



The Effect of Lifestyle on Chronic Energy Deficiency (CED) in Pregnant Women at The Wiradesa Public Health Center, Pekalongan District

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ABSTRACT

Chronic Energy Deficiency (CED) in pregnant women is a significant nutritional problem in Indonesia, with the potential to causing serious complications, such as low birth weight and stunting. This study aims to analyze the influence of lifestyle on the incidence of CED at the Wiradesa Community Health Center, Pekalongan Regency. The method used was an analytical study with a case-control design, involving 90 respondents—comprising 30 pregnant women with CED and 60 without CED—selected through quota sampling. Data were collected using the Health Promoting Lifestyle Profile II questionnaire and analyzed using binary logistic regression analysis. The results showed a significant association between lifestyle and the incidence of CED ($p < 0.05$), with factors such as physical activity, health responsibility, and nutrition contributing significantly to the nutritional status of pregnant women. The discussion highlights the importance of healthy lifestyle interventions for pregnant women in efforts to prevent CED. This study concludes that an unhealthy lifestyle significantly increases the risk of CED, and that education and promotional programs are needed to raise awareness about healthy lifestyle among pregnant women.

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INTRODUCTION

Pregnant women suffering from Chronic Energy Deficiency (CED) face risks to both themselves and their fetus or infant. They are at risk of giving birth to a baby with Low Birth Weight (LBW), and the fetus's growth and brain development may be stunted—which is associated with reduced intelligence in the child later in life—and the baby's length at birth may also be abnormal, a condition linked to stunting. Mental, physical, and cognitive disabilities are also associated with CED. CED also increases the risk of anemia, bleeding, and infectious diseases [1]. A study has been done by [2] indicates a significant association between CED in pregnant women and the incidence of stunting.

The World Health Organization (WHO) states that the prevalence of CED among pregnant women worldwide ranges from 35 to 37 percent. In developing countries such as Bangladesh, India, Myanmar, Nepal, Sri Lanka, and Thailand, the incidence of CED ranges from 15 to 47%. All of these countries have a body mass index (BMI) below 18.5. The country with the highest prevalence rate is Bangladesh at 47%, while Indonesia ranks fourth with a prevalence rate of 35.5%, and Thailand has the lowest rate at 15.25%. Indonesia ranks fourth with a prevalence rate of 35.5% (Hasan et al., 2024). The Ministry of Health of the Republic of Indonesia reported in 2023 that the prevalence of CED among pregnant women in Indonesia was 16.9% and 24.6% in Central Java [3].

CED is a nutritional problem influenced by several factors, namely direct factors consisting of nutritional intake, disease, and dietary supplements; biological factors such as age, interval between pregnancies, and parity; other factors such as sociocultural factors and access to healthcare facilities; and socioeconomic factors such as income, employment, education, and lifestyle [4].

An unhealthy lifestyle during pregnancy can increase the risk of various health problems, such as obesity, gestational diabetes, and pregnancy-induced hypertension. Additionally, it can lead to antepartum hemorrhage, complications during childbirth, and an increased likelihood of depression both before and after childbirth. Pregnant women with unhealthy lifestyles are also more vulnerable to infections, which can result in hospitalization and prolonged stays in the neonatal intensive care unit for newborns. In fact, an unhealthy lifestyle during pregnancy can contribute to maternal and infant mortality. Lifestyle is measured across six dimensions: health responsibility, physical activity, nutrition, spiritual growth, interpersonal relationships, and stress management [5]

Data from the Pekalongan Regency Health Office in 2024 show that the number of pregnant women with CED in 2022 was 148 (30.02%), in 2023 was 99

(23.02%), and in 2024 was 116 (23.54%), while the number of pregnant women with CED at the Wiradesa Community Health Center in 2022 was 135 (15.2%), in 2023 was 89 (11.06%), and in 2024 was 116 (16.59%). Based on these data, it can be concluded that the incidence of CED among pregnant women at the Kandangserang Community Health Center decreased significantly from 2022 to 2024, whereas the incidence of CED among pregnant women at the Wiradesa Community Health Center decreased in 2023 but surged sharply in 2024. This study was conducted at the Wiradesa Community Health Center because in 2024, the number of pregnant women with CED surged sharply—from 11.06% in 2023 (11.06%) to (16.59%), and the Wiradesa Community Health Center is geographically close to transportation access points, has a more diverse social and cultural dynamic, and experiences significant influence from external cultures that are driving changes in the community's lifestyle.

