



LITERATURE REVIEW: FACTORS ASSOCIATED WITH THE INCIDENCE OF CHRONIC ENERGY DEFICIENCY IN PREGNANT WOMEN

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ABSTRACT

Chronic Energy Deficiency in pregnant women is a serious health problem because it increases the risk of complications during pregnancy, childbirth, and fetal growth. Various studies have shown that the prevalence of chronic energy deficiency remains high and is influenced by multidimensional factors such as nutritional status, socioeconomic status, knowledge, and access to health services. The purpose of this study was to conduct a literature review to identify factors of chronic energy deficiency to strengthen evidence-based prevention strategies, specifically dietary patterns, maternal knowledge, and husband or family support. The study used a literature review by searching articles in PubMed, ScienceDirect, and Google Scholar. The inclusion criteria were articles published between 2021 and 2025, cross-sectional design, full papers, and discussing variables related to chronic energy deficiency in pregnant women. The MeSH (Medical Subject Heading)-based keywords were "Chronic Energy Deficiency" AND "Pregnant Women" AND "Food Consumption Patterns" OR "Husband/Family Support" OR "Mother's Knowledge". A total of 21 articles met the criteria and were analyzed. Most studies found a significant association between maternal knowledge and the incidence of chronic energy deficiency. Consumption patterns were also associated with the incidence of chronic energy deficiency, especially in mothers with low energy and protein intake. Husband or family support has been shown to be a reinforcing factor that helps mothers meet nutritional needs through emotional, informational, and financial support. Prevention of chronic energy deficiency requires a multidimensional approach that focuses on increasing nutritional knowledge, improving eating habits, and strengthening family support.

Keywords: chronic energy deficiency; consumption patterns; husband's support; maternal knowledge; nutrition of pregnant women

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INTRODUCTION

Chronic energy deficiency is a condition where the mother suffers from a chronic lack of food consumption which causes health problems in pregnant women (Febriyeni, 2017). Chronic Energy Deficiency in pregnant women is a nutritional problem that remains a major challenge in improving maternal health. This condition results from a long-term imbalance in energy and protein intake, which impacts maternal health and fetal growth, and potentially increases the risk of maternal and neonatal morbidity and mortality (Astikasari & Harliyanti, 2018). Various reports indicate that the prevalence of chronic energy deficiency in pregnant women in Indonesia remains high and tends to vary across regions, influenced by social, economic, cultural, and environmental factors (Ernawati, 2018). Pregnant women with KEK generally have a BMI <18.5 kg/m², mid-upper arm circumference (MUAC) <23.5 cm, and show signs of fatigue, weakness, and are at high risk of pregnancy complications such as anemia, premature birth, and low birth weight (LBW) babies (Kemenkes RI, 2022; Usiyanti et al., 2024). (Riansih et al., 2023).

Based on WHO, (2021) data the prevalence of chronic energy deficiency in pregnancy globally is 35-75%, which is significantly higher in the third trimester compared to the first and second trimesters of pregnancy. WHO also noted that 40% of maternal deaths in developing countries are related to chronic energy deficiency. The incidence of chronic energy deficiency in developing countries such as Bangladesh (47%), Myanmar (39%), India (35.5%), Indonesia (33%), Nepal (31%), Sri Lanka (27%), and Thailand (15.25%) is 15-47%, namely with a BMI <18.5%. The country with the highest incidence is Bangladesh at 47%, while Indonesia is the fourth largest after India with a prevalence of 35.5% and the lowest is Thailand with a prevalence of 15.25%. According to the 2018 Indonesian Basic Health Research report, the prevalence of chronic energy deficiency in pregnant women in Indonesia is 17.3%. Maluku Province has the highest proportion of chronic energy deficiency in pregnant women in Indonesia at 30.7%, and North Kalimantan has the lowest at 1.7%. South Kalimantan has 19.5% of pregnant women with chronic energy deficiency (Kemenkes RI, 2019).

Chronic energy deficiency in pregnant women can cause risks and complications for the mother, including the mother not gaining weight normally, anemia, bleeding, and infection (Widiyanti et al., 2023). A pregnant woman who has chronic energy deficiency will feel constantly tired, feel tingling, have a pale and unfit face, experience difficulties during childbirth, and when breastfeeding later the mother's breast milk will not be enough to meet the baby's needs so the baby will lack breast milk (Owa et al., 2017). The effect of chronic energy deficiency on the birth process can result in premature birth, difficult and prolonged labor, bleeding after delivery (Mathur & Pillai, 2019). Pregnant women who experience chronic energy deficiency can experience stunted growth of the fetus they are carrying, miscarriage or abortion, stillbirth, neonatal death, congenital defects, anemia in babies, intrapartum asphyxia (death in the womb), and birth with low birth weight (Haryanto et al., 2017).

