LITERATURE STUDY THE RELATIONSHIP BETWEEN PREGNANT WOMEN'S KNOWLEDGE ABOUT NUTRITION AND THE INCIDENCE OF CHRONIC ENERGY DEFICIENCY (CED)

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ABSTRACT

The results of the Basic Health Research (Riskesdas) show that the prevalence of the risk of CED in pregnant women is still quite high at 17.3%, for the age that often occurs is 15-49 years. One of the factors causing Chronic Energy Deficiency (KEK) is knowledge, pregnant women who have good knowledge will tend to pay attention to the nutritional value of the food consumed. The purpose of the study was to analyze research articles related to the relationship between knowledge of pregnant women about nutrition and the incidence of KEK. This study uses a literature review research method with 11 articles obtained through screening based on the criteria set by the researcher. Search articles using Google Schoolar and Semantic Sholar databases. The conclusion of this study is that mothers who have good knowledge about nutrition do not experience CED, while pregnant women who have less knowledge about nutrition are at risk of experiencing CED.

Keywords: Nutrition, Pregnant Women, Chronic Energy Deficiency (CED), and Knowledge

INTRODUCTION

The pregnancy process plays a crucial role in fetal growth. According to the development plan from 2020 to 2024, one of the main targets of the Ministry of Health over these five years is to improve public health, marked by a decrease in the Maternal Mortality Rate (MMR), Infant Mortality Rate (IMR), prevalence of malnutrition, and prevalence of stunting (Kemenkes RI, 2020).

During pregnancy, the nutrition of pregnant women must meet the nutritional needs for both themselves and the growth and development of the fetus because the fetus's nutrition depends on the mother's nutrition. Therefore, the nutritional needs of the mother must also be fulfilled. Insufficient energy and protein intake in pregnant women can lead to Chronic Energy Deficiency (CED) (Kemenkes RI, 2016).

Chronic Energy Deficiency (CED) is a condition where a person experiences a continuous lack of energy and protein intake, leading to health problems. A pregnant woman is said to suffer from CED if her Upper Arm Circumference (UAC) is less than 23.5 cm (Wiknjosastro, 2007).

Based on the results of the Nutrition Status Monitoring survey (PSG) in 2017, the prevalence of pregnant women at risk of CED decreased by 14.8% (Kemenkes RI, 2020). Furthermore, the results of the 2018 Riskesdas showed an increase in the prevalence of CED in pregnant women, reaching 17.3%, with the proportion of CED risk occurring in the age group of 15-49 years (Riskesdas, 2018).

Thus, this indicates that Indonesia still faces a moderate public health issue (10-19%) concerning pregnant women at risk of CED (Kemenkes RI, 2020). Among the 34 provinces in Indonesia, Jambi ranks 15th for pregnant women with CED, with a percentage of 12.0%, which means it has met the expected target of 14.5%. The lowest percentage of pregnant

women with CED is in DKI Jakarta at 3.1%, while the highest is in West Papua at 40.7%.

Pregnant women with Chronic Energy Deficiency (CED) are at risk of giving birth to Low Birth Weight (LBW) babies, which can potentially lead to mortality, growth disorders, and developmental issues in children. CED can also indirectly contribute to maternal mortality (Kemenkes RI, 2016). In addition, CED also poses risks such as decreased muscle strength that aids in childbirth, potentially leading to fetal death (miscarriage), premature birth, birth defects, LBW, and even infant mortality. CED can also disrupt fetal growth and development, affecting physical growth (stunting), brain development, and metabolism, which may contribute to infectious diseases in adulthood (Kesmas, 2018).

A pregnant woman and fetus experiencing CED may exhibit several symptoms, including continuous fatigue, tingling sensations, pale and lethargic appearance, difficulty during childbirth, insufficient breast milk production for nursing, which can lead to inadequate milk supply for the baby. This deficiency can result in miscarriage, suboptimal fetal growth causing low birth weight, and disrupted development of all fetal organs. These effects can impact learning abilities, cognitive function, and increase the risk of disabilities and infant mortality at birth (Wiknjosastro, 2007).

Chronic Energy Deficiency (CED) can be caused by several factors, one of which is knowledge. Knowledge is a factor that correlates with the attitudes and behaviors of individuals in the health field. Good nutritional knowledge among pregnant women can foster positive attitudes and actions in maintaining dietary patterns that meet the needs of pregnant women (Soekidjo and Notoatmodjo, 2012).

