

# Relationship Between Nutritional Knowledge and Economic Status with Chronic Energy Deficiency in Pregnant Women in Selatan Konawe

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## **Authors' contributions**

*This work was carried out in collaboration among all authors. Author HM designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors Sunarsih and Labanudi managed the analyses of the study. Author Labanudi managed the literature searches. All authors read and approved the final manuscript.*

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## **ABSTRACT**

**Background:** Nutritional problems, especially on pregnant women, are still a public health problem in Indonesia. One of the diseases caused by malnutrition in pregnant women, which shows that the number of cases is still high, is chronic energy deficiency. The aim of this study was to determine the relationship between knowledge of nutrients in food and economic status with the incidence of chronic energy deficiency on pregnant women.

**Materials and Methods:** This type of research is quantitative with a case control approach. The population in this study is divided into two, namely the population of cases and controls. The case population was pregnant women with 309 people, while the control population was all pregnant women who did not have chronic energy efficiency is 952 people, totaling population it was 1361 people. The sample size in each group was 344 respondents. The case sample was taken by simple random sampling while the control sample was taken by systematic random sampling. Data were obtained using a questionnaire then analyzed descriptively and inferentially using the Chi Square test and Odds Ratio.

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**Results:** The results showed that there was a relationship between knowledge and the incidence of chronic energy deficiency on pregnant women, where it was obtained that  $\chi^2$  count = 6,768 >  $\chi^2$  table = 3,841 and OR was 2,159, meaning that pregnant women with knowledge of nutrients in food were categorized as less having a risk of 2,159 times greater. To suffer from chronic energy deficiency compared to pregnant women who have good knowledge of nutrition in their diet. The results also showed that there was a relationship between economic status and the incidence of chronic energy deficiency on pregnant women, where the  $\chi^2$  count = 4,585 >  $\chi^2$  table = 3,841 and the OR of 1,688. This means that pregnant women with low economic status have a 1,688 times greater risk of suffering from chronic energy deficiency compared to pregnant women with sufficient economic status.

**Conclusion:** Knowledge and economic status are factors that are related to the incidence of chronic energy deficiency in pregnant women in South Konawe District. Therefore, it is hoped that the government through the health office can facilitate increased public knowledge about the importance of nutritional intake for pregnant women and it is also hoped that the government will provide stimulants for pregnant women with low economic status.

*Keywords: Nutritional knowledge; economic status; chronic energy deficiency; pregnant women.*

## 1. INTRODUCTION

Nutritional problems in women of childbearing age are still a public health problem in the world, especially developing countries including Indonesia. Malnutrition worldwide covers a spectrum of nutritional disorders, deficiencies and conditions such as intrauterine growth retardation, protein-energy malnutrition, iodine deficiency disorders, vitamin A deficiency, and iron deficiency anemia. In Indonesia, the problem of malnutrition in pregnant women is still the focus of attention, these problems include anemia and pregnant women in chronic energy deficiency (CED) [1].

Chronic Energy Deficiency (CED) is a manifestation of nutritional deficiency or malnutrition in which almost every woman of childbearing age, especially those aged 15 to 49 years, is the age most at risk [2]. According to Helena, (2013) Chronic Energy Deficiency (CED) is a condition of malnutrition. Where the condition of the mother is suffering from a chronic shortage of food which results in the emergence of health problems in the mother relatively or absolutely one or more nutrients. CED conditions occur because the body lacks one or several types of nutrients needed. Several things that can cause the body to be deficient in nutrients, among others: the amount of nutrients consumed is insufficient, of low quality or both. Nutrients that are consumed may also fail to be absorbed and used by the body. Upper arm circumference is a type of anthropometric examination used to measure the Risk of Chronic Energy Deficiency (CED) in women of childbearing age which includes adolescents,

pregnant women, nursing mothers and fertile age couples. While the threshold limit for Mid Upper Arm Circumference (MUAC) in women with the risk of CED is 23.5 cm and if it is less than 23.5 cm the woman is at risk of chronic energy deficiency (CED) [3].

Maternal and child malnutrition is the underlying cause of at least 3.5 million deaths each year and 11% of the total global disease burden. New evidence from developing countries shows that women with a body mass index (BMI) below 18.5 show a progressive increase in the mortality rate as well as an increased risk of disease. Research conducted on the Kunama community, Ethiopia, showed that the overall prevalence of malnutrition was 47.9% (95% CI 42.11-53.7%). This finding is higher than that of the Sub-Saharan Demographic and Health Survey (DHS), which ranges from 7 to 37%. Meanwhile the previous study also showed that the prevalence of malnutrition in Kerala (India), Bangladesh (Asia), Purworejo, and in the slum areas of Dhaka was 19%, 34%, 17%, and 30.8%, respectively (13- 16%) [4].