Factors influencing chronic energy deficiency include direct factors (food intake or consumption patterns and infections) and indirect factors, encompassing a variety of factors, including maternal age, parity (number of previous pregnancies), education level, knowledge of nutritional needs, employment status, household income, food expenditure, availability of nutritious food choices, maternal age, pregnancy spacing, behavioral factors, and frequency of antenatal care (ANC) visits (Diana et al., 2022). Therefore, this literature review was conducted to examine the relationship between direct factors, which are factors that biologically and directly influence the incidence of chronic energy deficiency in pregnant women, and indirect factors, which are factors that indirectly influence the incidence of chronic energy deficiency in pregnant women through certain conditions.

METHOD

The method used in this study was a literature review by searching for scientific articles through several databases, namely PubMed, ScienceDirect, and Google Scholar. The selection of literature was carried out based on predetermined inclusion criteria, including articles published between 2021 and 2025, available in full paper form and freely accessible, and discussing relevant topics such as chronic energy deficiency, pregnant women, food consumption patterns, maternal knowledge, and husband or family support. In addition, only articles with a cross-sectional research design, written in Indonesian or English, and published in national journals indexed at least Sinta 4 or international journals indexed by Scopus were included in the review.

To assist the literature identification process, the researcher determined MeSH (Medical Subject Heading)-based keywords, namely "Chronic Energy Deficiency" AND "Pregnant Women" AND "Food Consumption Patterns" OR "Husband/Family Support" OR "Mother's Knowledge" for the search in international journals. Meanwhile, a national journal search used the keywords "chronic energy deficiency" AND "pregnant women" AND "dietary patterns" OR "husband/family support" OR "maternal knowledge." This method was applied to ensure that the reviewed literature was

relevant, up-to-date, and of adequate academic quality. The literature review was conducted narratively by searching for scientific articles and then analyzing them descriptively and comparatively.

RESULT

Based on the article review, 21 articles examined the relationship between nutritional needs and the incidence of chronic energy deficiency in pregnant women, which are briefly described below.

Table 1.

Descriptive characteristics of studies on nutritional needs and the incidence of chronic energy deficiency in pregnant women (n = 21): 2021–2025

Author (Year)	Design	Location	Target	Sampling	Age	Education	Income
Marjan <i>et al.</i> (2021)	Cross-Sectional	In the Gunung Sindur Community Health Center area of Bogor Regency.	70 pregnant women	Purposive Sampling	≥ 20 year	Graduated from elementary school	Rp. 1.000.000 – 5.000.000
Riansih <i>et al.</i> (2023)	Cross-Sectional	In the Glondong Mlati area of Sleman, Yogyakarta.	30 pregnant women	Total sampling	-	-	> Minimum Wage
Sunsanti <i>et al.</i> (2024)	Cross-Sectional	In the Ogan Komering Regency Review.	54 pregnant women	Accidental sampling	-	-	High income
Lestari <i>et al.</i> (2023)	Cross-Sectional	In the working area of the North Bogor Community Health Center	65 pregnant women	Simple random sampling	20-35 year	Low education	≤ Rp. 4.330.249,57
Sulistianingsih <i>et al.</i> (2024)	Cross-Sectional	In Jambesari Village, Bondowoso	41 pregnant women	Total sampling	26-35 tahun	Junior High School	-
Wati <i>et al.</i> (2024)	Cross-Sectional	In Banyumas Regency, Central Java Province, Indonesia	100 pregnant women	Cluster random sampling	20-35 year	Senior High School	-
Usiyanti <i>et al.</i> (2024)	Cross-Sectional	In the working area of the Gardu Harapan Community Health Center	89 pregnant women Trimester III	Total sampling	20-35 year	-	High income
Simanjuntak <i>et al.</i> (2024)	Cross-Sectional	In the working area of the Pembina Community Health Center, Palembang	100 pregnant women	-	20-35 year	High education	-
Harna <i>et al.</i> (2024)	Cross-Sectional	In the working area of the Parung Panjang Community Health Center, Bogor	140 pregnant women	Purposive Sampling	20-35 year	Low education	< Minimum Wage