This theory aligns with the findings of research conducted by Syakur (2020), which established a relationship between age, education, parity (number of pregnancies), knowledge, and meal frequency with the occurrence of chronic energy deficiency in pregnant women in the working area of Maccini Sombala Health Center, Tamalate Subdistrict, Makassar City in 2019 (Syakur *et al.*, 2020).

Another study by Aulia, Verawati, and Dhilon (2020) indicates that nutritional knowledge has a significant relationship with the incidence of Chronic Energy Deficiency (CED) (Ibti, 2020). This study is also consistent with research conducted by Sukmawati (2012), which found a relationship between knowledge and Chronic Energy Deficiency (CED) in pregnant women, with a p-value of 0.043 ($p < 0.05$) (Kemenkes RI, 2020).

Based on the background described above, the author intends to conduct a literature study on "The Relationship Between Pregnant Women's Knowledge About Nutrition and the Incidence of Chronic Energy Deficiency (CED)."

METHODS

This study employs the literature review method, a research design involving the exploration of various sources such as books, research articles from accredited journals, and other relevant publications related to the research topic, aimed at addressing existing issues or problems as references.

The literature sources for this study were obtained through accredited journal portals that are accessible, using Google Scholar and Semantic Scholar as primary search tools. The keywords used were "Knowledge", "Pregnant women", "Nutrition", and "Chronic Energy Deficiency (CED)" for Google Scholar, and "Knowledge, Pregnant women, Nutrition, Chronic lack of energy" for Semantic Scholar. The study is titled "The Relationship Between Pregnant Women's Knowledge About Nutrition and the Incidence of Chronic Energy Deficiency (CED)".

The inclusion criteria for research articles in this literature review include publication between 2017 and 2021, publication in accredited journals, availability of full paper or full text, addressing the variables of pregnant women's nutritional knowledge and chronic energy deficiency incidence, use of Indonesian and/or English language, and being original research. Based on these criteria, 11 journals were identified that meet the requirements for use in this study.

RESULTS

In this study, 11 articles with topics relevant to the research problem in the literature review were utilized. The analyzed articles are presented in the following table, containing author and year, article title, publication name, article language, research objectives, research methods, and findings from the articles.

Table 1. Results of the literature review study

No	Author, year	Title	Journal Name	Journal Language	Research Objectives	Research Methods	Findings
1.	Elisa Murti, dan Puspita ningrum 2017	The relationship between knowledge and nutritional status of pregnant women at the Tanjung Pinang City Health Center in Jambi. (Murti and Puspita, 2017)	JI-KES: Jurnal Ilmu Kesehatan Volume 1, No. 1, Agustus 2017: Page 44- 49 ISSN:2579-7913	Indonesian	To determine the relationship between knowledge and nutritional status among pregnant women at the Tanjung Pinang City Health Center in Jambi.	Method: This study employs a descriptive correlational approach with a cross-sectional design. Research Instrument: A questionnaire was used as the research instrument. Data Analysis: Data analysis was conducted using Chi-Square analysis with $\alpha = 0.05$. Sampling Technique: Quota sampling was used. Population: All pregnant women who underwent prenatal check-ups at the Tanjung Pinang City Health Center in 2016. Sample: 62 respondents were included in the study. Measurement: Nutritional knowledge was measured in relation to the incidence of Chronic Energy	1. Based on univariate analysis, out of 62 respondents, 31 respondents (50%) had good knowledge about maternal nutrition. 2. Out of 62 respondents, 10 pregnant women (55.6%) with poor nutritional status experienced Chronic Energy Deficiency (CED). 3. Based on the Chi-Square test, a p-value of 0.000 was obtained. Since p-value (0.000) < 0.05, it is concluded that there is a significant relationship between maternal knowledge and nutritional status among pregnant women at the Tanjung Pinang City Health Center in Jambi in 2016.

