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(Research/Review) Article

The Relationship between Nutritional Behavior and Dietary Patterns and the Incidence of Chronic Energy Deficiency in Pregnant Women in the Work Area of Sendana II Health Center in 2025

Nur Anisafauziah Ilham[1*], Sri Aryati Artha[2], Al Munawarah Fattah[3], Agusliani[4]

[1-4] Midwifery Study Program , STIKes Bina Bangsa Majene, Majene , West Sulawesi, Indonesia
* Corresponding Author: e- mail: jiwasafauziahilham@gmail.com

Abstract. Background: Chronic energy deficiency (CED) is one of the nutritional problems often faced by pregnant women, especially in developing countries. CED can have serious impacts on maternal and fetal health, including the risk of complications during pregnancy, premature birth and stunted fetal growth. CED is a condition where a person suffers from chronic food shortages characterized by an upper arm circumference (MUAC) <23.5 cm, resulting in health problems. Objective: To determine the relationship between nutritional behavior and dietary patterns with the incidence of chronic energy deficiency (CED) in pregnant women in the working area of Sendana II Health Center in 2025. Method: The type of research used in this study is *a cross-sectional study,* and uses the Slovin formula to determine the minimum sample size. Results: Based on the *Chi-square analysis* , it shows that nutritional behavior and eating patterns each show a value of $p = 0.002$ ($p < 0.05$) and $p = 0.000$ ($p < 0.005$), meaning that there is a relationship between nutritional behavior and eating patterns and the incidence of chronic energy deficiency (CED) in pregnant women at the Sendana II Community Health Center in 2025. Conclusion: There is a significant relationship between nutritional behavior and eating patterns and the incidence of chronic energy deficiency (CED) in the work area of the Sendana II Community Health Center in 2025 .

Keywords: chronic energy deficiency; dietary patterns; MUAC; nutritional behavior; pregnant women

1. Introduction

Chronic Energy Deficiency (CED) is a nutritional problem frequently faced by pregnant women, especially in developing countries. CED can have serious impacts on maternal and fetal health, including the risk of complications during pregnancy, premature birth, and stunted fetal growth. CED is a condition where someone suffers from chronic nutritional deficiencies, characterized by an upper arm circumference (MUAC) of <23.5 cm, resulting in health problems. Chronic Energy Deficiency (CED) can occur in women of childbearing age (WUS) and pregnant women (Rahayu, 2021).

According to data from the World Health Organization (WHO), the prevalence of chronic energy deficiency syndrome (CED) among pregnant women remains quite high, and this is a major concern in efforts to improve public health. According to WHO data, the global prevalence of CED in pregnant women in 2023 is projected to reach 35-75%. The countries with the highest prevalence of CED are in Sub-Saharan Africa. This region experiences a high prevalence of CED, especially among pregnant women. The main factors contributing to this high prevalence are poverty, lack of access to nutritious food, and health problems.

Meanwhile, Indonesia ranks 4th as the country with the highest prevalence of SEZ in the world (WHO, 2018).

A survey conducted in Indonesia found that 16.9% of pregnant women are suffering from chronic energy deficiency syndrome (CED). However, the target set by the Indonesian Ministry of Health, which aims to reduce the prevalence of CED in pregnant women to 10%

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by 2024, has not been met (Ministry of Health, 2023). In Indonesia, many pregnant women still struggle to meet optimal nutritional needs. Factors such as low education levels, economic constraints, and lack of access to nutritious food contribute to an unbalanced diet. Furthermore, cultural differences and different eating habits can also influence the nutritional behavior of pregnant women. Maternal nutritional behavior and dietary patterns play a crucial role in preventing CED. Nutritional behavior encompasses knowledge, attitudes, and practices related to food and nutrient intake. Dietary patterns, including the type, quantity, and frequency of food consumption, can influence a pregnant woman's nutritional status. Efforts to prevent CED include ensuring a balanced nutritional intake and regularly monitoring the health of pregnant women, using indicators such as the MUAC (Lila) (Dewi et al., 2021).

