Family Welfare and Its Role in Chronic Energy Deficiency (CED) Among Pregnant Women

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Abstract. Background: Pregnancy can trigger Chronic Energy Deficiency (CED). The main factors influencing CED in pregnant women include food intake, family welfare, and nutritional status. Efforts to reduce the prevalence of CED in Indonesia encompass early screening, nutrition education, and the provision of supplementary food. The novelty of this study lies in identifying the relationship between family welfare levels and the incidence of CED in pregnant women. The study aims to describe family welfare levels, examine the incidence of CED, and analyze the relationship between family welfare and CED occurrence. Methods: This research utilized an analytical observational approach with a cross-sectional design. The study population consisted of pregnant women in the UPTD Puskesmas Mayong I, Jepara area, in 2022, with inclusion criteria being pregnant women in their second and third trimesters who attended antenatal care at the maternal and child health clinic. The sample size was 87 respondents, calculated using the Slovin formula (error margin 0.05%), and sampling was conducted using non-probability consecutive sampling. Data analysis employed the chi-square test. Results: Most families were categorized as "prosperous," with 79 respondents (90.8%). The majority of pregnant women did not experience CED, accounting for 61 respondents (70.1%). Additionally, most of the prosperous families had pregnant members without CED, comprising 59 respondents (67.8%), with a p-value of 0.012 (p-value < 0.05). Conclusion: There is a significant relationship between family welfare and the incidence of Chronic Energy Deficiency (CED) among pregnant women in UPTD Puskesmas Mayong I, Jepara Regency.

Keywords: *Family Welfare, Chronic Energy Deficiency (CED), Pregnant Women*

INTRODUCTION

Pregnancy is a transitional period, marking the shift from life before having a child in the womb to life after the child is born (Ratnawati, 2020). Biologically, pregnancy occurs through the fusion of spermatozoa and ovum, followed by implantation. A normal pregnancy lasts for approximately 40 weeks or about 9 months based on the international calendar, calculated from fertilization to childbirth. Thus, pregnancy can be defined as the meeting of an egg and sperm, whether inside or outside the uterus, culminating in the birth of the baby and placenta through the birth canal (Yulaikhah, 2019).

Chronic Energy Deficiency (CED) is a condition in which pregnant women experience prolonged food intake deficits, resulting in an inability to meet nutritional needs during pregnancy (Sayogo, 2017). CED can be identified by a body weight of less than 40 kg or an Upper Arm Circumference (UAC) of less than 23.5 cm (Indonesian Ministry of Health, 2016). CED is a form of malnutrition that occurs when pregnant women experience long-term (chronic) insufficient food intake, leading to health disorders caused by a deficiency in one or more essential nutrients, either relatively or absolutely (Helena, 2018). More broadly, Chronic Energy Deficiency (CED) is a condition in which a person's nutritional status is classified as poor due to prolonged insufficient intake of macronutrient-rich foods, particularly energy (Rahmaniar et al., 2016). Risk factors for CED include short interpregnancy intervals (less than 2 years), which affect dietary choices and the nutritional status of the mother (Indonesian Ministry of Health, 2016). According to the Pocket Book PSG data from the Ministry of Health in 2017, the prevalence of CED in Indonesia reached 14.8%, with a prevalence of 19.2% in Central Java and 22.9% in Jepara Regency.

Research by Tanziha (2016) showed that pregnant women with CED are 3.243 times more likely to experience anemia in urban areas, while in combined rural and urban areas, the risk is 2.27 times higher. Data from Statistics Indonesia (BPS) in 2019 recorded 38,602 cases of CED in Central Java, with 204 pregnant women in Jepara Regency experiencing CED in 2018. CED in pregnant women can lead to a range of negative impacts on both maternal and fetal health. The primary effects of CED on pregnant women include an increased risk of anemia, health problems such as excessive weakness and fatigue, reduced immunity making them more susceptible to infections, bleeding, and complications during childbirth. Additionally, it raises morbidity and mortality risks during pregnancy and postpartum.

For the fetus, CED can result in premature birth, low birth weight (LBW) of less than 2,500 grams,

fetal growth disorders like Intrauterine Growth Restriction (IUGR), and an increased risk of stunting in children. Babies born to mothers with CED are more likely to face neonatal death due to impaired organ development and function. One significant consequence of CED is anemia in pregnant women. The main cause of anemia is iron deficiency, often stemming from a lack of knowledge among pregnant women about the benefits of iron. Iron deficiency is reported to account for approximately 50% of anemia cases in pregnant women (Micronutrient and Child Blindness Project & FANTA). During pregnancy, iron requirements double to support fetal growth and prevent excessive blood loss during delivery. Anemia during pregnancy increases maternal morbidity and mortality risks, especially in the event of postpartum hemorrhage, as well as the risk of premature birth and low birth weight in infants (Sabrina, 2017).

