

The Effect of Supplementary Feeding Interventions on Nutritional Status of Pregnant Women with Chronic Energy Deficiency

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ABSTRACT

Background: The high number of pregnant women with Chronic Energy Deficiency at Puskesmas Kuwarasan, Kebumen District can increase the Maternal Mortality Rate and Infant Mortality Rate. One of the efforts made to reduce the number of pregnant women with chronic energy deficiency is the provision of supplementary foods in the form of biscuits and milk per day for 90 days. This study aims to determine the effect of the intervention of supplementary feeding on the nutritional status of pregnant women with chronic energy deficiency. **Method:** This research used descriptive-analytical method with a case study design. It involved 5 cases of pregnant women with Chronic Energy Deficiency. The nutritional status of pregnant women was measured using the mid-upper arm circumference indicator. Differences in nutritional status before and after the intervention were measured based on the mid-upper arm circumference. After the intervention with the provision of supplementary foods in the form of biscuits and milk for 90 days, the chronic energy deficiency issue was resolved as indicated by a change in nutritional status in pregnant women with chronic energy deficiency whose status changed to normal nutritional status. **Result:** The average value of mid-upper arm circumference increased from 21.8 to 23.82 cm. The Wilcoxon test obtained a p-value of 0.038 (there is a significant relationship before and after the intervention of supplementary foods for 90 days). **Conclusion:** *Supplementary foods of biscuits and milk can improve nutritional status to normal..*

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1. Introduction

Maternal mortality refers to death that occurs during pregnancy, childbirth, and postpartum period due to direct or indirect causes of pregnancy and childbirth [1]. The number of maternal mortality in Central Java is high [2]. Data on maternal mortality show 602 cases in 2016, 548 cases in 2017, and 421 cases in 2018 [3]. In Central Java, the districts/cities with the highest maternal mortality are Brebes with 31 cases, Pemaslang with 25 cases, Kendal with 25 cases, and Kebumen with 12 cases [4]. Besides, maternal mortality, the second issue referring to the results of the 2013 Basic Health Research (Riskesdas) is Chronic Energy Deficiency (KEK) which increased to 38.5% from 31.3% in 2010 [5]. Maternal mortality reached 619 cases on Java island in 2015 [6]. In 2018, 4 pregnant women died due to pregnancy issues [7]. Specifically, in Puskesmas Kuwarasan, Kebumen District, the Chronic Energy Deficiency (KEK) rate in 2019 was 69 cases and increased to 70 cases in 2020 or an increase of 0.1% [8].

Chronic Energy Deficiency (KEK) is a nutritional deficiency in pregnant women [9]. The health and safety of both mothers and babies depend on the mother's nutrition during pregnancy [10]. The impacts of Chronic Energy Deficiency (KEK) in pregnant women are prolonged labor, postpartum

bleeding, and even death [11]. Pregnant women who suffer from Chronic Energy Deficiency (KEK) have a mid-upper arm circumference of < 23.5 cm [12].

Pregnant women with Chronic Energy Deficiency (KEK) can experience a risk of inadequate nutrition to meet metabolic needs [13]. Inadequate nutrition can be caused by the inability to absorb nutrients, or economic or psychological factors [14]. Nutritional management intervention is one alternative to overcome the risk of the nutritional deficit by identifying nutritional status, monitoring food intake, providing supplements, and collaborating with nutritionists/other health workers [15].

Based on the results of a preliminary study at Puskesmas Kuwarasan, Kebumen District, there were 128 cases of high-risk pregnant women in 2018 and 102 cases in 2019 (Kuwarasan Health Center, 2019). The risk of nutritional deficits due to Chronic Energy Deficiency (KEK) can cause problems during pregnancy and other problems, both physically and psychologically. This study aims to determine the effect of supplementary feeding interventions on the nutritional status of pregnant women with chronic energy deficiency.

2. Materials and Method

This research used a descriptive-analytic method with a case study design. The population in this study were pregnant women with chronic energy deficiency in the coverage area of Puskesmas Kuwarasan in 2019. This study involved five cases of pregnant women with Chronic Energy Deficiency (KEK) who had antenatal care visits at Puskesmas Kuwarasan as samples or respondents. Case criteria were pregnant women with chronic energy deficiency with a mid-upper arm circumference of lower than 23.5 cm. The study was conducted at Puskesmas Kuwarasan from February 2020 to May 2021. The intervention was done on five respondents by providing supplementary foods in the form of milk and biscuits for 90 days. The mid-upper arm circumference was measured before starting the observation and after 90 days of intervention.