The latest data from 2025 at the Wiradesa Community Health Center, covering January through March, showed that 27 pregnant women were suffering from chronic energy deficiency; this prompted the researchers to conduct the study at the Wiradesa Community Health Center, as 27 pregnant women had already been diagnosed with chronic energy deficiency in just the first three months of the year. This indicates that during this three-month period, the incidence of chronic energy deficiency was quite high. The occurrence of chronic energy deficiency among pregnant women poses a risk of increasing other complications such as anemia, preterm birth, and low birth weight (LBW), which can raise rates of morbidity and mortality among mothers and infants. The Wiradesa Community Health Center covers a fairly large service area and serves as a referral center for health services for pregnant women in the surrounding area; therefore, it is expected to provide insight into the issue of chronic energy deficiency in that region.

METHOD

This study used a descriptive-correlational design with a case-control approach. The study population consisted of all 27 pregnant women with CED in the Wiradesa Community Health Center (Puskesmas) area during January–March 2025. The study sample comprised 30 pregnant women with CED in the Wiradesa Community Health Center (Puskesmas) area for the case group and 60 for the control group, selected using the quota sampling technique. The research instrument used was the Health-Promoting Lifestyle Profile II, which had been modified and validated, consisting of 43 items. Data analysis yielded frequency distributions and percentages of lifestyle factors and the incidence of CED among pregnant women. Bivariate analysis was performed using the chi-square test. This study received ethical approval from the Ethics Committee of

Muhammadiyah University of Pekajangan Pekalongan, as evidenced by letter No. 134/KEP-UMPP/VI/2025.

RESULT AND DISCUSSION

Result

The characteristics of the respondents including age, education level, occupation, and parity can be seen in Table 1 below.

Table 1. The characteristics of the respondents (n = 90)

Karakteristik	CED (Kasus)		Tidak CED (Kontrol)	
	f	%	f	%
Age				
< 20 years	0	0	1	1,7
20-35 years	28	93,3	55	91,7
> 35 years	2	6,7	4	6,7
Education				
Elementary School	2	6,7	7	11,7
Yunior High School	9	30	15	25
Senior High School	18	60	31	51,7
Higher Education	1	3,3	7	11,7
Occupation				
Housewife	24	80	48	80
working mothers	6	20	12	20
Gravida				
Primigravida	18	60	25	41,7
Multigravida	12	10	35	58,3
Gestation Age				
1 st Trimester	12	40	26	43,3
2 nd Trimester	12	40	23	38,3
3 rd Trimester	6	20	11	18,3

The results of the study on the lifestyles of pregnant women are shown in Table 2 below:

Table 2. Frequency Distribution of the Lifestyles of Pregnant (n = 90)

Variable	Case (CED)		Control (No CED)	
	f	%	f	%
Lifestyle				
Poor	9	30	5	5,6
Good	21	70	55	91,7
Interpersonal Relationships				
Poor	21	70	27	45
Good	9	30	33	55
Nutritional Intake				
Poor	23	76,7	27	45
Good	7	23,3	33	55

Responsibility				
Baik	9	30	29	48,3
Physical Activity				
Poor	19	63,3	30	50
Good	11	36,7	30	50
Stress Management				
Poor	20	66,7	29	48,3
Good	10	33,3	31	75,6
Spiritual Maturity				
Poor	19	63,3	25	41,7
Good	11	36,7	35	58,3

Table 2 shows that the majority of participants had a healthy lifestyle. Interpersonal relationships in the case group were found to be mostly poor (70%), whereas more than half of the interpersonal relationships in the control group (55%) were good. Regarding nutritional intake patterns, the majority of the case group had poor nutritional intake patterns (76.7%), whereas more than half of the control group (55%) had good nutritional intake patterns. Responsibility levels were mostly poor in the case group, and similarly, more than half of the control group also had poor levels of responsibility.