						Deficiency (CED): Using 3 categories: good, fair, and poor	
2.	Indrianti Fenti Dwi Pertiwi, Wina rachmania. 2018	Factors Associated with Chronic Energy Deficiency (CED) Incidence in Pregnant Women at the Warung Jambu Health Center, Bogor City. (Fitrianingtyas, Fenti and Wina, 2018)	HEARTY Jurnal Kesehatan Masyaraka T Vol.6 No.2 2018 ISSN. 2620-7869	Indonesian	To determine the factors associated with the incidence of Chronic Energy Deficiency (CED) among pregnant women at the Warung Jambu Health Center in Bogor City.	Method: This study employs a quantitative approach with a Cross-Sectional research design. Research Instrument: A questionnaire was used as the research instrument. Data Analysis: Data were analyzed using univariate and bivariate analysis with Chi-Square statistical tests. Sampling Technique: Random sampling was utilized. Population: The entire population consists of pregnant women within the jurisdiction of the Warung Jambu Health Center, Bogor City, West Java, totaling 1370 pregnant women. Sample: 43 respondents were included in the study. Procedure:	1. Research findings: The research revealed that out of 25 respondents with poor nutritional knowledge, 10 respondents (40.0%) did not experience Chronic Energy Deficiency (CED) with MUAC (Mid Upper Arm Circumference) ≥ 23.5 cm, while 15 respondents (60.0%) experienced CED with MUAC < 23.5 cm. Among the 18 respondents with good nutritional knowledge, 16 respondents (88.9%) did not experience CED with MUAC ≥ 23.5 cm, and 2 respondents (11.1%) experienced CED with MUAC < 23.5 cm. 2. Statistical test result: The statistical analysis showed a significant relationship between nutritional knowledge and the incidence of Chronic Energy Deficiency (CED) in

						The study utilized a questionnaire and Mid Upper Arm Circumference (MUAC) tape. Measurement of nutritional knowledge with CED incidence: Using 2 categories: good and poor	pregnant women, with a p-value of 0.004.
3.	Siti Elfiyah, Ani Nurhaini, Lely Nurlaili 2021	Relationship between Knowledge of Nutrient Intake and Incidence of Chronic Energy Deficiency in Pregnant Women in the Work Area of Upt. Puskesmas Kalijaga, Cirebon City (Elfiyah S, Ani Nurhaini, 2021)	Jurnal Kesehatan Mahardika Vol. 8 No.1 Februari 2021 ISSN : 2614-1663 e-ISSN : 2355-0724	Indonesian	To determine the relationship between knowledge of nutrient intake and the incidence of chronic energy deficiency in pregnant women at Puskesmas Kalijaga.	Method: This study employs an analytic survey with a cross-sectional research design. Research Instruments: The research utilizes a questionnaire on nutrient intake knowledge, an observation sheet on chronic energy deficiency, and MUAC (Mid Upper Arm Circumference) tape. Data Analysis: Spearman Rank correlation test with significance level α = 0.05 is used for data analysis. Sampling Technique: Total sampling method is utilized. Population: All pregnant women residing in the work area of UPT.	1. The statistical test results show that the majority of respondents (70.8%) have good knowledge of maternal nutrient intake, while 12.3% have fair knowledge, and 16.7% have poor knowledge. 2. Most respondents do not experience chronic energy deficiency (83.3%), while 16.7% experience chronic energy deficiency. 3. The statistical test results indicate a very strong and positive relationship between knowledge of nutrient intake and the incidence of chronic energy deficiency in pregnant women at UPT. Puskesmas Kalijaga, Cirebon City, with a p-value of 0.000 (p-value < α = 0.05) and correlation coefficient (r) of 0.80

						Puskesmas Kalijaga, Cirebon City in January 2020, totaling 54 pregnant women. Sample: 24 respondents were included in the study. Measurement of nutritional knowledge with CED incidence: Using 3 categories: good, fair, and poor	
4.	Ani Retni, dan Nikmawati Puluhulaw 2021	The Influence of Pregnant Women's Knowledge on the Incidence of Chronic Energy Deficiency in the Working Area of Puskesmas Batudaa Pantai (Retni and Puluhulaw, 2021)	Jurnal Zaitun Universitas Muhamma diyah Gorontalo ISSN : 2301-5691	Indonesian	To determine the influence of pregnant women's knowledge on the incidence of chronic energy deficiency in the working area of Puskesmas Batudaa Pantai.	Method: Quantitative descriptive approach Research Instruments: Questionnaire containing several questions about respondent demographics such as name, age, highest education level, occupation, address, and phone number, along with questions about the respondent's knowledge of chronic energy deficiency. Interviews were conducted with respondents afterward. Data Analysis: Chi-Square test Sampling Technique: Total sampling method	1. Based on univariate analysis, it was found that out of 36 respondents, the majority had insufficient knowledge, with 17 respondents (47.2%), while the lowest knowledge level was fair, with 9 respondents (25.0%). 2. There were 18 respondents (50.0%) with Chronic Energy Deficiency (CED), and 18 respondents (50.0%) without CED. 3. The Chi-Square test results indicate that there is an influence of pregnant women's knowledge on the incidence of chronic energy deficiency in the working

