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Research article

Analysis of Eating Patterns and Parity with the Incidence of Chronic Energy Deficiency in Pregnant Women: Literature Review

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ABSTRACT

Background: The high incidence of Chronic Energy Deficiency (CED) in pregnant women in Indonesia can result in risks and complications for pregnant women and their unborn children. The high parity of pregnant women causes the condition of the reproductive organs to become weaker, which has an impact on the health of the mother and baby. In addition, the poor diet of pregnant women causes inadequate nutritional intake during pregnancy, which causes CED**.**
Methods: Method this research is literature review, which sourced from Google Scholar and PubMed databases published from 2016 to 2020, and manually selected articles relevant to the research questions.
Results: The research results show that Parity and diet do not have a direct effect, but are risk factors that can cause CED in pregnant women, so all efforts to prevent CED must always pay attention and be alert to mothers with parity and eating patterns that are at risk.
Conclusion: It is hoped that there will be efforts to increase knowledge of information regarding reproductive health and nutrition of pregnant women so that a woman can better prepare for her pregnancy process and the need to take precautions if she has risk factors for CED.

I. Introduction

Chronic energy deficiency (CED) is one of the causes of complications during pregnancy and childbirth (Hartono, 2018). If the input of nutrients to pregnant women from food is not balanced with the body's needs, nutritional deficiencies will occur. If this happens for a long time, pregnant women will experience chronic energy deficiency which can result in health problems for both the pregnant mother and the baby to be born, such as poor fetal growth and increased risk of neonatal death and low birth weight (LBW) (Arisman, 2022).

The proportion of pregnant women with CED in Indonesia based on Basic Health Research has increased, namely in 2018 it was 33.5%, increasing to 38.5% in 2015 (Ministry of Health of the Republic of Indonesia, 2018). Based on data from the East Java Provincial Health Service in 2018, the prevalence of pregnant women with CED was 27.6%, while for Tulungagung Regency in 2019 the prevalence of CED in pregnant women was 13.4% (Tulungagung District Health Office, 2019).

The causes of CED in pregnant women are multi-factorial. The direct cause is the diet of pregnant women which is caused by a lack of nutritional intake compared to their needs, infections, especially in the form of parasites, which can lead to hijacking of nutritional intake by parasites and excessive activity patterns of pregnant women causing the use of energy reserves which results in a decrease in fat reserves. The indirect causes are economic conditions which have an impact on the family's ability to provide quality food, the level of education which has an impact on the ability to understand the nutritional needs of pregnant women and the social status of the family (Istanti, 2016).

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Food consumption patterns have been known to be a risk factor for nutritional problems in pregnant women. Pregnant women's needs for energy, vitamins and minerals increase according to the mother's physiological changes, especially at the end of the second trimester (Dafiu, 2017). Eating pattern is a term to describe habits and behavior related to food and eating, such as table manners, patterns of food eaten, frequency and portions of food, beliefs and acceptance of food (for example taboos and likes or dislikes towards food), distribution of food among family members, and how to choose the food ingredients to be eaten (Kusumawati 2021).

A person's eating pattern can be determined by looking at the person's daily food consumption. In pregnant women, inadequate nutritional food intake triggers an imbalance between intake to meet needs and energy expenditure. In fact, during pregnancy, pregnant women need additional nutrients for the growth of the fetus, placenta and other organs or tissues, an average of 200 kcal per day. If this condition persists for a long time, chronic energy deficiency occurs in pregnant women (Saputro, 2023).

The relationship is with indirect factors, namely the characteristics of pregnant women, one of which is influenced by parity and employment status. Parity is related to the condition of the female reproductive organs. Mothers who give birth too many times or give birth too closely will cause low quality of the fetus and will also be detrimental to health because the mother does not get the opportunity to repair her own body because the mother needs sufficient energy to recover after giving birth to her child. Conceiving again will cause nutritional problems for the mother and the fetus/baby being conceived (Anfiksyar, 2019).