In general, the prevalence of KEK in West Sulawesi Province is included in the 13 provinces with the highest risk of KEK exceeding the national value. From the data from the Majene Regency Health Office in 2024, the prevalence of KEK in 11 Community Health Center areas, namely Banggae 1 with 107 pregnant women, Totoli Community Health Center with 104 pregnant women, Banggae II Community Health Center with 32 pregnant women, Lembang Community Health Center with 60 pregnant women, Pamboang Community Health Center with 125 pregnant women, Sendana 1 Community Health Center with 25 pregnant women, Tammerodo Community Health Center with 27 pregnant women, Sendana II Community Health Center with 50 pregnant women, Malunda Community Health Center with 100 pregnant women, Ulumanda Community Health Center with 22 pregnant women, and Salutambung Community Health Center with 16 pregnant women. Meanwhile, data from the Majene Health Service in 2024 showed that the prevalence of KEK in several Community Health Center areas in Majene tends to remain high, including Sendana II Community Health Center which is ranked 5th with the highest prevalence.

Sendana II Community Health Center is one of the community health centers in Majene Regency, located between the ocean and the mountains. Most of the residents are fishermen and farmers. This area still has minimal knowledge and information about health, especially nutrition for pregnant women. This lack of knowledge and information contributes to a high incidence of chronic energy deficiency (CED) among pregnant women in the area.

The health of pregnant women is highly dependent on their daily diet, from before pregnancy through delivery. According to research by Sulistianingsih et al. (2024), there is a correlation between maternal diet and the incidence of CED in pregnant women. From this study, it shows that the dietary patterns consumed are based on balanced nutritional guidelines, namely consuming 6 portions of staple foods, and approximately 4 portions of animal side dishes where these staple foods are very important as a source of energy for pregnant women and the fetus they are carrying and animal foods function as a source of protein while, research conducted by Hasanah et al (2023) there is a relationship between aspects of eating habits with the incidence of KEK in pregnant women, such as the habit of not eating with family, a diet that is less diverse and sources of energy, frequency, and insufficient meal portions, there are food taboos, family food distribution methods and poor food selection, where all these aspects can cause the risk of KEK in pregnant women to increase later, the results of a study that is not much different were conducted by Marsedi et al (2022) where there is a significant relationship related to nutrient intake with the incidence of KEK in pregnant women in the Sie Jang Health Center area, Bukit Bestari District, Tanjungpinang City. Thus, attention and awareness are needed from various parties regarding KEK problems in pregnant women, by paying attention to the pattern of consuming nutritious food, both from the type, frequency, and amount of food consumed.

Based on the background above, the author is interested in conducting research on "The Relationship between Nutritional Behavior and Eating Patterns and the Incidence of Chronic Energy Deficiency (CED) in pregnant women at Sendana II Community Health Center in 2025. "

2. Materials and Method

2.1. Materials

Material And tools used in study This consists of from sheet informed consent , questionnaire research , as well as tool measuring anthropometry . Sheet agreement given to candidate respondents before study starts with objective to obtain agreement in a way aware for respondents For participate in study .

Instrument main in study This Is questionnaire , consisting of from questionnaire behavior nutrition for measure knowledge And attitude Mother pregnant to nutrition , as well as the Food Frequency Questionnaire (FFQ) used For identify pattern Eat based on type , quantity , and frequency consumption food consumed respondents . In addition Therefore , a questionnaire was also used related with condition Lack Energy Chronicle (KEK) for ensure nutritional status respondents . In addition that , used tool measuring Circumference Arm Top (LILA) for assess nutritional status Mother pregnant .

2.2. Methods

Study This is study quantitative with design *cross sectional study* was conducted For know connection behavior nutrition And pattern Eat to incident Lack Energy Kronok (KEK) on Mother pregnant . Research This implemented in the region Work Community Health Center Sendana II, District Sendana , Regency Majene , on July 8 , 2025 to July 22 , 2025. Population study Is all over Mother pregnant, totaling 121 people, with amount sample A total of 55 respondents were determined use formula *Slovin* And chosen through technique *simple random sampling* based on criteria inclusion And exclusion . Primary data was obtained through filling questionnaire about behavior nutrition and Food Frequency Questionnaire (FFQ), as well LILA measurement as an indicator of nutritional status . Secondary data obtained from agency related And source bibliography . Analysis of the data used consists of from analysis univariate For describe distribution characteristics of research variables , as well as analysis bivariate use test *Chi-Square* with a significance level of $\alpha = 0.05$ For know connection between behavior nutrition And pattern Eat with KEK incident on Mother pregnant .