Physical activity in the case group was mostly poor, as was the case in the control group, where half of the respondents had poor physical activity levels. Stress management in the case group was mostly poor (66.7%), in contrast to the control group (75.6%), where the majority had good stress management. Spiritual maturity in the case group (63.3%) was mostly poor, whereas more than half of the control group exhibited good spiritual maturity.

The influence of lifestyle—which includes six indicators—on the incidence of CED in pregnant women can be seen in Table 3.

Table 3. The Effect of Lifestyle on CED (n=90)

Variable	B	Sig	Exp (B)	95% CI (Lower-Upper)
Lifestyle	1,156	0,091	3,179	0,831-12,155
Interpersonal Relationships	0,650	0,363	1,916	0,472-7,779
Nutritional Intake	1,115	0,092	3,049	0,835-11,135
Responsibility	-0,320	0,649	0,726	0,183-2,886
Physical Activity	0,099	0,861	1,104	0,363-3,354
Stress Management	-0,159	0,806	0,853	0,241-3,023
Spiritual Maturity	-0,160	0,835	0,852	0,189-3,840

Table 3 shows the results of a binary logistic regression analysis examining the effects of lifestyle and its domains on chronic energy deficiency in pregnant women. Lifestyle and dietary patterns have an effect on CED; however, the effects of both are not statistically significant, $p = 0.091$ and $p = 0.092$, respectively. Lifestyle and dietary patterns have relatively high effect sizes (OR) there were 3.179 and 3.049, respectively. There were no significant effects in terms interpersonal relationships, responsibility physical activity stress management and spiritual maturity on CED.

Discussion

Lifestyle is a crucial factor in determining the nutritional status of pregnant women. Unhealthy maternal lifestyles—such as a lack of social support, poor stress management, and inadequate nutritional intake—can lead to health problems in pregnant women, such as the occurrence of CED. This is consistent with the findings of Mihiret et al. who state that an unhealthy lifestyle during pregnancy increases the risk of obesity, gestational diabetes, pregnancy-induced hypertension, antepartum hemorrhage, complications during labor and delivery, antenatal and postpartum depression, infections, hospital admissions, and length of stay in the neonatal intensive care unit [5]. An unhealthy lifestyle during pregnancy also contributes to maternal and infant mortality.

Interpersonal relationships between pregnant women and their social environment enable them to receive social support from their husbands, families, or the surrounding community. This support plays a crucial role in determining the nutritional status of pregnant women. Unhealthy interpersonal relationships can cause stress, leading to a lack of motivation to maintain their own health—including meeting nutritional needs during pregnancy—which increases the risk of stunting. This aligns with the findings of Handayani et al. (2020), who state that pregnant women need support from their environment to cope with physical and emotional changes during pregnancy—such as communicating openly with their partners, accepting and seeking support, attending prenatal classes or support groups, maintaining good communication with healthcare providers, and showing empathy toward others [6]. Marsekin et al., (2021) indicates that family support is associated with the incidence of CED among pregnant women [7].

Nutritional intake patterns are a major factor influencing the nutritional status of pregnant women; cases of acute malnutrition in pregnant women occur due to insufficient nutrient or energy intake relative to the mother's needs during pregnancy, and persist over an extended period. This can be caused by an unbalanced diet that is low in energy and protein. Pregnant women will

experience weight loss and a reduction in upper arm circumference if their nutrient intake is insufficient. If left unaddressed, this condition poses a risk of low birth weight (LBW) and even stunting. This is consistent with Suryani et al., (2021), who state that nutrition as part of a lifestyle—specifically daily dietary patterns and nutritional choices—can influence overall health and life balance. This includes a balanced diet, the importance of breakfast, consuming nutrients at appropriate intervals, the habit of drinking enough water, eating foods that support physical and mental health, maintaining proper nutrition, managing dietary patterns and body weight, and getting sufficient sleep [8]. This is also supported by a study Pratikasari and Alfitri (2025), which states that there is a relationship between dietary patterns and the incidence of CED in pregnant women. Nutritional education interventions have a positive effect on improving the quality of dietary patterns in pregnant women [9].