						Population: 36 pregnant women visiting the working area of Puskesmas Batudaa Pantai. Sample: 36 individuals Measurement of nutritional knowledge with CED incidence: Using 3 categories: good, fair, and poor	area of Puskesmas Batudaa Pantai, with a p-value < 0.05.
5.	Rika Fitri Diningsih, Puji Astuti Wiratmo, Erika Lubis 2021	Relationship Between Knowledge Level on Nutrition and the Incidence of Chronic Energy Deficiency (CED) in Pregnant Women. (Diningsih, Wiratmo and Lubis, 2021)	Binawan Student Journal (BSJ) Volume 3, Nomor 3, Desember 2021 ISSN 2656-5285 e-ISSN 2715-1824	Indonesian	To determine the relationship between the level of knowledge about nutrition and the incidence of chronic energy deficiency (CED) in pregnant women at the Matraman Sub-District Health Center, East Jakarta.	Method: This study utilizes a descriptive correlational approach with a cross-sectional design. Research Instrument: A questionnaire was developed based on existing theories and underwent validity testing. The instrument analysis yielded a Cronbach's alpha coefficient of 0.761, indicating good reliability (above the threshold of 0.7). Data Analysis: Univariate analysis involved frequency distribution, while bivariate analysis utilized the Chi-Square statistical test. Sampling Technique: Non-probability sampling was	1. The study revealed that among the respondents, 40 pregnant women (38.5%) had a good level of nutrition knowledge, 39 respondents (37.5%) had a sufficient level of knowledge, and 25 respondents (24.0%) had poor knowledge. Regarding the incidence of Chronic Energy Deficiency (CED) among pregnant women, 60 respondents (57.7%) did not experience CED, while 44 respondents (42.3%) did experience CED. 2. The statistical analysis indicated a significant relationship between the level of nutrition knowledge and

						employed, specifically purposive sampling. Population: All pregnant women in their second and third trimesters at Matraman Sub-District Health Center, East Jakarta, totaling 122 pregnant women. Sample: 104 respondents were included in the study. Measurement of Nutrition Knowledge and CED Incidence: Knowledge of nutrition was categorized into three levels: good, sufficient, and poor.	the incidence of CED among pregnant women at Matraman Sub-District Health Center, East Jakarta, with a p-value of 0.000 ($p < 0.05$).
6.	Febriyeni 2017	Factors Related to the Occurrence of Chronic Energy Deficiency in Pregnant Women. (Febriyeni, 2017)	Jurnal Human Care Volume 2;No.3 Tahun 2017 ISSN:2528-66510	Indonesian	To determine factors associated with the occurrence of chronic energy deficiency in pregnant women.	Method: Using descriptive analytics with a cross-sectional approach. Data analysis: Conducted univariate and bivariate analysis using Chi-Square statistical test. Sampling technique: Total sampling. Population: All pregnant women in the working area of Puskesmas Banja Laweh in 2017, totaling 55 individuals.	1. 87.3% of respondents did not experience Chronic Energy Deficiency (KEK). Among them, 60.0% had high knowledge, 56.4% had high economic status, and 56.4% had a good dietary pattern. Bivariate analysis revealed a relationship between knowledge ($p = 0.013$ and OR = 12.000), economic status ($p = 0.035$ and OR = 10.000), and dietary pattern ($p = 0.019$ and OR = 13.200) with the occurrence of KEK in