3. Results and Discussion

3.1 . Research Results

3.1.1 Characteristics Respondents

Table 1. Distribution of Characteristics of Pregnant Women at Sendana II Community Health Center in 2025 (N=55)

Characteristics of Pregnant Women	Frequency (f)	Percentage (%)
Age		
No At risk (20-35 years)	43	78.2
At risk (<20 and >35 years)	12	21.8
Total	**55**	**100**
Education		
Low (Elementary/Middle/High School)	46	83.6
Higher (Diploma/Bachelor)	9	16.4
Total	**55**	**100**
Income		
Low	51	92.7
Tall	4	7.3
Total	**55**	**100**
Employment Status		
No Work	48	87.3
Work	7	12.7
Total	**55**	**100**

Source : Primary Data, 2025

Results table 4.1 above can known that age Mother pregnant majority aged No at risk (20-35 years) as many as 43 people (78.2%) and minority aged at risk (<20 and >35 years) as many as 12 people (21.8%). Based on education Mother pregnant majority educated low as many as 46 people (83.6 %) and minority educated tall as many as 9 people (16.4%). Based on income Mother pregnant majority income low as many as 51 people (92.7 %) and minority

income tall as many as 4 people (7.3%). Based on employment status majority No Work as many as 48 people (87.3 %) and minority Work as many as 7 people (12.7%).

3.1.2 Incident Lack Energy Chronic In Pregnant Women

Table 2. Frequency Distribution of Respondents Based on the Condition of Pregnant Women with and without KEK in the Work Area of Sendana II Health Center in 2025 (N=55)

Special Economic Zone (SEZ)	Frequency (f)	Percentage (%)
KEK (<23.5 cm)	28	50.9
No KEK (≥ 23.5 cm)	27	49.1
Total	**55**	**100**

Source : Primary Data, 2025

Based on Table 2, it was found that 28 respondents (50.9%) experienced KEK and 27 respondents (49.1%) did not experience KEK.

3.1.3 Behavior Nutrition

Table 3. Distribution of Nutritional Behavior of Pregnant Women in the Work Area of Sendana II Community Health Center in 2025 (N=55)

Nutritional Behavior	Frequency (f)	Percentage (%)
Good	33	60.0
Bad	22	40.0
Total	**55**	**100**

Sources : Primary Data, 2025

The results of table 3 above show that the nutritional behavior of pregnant women is mostly good, amounting to 33 people (60.0%), and the minority has poor nutritional behavior, amounting to 22 people (40.0%).

3.1.4 Eating Patterns

Table 4. Distribution of Pregnant Women's Dietary Patterns in the Sendana II Community Health Center Work Area in 2025 (N=55)

Dietary habit	Frequency (f)	Percentage (%)
Good	35	63.6
Bad	20	36.4
Total	**55**	**100**

Source : Primary Data, 2025

The results of table 4 above show that the majority of pregnant women's eating patterns are in the good category, as many as 35 people (63.6%) and the bad category, as many as 20 people (36.4%).

3.1.5 Analysis Bivariate

3.1.5.1 Relationship Behavior Nutrition With Incident Lack Nutrition Chronic (CED) in Pregnant Women

Table 5. The Relationship Between Nutritional Behavior and the Incidence of Chronic Energy Deficiency (CED) in Pregnant Women at Sendana II Community Health Center in 2025 (N=55)

Nutritional Behavior	The incidence of chronic energy deficiency (CED) in pregnant women				Total		*P-Value*
	Experiencing KEK		No Experience KEK				
	n	%	n	%	N	%	

Good	11	20	22	40	33	60	
Bad	17	30.9	5	9.1	22	40	*0.004*
Total	**28**	**50.9**	**27**	**49.1**	**55**	**100**	

Sources : Results Test *Chi-square* , 2025

The results of Table 5 show that 22 respondents (40%) had good nutritional behavior and did not experience CED, 11 respondents (20%) had good nutritional behavior and did not experience CED. 17 respondents (30.9%) had poor nutritional behavior and did not experience CED, and 5 respondents (9.1%) had poor nutritional behavior and did not experience CED.

the Chi-square analysis , it shows that the *p value = 0.004* (p <0.05), meaning that there is a relationship between nutritional behavior and the incidence of chronic energy deficiency (CED) in pregnant women at the Sendana II Community Health Center, Majene Regency in 2025.