That nutritional problems such as Chronic Energy Deficiency (CED) can be overcome, a nutrition improvement program is needed by increasing the quality of nutritional intake to ensure adequate nutrition. Providing additional food and iron to pregnant women who suffer from CED and come from poor families can improve the nutritional status of pregnant women. Meanwhile, to prevent the occurrence of CED in pregnant women which is caused by a lack of knowledge about adequate nutritional intake for pregnant women, it is necessary to provide education and counseling during ANC. This study aimed to analyze Eating Patterns and Parity with the Incidence of Chronic Energy Deficiency in Pregnant Women.

II. METHODS

The method used is to collect and analyze related research articles. A literature review was carried out on quantitative research which aimed to analyze the influence of diet and parity on the incidence of chronic energy deficiency. Secondary data sources obtained in the form of articles or journals that are relevant to the topic are carried out using databases via Google Scholar and PubMed Central (PMC). Searching for articles or journals uses keywords and Boolean operators, making it easier to determine which articles or journals to use.

Keywords used in this research (Dietary Pattern and Parity) AND (Chronic Energy Deficiency) OR (KEK) for national articles as well as keywords (Dietary and Parity) AND (Chronic Energy Deficiency) for international articles. There are several criteria for this literature review, including; 1) National and international journals related to research topics on diet, parity and chronic energy deficiency; 2) Show results that are in accordance with the research objectives and hypotheses, namely the influence of dietary factors and parity on the incidence of chronic energy deficiency; 3) The method used is Mix methods study, experimental study, survey study, cross-sectional, correlation or comparison analysis; 4) Articles or journals published from 2016 and above; and 5) Use Indonesian or English. The selected articles were then criticized by researchers.

III. RESULTS

Other research journals that were also analyzed in this *literature review* were only used to support and strengthen the influence of diet and parity on the incidence of chronic energy deficiency in children, here are the results of journal searches:

Table 1. Research Journal Search Results

No	Author	Journal Name Vol, No, Year	Title	Method (Design, sample, variables, instruments, analysis)	Research result
1	Vita Kartika Mahirawati	Health Systems Research Bulletin – Vol. 17 No. April 2, 2016	Factors Associated with Chronic Energy Deficiency (KEK) in Pregnant Women in Kamoning and Tambelangan, Sampang Regency, East Java	D : *cross sec tional* S : *simple random sampling* V : Socioeconomic factors (education, employment, income), maternal factors (age, age at marriage, parity, HB levels, frequency of eating) and the incidence of CED I : Questionnaire and observation A : test *Chi-square*	The incidence of CED in pregnant women is related to education level, employment status, gestational age and hemoglobin levels in the blood and frequency of eating. Subtopic: Eating frequency is related to the incidence of CED
2	Siti Muliawati	INFOKE, VOL. 3 NO. November 3, 2017	Factors Causing Chronic Lack of Energy in Pregnant Women at the Sambi Community Health Center, Sambi District, Boyolali Regency in 2017	D : Descriptive *case control* S : *Purposive sampling* V : Income, education, parity, consumption patterns, infectious diseases and CED incidence I : Questionnaire and observation A : univariate analysis	The age factor is known to be mostly aged between 21 – 35 years, totaling 27 pregnant women (90%). The parity factor for mothers who experienced CED was mostly primiparous parity, amounting to 23 pregnant women (76.7%). The consumption pattern factors of mothers who experience CED are known to be mostly in the good category, amounting to 18 pregnant women (60%). Infectious Disease Factors Most of the pregnant women did not have infections as many as 26 pregnant women (86.7%). Subtopic: Parity is a risk factor for CED, but consumption patterns are not
3	Octriyani	Journal of Nutrition and Dietetics Vol. 2, no. 3, September 2016	Dietary patterns and dietary restrictions are not related to chronic energy deficiency in pregnant women	D : Observational analytics S : *Total sampling* V : Eating patterns, abstinence from food and the incidence of CED I : Questionnaire and observation A : bivariate (*chi-square* and *Mann Whitney*) and multivariate (logistic regression)	There is no relationship between diet and dietary restrictions and the incidence of CED in pregnant women ($p>0.05$). As many as 17.91% of pregnant women are at risk of CED, 20.99% of them have an insufficient staple diet (rice) and 20.22% still have dietary restrictions. Foods that are prohibited are food sources of protein, sources of vitamins and minerals (fruit and vegetables), and food sources of energy