Family welfare or socioeconomic status also plays a significant role in anemia. Low income limits access to nutritious food, with protein-rich foods, which help prevent anemia, being costly and often unaffordable for low-income families, thus heightening the risk of anemia in pregnant women (Purwanto, 2012). Several factors contribute to CED, including inadequate food intake, maternal age (too young or too old), occupation, health conditions, socioeconomic status, parity, education level, and maternal nutritional status (Marmi, 2012).

Efforts to reduce the prevalence of CED in Indonesia include early screening by measuring upper arm circumference during a pregnant woman's first visit, nutritional education through prenatal classes or discussions, and providing supplementary foods such as biscuits. These efforts are implemented in an integrated manner, involving healthcare professionals such as midwives, doctors, and nutritionists (Ministry of Health, Republic of Indonesia, 2015).

Based on a preliminary study conducted at the Mayong I Community Health Center (UPTD Puskesmas Mayong I) from January to August 2022, there were 687 pregnant women, among whom 38 experienced Chronic Energy Deficiency (CED) and 20 suffered from anemia. This research is significant because this area has not been specifically studied concerning the relationship between family socioeconomic status and the incidence of CED and anemia. The novelty of this study lies in examining the connection between family welfare and the occurrence of CED in pregnant women. The objectives of this research are to describe family welfare, to outline the incidence of CED, and to analyze the relationship between family welfare and the occurrence of CED.

METHODS

The research method employed by the researcher is the correlational research method. According to Arikunto (2013) Correlational Studies The research method used by the researcher is the correlational research method. According to Arikunto (2013), correlational research is intended to determine whether or not there is a relationship between two or more variables. A characteristic of correlational research is that it does not require a large number of research subjects.

The research design for this study is a quantitative correlational research method. According to Creswell (2014), quantitative correlational research uses statistical methods to measure the influence between two or more variables. This type of research provides information about the degree of the relationship that occurs, rather than determining whether one variable affects another. Quantitative research employs a numerical data approach that is processed using statistical methods.

According to Sugiyono (2016), the population is a generalization area consisting of objects/subjects with specific qualities and characteristics determined by the researcher to be studied and from which conclusions are drawn. The population for this study includes all pregnant women in their second and third trimesters in the UPTD Puskesmas Mayong I area during December 2022 to January 2023, totaling 112 individuals.

To calculate the sample size, this study uses the Slovin formula technique (Sugiyono, 2012). The Slovin formula is used because it ensures the sample size is representative, allowing the research findings to be generalized. Additionally, the calculation does not require a sample size table but can be performed using a straightforward formula. The Slovin formula for determining the sample size is as follows::

$$n = \frac{N}{1 + ne^2}$$

Explanation:
n: Sample size/number of respondents
N: Population size
e: Tolerance percentage for sampling error; e=0.05%

The sample size calculated using the Slovin formula is 87 respondents. The sampling technique employed is purposive sampling, which involves selecting samples from the population based on the inclusion and exclusion criteria set by the researcher, ensuring the sample represents the known characteristics of the population (Nursalam, 2017). The inclusion and exclusion criteria for the sample are: pregnant women in their second or third trimester, those receiving antenatal care at the Maternal and Child Health (MCH) Clinic of Puskesmas Mayong I, women willing to participate as respondents.

Measurement Tools: The tool used to assess the incidence of Chronic Energy Deficiency (CED) is a Mid-Upper Arm Circumference (MUAC) tape provided by the health center, following the SOP for MUAC measurement at Puskesmas Mayong I, Jepara. Family welfare is evaluated based on the 2022 Minimum Regional Wage (UMR) of Jepara Regency, set at IDR 2,108,403.

Data Analysis:The relationship analysis in this study uses the Chi-Square correlation technique (Sujarweni, 2015). The requirements for the Chi-Square test include:No cells with an actual frequency (F0) value of 0. Table 2 x 2 contingency table with no more than 10% of the expected count (Fh) values less than 5. This test was chosen because the data collected is ordinal, which allows for the analysis of data inherently ranked in nature (Ghozali, 2018).

RESULTS AND DISCUSSION

Table 1 Characteristics of Pregnant Women

Variable	F	(%)
Age		
Reproduction (20-35)	80	92
Non Reproduction (<20->35)	7	8
Total	87	100,0
Education		
Basic (Elementary School – Junior High School or equivalent)	20	22,9
Intermediate (Vocational High School – Senior High School or equivalent)	57	65,5
Higher Education	10	11,5
Total	87	100,0
Occupation		
Homemaker	33	37,9
Factory Worker	46	52,9
Farmer	2	2,3
Merchant	2	2,3
Civil Servant	4	4,6
Total	87	100,0

Based on Table 1, it shows that the majority of mothers are within the reproductive age range (20-35 years), with 80 respondents (92%). The education level of the mothers is secondary (Vocational High School/High School or equivalent), with 57 respondents (65.5%). The occupation of the mothers is factory workers, with 46 respondents (52.9%).