3.1.5.2 Relationship Pattern Eat With Incident Lack Nutrition Chronic (CED) in Pregnant Women

Table 6. The Relationship Between Dietary Patterns and the Incidence of Chronic Energy Deficiency (CED) in Pregnant Women at Sendana II Community Health Center in 2025 (N=55)

Dietary habit	**The incidence of chronic energy deficiency (CED) in pregnant women**				**Total**		***P-Value***
	Experiencing KEK		**No Experience KEK**				
	n	**%**	**n**	**%**	**N**	**%**	
Good	11	20	24	43.6	35	63.6	
Bad	17	30.9	3	5.5	20	36.4	*0,000*
Total	**28**	**50.9**	**27**	**49.1**	**55**	**100**	

Sources : Results Test *Chi-square* , 2025

The results of Table 6 show that 24 respondents (43.6%) had a good diet and did not experience CED, 11 respondents (20%) had a good diet and did not experience CED. 17 respondents (30.9%) had a poor diet and did not experience CED, and 3 respondents (5.5%) had a poor diet and did not experience CED.

the Chi-square analysis , it shows that the *p value = 0.000* (p <0.05), meaning that there is a relationship between dietary patterns and the incidence of chronic energy deficiency (CED) in pregnant women at the Sendana II Community Health Center, Majene Regency in 2025.

3.2 Discussion

3.2.1 Relationship between Nutritional Behavior and the Incidence of Chronic Energy Deficiency (CED) in Pregnant Women

Based on the research results, it shows that there is a relationship between nutritional behavior and the incidence of chronic energy deficiency (CED) in pregnant women at the Sendana II Community Health Center, Majene Regency in 2025, as evidenced by the *p value* = 0.004 <0.05.

The results of this study are in line with research conducted by Trisnawati Astie & Mokodompit Agus E (2025) which stated that there is a relationship between the nutritional behavior of pregnant women and the incidence of CED with a p value of 0.015 <0.05. This shows that the nutritional behavior of pregnant women is very influential in preventing CED, although in practice, some pregnant women avoid foods that should be beneficial, such as fish, which is an important source of protein for pregnant women.

This study is also in line with research conducted by Susanti (2019) who stated that there is a relationship between nutritional behavior and eating culture with the incidence of chronic energy deficiency (CED). This is due to beliefs and taboos regarding certain foods. Research by Israq (2017) also suggests a relationship between nutritional behavior in the eating culture of pregnant women with the incidence of CED in the work area of the Nabo Health Center, Kendari City with a p value = 0.000, and vice versa that a good eating culture can prevent pregnant women from suffering from Chronic Energy Deficiency (CED).

Food consumption behavior is a form of behavior to prevent disease in the sense of maintaining and improving health to avoid KEK, in addition to eating behavior to fulfill food needs or hunger, obtain the nutrition the body needs and to fulfill psychological needs (Purwoastuti and Walyani, 2016).

Nutritional behavior is a series of activities carried out by mothers to meet their nutritional needs, for example, by maintaining a balanced diet. A balanced diet, which meets nutritional needs and includes the right food choices, will result in good nutritional status. Food intake that exceeds the body's needs will lead to excess weight and other diseases caused by excess nutrients. Conversely, food intake that is less than the body's needs will cause the body to become thin and susceptible to disease. Both conditions are equally unhealthy and are therefore called malnutrition. A society's eating culture plays a crucial role in determining an individual's consumption patterns (Sulistyoningsih, 2019).

Nutritional behavior of pregnant women is an aspect of eating habits which is one of the causes of CED in pregnant women, all aspects of eating habits such as the habit of not eating with family, less diverse and energy-rich food patterns, less frequency and portion of food, taboos on foods that are good for consumption, poor ways of distributing family food, and poor ways of choosing food ingredients are the causes of CED in pregnant women. (Sulistyoningsih, 2019).

According to researchers, all aspects of eating behavior, such as frequency, insufficient portion sizes, food restrictions, poor food distribution, and poor food selection, are contributing factors to CED in pregnant women. Therefore, the nutritional behavior of pregnant women is crucial in preventing CED.