No	Author	Journal Name Vol, No, Year	Title	Method (Design, sample, variables, instruments, analysis)	Research result
					Subtopic: Diet is not related to KEK but is more influenced by nutritional intake and income
4	Yetti Anggraini	Health Journal, Volume IV, Number 2, October 2017	The Influence of Demography and Socioeconomics on the Chronic Energy Deficiency of Pregnant Women in Metro City, Lampung Province	D : Observational analytics S : *Total sampling* V : Demographic factors, socioeconomic factors and the incidence of CED I : Questionnaire and observation A : bivariate (*chi-square* and *Mann Whitney*) and multivariate (logistic regression)	Demographic factors: age (p=0.170), parity (p=0.071) and gestational age (p=0.429) did not have a significant effect on the incidence of CED in pregnant women. Meanwhile, socioeconomic factors: education and employment (p=0.001), number of family members and income (p=0.001) have a significant influence. Multivariate analysis in the final model revealed that parity had an influence on the incidence of CED (OR=3.44; p=0.003). There is an influence of the number of family members on the incidence of CED in pregnant women (OR= 10.21; p=0.001), and income shows the strongest influence on the incidence of CED in pregnant women (OR=38.29; p=0.001) Subtopic: The factor that most influences KEK is family income
5	Hanifatul Hikmah	Malakbi Midwifery Journal Volume 1, Number 1, January 2020	Maternal Factors and Dietary Patterns in the Occurrence of Chronic Energy Deficiency in Pregnant Women in the UPTD Working Area of the Kangkung Community Health Center	D : Correlational analysis S : *Purposive sampling* V : Characteristics of pregnant women, maternal factors, eating patterns and the incidence of CED I : Questionnaire and observation A : bivariate (*chi-square* and *Mann Whitney*) and multivariate (logistic regression)	The results of the study showed that there was a significant relationship between pregnant women's age (p value 0.002), parity (p value 0.011), education (p value 0.000), history of comorbidities (p value 0.030), diet (p value 0.000) and the incidence of CED . There is no relationship between family income and the incidence of KEK (p value 0.063) . Subtopic: Parity and diet have an effect on KEK but income has no effect
6	Rusmalina Fuspita Rini	Journal of Holistic and Health Sciences,	Factors Associated with Chronic Energy Deficiency	D : Correlational analysis S : *Total sampling*	There is a relationship between total energy, protein intake, and parity with the incidence of

No	Author	Journal Name Vol, No, Year	Title	Method (Design, sample, variables, instruments, analysis)	Research result
		2(1). 2018	(KEK) in Pregnant Women in the UPTD Working Area of Jatiluhur Health Center, Purwakarta in 2017	V : total energy, protein intake, smoking habits, alcohol consumption, parity, pregnancy spacing, age, infectious diseases, physical activity, education, knowledge, income, Body Mass Index (BMI) and the incidence of CED I : Questionnaire A : *chi-square*	Chronic Energy Deficiency (CED) in Pregnant Women. Meanwhile, factors that are not related to KEK are pregnancy interval, age, disease infection, education , knowledge and income Subtopic: The incidence of CED is influenced by nutritional intake and parity factors
7	Rafiyah	Journal of Maternity Care and Reproductive Health, 2(1). 2019	*Characteristics Of Pregnant Women With The Chronic Energy Deficiency At The Phc Of Pasundan Garut*	D : Quantitative descriptive S : *Total sampling* V : Maternal characteristics (age, education, occupation, income, parity, delivery interval, pregnancy complications, history of infectious diseases and consumption of Fe tablets) and the incidence of CED I : Questionnaire A : *univariate*	The conclusion of this research is that the main causes of CED in pregnant women at the Pasundan Garut Community Health Center are family income and eating patterns. Subtopic: Income and diet influence the incidence of CED
8	Irfana Tri Wijayanti	SMART Midwifery Journal, 6(1), 5-9. 2019	Eating Patterns of Pregnant Women That Influence the Incidence of Childbirth at the Gabus I Community Health Center, Pati Regency	D : Correlational analysis S : *stratified random sampling* V : Eating patterns and the incidence of CED I : Questionnaire A : *Chi square*	The results of the research showed that 18 respondents (51.4%) had an adequate diet, 23 respondents (65.7%) did not experience chronic energy deficiency (CED). The analysis results were obtained (X^2 count = 15.027 and pvalue = 0.001) which means there is a relationship between diet and KEK Subtopic: Diet influences the incidence of CED