Table 2. Frequency Distribution of Family Welfare and Incidence of Chronic Energy Deficiency (CED)

Variable	F	%
Family Welfare		
Prosperous	79	90,8
Not Prosperous	8	9,2
Total	87	100
Incidence of Chronic Energy Deficiency (CED)		
CED	26	29.9
Not CED	61	70.1
Total	87	100

Based on table 2, it can be seen that the majority of family welfare among pregnant women at UPTD Puskesmas Mayong I, Jepara Regency, in 2022 is categorized as prosperous, with 79 respondents (90.8%), while families classified as not prosperous total 8 respondents (9.2%).

Regarding the incidence of Chronic Energy Deficiency (CED) among pregnant women at UPTD Puskesmas Mayong I, Jepara Regency, in 2022, the majority did not experience CED, with 61 respondents (70.1%), while 26 respondents (29.1%) were affected by Chronic Energy Deficiency (CED).

Table 3. The Relationship between Family Welfare and Incidence of Chronic Energy Deficiency (CED)

Family Welfare	CED				Total		*ρ value*
	Not CED		CED				
	%		f	%	f	%	
Prosperous	67,8		20	23,0	79	90,8	0,012
Not Prosperous	2,3		6	6,9	8	9,2	
Total	70,1		26	29,9	87	100	

Based on Table 3, it shows that out of 87 respondents, the majority had a prosperous economic status with normal Chronic Energy Deficiency (CED) incidence, totaling 59 respondents (67.8%). In contrast, a smaller number with an unprosperous economic status experienced normal CED, totaling 2 respondents (2.3%). The Chi-Square test results showed a p-value of 0.012 (2-sided), which is less than 0.05. It can be concluded that the null hypothesis (Ho) is rejected, meaning there is a relationship between family welfare and the incidence of Chronic Energy Deficiency (CED) in pregnant women at UPTD Puskesmas Mayong I, Jepara Regency, in 2022.

DISCUSSION

1. Family Welfare

Based on the research findings, it shows that out of 87 respondents, the majority have a prosperous family welfare status, with 79 respondents (90.8%) categorized as prosperous. The field study revealed that the majority of mothers work as factory employees, with 46 respondents, and the Puskesmas Mayong I area is close to several factories, including HWI, Parkland World Indonesia, PWI, Kanindo, Urecel, White Pigeon Trading, and Prodeco Wood. The residents in the vicinity of these factories typically work as factory laborers with an income above the minimum regional wage (UMR) of Jepara Regency for 2022, which is IDR 2,108,403, and additional income is provided if they work overtime.

Based on observations made on the daily lives of respondents who live near the health center and are pregnant, some wives work in factories, while others sew at home, contributing to the family income. Meanwhile, the husbands usually farm on their days off or take on odd jobs, such as being construction workers or delivery couriers. Employment determines a family's income and can improve their economic status (Kuswati, 2020).

On the other hand, a small percentage of respondents, 8 (9.2%), have an unprosperous status. This is because some pregnant women are not working and are stay-at-home mothers (IRT), with

33 respondents in this category. These mothers do not generate income as they are engaged in household activities. Social and economic status involves the parents' occupations and income. Families with lower social and economic status tend to focus on meeting basic needs. Social economic status is largely determined by the type of work and the income received by the individual or family within society (Sugihartono et al., 2015).

Changes in knowledge will lead to changes in attitudes, behavior, income, and eating habits. These changes affect the selection of types and amounts of food consumed. Additionally, family income enhances social economic status. Health needs, healthcare facilities, and nutritional requirements can be met if the family has sufficient economic capacity (Arisman, 2014).

In line with the study by Febrianti et al. (2020), the findings of this study show that 48.3% have low economic status and 51.7% have sufficient economic status. Meanwhile, 58.3% of pregnant women with higher economic status are likely to meet their nutritional needs, ensuring their nutritional requirements are fulfilled. This contrasts with the study by Rostania et al. (2022), which found that 28 respondents had low income, representing 96.6%, and only 1 respondent had sufficient income, representing 3.4%. Income level affects a family's purchasing power for daily food supplies. This situation is dangerous for the health of the family and could ultimately lead to poor nutritional status for pregnant women.

2. Incidence of Chronic Energy Deficiency (CED)

Based on the research findings, the majority of cases of Chronic Energy Deficiency (CED) among pregnant women were classified as Non-CED, with 61 respondents (70.1%). This is attributed to pregnant women receiving adequate information about maternal nutrition, facilitated by their educational background, where most had completed high school/vocational school (57 respondents or 65.5%). This educational level makes it easier for them to absorb the information provided, thus preventing CED. Moreover, these women did not experience pregnancy-related complications, had good appetites, consumed vegetables, utilized available local resources, and were in their second or third trimester of pregnancy—periods when appetite typically improves (Supariasa, 2013).