Generally pregnant women have a deficiency of more than one type of micronutrient. The study conducted in Malawi by Cambria M. Glosz et al. showed that more than 20% of pregnant women with moderate acute malnutrition had one or more micronutrient deficiencies even though supplementation did not improve their nutritional status, with the exception of vitamin B12 and vitamin D [5].

Case of pregnant women in CED, Nationally based on the results of Basic Health Research

2013, PSG 2017, and Basic Health Research 2018 showed a significant decrease in the last 5 years. From 24.2% in 2013 to 14.5% in 2018, below the activity performance indicator target of 19.7% for 2018 [6].

Based on data from Basic Health Research in 2013, nationally, the risk prevalence of Chronic Energy Deficiency (CED) in women of childbearing age aged 15 to 49 years, respectively, was 24.2% and not pregnant was 20.8%. The lowest was in Bali province 10.1% was pregnant and 14% was not pregnant, the highest was in Papua province at 37.2% was pregnant and 32.1% was not pregnant; Data from the 2017 Nutritional Status Monitoring, nationally the percentage of risk of Chronic Energy Deficiency (CED) is 14.8% for pregnant women, the highest is in Papua Province 21.7% and the lowest is in North Sulawesi Province 6.7%; And data from Basic Health Research in 2018, nationally, the risk prevalence of Chronic Energy Deficiency (CED) in women of childbearing age aged 15 to 49 years respectively who are not pregnant is 17.3% and pregnant is 14.5%. The lowest was in the province of North Kalimantan 1.7%, the highest was in the province of East Nusa Tenggara 36.8% pregnant women; and the lowest was in Bangka Belitung Province at 10.8%, the highest was in East Nusa Tenggara at 32.5% for non-pregnant women. Looking at these data, it appears that over the last 5 years there has been a decrease in the prevalence of CED by 6.9% in pregnant women and 6.3% in non-pregnant women [6].

At the level of Southeast Sulawesi Province, cases of pregnant women who experienced CED during the period 2013 to 2018 showed an increase from 23.5% to 28% even though in 2017 there was a decline of 15.5%. Data from the 2013 Basic Health Research shows the prevalence of pregnant women with chronic energy deficiency (CED) as much as 23.5%, the highest in Buton Regency at 65.4%, the lowest in Wakatobi Regency without cases (0.0%), Konawe Regency The South is on the numbers 15.9%. Based on Nutritional Status Monitoring data in 2017, the prevalence of chronic energy deficiency (CED) in women of childbearing age and pregnant women was 7.9% and 18.6%, respectively. The highest is in West Muna district and the lowest is in Kolaka Timur district, Konawe Selatan Regency is in the 4th position out of 17 districts / cities 18.6%. Based on data from the Southeast Sulawesi Provincial

Health Office, the number of pregnant women experiencing chronic energy deficiency (CED) in 2018 was 9,191 people spread across 17 districts / cities with the highest number of cases in Konawe Selatan district as many as 1,671 people (18.18%) and the lowest was in Konawe Kepulauan Regency as many as 180 people (1.95%) [6].

Based on the data above shows an increase in cases of pregnant women experiencing CED in South Konawe district during the last 5 years in the 2013 - 2018 periods. If in 2013 the number of cases was 15.9%, it increased to 18.18% in 2018. Prevalence the highest was in Konda district 57% and the lowest was in Benua District 1.32% [6].

The increase in cases of CED in pregnant women in Konawe Selatan district is influenced by many factors, especially lack of nutritional intake and health problems, especially by infectious diseases. Not only that, but there are many factors as determinants that influence the occurrence of CED in WUS, both pregnant and non-pregnant.

At least there are several factors that can affect the nutritional status of women of childbearing age, especially during pregnancy, including: family income, age, parity, birth distance, education, and a woman's workload. These factors, either alone or simultaneously, are thought to affect the nutritional status of pregnant women, manifested in chronic energy deficiency (CED) [6].

According to Labanudi (2013), nutrition of pregnant women is influenced by: age, body weight, environmental temperature, activity, health status, knowledge of nutrition in food, habits and views of women on food, and economic status. The same opinion was expressed by Siti Maryam (2016), that the nutritional needs of pregnant women are influenced by factors: women's habits and views on food, economic status, knowledge of nutrients in food, health status, activity, environmental temperature, body weight, and age [2,7].

