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Nutritional Knowledge in Pregnant Women and Their Nutritional Status

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ABSTRACT

Chronic Energy Deficiency (CED) remains a persistent nutritional challenge among pregnant women, particularly in developing countries such as Indonesia. Insufficient consumption of energy and vital nutrients during pregnancy has been associated with detrimental maternal and fetal outcomes, including low birth weight, maternal anemia, and higher risks of neonatal mortality. One of the fundamental contributors to the persistence of CED is inadequate maternal knowledge regarding nutrition. This literature review aims to assess the association between maternal nutritional knowledge and the occurrence of CED, based on national research studies conducted between 2020 and 2025. A total of nine cross-sectional studies were analyzed using a narrative review method. Articles were selected using purposive sampling from databases such as Google Scholar and institutional repositories. The inclusion criteria included pregnant women as subjects, Chronic Energy Deficiency (CED) was assessed using the Mid-Upper Arm Circumference (MUAC) measurement, along with evaluations of maternal nutritional knowledge. The findings consistently indicated that pregnant women possessing a higher level of nutritional understanding were less likely to experience CED (with MUAC measurements ≥ 23.5 cm), whereas limited knowledge was strongly associated with an increased risk of CED. Some studies also highlighted the role of other influencing factors such as maternal attitude, household income, antenatal care attendance, and access to nutrition counseling. In conclusion, maternal nutritional knowledge plays a significant role in preventing CED. However, to be effective, knowledge must be accompanied by supportive behaviors and enabling socioeconomic conditions. Integrated interventions involving education, routine antenatal monitoring, and family empowerment are recommended to reduce the risk of CED and improve maternal health outcomes.

Key Messages:

- Maternal nutrition knowledge is key to preventing Chronic Energy Deficiency (CED).
- Well-informed pregnant women are more likely to meet nutritional needs and maintain normal MUAC.
- Integrated approaches are needed to improve maternal nutrition : education, economic support, and community health services must work together.

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INTRODUCTION

Stunting remains a serious public health concern due to its long-term consequences, not only on physical growth resulting in shorter stature compared to age norms but also on brain development, learning

capacity, and future productivity. Stunting, often referred to as short stature, is a result of chronic nutritional deficiencies, lack of psychosocial stimulation, and repeated exposure to infections, especially during the first 1,000 days of life from conception to the child's second birthday. A child is classified as stunted when their length or height is below minus 2 standard deviations (-2 SD) from the median height for their age (Directorate General of Public Health, 2018)

In an effort to accelerate stunting prevention, the National Team for the Acceleration of Stunting Reduction targets priority groups, including pregnant women, breastfeeding mothers, and children aged 0–23 months referred to as households of the first 1,000 days of life (HPK). These groups are the main focus of the National Strategy for Stunting Prevention (Stunting Reduction Acceleration Team, 2019). The nutritional status of pregnant women has been shown to influence newborn length, where maternal weight gain during pregnancy correlates significantly with birth length. This clearly indicates that maternal health and nutrition during pregnancy directly affect fetal growth (Trihono, 2015)).

One of the leading causes of stunting is low birth weight, a condition closely associated with the mother's knowledge of nutrition during pregnancy (Trihono, 2015)). This literature review is based on the premise of exploring the relationship between maternal nutritional knowledge and maternal nutritional status during pregnancy. The research problem in this study is: Is there an effect of maternal nutritional knowledge on the nutritional status of pregnant women?. The objective of this review is to determine whether maternal knowledge of nutrition affects the nutritional status of pregnant women.

METHOD

This study employed a literature review method. The article search process was conducted using databases such as Google Scholar and PubMed. The keywords used were: "relationship between maternal nutritional knowledge and maternal nutritional status." The inclusion criteria for selected articles were: (1) articles published in nationally accredited journals, (2) published within the last five years, (3) full-text availability, (4) open-access access, and (5) no restriction on study design. methods can be briefly described and appropriately cited.

The keyword-based search total 463 articles were found from several databases using keyword searches. After reviewing the titles and applying the inclusion criteria, 8 articles were selected for full-text analysis. The process of article selection and analysis is shown in figure 1.

RESULTS

Based on the article search a total of 8 journal articles were included and analyzed using a matrix table to identify the variables studied in each article. All articles used a cross-sectional study design and were published in Indonesia journals. The main variables reviewed in this literatur study are maternal nutritional knowledge and the nutritional status of pregnant women. The result of the analysis are presented in Table 1.