Conversely, a smaller proportion of pregnant women, totaling 26 respondents (29.1%), experienced CED. This condition is influenced by various factors, one of which is the mother's occupation. Employment impacts economic status, as working mothers have their own income, making it easier to meet nutritional needs without solely relying on their husband's income (Musni, 2019). Nutritional and health issues among pregnant women affect maternal and infant health, safety, and the quality of the baby born. Pregnant women with CED are at risk of reduced muscle strength, which can prolong labor and lead to postpartum hemorrhage, and in severe cases, maternal death. Risks for the baby include fetal death (miscarriage), premature birth, birth defects, low birth weight (LBW), and even infant mortality. CED in pregnant women can also impair fetal growth and development, including physical growth (stunting), brain development, and metabolism, potentially leading to non-communicable diseases in adulthood (FKM UI, 2017).

This aligns with the findings of Rostania et al. (2022), which revealed that 11 pregnant women (37.9%) at Paccing Health Center in Bone Regency did not experience Chronic Energy Deficiency (CED). However, this indicates that there are still pregnant women with CED who are at risk of delivering babies with low birth weight (LBW). Similarly, Apriani et al. (2022) reported that out of 31 respondents, 21 did not experience CED in the working area of Rimbo Kedui Health Center in Seluma Regency. Despite economic challenges, these women prioritized their pregnancies and utilized available local resources to ensure adequate nutrition.

3. The Relationship Between Family Welfare and Incidence of Chronic Energy Deficiency (CED)

The majority of families with normal Chronic Energy Deficiency (CED) cases amounted to 59 respondents (67.8%). The chi-square test results showed a significance value of 0.012 ($p < 0.05$), indicating that Ho is rejected, meaning there is a relationship between family welfare and the incidence of CED among pregnant women at UPTD Mayong I Health Center, Jepara Regency, in 2022. Families with higher economic levels tend to allocate a portion of their income for food, and better economic status allows for higher-quality food purchases, ensuring adequate nutrition. As a result, respondents from prosperous families did not experience CED and maintained a normal nutritional status. Parental economic status significantly impacts a family's ability to achieve optimal health. Low income makes it challenging for parents to provide healthy, nutritious food for

their children, affecting the family's nutritional and health status (Marmi, 2012).

A small proportion of respondents from non-prosperous families with normal CED cases totaled 2 respondents (2.3%). Low expenditures are more likely to lead to CED because they correlate positively with the quality of food purchased. Reduced food expenditure results in limited fulfillment of nutritional needs, particularly for energy and protein. Household spending patterns reflect societal living standards, where welfare is indicated by a smaller percentage of food expenditure relative to total household expenses (Tentri et al., 2015).

On the other hand, 20 respondents (23.0%) from prosperous families experienced CED. This could occur due to nutritional problems such as CED and anemia during pregnancy. Lack of nutritional knowledge during pregnancy increases the risk of complications, particularly in the third trimester, including low birth weight (LBW) babies, maternal mortality, hemorrhage, and other health issues (Saifuddin, 2012).

Non-prosperous families experiencing CED accounted for 6 respondents (6.9%). Employment status often determines socioeconomic and health outcomes. Women who are homemakers tend to have lower health levels than those engaged in outside employment. Low-income families are more prone to poor nutritional status or CED due to limited household spending on food. Family income is not always fully utilized for food needs, which directly correlates with the incidence of CED (Kartikasari & Mustika, 2017).

This study differs from the research by Ausa et al. (2015), conducted on pregnant women in Gowa Regency in 2015, which found no significant relationship ($p = 0.741$) between CED and income. However, families with low economic levels typically allocate more of their income for food, and higher income enables better-quality food purchases. Supporting findings by Tentri et al. (2015) concluded that education ($p = 0.000$) and food expenditure ($p = 0.012$) are associated with CED in pre-conception women in Makassar. Similarly, research by Febrianti et al. (2020) showed a relationship between economic status and the incidence of CED among pregnant women, with a p-value of 0.036 and OR 0.332 (0.114–0.965), indicating that economic status influences the occurrence of CED during pregnancy.

CONCLUSION

1. Most families of pregnant women recorded at UPTD Mayong I Health Center, Jepara Regency, in 2022, were in prosperous conditions.
2. The majority of pregnant women at UPTD Mayong I Health Center, Jepara Regency, in 2022, did not experience Chronic Energy Deficiency (CED).
3. There is a relationship between family welfare and the incidence of Chronic Energy Deficiency (CED).

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