						Sample: 55 respondents. Measurement of nutritional knowledge and occurrence of Chronic Energy Deficiency (KEK): Using 2 categories: low and high.	pregnant women. It can be concluded that factors associated with the occurrence of KEK in pregnant women are knowledge, economic status, and dietary pattern.
7.	Sri Ulfiani Maskur, Budiman, Ayu Lestari(27) 2021	The Relationship Between Knowledge and Dietary Habit with Incidence Chronic Energy Deficiency in the Pregnant Women in the Working Area Talise City of Palu (Ulfiani, S.M and Budiman, 2021)	International Journal of Health, Economics, and Social (IJHESS) Vol-3, Issue-1, 2021 e-ISSN: 2685-6689	English	To determine the relationship between knowledge and eating habits with the occurrence of chronic energy deficiency in pregnant women at Talise Health Center.	Method: Using survey analytics with a cross-sectional approach. Data analysis: Utilizing univariate and bivariate analysis. The test used is Chi-Square. Population: All pregnant women visiting Talise Health Center. Sample: 95 respondents.	1. Based on univariate analysis of 95 respondents, it was found that 91.6% of respondents have high knowledge, and 8 respondents (8.4%) have low knowledge. 2. Among the respondents, 75 (78.9%) did not experience chronic energy deficiency, while 20 (21.1%) did experience chronic energy deficiency. 3. Based on the research findings from 95 respondents, among those with low knowledge, 2 respondents (8%) suffered from chronic energy deficiency, whereas among those with high knowledge, 18 respondents (90%) suffered from chronic energy deficiency. The respondents who did not suffer from chronic energy

							deficiency were 62 (92%). The Chi-Square test results showed a p-value of 0.665 (P > 0.05), thus H0 was accepted. Therefore, it can be concluded that there is no relationship between knowledge and the occurrence of chronic energy deficiency in pregnant women.
8.	Robiyati, Siti Aisyah, Helni Anggraini 2022	Factors Associated with the Incidence of Chronic Energy Deficiency (CED) in Pregnant Women in the Working Area of the UPT Health. (Robiyati and Anggraini, 2022)	Science Midwifery Vol 10, No. 2, April 2022	English	To determine the factors associated with the occurrence of chronic energy deficiency in pregnant women in the service area of the Inpatient Unit of Banding Agung Health Center in 2021.	Metode: Descriptive quantitative method using a cross-sectional approach. Analisis data: Utilizing univariate and bivariate analysis. The test used is Chi-Square. Teknik pengambilan sampel: Using accidental sampling technique. Populasi: 245 individuals. Sampel: 71 respondents.	1. Based on the univariate analysis, it was found that 45 respondents (63.4%) have inadequate knowledge, while 26 respondents (36.6%) have good knowledge. 2. Out of 71 respondents, 48 (67.6%) experienced chronic energy deficiency (KEK), whereas 23 respondents (32.4%) did not. 3. The statistical test results indicate a significant relationship between knowledge and chronic energy deficiency with a p-value of 0.006, which is less than 0.05.

9.	Hasta Munanto, Sunarsih, Labanudi 2020	Relationship Between Nutritional Knowledge and Economic Status with Chronic Energy Deficiency in Pregnant Women in Selatan Konawe. (Munanto and Sunarsih, 2020)	Asian Journal of Research in Nursing and Health 3(4): 1-8, 2020; Article no.AJRNH.60609	English	To determine the relationship between knowledge of nutrition and food, economic status, and the occurrence of chronic energy deficiency in pregnant women.	Metode: Quantitative with a case-control design. Instrumen penelitianUsing a questionnaire. Analisa dataDescriptive and inferential analysis using chi-square test and Odds Ratio. Teknik pengambilan sampel: Case samples were taken using simple random sampling, while control samples were taken using systematic random sampling. Populasi: The population is divided into two groups: cases and controls. The case population consists of 309 pregnant women, while the control population consists of 952 pregnant women who did not experience chronic energy deficiency. Sampel: 344 respondents were sampled from each group.	1. From this research, it is found that knowledge and economic status are factors associated with the occurrence of chronic energy deficiency in pregnant women in South Konawe Regency. 2. Based on the data analysis results, the calculated chi-square value (x^2 hitung) is 6.768, which exceeds the critical chi-square value (x^2 tabel) of 3.841. This indicates that knowledge of nutrition in food is a determining factor in the occurrence of chronic energy deficiency in pregnant women in South Konawe Regency. 3. The research results show a significant relationship between knowledge and the occurrence of chronic energy deficiency (KEK) in pregnant women, where the calculated chi-square value (x^2 hitung) is 6.768, which is greater than the critical chi-square value (x^2 tabel) of 3.841, and the Odds Ratio