DISCUSSION

Nutritional knowledge is one of the key determinants of maternal nutritional status during pregnancy. A lack of awareness regarding essential nutrients, dietary requirements, and appropriate meal planning increases the risk of Chronic Energy Deficiency (CED), which can have detrimental effects not only on maternal health but also on fetal development. Based on the review of eight scientific studies, it was consistently found that there is a significant association between maternal nutritional knowledge and CED, though the degree of influence varies depending on socio-economic context and behavioral factors

A study by Hasibuan et al (2023) revealed that among 61 pregnant women in Pekanbaru, those with good knowledge were significantly less likely to experience CED, with a p-value of 0.000. Similar findings were presented by Sagitarini et al (2021) in Denpasar, where good nutritional knowledge was strongly correlated with a Mid-Upper Arm Circumference (MUAC) ≥ 23.5 cm ($p = 0.001$), reflecting a normal nutritional status.

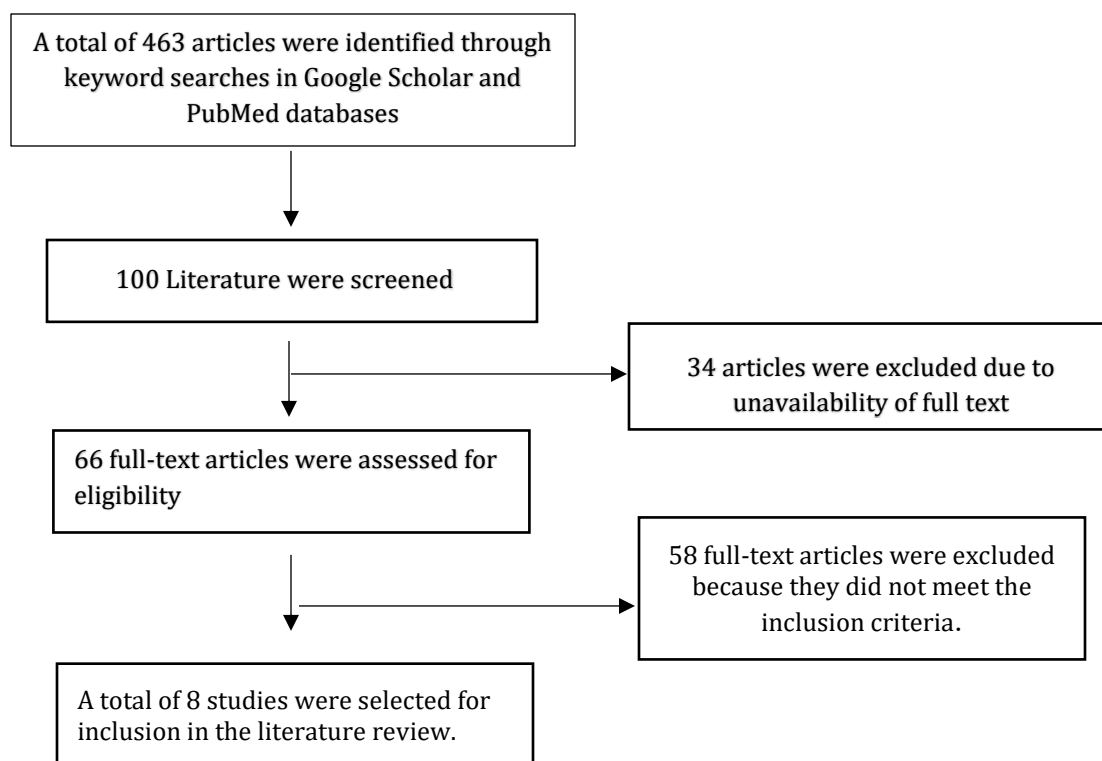


Figure 1. Steps for Systematic Review

Jannah1 et al (2022) also found that pregnant women with adequate knowledge had better nutritional status, evidenced by $p = 0.003$ in Sememi Public Health Center, Surabaya. These findings support the hypothesis that improved knowledge enables mothers to plan balanced meals and meet daily energy requirements, reducing the likelihood of CED. Wenny Mandella et al. (2023) added an economic and behavioral dimension to this relationship. In their study, knowledge, family income, and antenatal care (ANC) attendance were significantly associated with CED occurrence ($p = 0.008$ for knowledge). This indicates that knowledge alone may not be sufficient without enabling factors such as financial stability and consistent maternal health checkups.