		Regency					
Kadmaerubun <i>et al.</i> (2023)	<i>Cross- Sectional</i>	In the working area of the Kolser Community Health Center, Southeast Maluku Regency	35 pregnant women	<i>Total sampling</i>	-	-	-
Triyawati & Yuliani (2023)	<i>Cross- Sectional</i>	In the working area of the Balen Community Health Center, Bojonegoro Regency, Indonesia	122 pregnant women	<i>Simple random sampling</i>	20-35 year	Senior High School	-
Pambudi (2023)	<i>Cross- Sectional</i>	In the working area of the Gaji Community Health Center, Tuban Regency	68 pregnant women	<i>Purposive sampling</i>	20-35 year	Higher education consists of high school and college	< UMK
Ulfah & Latip (2024)	<i>Cross- Sectional</i>	In the working area of the Dander Community Health Center, Bojonegoro Regency	96 pregnant women	<i>Proporsional simple random sampling</i>	-	-	-
Mansoben & Gurning, 2022	<i>Cross sectional</i>	Working area of the Remu Community Health Center, Sorong City	98 pregnant women	<i>Accidental</i>	20– 35 year	Elementary school Middle school High school	Low/High
Maurizatilla <i>et al.</i> 2024	<i>Cross sectional</i>	Working area of the Tanah Luas Community Health Center, North Aceh Regency	37 pregnant women	<i>Purposive</i>	<20 & ≥35 year	Elementary school Middle school High school	Low
Mariyatun <i>et al.</i> 2023	<i>Cross sectional</i>	Working area of the Simpang Teritip Community Health Center, West Bangka Regency	63 pregnant women KEK	-	20– 35 year	Elementary school Middle school High school	Low
Sukarti <i>et al.</i> 2023	<i>Cross sectional</i>	Working area of the Purnama Community Health Center, Dumai City	170 pregnant women	<i>Simple random</i>	20– 35 year	Did not graduate from high school / high school	Low
Aryanti & Tambunan, 2023	<i>Retrospektif & Cross sectional</i>	Working area of the Napal Putih Community Health Center,	45 pregnant women	<i>Total sampling</i>	20– 35 year	-	Low

		North Bengkulu Regency					
Fitria <i>et al.</i> 2023	Cross sectional	Puskesmas Guciali Community Health Center, Kedungjajang, Klakah, Ranuyoso, and other areas. Lumajang	194 pregnant women (97 chronic energy deficiency+ 97 control)	Purposive	20–35 year	Elementary school Middle school High school	Low
Aeni <i>et al.</i> 2024	Cross sectional	Losarang Community Health Center, Indramayu Regency	67 pregnant women	Accidental	20–35 year	Elementary school Middle school High school	Variatif
Herawati <i>et al.</i> 2024	Cross sectional	Pajar Bulan Community Health Center, Muara Enim Regency	56 pregnant women	Total sampling	≤20 & ≥35 year	Did not graduate from high school / high school	Low

Table 2.
Results of a Review of 21 Articles on Factors Affecting Nutritional Needs and the Incidence of chronic energy deficiency in Pregnant Women (n = 21) in 2021–2025

Researchers, Year	Factors analyzed	Metode	Chronic energy deficiency prevalence	Factors related to chronic energy deficiency
Marjan <i>et al.</i> (2021)	Age, parity, pregnancy spacing, nutritional knowledge, Energy intake, protein intake	Questionnaire 2x24-hour recall form	57.14% of pregnant women are at risk of Chronic energy deficiency (40 out of 70 women).	Age (p=0.009), parity (p=0.027), nutritional knowledge (p=0.045), energy intake (p=0.001, OR 9.667), and protein intake (p=0.007).
Riansih <i>et al.</i> (2023)	Pregnancy spacing, parity, income, knowledge, Infectious diseases Pregnancy spacing, knowledge, and family income	Questionnaire Maternal and Child Health (KIA) book for pregnant women	33.3% of pregnant women experience CED (10 out of 30 pregnant women).	Birth spacing (p=0.000), parity (p=0.000), income (p=0.000), knowledge (p=0.000), and infectious diseases (p=0.000)
Susanti <i>et al.</i> (2024)	Pregnancy spacing, family knowledge, and income	Questionnaire	24.1% of pregnant women experienced CED (13 out of 54).	Knowledge (p=0.000) with OR 19.444, pregnancy spacing (p=0.000, OR 22.688), income (p=0.000, OR 32.083).
Lestari <i>et al.</i> (2023)	Age, economic status, pregnancy spacing, education, maternal knowledge of nutrition, prenatal care, and infectious diseases	Questionnaire Secondary data	A total of 24.6% of pregnant women experienced CED (16 out of 65).	Maternal knowledge (p=0.007, OR 6.188), pregnancy spacing (p=0.67), education (p=0.757).
Sulistianingsih <i>et al.</i> (2024)	Dietary patterns	Questionnaire	41.5% of pregnant women experienced	Dietary patterns (p=0.011).