							(OR) is 2.159. This means that pregnant women with inadequate knowledge of nutrition in food are at 2.159 times greater risk.
10.	Nur Cahya Rachmawati, Yulia Lanti Retno Dewi, Vitri Widyaningsi h 2019	Multilevel Analysis on Factors Associated with Occurrence Chronic Energy Deficiency among Pregnant Women. (Cahya N.R and Dewi Y, 2019)	Jurnal Of Maternal and Child Health (2019), 4(6): 474-485 e-ISSN: 2549-0257	English	To analyze the factors contributing to chronic energy deficiency in pregnant women in Gunung Kidul Regency.	Method: Using a case-control design. Research Instruments: Utilizing Mid Upper Arm Circumference (MUAC)/LILA and questionnaires. Data Analysis: Conducting hierarchical multiple logistic regression. Sampling Technique: Employing fixed disease sampling for pregnant women samples and cluster sampling for pregnancy samples at health centers. Population: All pregnant women at health centers in Gunung Kidul during April-May 2019. Sample: 200 pregnant women.	1. Based on the research results: From 200 respondents, it was found that 60 respondents have good knowledge and 140 respondents have poor knowledge. 2. Regarding the incidence of Chronic Energy Deficiency (KEK), 50 respondents experienced KEK while 150 respondents did not. 3. Bivariate analysis showed significant associations between KEK and the following factors: energy and protein intake (OR=6.01; p<0.001), education level (OR=7.15; p<0.001), occupation (OR=5.87; p<0.001), knowledge (OR=3.69; p<0.001), family income (OR=7.76; p<0.001), age (OR=3.99; p<0.001), reality (OR=4.00; p<0.001), utilization of ANC services (OR=3.59; p<0.001), and

							food availability (OR=4.47; p<0.001).
11.	Shinta Novelia, Rukmaini, Ema Annisa 2021	Factors Related to Chronic Energy Deficiency among Pregnant Women. (Novelia and Rukmaini, 2021)	Nursing and Health Sciences Journal Volume 1, Number 3 (December 2021) e-ISSN: 2798-5067 p-ISSN: 2798-5059	English	To determine the factors associated with Chronic Energy Deficiency (KEK) in pregnant women at Kaler Health Center, Tangerang Regency in 2019.	Method: Using a cross-sectional study. Research Instrument: Questionnaire on knowledge of Chronic Energy Deficiency (KEK) in pregnant women. Data Analysis: Conducted using univariate and bivariate analysis with Chi-Square statistical tests. Sampling Technique: Employing cluster random sampling. Population: 286 respondents. Sample: 167 respondents calculated using the Slovin's formula.	1. The research results indicate that: A majority of the respondents do not suffer from chronic energy deficiency (73.7%). 2. About 50.9% have inadequate knowledge. 3. Most respondents do not have a history of illness (94.6%) and are mostly multiparous (78.4%) with low knowledge. 4. The study shows a significant relationship between knowledge and chronic energy deficiency (KEK) in pregnant women, with a p-value of 0.06.

DISCUSSION

Knowledge is the result of knowing, which occurs through the human senses, namely sight, hearing, smell, taste, and touch. Most of human knowledge is obtained through the eyes and ears.(Soekidjo and Notoatmodjo, 2012) Knowledge of maternal nutritional intake is the result of knowing by pregnant women regarding the amount of nutrition intake through daily food consumption. (Suhardjo, 2010)

The analysis of 11 articles discussing the relationship between pregnant women's knowledge of nutrition and the occurrence of Chronic Energy Deficiency (KEK) reveals that: Most articles categorize knowledge into good, moderate, and poor categories, with a majority percentage (55%). This categorization was observed in studies by (Murti and Puspita, 2017), (Elfiyah S, Ani Nurhaini, 2021), (Retni and Puluhulaw, 2021), (Diningsih, Wiratmo and Lubis, 2021), (Robiyati and Anggraini, 2022) (Munanto and Sunarsih, 2020). Additionally, some articles categorize knowledge into good and poor categories, comprising 45% of the studies. These include research conducted by (Fitrianingtyas, Fenti and Wina, 2018), (Febriyeni, 2017), (Ulfiani, S.M and Budiman, 2021), (Cahya N.R and Dewi Y, 2019), and (Novelia and Rukmaini, 2021). All articles used a questionnaire to measure knowledge regarding nutritional intake during pregnancy, nutritious foods beneficial for pregnant women, consequences of nutritional deficiencies, proteins and minerals, protein sources and the effects of protein deficiency, foods rich in iron, consumption of iron supplements, foods to avoid during pregnancy, and myths about foods prohibited during pregnancy.