Additionally, studies by Erike (2020) and Muhith (2025) highlighted that attitude plays a crucial role alongside knowledge. Positive attitudes toward healthy eating, supplementation, and pregnancy care showed strong associations with nutritional status ($p < 0.05$), suggesting that both cognitive and affective domains must be addressed in nutrition education.

Weni Kurnia Sari et al. (2021) emphasized that 77% of mothers with poor nutritional knowledge experienced CED, underlining the gap between dietary understanding and practical application. In many cases, poor knowledge led to inadequate food intake despite the physical availability of food. Dian Soekmawati et al. (2022) extended this by associating poor knowledge with maternal anemia, another indirect consequence of prolonged nutrient deficiency, especially iron. Anemia and CED often coexist during pregnancy and share similar risk profiles.

From the literature reviewed, several consistent patterns emerged:

1. Pregnant women with good nutritional knowledge are significantly less likely to suffer from CED.

2. Positive attitudes and health-seeking behaviors amplify the impact of nutritional knowledge.
3. Socioeconomic conditions such as income level, family size, and access to health services influence the extent to which knowledge can be translated into action.

Despite these strong associations, all studies used cross-sectional designs, limiting causal interpretation. Moreover, reliance on self-reported questionnaires may introduce information bias, as participants might overestimate their knowledge or provide socially desirable responses. These findings suggest the need for multi-level interventions. Effective CED prevention programs should include:

1. Community-based nutrition education tailored to local dietary practices,
2. Integration of counseling during ANC visits,
3. Household empowerment, particularly involving spouses or other decision-makers.

In summary, maternal nutritional knowledge significantly contributes to the prevention of CED during pregnancy. However, optimal outcomes require that this knowledge is supported by enabling environments, positive behavioral change, and sustained support from the health system.

Tabel 1. The result of the analysis

No	Author	Title	Research location	Subject	Methods	Results
				Research		
1	Weni Kurnia sari, Sri nova delta 2021	The Relationship Between Nutritional Knowledge Level, Anemia, and Food Consumption Level with the Incidence of Chronic Energy Deficiency (CED) in Pregnant Women in Muara Madras Village, Merangin Regency, Jambi	Merangin	The sample consisted of 35 pregnant women.	Study Design : Cross sectional	The results showed that 24 respondents (69%) experienced Chronic Energy Deficiency (CED), while 11 respondents (31%) did not. Regarding nutritional knowledge, 21 respondents (60%) had poor knowledge, 4 respondents (11.5%) had moderate knowledge, and 10 respondents (28.5%) had good knowledge.
					Data analysis : chi-square	Between nutritional knowledge and the incidence of CED, the p-value = 0.018, indicating a significant relationship between the mother's nutritional knowledge and the incidence of Chronic Energy Deficiency (CED).
2.	Wenny Mandella, Nora veronica, Liya Lugita sari, 2023	Factors Associated with Chronic Energy Deficiency (CED) in Pregnant Women in the Working Area of Seginim Public Health Center, South	South Bengkulu	The sample consisted of 35 pregnant women.	Study Design : Cross sectional	The results showed that pregnant women who experienced CED had poor knowledge in 13 individuals (54.2%), moderate knowledge in 8 individuals (33.3%), and good knowledge in 3 individuals (12.5%). Meanwhile, among pregnant women who did

No	Author	Title	Research location	Subject	Methods	Results
				Research		
		Bengkulu Regency				not experience CED, the majority had moderate knowledge—24 individuals (41.7%), followed by good knowledge in 17 individuals (33.3%), and poor knowledge in 10 individuals (19.6%). According to the researcher, this indicates that knowledge has a significant influence on an individual's health status.
					Data Analysis : chi-square	A p-value of 0.008 (< 0.05) was obtained, indicating a significant relationship between the knowledge variable and the incidence of Chronic Energy Deficiency (CED).
3	Erike Septa Prautami 2020	The Relationship Between Knowledge and Attitudes of Pregnant Women Regarding Nutritional Status During Pregnancy	Palembang	The sample consisted of 115 pregnant women	Study Design : Cross sectional	The results showed that among 15 respondents with good knowledge, 9 individuals (60%) had good nutritional status. Meanwhile, among 15 respondents with poor knowledge, only 2 individuals (13.3%) had good nutritional status.
					Data Analysis : chisquare,	Based on this study, knowledge has a significant relationship with nutritional status during pregnancy.
4	Dian soekamawati R, irni S, Kusniyati U, Hardiniyati, 2022	Anemia in Pregnant Women Based on Age, Knowledge, and Nutritional Status	Mataram	The sample consisted of 93 pregnant women.	Study design : cross sectional	The results showed that most pregnant women who experienced anemia had low knowledge, with 37 pregnant women (39.8%). In contrast, among those who did not experience anemia, the majority had high knowledge, with 25 pregnant women (26.9%).

