

Effectiveness of Supplementary Feeding in Pregnant Women with Chronic Energy Deficiency : A Systematic Article Review

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Abstract

Introduction: Changes that occur during pregnancy, both physical and psychological will have a big impact and cause discomfort in pregnant women and the discomforts are varies in each trimester. In the first trimester, the common discomforts are nausea, vomiting, decreased appetite, and various other symptoms. Nausea and vomiting cause a decrease in appetite, and if this is allowed to continue become one of the causes of chronic energy deficiency in the mother and hurts the fetus. Decreased appetite in pregnant women will be fatal if left alone without any effort to fulfill the nutrition of pregnant women who have no appetite. Therefore, it is necessary to provide supplementary feeding to pregnant women to meet nutritional needs and prevent the adverse effects of chronic energy deficiency.

Purpose: This review aims to explore several articles regarding supplementary feeding to meet the nutrition of pregnant women. It is hoped that the results of this review will provide up-to-date information that is useful for maximizing the nutrition of pregnant women and providing good output for both the mother and the fetus.

Method: This review article was carried out by reviewing articles published in 2014 - 2019. The method of searching for articles in this review article uses Google Scholar. The keywords used when searching is "Providing Supplementary Food for Pregnant Women". Article selection was based on inclusion and exclusion criteria and 5 articles were selected.

Result: Based on the 5 articles that were reviewed, all articles showed the benefits of giving supplementary food to pregnant women. The provision of additional food increases body weight, increases consumption of nutrients (energy, protein), and improves the nutritional status of pregnant women.

Conclusion: Considering that supplementary food for pregnant women makes a significant contribution to overall energy consumption, it is necessary to develop local food ingredients which are potential sources of nutrients. Providing additional food is very beneficial for pregnant women who have a poor diet due to lack of appetite so if nutrition is sufficient with the help of additional food, it is hoped that the bad consequences of chronic energy deficiency and anemia will not occur in the mother or fetus.

Keywords: Supplementary Feeding; Chronic Energy Deficiency; Discomforts in First Trimester

1. Introduction

The changes experienced by mothers during pregnancy are physiological, psychological, and social changes. Physiological changes such as changes in the reproductive organs, namely the uterus, ovaries, vagina, cervix, and breasts. Changes also occur in various systems such as the cardiovascular system, respiratory system, digestive system, integumentary system, musculoskeletal system, nervous system, and endocrine system. Most of these changes are influenced by the endocrine system through the work of hormones.

Changes that occur in the first trimester of pregnancy include an increase in several reproductive hormones such as estrogen, progesterone, relaxin, and somatomammotropin. This happens because the

first trimester is the phase of organogenesis or the phase of the formation of fetal organs, in this phase a supportive biological environment for pregnant women is needed. The effect of increasing these hormones is increasing vascularity to various organs such as the uterus, breasts, and vagina which are very useful for the growth and development of the fetus.

These changes vary in each trimester of pregnancy. The first trimester is a period of discomfort for pregnant women because during this period physiological changes occur. Complaints of pregnant women related to nutritional intake are experienced by pregnant women, namely nausea and vomiting, lack of food intake, decreased appetite, weight loss, thinness, paleness, dizziness or headaches, and decreased blood pressure. Nausea and vomiting experienced by the mother have an impact on decreased appetite resulting in weight loss (Kusuma, 2018).

The diet of pregnant women during pregnancy changes according to the ongoing pregnancy, for example during the first trimester of pregnancy pregnant women will experience a decrease in appetite, and nausea and vomiting often arise. In a study of 40 respondents, 70% of them had a poor diet. If this is left unchecked and continues, it will result in many bad things for both the pregnant woman and the fetus she contains (Hazelina, 2013).

Chronic energy deficiency is a problem of malnutrition that often occurs in pregnant women, which is caused by a lack of energy over a long period. Chronic Energy Deficiency is determined by the size of the upper arm circumference. In a qualitative study, many pregnant women complained of decreased appetite, this is one of the causes of chronic energy deficiency occurring in pregnant women (Muhammad, 2019).