			CED (17 out of 41).	
Wati <i>et al.</i> (2024)	Maternal age, pregnancy interval, parity, educational attainment, nutritional knowledge, occupation, frequency of antenatal care (ANC) Nutritional intake.	Questionnaire SQ-FFQ	As many as 32% of pregnant women experience KEK (out of a total of 100 pregnant women).	Maternal age (p=0.022, OR:3.49;95% CI: 1.10-11.05), pregnancy interval (p=0.009, OR:7.30;95%CI:1.84-28.99), education level (p=0.012, OR:4.12; 95%CI:1.37-12.33), nutritional knowledge (p=0.023), utilization of ANC services (p=0.028, OR:3.06;95%CI: 1.01-9.19), energy intake (p=0.002), protein intake (p=0.006, OR:6.80;95%CI: 1.62-28.59), vitamin C intake (p=0.016), folate intake (p=0.011), calcium intake (p=0.004).
Usiyanti <i>et al.</i> (2024)	Family knowledge and income	Questionnaire	As many as 23.6% of pregnant women experienced KEK (21 out of 89 people).	Age (p=0.000, OR 8.375), knowledge (p=0.000, 4.650, family income (p=0.000, OR 5.600).
	Demographic data and health history	Medical records		
Simanjuntak <i>et al.</i> (2024)	Education, knowledge, nutritional intake, and husband's support	Questionnaire	Of 100 pregnant women, 25 (25%) experienced CED, while 75 (75%) did not.	Education values (p=0.000, OR: 5.84 95% CI=2.19-15.63), knowledge (p=0.000, OR: 71.24 95% CI:16.96-299.30), nutritional intake (p=0.000, OR: 204.13 95% CI: 35.07-1188.02), husband's support (p=0.000, OR: 4.57 95% CI = 3.13-6.67).
Harna <i>et al.</i> (2024)	Maternal age, parity, gestational age, history of infectious diseases, knowledge, income, anemia status Energy adequacy, protein adequacy	Questionnaire SQ-FFQ	The prevalence of CED was 20.7% (29 out of 140 pregnant women).	Maternal age (p<0.05, OR 2.472), parity (p<0.05, OR 4.125), pregnancy spacing (p<0.05 OR 2.959), history of infectious disease (p<0.05), knowledge level (p<0.05, OR 0.223), energy intake (p<0.05, OR 0.392).
Kadmaerubun <i>et al.</i> , (2023)	Maternal and carbohydrate adequacy Dietary patterns and nutritional intake	Questionnaire	20.0% of pregnant women experienced CED (7 out of 35 had CED).	Diet (p=0.000), nutritional intake (p=0.000).
Triyawati & Yuliani (2023)	Age, number of children, educational background, employment status, maternal knowledge, antenatal class participation, and family support	Questionnaire and Secondary data(cohort mother)	As many as 19.7% of pregnant women experienced CED (24 CED and 98 non-CED).	Education level (p=0.000), knowledge (p=0.020), antenatal classes (p=0.047), informative support (p=0.032), instrumental support (p=0.017)
Pambudi (2023)	Identity (age, education,	Questionnaire (Secondary	19.7% of pregnant women	Maternal age (p=0.001), parity (p=0.013), maternal

	employment), socioeconomic status (income), maternal knowledge	data)	experienced CED (24 out of 122).	employment status (p=0.014), maternal education (p=0.009).
	Obstetric history (maternal age, parity, pregnancy spacing	Interview + KIA book		
	Nutritional intake	Observation with 24-hour recall or FFQ		
Ulfah & Latip (2024)	Dietary patterns, husband's support, and food culture	Questionnaire and documentation (KIA book)	41.7% of pregnant women experienced CED (40 out of 94).	Dietary patterns (p=0.000), husband's support (p=0.000), and food culture (p=0.000).
Mansoben & Gurning, 2022	Knowledge, income, husband's support	Questionnaire	Of the 98 pregnant women, 24 (24.5%) had CED and 74 (75.5%) did not.	Knowledge (p=0.043), income (p=0.031), husband's support (p=0.007).
Maurizatilla <i>et al.</i> , 2024	Age, parity, income, knowledge	Questionnaire	59.5% of pregnant women experienced CED (15 out of 37)	Age (p=0.031), parity (p=0.000), income (p=0.037), knowledge (p=0.038).
Mariyatun <i>et al.</i> , 2023	Nutritional patterns, attitudes, family support	Questionnaire	25.4% of pregnant women experienced CED (22 out of 63).	Nutritional patterns (p=0.012), attitudes (p=0.028), family support (p=0.020).
Sukarti <i>et al.</i> , 2023	Knowledge, infection, energy and protein intake	Questionnaire	Of the 170 pregnant women, 50 mothers had CED (29.4%) and 120 mothers did not have CED (70.6%).	Knowledge (p=0.029), infectious diseases (p=0.044), energy intake (p=0.041), protein (p=0.038)
Aryanti & Tambunan, 2023	Consumption patterns, dietary restrictions	Questionnaire	Of the total 45 pregnant women, 33 (73.3%) did not have CED, 12 (26.7%) had CED	Consumption patterns (p=0.023), infections (p=0.041), dietary restrictions (p=0.013).
Fitria <i>et al.</i> , 2023	Infectious diseases Predisposing factors: age, education, knowledge, occupation, and adherence to antenatal care. Reinforcing factors: support from husband and family, and the role of health workers. Enabling factors: transportation	Observation Questionnaire	97 KEK mothers and 97 non-KEK mothers	Education (p=0.043), pregnancy (p=0.000), parity (p=0.000), pregnancy spacing (p=0.000), husband's support (p=0.005)