The results of research conducted by Mahirawati (2014), in her research article, show that the incidence of CED in pregnant women is related to education level, employment status, gestational age and hemoglobin levels in the blood and frequency of eating. Furthermore, it can be explained that the characteristics of CED pregnant women include being dominated by the family's economic conditions and a low level of education. Likewise with the mother's husband, apart from having a low education, his monthly income is also low, namely ≤ Rp. 1,120,000. Maternal factors related to the incidence of CED are age at marriage and age at first pregnancy that is too young (< 20 years), parity and hemoglobin

(Hb) levels. It was found that 70.6% of CED pregnant women suffered from anemia even though 66.7% of CED pregnant women had taken iron (Fe) pills every day. One of the risk factors for pregnant women with CED is consuming nutritious food that is poor in terms of quality and quantity. 54.9% of pregnant women with CED had a frequency of eating 3x/day. Although eating frequency does not have a significant relationship with the incidence of CED in pregnant women, during pregnancy, the food consumed by pregnant women must contain enough nutrients so that the fetus in the womb gets enough food.

Sumini (2018) in her descriptive research article states that the parity factors for pregnant women who experience chronic energy deficiency are mostly primipara parity, amounting to 23 pregnant women (76.7%). Consumption Pattern Factors: Most pregnant women who experience chronic lack of energy have good consumption patterns, amounting to 18 pregnant women (60%). Infectious Disease Factors Most of the pregnant women did not have infections as many as 26 pregnant women (86.7%).

In the two previous articles it was stated that parity and diet do not have a significant effect but are risk factors for CED. This is confirmed by the results of research by Oktriyani (2016) which concluded that there is a partial relationship between dietary patterns and dietary restrictions and the incidence of CED in pregnant women but is more influenced by the level of energy intake and family income. In the qualitative analysis, it was found that there are still dietary restrictions among pregnant women, namely negative behavior that avoids consuming certain types of food due to cultural influences that exist in the local community. This shows that poor eating patterns do not necessarily influence the incidence of CED but are more influenced by the energy or nutritional intake consumed by pregnant women.

In relation to parity, the results of Anggraini's (2017) research also show similar results where parity does not have a significant effect on the incidence of CED in pregnant women. This research explains that demographic factors including: age (p=0.170), parity (p=0.071) and gestational age (p=0.429) do not have a significant effect on the incidence of CED in pregnant women. Meanwhile, socioeconomic factors: education and employment (p=0.001), number of family members and income (p=0.001) have a significant influence. However, the results of the multivariate analysis actually show that parity has a significant effect, this means that parity is a risk factor for CED, the risk increases, influenced by other interacting factors, for example education and income which are related to the ability to meet nutritional intake during pregnancy.

Research results that differ from several previous articles occurred in the results of Rini's research (2018) which concluded that the factors associated with the incidence of CED in pregnant women were Total Energy (p=0.004, PR=0.410) and protein intake (p=0.001, PR=2.053) apart from that, it can be said that the risk of CED in pregnant women doubles if the pregnant woman has low protein intake and high parity (p=0.024, PR=0.410). Meanwhile, factors that were not related to CED in pregnant women were Pregnancy Distance (p=0.148, PR=0.666), Age (p=0.087, PR=1.6), Infectious Diseases (p=0.156, PR=1.521), Education Level (p=0.000, PR=0.703), Knowledge (p=0.148, PR=0.666), and Income (p=0.000, PR=0.703).

Different research results were also shown by the research results of Wijayanti (2019) which concluded from the results of the analysis that there was a relationship between diet and KEK (X^2 = 15.027 and pvalue = 0.001). Furthermore, it was discovered that 18 respondents (51.4%) had an adequate diet and 23 respondents (65.7%) did not experience Chronic Energy Deficiency (KEK). Apart from that, Rafiyah (2019) also stated that the main causes of CED in pregnant women at the Pasundan Garut Community Health Center were family income and diet.