Apart from the factors mentioned above, the nutritional status of pregnant women is also influenced by the amount of food consumed, workload, health services, health status, education, food absorption, parity and birth spacing, consumption of caffeine, and consumption of iron tablets [8]. And another factor that plays a role in the incidence of CED is

ecological factors which include accessibility to health services [9].

Based on a preliminary study at two Health Office in Konawe Selatan District, namely Laonti Health Office and Andoolo Utama Health Office, found that the number of patients with chronic energy deficiency (CED) in 2018 was 134 pregnant women with details: 77 Laonti Health Office and 57 Andoolo Utama Health Office. And based on nutrition survey data at Health Office and the results of interviews with health center nutrition officers, it is known that the cause of chronic energy deficiency in pregnant women is that there are still many pregnant women whose knowledge of the importance of nutritional intake is still lacking, apart from that the economic capability is also one of the causes of protein energy deficiency in pregnant women. Based on information from the Health Office Nutrition Implementer, generally those who experience are underprivileged families. In terms of the work of the head of the family, most of them work as cultivators of rice fields and long-term and short-term plantations, which if the income from the business is calculated cannot meet the family's needs.

Based on the background and study of the above problems, researchers intends to conduct research on "Relationship Between Nutritional Knowledge And Economic Status With Chronic Energy Deficiency In Pregnant Women In Selatan Konawe".

## **2. METHODS**

### **2.1 Research Type and Design**

This type of research is a quantitative study with a case control design with a retrospective approach.

### **2.2 Location and Time of Research**

This research was conducted in Konawe Selatan Regency, Southeast Sulawesi Province. Research implementation until the preparation of the final report which starts in December 2018 and finishes in August 2020.

### **2.3 Population and Sample**

#### **2.3.1 Population**

The population in this study is divided into two, namely cases and controls. The case population were pregnant women with selected CED 3 out

of 24 sub-districts that had the lowest, medium, and highest cases of CED mothers, amounting to 309 people and the control population is all pregnant women who are not CED, amounting to 952 people. Total population as much 1,361 people.

#### **2.3.2 Sample**

The size of the sampel cases and controls were 344 respondents respectively. The case sample was taken by simple random sampling, while for the control sample, the sampling used a systematic random sampling technique with the help of registers of pregnant women in the nutrition reports at the public health center.

### **2.4 Data Collection**

Data were collected using questionnaires and observation sheets. Questionnaires were tested for validity and reliability first. The questionnaire used has passed the validity and reliability test.

### **2.5 Data Analysis**

Data were analyzed descriptively and inferential. The inferential analysis used was the chi square test and the odds ratio.

Knowledge of food nutrition: if the respondent's answer score from the proposed questionnaire is less than 60% of the total score then it is categorized as lacking knowledge and the answers to the answers are more than 60% in the good category.

Economic status: if the respondent's income is more than the regional minimum wage set by the government, it is categorized as high, whereas if it is below the regional minimum wage, it is categorized as less.

Chronic Energi Defiency: in measured by measuring the pregnant woman's arm circle. a person is said to be at risk of chronic energy less when the upper arm circumference is <23,5 cm.

## **3. RESULTS**

### **3.1 The Relationship between Knowledge of Nutrients in Food and Chronic Energy Deficiency in Pregnant Women in South Konawe District**

The determinants of nutritional knowledge in food with the incidence of chronic energy deficiency in pregnant women in South Konawe Regency can be seen in the Table 1.

**Table 1. Relationship Knowledge of Nutrients in Food with Chronic Energy Deficiency in Pregnant Women in South Konawe Regency**

Food Nutritional Knowledge	CED				Total		X <sup>2</sup> Count	OR	CI	
	Case		Control		n	%			Lower	Upper
	n	%	n	%						
Less	43	65.2	23	34.8	66	100	6,768	2,159	1,235	3,775
Enough	129	46.4	149	53.6	278	100				
Total	172	50	172	50	344	100				

**Table 2. Determinants of Economic Status with Chronic Energy Deficiency in Pregnant Women in South Konawe District**

Economic Status	CED				Total		X <sup>2</sup> Count	OR	CI	
	Case		Control		n	%			Lower	Upper
	n	%	n	%						
Less	121	54.5	101	45.5	222	100	4,585	1,688	1,067	2,606
Enough	51	41.8	71	58.2	122	100				
Total	172	50	172	50	344	100				