	and easy access to health information.			
Aeni <i>et al.</i> , 2024	Dietary patterns	Questionnaire	Of the 67 pregnant women, 58 (86.6%) did not have CED, 9 had CED (13.4%).	Diet (p=0.294).
Herawati <i>et al.</i> , 2024	Education, knowledge, age, parity	Questionnaire	Of the 56 pregnant women, 31 mothers had CED and 25 mothers did not have CED (31/56 = 55.4%).	Education (p=0.009), knowledge (p=0.001), age (p=0.040), parity (p=0.013).

DISCUSSION

Table 1 shows the population characteristics of 21 studies examining the relationship between factors related to nutritional fulfillment and the incidence of chronic energy deficiency in pregnant women. The majority of studies used a cross-sectional design, with locations spread across various community health centers (Puskesmas) operating areas in Indonesia, providing a fairly representative picture of the social, economic, and demographic variations of pregnant women.

In terms of characteristics, the pregnant women studied were generally aged between 20 and 35, the most active reproductive age group. Maternal education levels varied from low (elementary school–junior high school) to high (senior high school–university), reflecting differences in knowledge capacity that can influence nutritional awareness. Family income also varied from low to high, reflecting unequal access to food and health services. Various sampling techniques were used, including purposive sampling, total sampling, accidental sampling, and simple random sampling, indicating differences in sample representation across studies. Overall, the characteristics in Table 1 indicate that the sociodemographic factors of pregnant women are highly heterogeneous, and this is important to consider as it can influence the results of analyses related to chronic energy deficiency incidence in each study area.

Table 2 shows the three main factors most frequently analyzed in relation to the incidence of chronic energy deficiency in pregnant women: consumption patterns or nutritional intake, maternal knowledge, and family support. These three factors demonstrate the relationship between direct factors, such as consumption patterns that directly influence energy and protein adequacy, and indirect factors, such as family knowledge and support that shape eating behavior, access to nutritious food, and maternal decisions in utilizing health services. The relationship between these direct and indirect factors illustrates that the incidence of chronic energy deficiency in pregnant women is influenced by a combination of the nutritional conditions consumed by pregnant women and the supporting environment that influences the mother's ability to meet her nutritional needs.

Maternal Nutritional Knowledge and the Incidence of Chronic Energy Deficiency

Knowledge was the most prominent factor, identified in 17 of 21 studies. A literature review showed that pregnant women's knowledge of pregnancy nutrition was significantly associated with the incidence of chronic energy deficiency. Knowledge of nutritional needs during pregnancy, the functions of nutrients, and the risks posed by chronic energy deficiency plays a crucial role in shaping maternal attitudes and behaviors regarding nutritional needs. (Sulistyawati, 2019). Pregnant women with a good level of knowledge tend to be able to choose the appropriate types and amounts of food, maintain regular eating patterns, and are more responsive in utilizing health services such as antenatal care check-ups (Astuti *et al.*, 2023).

Maternal knowledge functions as a predisposing factor that influences health behavior, as explained in the theory of health behavior (Muntarti, 2021). Adequate knowledge enables mothers to understand the importance of adequate energy and protein intake during pregnancy, thus encouraging behavioral changes toward healthier eating practices. Conversely, limited knowledge often leads to mothers being unaware of the signs and risks of chronic energy deficiency, ignoring dietary diversity, and having less than optimal access to available health information and services (Grace et al., 2022).