IV. DISCUSSION

1. The Relationship between Parity and Chronic Energy Deficiency in Pregnancy

Research conducted by Hikmah (2020), Rini (2018) and Wijayanti (2019) shows that parity is related to chronic energy deficiency during pregnancy. This happens because high parity will have an impact on the unprepared condition of the reproductive organs, causing various health problems for both the mother and the baby being born. However, different research results occurred in Anggraini's research (2017), where it was stated that partially there was no influence between parity on the incidence of SEZ, but when a multivariate analysis was carried out together with socio-economic factors (education, employment, number of family members and income) parity became influential. significant effect on the incidence of CED (OR=3.44; p=0.003).

According to Baliwati (2014) the best parity is 2 times. A birth distance that is too close will cause low quality of the fetus/child and will also be detrimental to the mother's health, the mother does not get

the opportunity to repair her own body because the mother needs sufficient energy to recover after gave birth to her child. Conceiving again will cause nutritional problems for the mother and the fetus/baby being conceived. The number of times a mother has given birth to a baby (parity) is measured as Good if 2 times, and Bad if ≥ 3 times.

Pregnancy that is too frequent can cause malnutrition because it depletes the body's nutritional reserves and the reproductive organs are not yet as perfect as they were before pregnancy. Apart from health problems, multiparas often pay less attention to their pregnancies and feel that they are already experienced in their pregnancies so they pay less attention to the information provided by health workers (Wijanti, 2016). Parity which is included in the high-risk factors in pregnancy is grade multiparous, where this can cause conditions that affect the optimization of the mother and fetus in the pregnancy at hand. It can be concluded that a parity of no more than 4 is not at risk of experiencing problems (Manuaba, 2010).

A high number of births causes the condition of the mother's reproductive organs to decline, thereby risking a decrease in the low quality of the fetus and will also be detrimental to the mother's health, the mother does not get the opportunity to repair her own body because the mother needs sufficient energy to recover after giving birth to her child. Women who become pregnant again with a history of pregnancies that are too high will cause nutritional problems for the mother and fetus one of which is chronic energy deficiency. However, referring to the results of research by Anggraini (2017) which shows that parity only influences the incidence of SEZ during multivariate testing, it can be concluded that the parity factor does not necessarily influence the incidence of SEZ, but is also influenced by other factors including socioeconomic.

2. The Relationship between Dietary Patterns and Chronic Energy Deficiency in Pregnancy

The research results of Muliawati (2013), Hikmah (2020), Rafiyah (2019) and Wijayanti (2019) state that consumption patterns influence the incidence of chronic energy deficiency. This is also supported by similar research, including by Mahirawati (2016) that eating frequency influences the incidence of CED and research by Rini (2018) which states that nutritional intake influences the incidence of CED. However, Oktriyani (2014) stated that consumption patterns have no effect on the incidence of chronic energy deficiency.

Pregnant women who experience protein deficiency have the opportunity to give birth to less than perfect babies, for example anal atresia, cleft lip or other congenital defects. If someone has a low protein intake, they have a greater chance of experiencing CED. Poor nutritional intake, especially during pregnancy, can cause fatigue, weakness, difficulty fighting infections, miscarriage or babies not growing well, congenital abnormalities and other serious health problems (Hidayati, 2011). A person's level of physical activity is related to their type of work. A person with a heavy level of activity every day and not balanced with adequate food intake means their body is more susceptible to infectious diseases and results in a critical lack of energy (Marlenywati, 2010).

Eating pattern is the amount, type and frequency of eating carried out by pregnant women. This is closely related to the number of sources of nutritional intake that will be absorbed by the body. The better the diet you have, the better the nutritional intake you receive, thereby preventing the occurrence of CED. Pregnant women who have poor eating patterns can indicate that the mother has the same eating habits as before pregnancy, even though pregnant women's food needs are 3 times more than before. Pregnant women in Indonesia are generally housewives, and a mother who previously worked will also take leave or even stop working when pregnant. This can be indicated that the physical activity carried out as a housewife tends to be lower than mothers who work outside the home with work capacities that require more energy. Mothers who take time off work can at least reduce energy burning in the body which can reduce energy reserves in the body of pregnant women. Exceptions can be made for pregnant women who have good nutritional status.