This aligns with Astri's opinion that a mother's knowledge significantly influences decision-making and behavior. Mothers with good nutritional knowledge are likely to provide sufficient nutrition for their babies. This is especially crucial during cravings, when they may feel reluctant to eat due to nausea and discomfort. Despite these conditions, mothers with good knowledge will strive to meet their and their baby's nutritional needs. From the analysis of the 11 articles, several studies examined the relationship between pregnant women's nutrition knowledge and the occurrence of Chronic Energy Deficiency (KEK)(Astri, 2011). For instance, in Dafiu's study, among 90 respondents, pregnant women with good knowledge had normal nutritional status (84.3%), whereas those with moderate and poor knowledge were more likely to have KEK, with percentages of 35.9% and 38.5%, respectively. The chi-square analysis yielded a p-value of 0.0001 ($p < 0.05$), indicating a significant association between good maternal knowledge and normal nutritional status (Dafiu and Rosmawati, 2017).

According to theory, the nutritional status of a mother during conception and throughout pregnancy significantly impacts the growth of the fetus she carries. The quality of a newborn is influenced by the mother's health and nutritional condition before and during pregnancy (Kusmiati, 2009). The majority of respondents have good knowledge, influenced by awareness and informed reasoning acquired from various sources such as print media, experiences shared by friends or family, and information from healthcare providers. Therefore, pregnant women's knowledge regarding maternal nutritional status is quite good, and most fall into the category of having good knowledge. Conversely, pregnant women with moderate or poor knowledge are often attributed to factors such as low education, unsupportive environments, and socio-cultural factors (Sugiharti and Evionita, 2019).

Based on the analyzed articles, it can be concluded that most pregnant women have good knowledge of nutrition. Considering the theories discussed above, knowledge or cognition plays a crucial role in shaping individual actions. Therefore, it is important to enhance pregnant women's knowledge of maternal nutritional issues, and for those who already possess such knowledge, it is hoped that they can apply it in their daily lives.

Occurrences of Chronic Energy Deficiency

Chronic Energy Deficiency (CED) in pregnant women is a state of insufficient nutrition due to an imbalance between energy intake and expenditure (Fitrianingtyas, Fenti and Wina, 2018). CED in pregnant women remains a persistent issue. It can impact the mother's health during pregnancy, childbirth, and the health of the child at birth (Diningsih, Wiratmo and

Lubis, 2021). Based on 11 analyzed articles, most pregnant women with good nutritional knowledge do not experience CED, whereas those with poor nutritional knowledge are at risk of CED. To assess nutritional status and the occurrence of CED in pregnant women, the Mid Upper Arm Circumference (MUAC) tape can be used. Pregnant women with MUAC <23.5 cm are at risk of poor nutritional status and CED. MUAC measurement is commonly used for screening rather than monitoring CED risk during pregnancy. Unlike MUAC, Body Mass Index (BMI) measurement cannot effectively detect CED risk due to weight changes during pregnancy. Therefore, MUAC is relatively more stable for assessing CED risk in pregnant women (Departemen Gizi dan Kesehatan, 2013).

Pregnant women should consume a minimum of 3,000 calories per day. If pregnant women avoid harmful habits such as smoking and substance abuse, it can contribute to good nutritional status for the baby at birth, and vice versa.

Based on the findings of the 11 analyzed articles, it can be concluded that a higher proportion of pregnant women exhibit good nutrition compared to those with poor nutrition or the absence of Chronic Energy Deficiency (CED). This trend may be influenced by good nutritional knowledge, as pregnant women understand the meaning of nutrition, its benefits, and good sources of nutrition during pregnancy. This understanding encourages pregnant women to apply what they know about nutrition.

Relationship Between Maternal Nutrition Knowledge and Incidence of Chronic Energy Deficiency

Based on an analysis of 11 articles, 10 studies indicate a significant relationship between maternal nutrition knowledge and the incidence of Chronic Energy Deficiency (CED). These studies include research by Murti & Ningrum, Elfiyah, Fitrianingtyas, Pertiwi & Rachmania, Nurhaini & Nurlaili, Retni & Puluhulaw, Diningsih, Wiratmo & Lubis, Febriyeni, Robiyati, Aisyah & Anggraini, Munanto, Sunarsih, & Labanudi, Rachmawati, Dewi & Widyaningsih, and Novelia, Rukmaini & Annisa.