Table 1 shows that of the results of data analysis using the chi square test obtained the  $x^2$  count = 6.768 and  $x^2$  table = 3.841 at  $\alpha = 5\%$  and  $df = 1$ , or the calculated  $x^2$  value is greater than the  $x^2$  table, namely ( $6.768 > 3.841$ ), meaning that knowledge of nutrients in food is a determinant factor of chronic energy deficiency in pregnant women in South Konawe District. The results of the calculation of the Odds Ratio at the 95% level (CI), obtained an OR of 2.159. This means that pregnant women with insufficient knowledge of nutrition in food have a 2.159 times greater risk of suffering from chronic energy deficiency (CED) than pregnant women with good knowledge of nutrition in their diet (95% CI: 1,235 - 3,775). Because the OR value  $> 1$ , it can be concluded that the knowledge of nutrients in food can be considered as a potential risk factor for chronic energy deficiency (CED) in pregnant women.

### 3.2 Relationship between Economic Status and Chronic Energy Deficiency in Pregnant Women in South Konawe Regency

The determinants of economic status with the incidence of chronic energy deficiency in pregnant women in South Konawe Regency can be seen in the Table 2.

Table 2 shows the results of data analysis using the chi square test obtained the  $x^2$  count = 4.585 and  $x^2$  table = 3.841 at  $\alpha = 5\%$  and  $df = 1$ , or the calculated  $x^2$  value is greater than the  $x^2$  table, namely ( $4.585 > 3.841$ ), meaning that knowledge

of nutrients in food is a determinant factor of chronic energy deficiency in pregnant women in South Konawe District. The results of the calculation of the Odds Ratio (OR) obtained an OR of 1.688. This means that pregnant women with low economic status have a risk of 1,688 times greater to suffer from chronic energy deficiency (CED) than pregnant women with sufficient economic status (95% CI: 1,235 - 3,775). Because the OR value  $> 1$ , it can be concluded that economic status can be considered a potential risk factor for chronic energy deficiency (CED) in pregnant women.

## 4. DISCUSSION

### 4.1 Determinants of Knowledge of Nutrients in Food with Chronic Energy Deficiency in Pregnant Women

Knowledge is one of the factors that influence a person's actions. Knowledge of pregnancy nutrition is very important for the fulfillment of nutrition during pregnancy. For pregnant women, nutritional needs are not only for themselves but also for the fetus they are carrying. The more fulfilled the nutritional needs of pregnant women, the nutritional needs of the fetus will also be fulfilled properly, so that the stages of growth and development of the fetus in the womb can occur perfectly. The aspects of nutritional knowledge include food and nutrition (definition, type, function, source, due to deficiency) [10].

According to the opinion of Notoatmodjo (2013), the relationship between knowledge, attitudes, intentions and behavior will affect one's participation in certain activities. The existence of knowledge of the benefits of something, will cause people to have a positive attitude towards it. In this case, pregnant women who have a positive attitude will apply positive things suggested by health workers, such as paying attention to the consumption of nutritious food to prevent CED [11].

Energy intake during pregnancy certainly determines the health of pregnant women and the fetus in their womb. Energy intake from healthy and nutritious food can certainly have a positive impact on the body, but it can also backfire when nutritional intake is not considered.

Nutritional status is an important aspect that determines whether a pregnant woman can pass her pregnancy well without any disturbances or not. One of the nutritional problems of pregnant women that often occur is chronic energy deficiency (CED), so it can also have an impact on the health of the fetus they are carrying.

The results showed that respondents with less knowledge about food nutrition but had a chronic energy deficiency. This is because the lack of knowledge about nutrients in food will result in respondents not paying attention to the consumption of nutritious foods to prevent CED. The fetus in the womb needs nutrients and only the mother can provide them, therefore the food of pregnant women must be sufficient for both, namely for the mother and the fetus in the womb. Food that contains adequate nutrition during pregnancy is very important. If the amount of food is reduced, the babies born will be smaller. Adequate nutrition during pregnancy will reduce risks and complications to the mother, ensuring fetal growth so that the newborn has a normal weight.

And There are also respondents with good knowledge but not suffering from chronic energy deficiency. This is because the respondent's habit of consuming nutritious food, although specifically the respondent does not know the details regarding the function of the food. Apart from the above, it is also caused by encouragement from other people such as husbands, mothers and in-laws to encourage respondents to consume foods that contain nutrients that are good for pregnancy.

Researchers also argue that the cause of chronic energy deficiency in pregnant women is due to the inactivity of health workers. One form of the lack of the role of officers that can lead to chronic energy deficiency is that health workers do not detect problems early in nutrition for fertile women, so that if the malnutrition continues, it can lead to chronic energy deficiency. In addition, there is a lack of information provided by health workers to women, especially pregnant women, about what foods are good for consumption during pregnancy so as not to trigger malnutrition.