Disease history can act as a starter for the occurrence of malnutrition as a result of decreased appetite, impaired absorption in the digestive tract, or increased need for nutrients due to disease. And several other factors are age factor, education factor, parity factor, consumption pattern factor, and income factor (Muliawati, 2013).

The results of Basic Health Research show that the prevalence of chronic energy deficiency in pregnant women aged 15-49 years is 24.2%. These results indicate that the prevalence of chronic energy deficiency risk in pregnant women is still high. Several causes affect the mother's need for nutrients that are not met, namely due to insufficient food intake and infectious diseases, pregnant women who eat enough food but suffer from illness will experience malnutrition, and pregnant women whose food intake is less than the immune system will weaken and will be susceptible to disease, low education level, mother's knowledge of malnutrition, inadequate family income, mother's age less than 20 years or more than 35 years so that it affects her nutritional needs, high maternal parity or too frequent pregnancies can deplete the body's nutritional reserves, spacing that is too close causes the mother not to have the opportunity to repair her body after giving birth, working pregnant women need more energy because their energy reserves are shared between herself and the fetus (Fitrianiingtyas et al, 2018).

Nutritional status is an important part of a person's health status. Not only nutritional status affects health, but health status also affects nutritional status. Infections and fever can cause decreased appetite or make it difficult to swallow and digest food. Parasites in the intestine such as roundworms and tapeworms compete with the body for food and thereby block nutrients from entering the bloodstream (Ningrum, 2010). Pregnant women with poor nutritional status will more easily feel weak, tired, lethargic, and have a reduced appetite so that the required nutritional intake is not met because when appetite decreases pregnant women will easily experience anemia. Pregnant women who experience anemia result in reduced oxygen supply to the body and brain cells. Malnutrition in the mother during pregnancy can affect and inhibit the growth of the fetus, as well as cause disturbances to the fetus, placenta, and mother's health (Hastuty, 2020).

The results showed that there was a significant relationship between knowledge and chronic energy deficiency events and found that respondents with less knowledge were 2.2 higher more at risk of suffering from chronic energy deficiency compared to respondents who had good knowledge (Fitrianiingtyas et al, 2018).

Efforts that must be made by health workers, especially midwives to prevent anemia in pregnant women, are to increase the consumption of iron from food sources such as vegetables, fruits, nuts, and grains, provide iron supplements, and provide additional food (Hastuty, 2020).

Some of the research described above shows that a lack of or no appetite in pregnant women will be fatal if left alone without any effort to fulfill the nutrition of pregnant women who have no appetite. Therefore, writing this review aims to explore several articles regarding supplementary feeding to meet the nutrition of pregnant women. It is hoped that the results of writing this review will provide up-to-date information that is useful for maximizing the nutrition of pregnant women and providing good output for both the mother and the fetus.

2. Method

This review article is done by reviewing articles published in 2014 – 2019. The method of searching for articles in this review article uses Google Scholar. The keywords used when searching is "Providing Supplementary Food for Pregnant Women". The sources used during the process of searching, reading, reviewing, and citing in this review article were obtained from reputable websites, books, and research journals.

Selection of articles based on inclusion and exclusion criteria. The inclusion criteria in this review article are research articles available in full text, in Indonesian, focusing on supplementary feeding, especially for Pregnant Women with Chronic Energy Deficiency with the year of publication 2014 - 2019. The exclusion criteria set are articles with the type of review article or systematic reviews and thesis articles both thesis and final report (not published in journals). Based on the inclusion and exclusion criteria, 5 articles were found that discussed the effect of supplementary feeding on pregnant women.

3. Result

Table 1. Research Design

Research design	Number of Articles
Quasi Experiments	1
Cross Sectionals	2
Concurrent Mixed Method	2
Total	5

Table 2. Article Screening Results

Researcher and Year of Publication	Title	Research design	Number of Samples	Results
Chandradewi, AASP (2015)	The Effect of Supplementary Feeding on Weight Gain for Pregnant Women (Chronic Energy Deficiency) in the Working Area of the Labuan Lombok Health Center	Quasi Experiments	52	The results showed: The average value of the mother's weight gain is less chronic energy given additional food for 90 days was 5.8 ± 2.007 kg, while the control group was 3.13 ± 1.767 kg. Pregnant women with chronic energy deficiency in the treatment group