According to the study by Murti & Ningrum, a majority of respondents with good nutrition knowledge also have good nutritional status. Pregnant women with positive attitudes tend to adopt health recommendations, such as consuming nutritious foods to prevent CED. This is because these pregnant women understand the concept of nutrition, its benefits, and good nutritional sources, which encourages them to apply this knowledge effectively and reduce the risk of CED (Fitrianingtyas, Fenti and Wina, 2018). On the other hand, pregnant women with inadequate knowledge, particularly regarding food and nutrition (understanding, types, functions, sources, and consequences of nutritional deficiencies), often fail to integrate nutritional information into their daily lives, leading to nutritional disorders (Suhardjo, 2010).

Similarly, Retni & Puluhulaw's study found that maternal nutrition knowledge significantly influences the occurrence of Chronic Energy Deficiency in the Batudaa Pantai Health Center area. Their Chi-Square test yielded a significance value of $p = 0.049$ ($p < 0.05$), indicating a correlation between maternal nutrition knowledge and CED occurrence. Dietary habits and food choices can be influenced by an individual's knowledge, attitudes towards food, and nutritional practices, which underpin food selection (Retni and Puluhulaw, 2021). The daily dietary requirements for pregnant women include carbohydrates for energy (3 tablespoons of rice or equivalents), proteins and minerals for growth (5 portions consisting of 2 pieces of fish/meat (50 grams each), 2 pieces of tempeh/tofu (50-70 grams each), and 1 portion of green/red beans), and vitamins and minerals for regulation (4 portions consisting of 1 portion of vegetables (100 grams) and 3 portions of fruits (100 grams), along with 5-7 glasses of milk for carbohydrates, proteins, vitamins, and minerals (Marni, 2013). Pregnant women with higher nutrition knowledge tend to pay more attention to the nutritional value of the foods they consume, thereby reducing the risk of Chronic Energy Deficiency (CED).

This finding is consistent with Rachmawati, Dewi & Widyaningsih's study, which demonstrated that higher maternal nutrition knowledge correlates with a lower risk of CED during pregnancy. Insufficient knowledge is often due to low maternal education and a lack of

effort to seek information related to CED. Maternal nutrition knowledge influences food choices, and women with greater knowledge are more likely to consider the nutritional value of their diet (Cahya N.R and Dewi Y, 2019). Chronic Energy Deficiency (CED) in pregnant women can be influenced by dietary patterns affected by cultural factors, such as beliefs that certain foods should be avoided during pregnancy to prevent birth defects. This belief can lead to inadequate food intake by pregnant women (Retni and Puluhulaw, 2021).

One article, conducted by Maskur, Budiman & Lestari, reported no significant relationship between maternal nutrition knowledge and the incidence of Chronic Energy Deficiency (CED). Their Chi-Square analysis yielded a significance value of 0.775 ($P > 0.05$), indicating no significant association between knowledge of chronic energy deficiency and its prediction in pregnant women at Talise Health Center. Economic factors in the family play a crucial role in this regard. Despite high maternal education, insufficient purchasing power can lead to unmet nutritional needs for pregnant women in terms of both quality and quantity, resulting in Chronic Energy Deficiency. Furthermore, lack of family support also affects the incidence of Chronic Energy Deficiency, as inadequate support discourages pregnant women from taking preventive measures against CED, thereby experiencing Chronic Energy Deficiency. Health behavior is influenced by factors such as knowledge. Insufficient knowledge of nutrition during pregnancy results in pregnant women consuming less energy than required (Ulfiani, S.M and Budiman, 2021).

Based on the analysis of 11 articles, it can be concluded that 10 studies suggest a significant relationship between maternal nutrition knowledge and the incidence of CED, while 1 study reports no relationship between maternal nutrition knowledge and the incidence of CED. Pregnant women with good nutrition knowledge are less likely to experience CED, whereas those with inadequate knowledge are at risk of developing CED.

CONCLUSIONS

The conclusions drawn from the analysis of 11 articles regarding the relationship between pregnant women's knowledge of nutrition and the incidence of Chronic Energy Deficiency (CED) are as follows:

1. Based on the analyzed articles, it is found that the majority of pregnant women have good knowledge of nutrition.
2. According to the analyzed articles, most pregnant women do not experience CED.
3. From the literature review, 10 articles indicate a significant relationship between pregnant women's knowledge of nutrition and the incidence of chronic energy deficiency, while 1 article suggests no significant relationship. Pregnant women with good nutrition knowledge are less likely to experience CED, whereas those with poorer knowledge are at higher risk of CED.

These conclusions highlight the importance of improving nutrition knowledge among pregnant women to reduce the risk of CED during pregnancy.

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