The results of the calculation of the Odds Ratio (OR), obtained an OR of 2,159. This means that pregnant women with insufficient knowledge of nutrition in food have a 2,159 times greater risk of suffering from chronic energy deficiency (CED) than pregnant women with good knowledge of nutrition in their diet.

This research is in line with research conducted in the Work Area of Health Office Umbulharjo I and Health Office Gedongtengen in 2017, which shows that there is a relationship between pregnant women's knowledge about pregnancy nutrition and the incidence of CED in pregnancy, where the Chi Square test results obtained a p-value of 0.0001 <0.05 [12]. This study is not in line with the research conducted at the Tanjung Pinang Public Health Center, Jambi City, where the statistical test results obtained p value = 0.064 (p > 0.05), it can be concluded that there is no significant relationship between the level of knowledge and the incidence of CED in pregnant women [13].

#### **4.2 Relationship between Economic Status and Chronic Energy Deficiency in Pregnant Women**

Economic status is often identified with family income to meet daily needs, especially clothing, food and shelter or shelter. According to Sumardi (2011), socio-economic conditions are a position that is socially regulated and places a person in a certain position in society, giving that position is accompanied by a set of rights and obligations that must be played by the person carrying that status. Meanwhile, WS Winke (1991) states that the notion of socio-economic status has the meaning of a situation which indicates the financial capacity of the family and the material equipment it has [14].

One of the factors causing the CED condition in pregnant women is socioeconomic status. The condition of low socioeconomic status will indirectly affect the mother and family in meeting the needs of balanced nutrition. The components of economic status include the socioeconomic level consisting of income, education, and number of family members. Family income is a determining factor in improving the nutritional status of pregnant women [15].

The results showed that there were respondents with less economic status who suffered from CED. This illustrates that the higher the economic status of a person, the easier it is for the person to meet their needs, and vice versa, the lower the economic status of a person will indirectly affect income and also affect the lack of fulfillment of nutritional needs during pregnancy. In meeting daily needs, pregnant women often face problems on how to fulfill them, especially to meet the health needs of their pregnancy.

Economic status is one of the causes of protein energy deficiency in pregnant women. Based on information from the Health Office Nutrition Implementer, generally those who experience are underprivileged families. In terms of the work of the head of the family, most of them work as cultivators of rice fields and long-term and short-term plantations, which if the income from the business is calculated cannot meet the family's needs.

And respondents with less economic status, but not suffering from chronic energy deficiency. According to the assumptions of the researchers, this is because the role of health workers is quite good in the area where the respondent lives. Health workers are active in early detection of nutritional problems in fertile women, so that if there is an indication of nutritional problems in pregnant women, then intervention is carried out by providing additional food to pregnant women so that the problem does not lead to more serious nutritional problems such as chronic lack of energy.

The statistical result obtained by odds ratio (OR) much 1.688. This means that pregnant women with low economic status have a risk of 1,688 times greater to suffer from chronic energy deficiency (CED) than pregnant women with sufficient economic status.

This research is in line with research conducted in the Work Area of Health Office Ipuh, Muko-

Muko Regency in 2019, which shows that there is a relationship between economic status and the incidence of chronic energy deficiency in pregnant women, where the statistical test results show that it is obtained (p value = 0.000 and OR = 13.67) [16].

This research is also in line with research conducted in the Rowosari Public Health Center Semarang, which shows that there is a relationship between economic status and the incidence of chronic energy deficiency in pregnant women, where the statistical test results obtained are (p = 0.012, 95% CI = 1.298-11.888 , OR = 3,929) [9].

## 5. CONCLUSION

Knowledge and economic status are factors related to the incidence of chronic energy deficiency in pregnant women in Konawe Selatan District. Therefore, it is hoped that the health office can motivate pregnant women to apply their knowledge about pregnancy nutrition by optimizing more integrated antenatal care services such as early detection of chronic energy deficiency in pregnant women, counseling with nutritionists more frequently to prevent complications from chronic energy deficiency during period of pregnancy and childbirth.

## CONSENT AND ETHICAL APPROVAL

This study was approved by the ethics committee of the Southeast Sulawesi Province Research and Development Agency.

This study has obtained the consent of the respondents before the data is collected. The consent statement contains a guarantee of the confidentiality of the respondent's personal data, and the voluntary right to participate in the research, and provides a guarantee that no participant is still harmed because of his / her participation in the research.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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