				<p>experienced an increase in consumption Of nutrients (energy, protein), namely an average of 643.05 ± 295,384 kcal and protein 26.65 ± 17.2461 grams. The contribution of additional food such as biscuits with local food to total energy and protein consumption In chronic maternal energy malnutrition in each treatment, the group was 23.44% energy (501.38 kcal) ± 2.56% (53.47 kcal) and protein 26.99% (18.83 gram) ± 5.8% (4.06 g) . Provision of additional food such as biscuits with local food had a significant effect on weight gain for pregnant women with chronic energy deficiency (p<0.05).</p>
<p>Yeti Hernawati and Rallyvia Kartika (2019)</p>	<p>The Relationship of Giving Supplementary Food to Pregnant Women with Chronic Energy Deficiency in the Work Area of the Ibrahim Adjie Public Health Center, Bandung City in 2018</p>	<p>Cross Sectionals</p>	<p>42</p>	<p>The results showed that pregnant women with chronic energy deficiency who received additional food for 4 months 73.68%. Meanwhile, the average increase in the upper arm circumference measurement value for women who are chronically low on energy and given additional food for 90 days is 2 cm. Bivariate data analysis used the Chi-Square statistical test with α=0.05. The results of the Chi-Square</p>

				test showed that there was a significant relationship between giving supplementary food to pregnant women and chronic energy deficiency in the working area of the Ibrahim Adjie Public Health Center for the period January - April 2018.
Dahlia Indah Amareta (2015)	The Relationship between Supplemental Feeding and Recovery with Hemoglobin Levels and Weight Gain in Pregnant Women with Chronic Energy Deficiency (Study in the Working Area of the Jelbuk Health Center, Jember Regency)	Cross Sectionals	38	The results showed that the respondents were in the age range of 14-37 years with an average of 20.45 years, and upper arm circumference was in the range of 20-23 cm with an average value of 21.87 ± 1.0 cm. Parity varied from 1 to 4. The average weight gain in the third trimester was 4.48 ± 3.2 kg with the highest increase of 12 kg and the lowest value of -0.5 kg meaning that there was a weight loss of 0.5 kg. This study concludes that there is a relationship between Supplementary feeding-Recovery and weight gain for pregnant women with chronic energy deficiency ($p=0.007$), and there is no relationship between supplementary feeding-Recovery and Hb levels ($p=0.097$).
Rosyati Pastuty, Rochmah KM, and Teti Herawati (2018)	The Effectiveness of the Supplementary Feeding Program for Recovery in Pregnant Women with Chronic Energy Deficiency in the City of Palembang	Concurrent Mixed Method	120	All components of the implementation of the Supplemental Feeding-Recovery program from inputs, processes, and outputs have been

				carried out according to plan. Based on the analysis of the Wilcoxon Test, showed that there were differences in the size of the upper arm circumference before and after the provision of supplementary food recovery in pregnant women with $p=0.001$ ($p<0.05$).
Evi Yunita Nugrahini, Jusuf S. Effendi, Dewi MD Herawati, Ponpon S. Idjradinata, Endang Sutedja, Johanes C. Mose, and Yoni Fuadah Syukriani (2014)	Energy and Protein Intake After the Supplementary Food Program for Recovery of Chronic Energy Lack of Pregnant Women at the Surabaya City Health Center	Concurrent Mixed Method	47	The results showed that the supplementary feeding-recovery program for chronic energy deficiency in pregnant women was only able to improve nutritional status to normal by 13%. The energy and protein intake of pregnant women with chronic energy deficiency after the supplementary feeding program was able to change their nutritional status to normal by 20%. There was no difference in energy and protein intake after the supplementary feeding program on the nutritional status of chronic energy deficiency and normal pregnant women ($p>0.05$).

The dominant factor for the low level of consumption of nutrients is thought to be two things, there is a low socioeconomic status which has implications for low purchasing power, and a decrease in appetite in the early period of pregnancy. This can happen because in the first trimester of pregnancy there will be an increase in metabolism, and hormonal changes, and also organ systems begin to form and begin to function. For pregnant women, this period is a period of adjustment both physically and emotionally. Pregnant women will generally experience feelings of wanting to vomit, nausea, and feeling tired which is known as morning sickness, although these events can occur not only in the morning.