However, several studies have shown that good knowledge does not always translate into adequate nutritional practices. This indicates the presence of other contributing factors, such as economic constraints, food availability, cultural or dietary restrictions, and low family support. These conditions can hinder the application of knowledge to practical behavior, even if mothers understand the importance of adequate nutrition during pregnancy. Therefore, improving nutritional knowledge among pregnant women remains a crucial component in efforts to prevent chronic energy deficiency, but it needs to be integrated with other supporting interventions. Sustainable, accessible, and contextual nutrition education, supported by a responsive family environment and health services, is expected to increase the effectiveness of behavior change and reduce the risk of chronic energy deficiency in pregnant women (Astikasari & Harliyanti, 2018).

Food Consumption Patterns and Nutritional Intake in Pregnant Women

Consumption patterns or nutritional intake are the most frequently studied factors, appearing in 14 of 21 studies. A literature review showed that unbalanced dietary patterns, low meal frequency, and energy and protein intake that does not meet nutritional adequacy are significantly associated with the incidence of chronic energy deficiency in pregnant women. The majority of studies confirm that energy and protein insufficiency are the primary determinants of chronic energy deficiency risk. Physiologically, pregnancy increases energy and protein requirements to support the growth and development of the fetus and placenta, as well as metabolic and anatomical changes in the mother (Purborin & Rumaropen, 2023). Additional energy requirements of around 180–300 kcal per day and increased protein requirements that are not balanced with adequate intake will cause a long-term energy deficit, resulting in chronic energy deficiency (Aryani & Annisa, 2019).

Yunika, (2021) which states that pregnant women with energy and protein intakes below the recommended intake have a higher risk of developing chronic energy deficiency compared to women with adequate intake. The mismatch between nutritional needs and consumption is often influenced by various factors, such as economic constraints, low nutritional knowledge, irregular eating habits, and food restrictions during pregnancy. This condition worsens the nutritional status of pregnant women and prevents them from meeting optimal nutritional needs. In addition to macronutrients, several studies also emphasize the importance of dietary variability and adequate micronutrients, such as folate, vitamin C, iron, and calcium, as protective factors against chronic energy deficiency. These micronutrients play an important role in energy metabolism, blood cell formation, tissue growth, and bone health of both mother and fetus. Monotonous consumption patterns, low consumption of vegetables and fruit, and a predominance of simple carbohydrates without a balanced intake of animal or vegetable protein have been shown to contribute to the low nutritional status of pregnant women, as reported by Rizka & Ahmad, (2014).

Therefore, an adequate, diverse, and balanced diet is a key component in preventing chronic energy deficiency in pregnant women. Nutritional interventions focused on improving the quality and quantity of food consumption, education about nutritional needs during pregnancy, and regular dietary monitoring through antenatal care services need to be optimized. This approach is expected to reduce the risk of chronic energy deficiency and support the achievement of optimal nutritional status in pregnant women.

Family Support for Nutritional Needs in Pregnant Women

Family support was found to be an important factor in 6 of 21 studies. A literature review showed that family support, particularly husband's support, plays a significant role in preventing chronic energy deficiency in pregnant women. This support includes physical, emotional, financial, and informational assistance that enables pregnant women to optimally meet nutritional needs during pregnancy. Mothers with strong family support are more likely to maintain regular eating patterns, have better access to nutritious foods, and are more compliant with health care providers' recommendations regarding nutritional needs and antenatal care visits (Fatoni et al., 2015).

Within the Green health behavior model, family support is categorized as a reinforcing factor that strengthens the influence of maternal knowledge and attitudes on the development of health behaviors, including nutritional behavior. Good nutritional knowledge in pregnant women will be more easily translated into healthy eating practices if supported by a conducive family environment. Conversely, without family or husband support, pregnant women potentially face various obstacles, such as limited access to nutritious food, an inability to avoid culturally based dietary restrictions, and a lack of consistency in implementing a healthy diet, which ultimately increases the risk of developing chronic energy deficiency (Otarina & Fauzia, 2019).

Several studies have also confirmed that the involvement of husbands or family members in household decision-making directly impacts a pregnant woman's ability to meet nutritional needs, especially in families with limited economic resources. Strong family support not only provides better access to food but also provides motivation and a sense of security for mothers in managing their food consumption according to pregnancy needs. This finding aligns with research Koamesah, (2021) which states that family support is a crucial determinant in maintaining the nutritional status of pregnant women.

Therefore, strengthening the role of the family, particularly husbands, is a crucial strategy in preventing chronic energy deficiency. Nutrition interventions should not only focus on pregnant women but also involve families through nutrition education, family-based counseling, and empowering husbands to support maternal and fetal health. This approach is expected to create an environment that supports healthy nutritional behaviors and sustainably reduces the incidence of chronic energy deficiency in pregnant women.