A strong sense of personal responsibility alone cannot prevent cases of CED in pregnant women. Women must also balance this with other lifestyle factors, such as interpersonal relationships and nutrition, because adequate nutrition can meet a woman's nutritional needs during pregnancy, thereby preventing cases of CED. Similarly, strong social support can prevent psychosocial problems in pregnant women, making them more motivated to maintain a healthy pregnancy and meet their nutritional needs. This aligns with the view expressed by Handayani (2017), who states that responsibility for one's health refers to an individual's awareness and the actions taken to maintain, improve, and preserve their health through healthy eating habits, regular exercise, health checkups, avoiding harmful habits, maintaining mental and emotional well-being, getting sufficient sleep, and taking responsibility for their social and environmental conditions [6]

One form of a mother's responsibility toward her pregnancy is maintaining a healthy birth spacing of more than 2 years, as pregnancies that are too closely spaced increase the risk of acute malnutrition (CED). Pregnant women with pregnancies that are too closely spaced have not yet fully recovered their health, particularly their nutritional status. Throughout pregnancy, a mother requires adequate nutrition for fetal development and, after childbirth, for her own recovery and breastfeeding. Therefore, if pregnancies are too close together, the mother's nutritional intake is directed toward the growth of the subsequent pregnancy rather than her own recovery, which increases the risk of CED [10].

Pregnant women with an inactive lifestyle are at risk of experiencing cases of CED, even though statistics show that physical activity has no effect on the incidence of CED in pregnant women. This may be because healthy physical activity in pregnant women, if not balanced with a nutritional intake that meets their needs, can lead to nutritional status problems such as CED. Light physical

activity appropriate for the mother's pregnancy condition can actually improve blood circulation, metabolism, and overall pregnancy health. This aligns with the findings of Romadhoni et al. (2022), who state that a lack of physical activity and irregular eating patterns are also factors that can contribute to the development of lifestyle-related diseases [11].

Pregnant women should reduce excessive work activities during pregnancy, as these can decrease energy intake, potentially leaving the mother's energy intake insufficient to meet nutritional needs during pregnancy—a risk factor for CED. This is consistent with a study Anjelika et al., (2021) which noted that mothers who have adequate energy intake but still experience CED do so because their physically demanding activities deplete a significant amount of energy, thereby increasing their risk of CED during pregnancy [12].

The study results show that, statistically, stress management has no effect on the incidence of CED in pregnant women; however, pregnant women with poor stress management remain at risk of developing CED. This is because mothers who cannot manage stress effectively may experience a reduced quality of life during pregnancy, such as sleep disturbances, decreased appetite, inadequate nutritional intake relative to pregnancy needs, and metabolic disorders. This aligns with the view expressed by Suryani (2022) Pregnant women must have the ability to identify, manage, and alleviate stress or anxiety that arises during pregnancy through adaptive and healthy methods, such as practicing relaxation techniques, praying, engaging in light exercise, socializing, attending prenatal classes or counseling, avoiding situations or people that trigger excessive stress, and ensuring adequate sleep and rest [8]. Research by Rahmawati (2026) indicates that there is a correlation between stress levels and the incidence of CED in pregnant women. Pregnant women should avoid becoming overly stressed so as not to compromise the health of both the mother and the unborn baby [13].

CONCLUSION

Lifestyle has an effect on CED, though it is not significant, and nutritional patterns also have an effect on CED. Overall, lifestyle has a relatively large effect on CED. Among the various aspects of lifestyle, nutritional intake is the indicator that has a relatively large effect on CED.

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