Supplementary feeding is an effort to increase nutrient intake for pregnant women with chronic energy deficiency to meet their nutritional needs. Some of the factors considered in selecting the type of product are products that are well known and have good taste so that they are liked and accepted by the public at large, are practical, have a relatively long shelf life, and are easy to serve. Another aspect to consider is the nutritional composition of the product (Chandradewi, 2015).

In Indonesia, Widya Karya National Food and Nutrition VII 2004, recommends adding 17 g/day of protein during pregnancy. Thus, in one-day protein intake can reach 75-100 g (about 12% of total calories); or about 1.3 g/kg BW/day, 1.5 g/kg BW/day (age 15-18 years), and 1.7 g/kg BW/day (under 15 years). In the intervention of supplementary feeding, apart from the nutritional content, other factors that affect the level of adherence to consumption must be considered. Sensory characteristics, preferences, acceptability, and variety of products given are components that affect the level of compliance with consumption. Product variations are expected to minimize boredom/saturation so that it will increase the level of consumption compliance with the given product.

Good nutritional status is one of the determining factors for the success of health development, which is an integral part of overall national development. Toddlers, school-age children, and pregnant women are nutritionally vulnerable groups that need special attention because of the negative impacts caused by malnutrition. The four main nutritional problems in Indonesia are protein-energy deficiency, disorders due to iodine deficiency, vitamin A deficiency, and iron nutritional anemia. In Indonesia, there are many cases of chronic energy deficiency, especially those possibly caused by an imbalance in nutritional intake (energy and protein), so that the nutrients the body needs are not fulfilled. This results in the growth of the body, both physically and mentally, which is not as perfect as it should be. Pregnant women who suffer from chronic energy deficiency have a risk of sudden maternal death during the perinatal period or the risk of giving birth to babies with low birth weight (LBW) (Hernawati, 2019).

The supplementary feeding program-recovery principle that is difficult to fulfill is that used as supplementary food and not as daily food. As many as 37.5% of respondents who received supplementary feeding recovery admitted that eggs were consumed together with the family. This is very difficult to avoid because the average economic condition of pregnant women with chronic energy deficiency is still lacking. So, it is necessary to educate pregnant women who receive supplementary feeding recovery so that the food ingredients provided as supplementary feeding are sought to be consumed by the pregnant women concerned (Amareta, 2015).

The supplementary feeding-recovery program for pregnant women with chronic energy deficiency aims to improve the nutritional status of malnourished pregnant women, especially from poor families. This is in line with one of the provisions of the Ministry of Health of the Republic of Indonesia regarding the reference strategy for tackling macro-nutrition problems, especially for pregnant women, by implementing direct subsidies in the form of supplementary feeding recovery. Based on the Decree of the Indonesian Ministry of Health, subsidies are given in the form of funds for the provision of additional food for pregnant women with chronic energy deficiency. However, in practice, the Palembang City Health Office provides supplementary feeding recovery to pregnant women with chronic energy deficiency in the form of biscuit bread (sandwiches) every day 1 loaf (100 gr) is given for 90 days in the final trimester (Pastuty et al, 2018).

Poor diet and food consumption during pregnancy and a lack of diversity in food consumption can result in insufficient energy requirements during pregnancy. Pregnant women pay less attention to the variety of food and the selection of food ingredients because they are related to purchasing power. The availability of food in the market also influences the variety of food. The diversity of food consumption for pregnant women is still lacking so the nutritional adequacy needed by the body during pregnancy cannot be fulfilled. Research conducted in the city of Makassar shows that mothers have irregular eating habits and there are changes in eating patterns before and after marriage. The food consumption patterns of pregnant women are also less varied, thus affecting the nutritional adequacy needed during pregnancy,

as well as their food intake (Nugrahini, 2014).

4. Conclusion and Suggestion

Considering that supplementary food for pregnant women makes a significant contribution to overall energy consumption, it is necessary to develop local food ingredients which are potential sources of nutrients. Besides that, to maintain consumption of the main food, the provision of additional food needs to be accompanied by intensive counseling and training on simple technology for the development of local food potential. Supplementary feeding is very beneficial benefits for pregnant women who have a poor diet due to lack of appetite so if nutrition is sufficient with the help of additional food, it is hoped that the bad consequences of chronic energy deficiency, anemia, etc will not occur in the mother or fetus.