No	Author	Title	Research location	Subject	Methods	Results
				Research		
					Data Analysis : uji chi-square, univariat and bivariat	There was a significant relationship between knowledge and the incidence of anemia in pregnant women, with a p-value of 0.004 (< 0.05). Additionally, there was a significant relationship between nutritional status and the incidence of anemia.
5	Evis R, Lidia F, Sri S, 2025	The Relationship Between Nutritional Knowledge and the Incidence of Chronic Energy Deficiency (CED) in Pregnant Women	Pekanbaru	The sample consisted of 61 pregnant women.	Study Design: Cross sectional	The study indicated that a large proportion of participants (68.9%) demonstrated a strong understanding of nutrition, yet 18% of the pregnant women were identified as suffering from Chronic Energy Deficiency (CED).
					Data Analysis : Uji Chi-Square	Statistical analysis using the Chi-Square test yielded a p-value of 0.00, indicating a statistically significant association between maternal nutritional knowledge during pregnancy and the likelihood of experiencing Chronic Energy Deficiency.
6	Darin J, Ernawati, Erinda N, 2022	Correlation Between Maternal Knowledge Levels and Nutritional Status During Pregnancy in the Coverage Area of Sememi Health Center, Surabaya	Surabaya	The sample consisted of 41 pregnant women.	Study Design : Cross sectional	Findings indicated that 35% (14 people) of the mothers demonstrated a strong understanding of nutrition.
					Data Analysis : univariat and bivariate with Wilcoxon Signed Rank Test	With a p-value of 0.003 (p < 0.05), the analysis confirmed a statistically significant association between maternal nutritional knowledge and the nutritional status of pregnant women.

No	Author	Title	Research location	Subject	Methods	Results
				Research		
7	Subhan M, 2025	Analyzing the Influence of Nutritional Knowledge and Attitudes on the Nutritional Status of Pregnant Women at Dempo Public Health Center	Palembang	The sample consisted of 36 pregnant women.	Study Design : Cross sectional	The findings revealed that 63.9% of the participants demonstrated adequate nutritional knowledge, whereas 36.1% were categorized as having poor knowledge. In terms of nutritional status, 25% of the respondents were identified as experiencing Chronic Energy Deficiency (CED), while the remaining 75% had sufficient nutritional status.
					Data Analysis : chisquare,	The study found a statistically significant association between maternal knowledge and nutritional status among pregnant women in the Dempo Health Center area, Palembang, as indicated by a p-value of 0.001.
8	Sugitarini, Putu N, Agustini, NKT, IGAK, 2021	The Relationship Between Nutritional Knowledge and the Nutritional Status of Pregnant Women in the Working Area of Public Health Center II	Denpasar	The sample consisted of 95 pregnant women.	Study Design : Cross sectional	Findings indicated that a significant proportion of respondents (77.9%) demonstrated strong knowledge of nutrition, and 85% were classified as having an adequate nutritional status.
					Data Analysis : chisquare,	The analysis revealed a statistically significant correlation between maternal nutritional knowledge and nutritional status during pregnancy, as evidenced by a p-value of 0.001.

Conclusion

This literature review confirms that nutritional knowledge is a significant factor associated with the nutritional status of pregnant women, particularly in preventing Chronic Energy Deficiency (CED). Pregnant women with adequate knowledge about balanced diets, essential nutrients, and healthy eating practices are less likely to experience CED, as reflected in improved Mid-Upper Arm Circumference (MUAC) measurements. However, the impact of knowledge is influenced by other variables, including socioeconomic status, family support, attitude, and access to health services.

The findings suggest that nutrition education alone is not sufficient unless it is accompanied by behavior change, positive attitudes, and an enabling environment that allows mothers to apply their knowledge

effectively. Therefore, multi-faceted interventions are necessary, including community-based education, strengthened antenatal care, and economic empowerment to improve maternal nutrition and reduce the incidence of CED.

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Conflict of Interest

The author declares no conflicts of interest in the publication of this article

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