Other Indirect Factors Affecting the Incidence of Chronic Energy Deficiency

In addition to family knowledge and support, several other indirect factors have been found to influence the incidence of chronic energy deficiency through the social, economic, and health behaviors of pregnant women. Family education and income have been shown to influence a mother's ability to understand nutritional information and access nutritious foods. Reproductive factors, such as pregnancy spacing and parity, also play a role, as pregnancies that are too close together or have a high number of pregnancies can repeatedly deplete a mother's energy reserves.

Cultural factors, including dietary restrictions or specific consumption habits, contribute to low nutritional diversity and adequacy. Furthermore, the regularity of antenatal care visits influences the risk of chronic energy deficiency by affecting a mother's access to education and monitoring of nutritional status during pregnancy. Overall, these findings emphasize that indirect factors operate through various social and reproductive dimensions, shaping consumption behavior and the ability of pregnant women to optimally meet nutritional needs.

CONCLUSION

Based on an analysis of 21 articles, the prevalence of chronic energy deficiency syndrome in pregnant women varies widely, ranging from 13% to over 50%, with the majority tending to fall within the 20–30% range. These findings confirm that chronic energy deficiency remains a

significant maternal nutrition problem in various regions. The incidence of chronic energy deficiency is primarily influenced by three main factors: maternal knowledge, dietary patterns, and family support. Maternal knowledge has been shown to play a significant role in food selection behavior and meeting nutritional needs, although findings vary depending on environmental and socioeconomic conditions. Inadequate dietary patterns, particularly low energy, protein, and micronutrient intake, have been consistently associated with an increased risk of chronic energy deficiency. Husband or family support is also an important determinant, contributing to meeting nutritional needs through emotional, informational, and financial support, as well as the provision of nutritious food.

Furthermore, several indirect factors, such as education, family income, parity, pregnancy spacing, employment status, dietary habits, and the regularity of ANC visits, also contribute partially to the occurrence of chronic energy deficiency. Overall, these findings confirm that preventing chronic energy deficiency in pregnant women requires a multidimensional approach that encompasses not only increasing nutritional knowledge and improving consumption patterns, but also optimizing family support and strengthening maternal health services at the primary level. Implementing integrated interventions is expected to reduce the prevalence of chronic energy deficiency and improve the nutritional status of pregnant women sustainably.

REFERENCES

- Aryani, N. P., & Annisa, N. H. (2019). PENGARUH PENINGKATAN BERAT BADAN SELAMA KEHAMILAN TERHADAP BERAT BADAN BAYI BARU LAHIR DI PUSKESMAS KEDIRI TAHUN 2016. *Bunda Edu-Midwifery Journal (Bemj)*, 2(2), 16–23. <https://bemj.e-journal.id/BEMJ/article/view/4>
- Astikasari, N. D., & Harliyanti, W. O. S. A. (2018). Analisis Perbandingan Status Gizi Ibu Hamil Yang Mengkonsumsi Susu Ibu Hamil Dan Yang Tidak Mengkonsumsi Susu Ibu Hamil Selama Kehamilan Di Bpm Ny. Endang S Kota Kediri. *Journal for Quality in Women's Health*, 1(1), 39–44. <https://jqwh.org/index.php/JQWH/article/view/7>
- Astuti, D. P., Damayanti, R., Mutikai, W. T., & Maryana, J. (2023). Identifikasi Karakteristik Ibu Hamil Risiko Tinggi. *Midwifery Science Care Journal*, 2(1), 17–22.
- Diana, D., Suprida, S., Riski, M., & Turiyani, T. (2022). Hubungan Pengetahuan, Frekuensi ANC, dan Usia Ibu dengan Deteksi Dini Bahaya Kehamilan Pada Ibu Hamil Trimester III. *Jurnal Ilmiah Universitas Batanghari Jambi*, 22(1), 171. <https://doi.org/10.33087/jiubj.v22i1.1776>
- Ernawati, A. (2018). Hubungan Usia Dan Status Pekerjaan Ibu Dengan Kejadian Kurang Energi Kronis Pada Ibu Hamil. *Jurnal Litbang*, XIV(1), 27–37.
- Fatoni, Z., Astuti, Y., Situmorang, A., NFN, W., & Purwaningsih, S. S. (2015). Implementasi Kebijakan Kesehatan Reproduksi Di Indonesia: Sebelum Dan Sesudah Reformasi. *Jurnal Kependudukan Indonesia*, 10(1), 65. <https://doi.org/10.14203/jki.v10i1.56>
- Febriyeni. (2017). Faktor-Faktor Yang Berhubungan Dengan Kejadian Kekurangan Energi Kronis Pada Ibu Hamil. *Jurnal Human Care*, 2(3).
- Grace, M. P., Goa, M. Y., & Bina, M. Y. (2022). Faktor-faktor yang Mempengaruhi Kunjungan Ibu Hamil Dalam Melakukan Antenatal Care di Puskesmas Kota Kupang. *CHMK Midwifery Scientific Journal*, 5(1), 400–414.
- Haryanto, C., Pradigdo, S., & Rahfiluddin, M. (2017). Faktor-Faktor Yang Berhubungan Dengan Kejadian Berat Badan Lahir Rendah (BBLR) Di Kabupaten Kudus (Studi di Wilayah Kerja Puskesmas Undaan Kecamatan Undaan Kabupaten Kudus Tahun 2015). *Jurnal Kesehatan Masyarakat (e-Journal)*, 5(1), 322–331.
- Kemendes RI. (2019). Laporan Nasional Riskesdas 2018. Jakarta: Kementerian Kesehatan Republik Indonesia, Badan Penelitian dan Pengembangan Kesehatan.
- Kemendes RI. (2022). Pedoman Penanggulangan Ibu Hamil Kekurangan Energi Kronis. Jakarta: Direktorat Pembinaan Kesehatan Masyarakat.