It is hoped that this research can add reference material related to supplementary food for pregnant women so that it can add insight and concern for students about pregnant women with appetite disorders so they don't experience chronic energy deficiency.

References

- Amareta, D. I. (2015). Hubungan pemberian makanan tambahan-pemulihan dengan kadar hemoglobin dan kenaikan berat badan ibu hamil kurang energi kronis (Studi di wilayah kerja Puskesmas Jelbuk Kabupaten Jember). *Jurnal Ilmiah Inovasi*, 15(2).
- Chandradewi, A. A. S. P. (2018). Pengaruh pemberian makanan tambahan terhadap peningkatan berat badan ibu hamil KEK (kurang energi kronis) di wilayah kerja Puskesmas Labuan Lombok. *Jurnal Kesehatan Prima*, 9(1), 1391-1402.
- Fitrianiingtyas, I., Pertiwi, F. D., & Rachmania, W. (2018). Faktor-Faktor yang Berhubungan dengan Kejadian Kurang Energi Kronis (KEK) pada Ibu Hamil di Puskesmas Warung Jambu Kota Bogor. *HEARTY: Jurnal Kesehatan Masyarakat*, 6(2).
- Hastuty, M. (2020). Hubungan Anemia Ibu Hamil dengan Kejadian Stunting pada Balita di UPTD Puskesmas Kampar Tahun 2018. *Jurnal Doppler*, 4(2), 112-116.
- Hazelina, N. (2013). Penelitian Gambaran Pola Makan Ibu Hamil Pertrimester Di Wilayah Kerja Puskesmas Sukosari Kabupaten Ponorogo (Doctoral dissertation, universitas muhammadiyah ponorogo).
- Hernawati, Y., & Kartika, R. (2019). Hubungan Pemberian Makanan Tambahan Pada Ibu Hamil Dengan Kurang Energi Kronis Di Wilayah Kerja Puskesmas Ibrahim Adjie Kota Bandung. *Jurnal Sehat Masada*, 13(1), 40-46.
- Kusuma, R. (2018). Studi kualitatif: Pengalaman adaptasi ibu hamil. *Jurnal Akademika Baiturrahim Jambi*, 7(2), 148-164.
- Muhamad, Z., Hamalding, H., & Ahmad, H. (2019). Analisis Kebiasaan Makan Pada Ibu Hamil Kekurangan Energi Kronik Di Wilayah Kerja Puskesmas Pulubala Kabupaten Gorontalo. *Jurnal Komunitas Kesehatan Masyarakat*, 1(1), 48-58.
- Muliawati, S. (2013). Faktor Penyebab Ibu Hamil Kurang Energi Kronis di Puskesmas Sambi Kecamatan Sambi Kabupaten Boyolali Tahun 2012. *Infokes: Jurnal Ilmiah Rekam Medis dan Informatika Kesehatan*, 3(3).
- Ningrum, Riska Ayu. (2010). Faktor-Faktor yang Berhubungan dengan Risiko Kurang Energi Kronis (KEK) pada Ibu Hamil di Kecamatan pncoran Mas Kota Depok Jawa Barat tahun 2010. Depok :fakultas Kesehatan Masyarakat Universitas Indonesia
- Nugrahini, E., Effendi, J., Herawati, D., Idjradinata, P., Sutedja, E., & Mose, J. (2014). Asupan energi dan protein setelah program pemberian makanan tambahan pemulihan ibu hamil kurang energi kronik di puskesmas kota surabaya. *Jurnal Pendidikan dan Pelayanan Kebidanan Indonesia*, 1(1), 41-47.
- Pastuty, R., Rochmah, K. M., & Herawati, T. (2018). Efektifitas Program Pemberian Makanan Tambahan-Pemulihan Pada Ibu Hamil Kurang Energi Kronik di Kota Palembang. *Jurnal Ilmu Kesehatan Masyarakat*, 9(3), 179-188.