The existence of one research result that contradicts several previous research results occurs because chronic energy deficiency is caused by various complex factors. According to researchers, diet is not a factor that directly influences the incidence of SEZ, but is influenced by other factors that influence diet itself, as research results from Oktriyani (2014) show that income is the factor that most influences the incidence of SEZ among several socioeconomic factors studied. Based on these facts, it can be assumed that pregnant women's food intake is not only influenced by their diet but is more caused by family income. The higher the family's income level, the better the opportunity for family members

to meet the food needs of all its members, including in this case pregnant women can have a good diet too.

3. The Influence of Income Factors on the Family's Ability to Fulfill Nutritional Intake in Relation to the Occurrence of KEK

The research results of Anggraini (2017), Himah (2020) and Rini (2018) show that income is a fairly strong factor in influencing the incidence of chronic energy deficiency in pregnant women. This fact is confirmed by research by Anggraini (2017) which shows that among the socio-demographic (age, parity, gestational age) and socioeconomic (education, employment, number of family members, income) factors studied, income is the strongest factor in influencing the incidence of SEZ. (showing the strongest influence on the incidence of CED in pregnant women (OR=38.29; p=0.001).

Family income determines the quality and quantity of food in the family. Families with limited income will most likely be less able to meet their food needs. Income is also something that greatly influences the condition of a family, including the health status of all family members, one of which is fulfilling the need for food that has sufficient nutritional value (Utami, 2018). Families with a low economic level usually spend most of their income on meeting food needs. The family's economic status will determine the type of food purchased. The higher the income, the greater the need for food. . Even though the family income is low, they have sufficient knowledge about nutritious food so that there is a balance between food intake and the body's food needs (Hartono, 2018).

In families with a low economic level, usually most of the income will be spent on meeting food needs. The family's economic status will determine the type of food purchased. The higher the income, the greater the need for food. Even though the family income is low, they have sufficient knowledge about nutritious food so that there is a balance between food intake and the body's food needs (Hartono, 2018). In families with a low economic level, usually most of the income will be spent on meeting food needs. The family's economic status will determine the type of food purchased. The higher the income, the greater the need for food. Even though the family income is low, they have sufficient knowledge about nutritious food so that there is a balance between food intake and the body's food needs (Hartono, 2018)

Economic status is quite dominant in influencing food consumption, in this case the eating patterns and nutritional intake of pregnant women which influence the incidence of CED. Increasing income will increase opportunities to buy food of better quality and quantity. The higher a person's income, the better the proportion of expenditure on food, conversely, the lower a person's income, the higher the proportion of expenditure on food but with lower food quality. This situation illustrates that income factors tend to influence the type of food that can be purchased, families with low incomes will find it difficult to choose foodstuffs with higher nutritional levels.

Low economic conditions are generally related to various health problems that they face due to inability and ignorance in dealing with various problems. Families with limited income are less likely to be able to meet the amount of food the body needs. Changes in income can directly affect family food consumption, thereby affecting pregnant women's eating patterns and ultimately also impacting nutritional intake, leading to chronic energy deficiency conditions.

Apart from income factors, education is also known to influence the incidence of SEZ. With a higher level of education, it is hoped that the knowledge or information about nutrition will be better so that it can meet the mother's level of knowledge regarding the importance of the benefits of nutrition for pregnant women and the fetus they are carrying. Based on the various research results above, it is necessary to consider that the level of education of pregnant women also determines a person's ability to receive health information. This condition can be used as a basis for providing nutritional education about fulfilling family nutrition. The next factor is income. Low income is one of the obstacles that causes people to be unable to buy food in the type and quantity needed. So that high and low income greatly affects the family's purchasing power for daily food which ultimately affects the nutritional condition of pregnant women and can cause nutritional deficiencies in mothers such as Chronic Energy Deficiency (CED).

V. CONCLUSION

The results of this literature review show that parity and diet do not necessarily influence the incidence of chronic energy deficiency, these two factors are not completely independent and are also strongly influenced by other factors including maternal characteristics, socioeconomic and maternal factors .

Based on these facts, this research concludes that parity and diet are risk factors that can cause CED in pregnant women so that all efforts to prevent CED must always pay attention and be alert to mothers with parity and eating patterns that are at risk

VI. CONFLICTS OF INTEREST

The author has no conflict of interest to declare

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