- Koamesah, S. M. J. et al. (2021). Relationship Between Knowledge, Family Support, Frequency of Information, and Attitude Towards Triple Elimination Testing During Covid-19. *Journal of Community Health*, 3(1), 1–9.
- Mathur, P., & Pillai, R. (2019). Overnutrition: Current scenario & combat strategies. *The Indian Journal of Medical Research*, 149(6), 695–705. https://doi.org/10.4103/ijmr.IJMR_1703_18
- Muntarti. (2021). Hubungan Tingkat Pengetahuan Ibu Hamil Dengan Kepatuhan Pemeriksaan Triple Eliminasi Di UPTD Puskesmas Sonokidul. *Skripsi*, 126.
- Otarina, & Fauzia, Y. (2019). Perilaku Pemenuhan Gizi Pada Ibu Menyusui Di Beberapa Etnik Di Indonesia. *Buletin Penelitian Sistem Kesehatan*, 22(4).
- Owa, K., Putra, I. W. G. A. E., & Trisna Windiani, I. G. . (2017). Risk factors for low birth weight infants in East Nusa Tenggara. *Public Health and Preventive Medicine Archive*, 5(1), 49. <https://doi.org/10.24843/phpma.2017.v05.i01.p08>
- Purborin, S. F. A., & Rumaropen, N. S. (2023). Hubungan Usia , Paritas , dan Tingkat Pendidikan dengan Kehamilan Tidak Diinginkan Pada Pasangan Usia Subur di Surabaya. *Media Gizi Kesmas*, 12(1), 207–211. <https://doi.org/10.20473/mgk.v12i1.2023.207-211>
- Rizka, F., & Ahmad, S. (2014). Kebiasaan Makan Sayur dan Buah Ibu Saat Kehamilan Kaitannya Dengan Konsumsi Sayur dan Buah Anak Usia Prasekolah. *Jurnal Gizi Dan Pangan*, 9(2), 133–138.
- Sulistyawati, A. (2019). Sikap Ibu Dalam Pemenuhan Kebutuhan Gizi Dengan Kejadian Kekurangan Energi Kronis Pada Ibu Hamil. February.
- Usiyanti, F., Sari, I., Anggraini, A., & Indriani, P. L. N. (2024). Faktor-Faktor yang Berhubungan dengan Kejadian Kurang Energi Kronik (KEK) Pada Ibu Hamil di Wilayah Kerja Puskesmas Gardu Harapan Tahun 2024. *Jurnal Kebidanan : Jurnal Ilmu Kesehatan Budi Mulia*, 14(2). <https://doi.org/10.54957/ijhs.v5i2.1442>
- WHO. (2021). *Infant and young child feeding*.
- Widiyanti, S., Yuliawati, Y., & Aghniya, R. (2023). Skrining Kesehatan Dalam Upaya Meningkatkan Status Kesehatan Remaja Di Kota Metro. *Jurnal Anestesi*, 1(1), 01–08.
- Yunika, R. P. (2021). Modul gizi pada kehamilan. In *Buku Praktis Gizi Ibu Hamil*. http://maryam.stikesyarsimataram.ac.id/809/1/MODUL_GIZI_KEHAMILAN.pdf