Researchers assume that pregnant women have several nutritional behaviors such as food taboos, including pregnant women abstaining from eating squid because they are worried that the squid's habit of moving back and forth will cause the baby to move back and forth during labor. Likewise, pregnant women abstain from eating rice crusts because they are worried that the baby's placenta will stick like sticky rice crusts.

3.2.2 Relationship between Dietary Patterns and the Incidence of Chronic Energy Deficiency (CED) in Pregnant Women

Based on the research results, it shows that there is a relationship between dietary patterns and the incidence of chronic energy deficiency (CED) in pregnant women at the Sendana II Community Health Center, Majene Regency in 2025, as evidenced by a p value of 0.000 <0.05.

The results of this study align with research conducted by Wijayati (2019), which found a *chi-square correlation test with a p-value* <0.05, indicating a relationship between dietary patterns and the incidence of chronic energy deficiency (CED) in pregnant women. This is because mothers with a good diet will have their nutritional needs met during pregnancy by consuming foods that meet their daily needs.

This research is also in line with research conducted by Sulistianingsih, et al (2024) which states that there is a relationship between dietary patterns and the incidence of chronic energy deficiency (CED) where a good dietary pattern has a tendency not to experience CED of 29.3%, while a sufficient dietary pattern has a tendency to experience CED of 24.4%, while a poor dietary pattern has a tendency to experience CED of 14.6%.

A balanced diet consists of a variety of foods in appropriate proportions and quantities to meet the nutritional needs of pregnant women. An unbalanced diet will lead to an imbalance in the intake of nutrients and can lead to malnutrition. An unbalanced diet can also result in an excess of certain nutrients, leading to overnutrition (Muliawati, 2016).

A lack of nutritional intake in pregnant women during pregnancy can impact the condition of Low Birth Weight (LBW). The mother's nutritional status during pregnancy, from conception and the subsequent process, can impact the growth and development of the fetus she is carrying. If the nutritional status of a pregnant woman is poor, before and during pregnancy, it can cause a low birth weight baby, inhibit fetal brain growth, and make the baby susceptible to infectious diseases. For fetal growth and differentiation activities, and to maintain maternal health during pregnancy, pregnancy will cause increased energy metabolism in the mother's body, which is accompanied by increased nutritional needs compared to the pre-pregnancy state. Basically, all nutrients require additional during pregnancy, but often deficient in protein, energy, and some minerals such as calcium and iron, and in the first trimester, energy needs increase slightly. Therefore, the diet of pregnant women can be adjusted again to their condition, because each pregnant woman has different conditions and

can also be influenced by health history and previous nutritional status. Of course, a deficiency in one nutrient intake will disrupt nutrient needs during pregnancy (Ari and Rusilanti, 2018).

According to researchers, diet determines the level or fulfillment of nutritional and other aspects during pregnancy. If a mother's diet is poor, such as consuming only rice and not supplementing it with other foods like vegetables, fruit, meat, and milk, the developmental and growth needs of both mother and fetus will not be met. Failure to meet these needs can lead to several problems, one of which is chronic energy deficiency syndrome (CED).

Researchers also assume that most pregnant women who were sampled in the Sendana II Community Health Center work area consume fish when the weather is good or suitable for fishing, if the weather is not good or not suitable for fishing then there are no fish in the area so another alternative to replace fish as protein is to replace it with eggs, tofu or tempeh. In line with the theory that states that tempeh is a plant-based food source made from soybeans rich in protein. Tempeh has very good nutritional content, consisting of about 19.5% protein, 4% fat, 9.4% carbohydrates, vitamin B12 between 3.9 - 5 mg / 100 grams of tempeh, as well as tofu and eggs where tofu has a protein content of about 7.8% and eggs have a protein content of about 12 - 13%. (Almatsier, 2019).

4. Conclusion

Results study show that there is significant relationship between behavior nutrition with incident Lack Energy Chronic (KEK) on Mother pregnant , which is indicated with mark *p-value* = 0.002)p < 0.05) through test *Chi-Square* . Besides Therefore , there is also a significant relationship between pattern Eat with KEK incident on Mother pregnant , with mark *p-value* = 0.000 (p < 0.05). With thus , it can concluded that Good behavior nutrition as well as eating own role in influence KEK incident on Mother pregnant in the area Work Community Health Center Sendana II Regency Majene .

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