3. Results and Discussion

3.1. Results

The results showed that all respondents with chronic energy deficiency were in the age range of 20-30 years. Most of them had a high school education level. In terms of parity status, 4 people were in G1(80%) and 1 person was in G2 (20%). The majority of pregnant women with chronic energy deficiency are in the age range of 14-37 years with an average of 20-30 years

Table 1. Characteristics of pregnant women with Chronic Energy Deficiency (KEK) at Puskesmas Kuwarasan

Characteristics	Frequency	Percentage
Age		
20 - 30 years old	5	100%
Education level		
Senior high school	5	100%
Chronic energy deficiency		
Chronic energy deficiency (< 23.5 cm)	5	100%
Parity		
1	4	80%
2	1	20%

Based on the table 2, all pregnant women with chronic energy deficiency show signs and symptoms of nutritional deficits before the supplementary feeding intervention with the average signs and symptoms of 50-60%.

Table 2. Signs and symptom of pregnant women with chronic energy deficiency at Puskesmas Kuwarasan before the supplementary feeding interventions. (n = 5).

Signs and symptoms	Before the supplementary feeding intervention				
	I	II	III	IV	V
Food portion spent	2	3	3	2	2
Verbalization of the desire to improve nutrition	2	2	2	2	2

Attitude towards food/drink in accordance with health goals	2	2	2	2	2
Weight	2	2	2	2	2
Frequency of meals	2	3	3	2	2
Appetite	2	3	3	2	2
Mucous membrane	2	2	2	2	2
Total	14	15	15	14	14
Percentage	51.85%	55.55%	55.55%	51.85%	51.85%

On table 3, all pregnant women with chronic energy deficiency showed signs and symptoms of a nutritional deficit before the supplementary feeding intervention in which almost all patients showed the same improvement in symptom reduction of 100%. The symptoms that appeared in the five patients were the same, namely the portion of food consumed increased, verbalization of the desire to improve nutrition, good attitude towards food in accordance with health goals, increased body weight, increased frequency of eating, and improved appetite

Table 3. Signs and symptoms of pregnant women with chronic energy deficiency at Puskesmas Kuwarasan after the supplementary feeding interventions. (n = 5)

Signs and symptoms	Before the supplementary feeding intervention				
	I	II	III	IV	V
Food portion spent	4	4	4	4	4
Verbalization of the desire to improve nutrition	4	4	4	4	4
Attitude towards food/drink in accordance with health goals	4	4	4	4	4
Weight	3	3	3	3	3
Frequency of meals	4	4	4	4	4
Appetite	4	4	4	4	4
Mucous membrane	4	4	4	4	4
Total	27	27	27	27	27
Percentage	100%	100%	100%	100%	100%

The table 4 shows that there was an average increase in MUAC at the first meeting by 21.8 to 23.82 at the third meeting. MUAC data were collected using anthropometric tape that has been calibrated and common at Puskesmas Kuwarasan. The intervention for pregnant women with chronic energy deficiency was done by checking the pregnant women's weight and MUAC (100%).

Table 4. Signs and symptoms of pregnant women with chronic energy deficiency at Puskesmas Kuwarasan after the supplementary feeding intervention. (n = 5).

RE SP ON DE NT	DAT E/ HOU R	FIRST MEETING				SECOND MEETING				THIRD MEETING			
		BLOOD PRESSURE	HEIGHT	WEIGHT	MUAC	BLOOD PRESSURE	HEIGHT	WEIGHT	MUAC	BLOOD PRESSURE	HEIGHT	WEIGHT	MUAC
1	19/02/2021	99/60	147	42.9	23.5								
	05/04/2021					110/70	147	40.7	22.5				
	19/05/2021									99/60	147	42.9	23.5
2	20/02/2021	110/87	164	56	21								
	06/04/2021					120/82	164	57.5	22				
	20/05/2021									110/70	164	59	24
3	25/02/2021	109/72	149	38	21.5								
	09/04/2021					110/70	149	40.7	22.3				

	25/05 /2021					112/80	149	41.2	23.6
4	26/02 /2021	110/79	150	50	22				
	12/04 /2021					100/70	150	51	23.3
	26/05 /2021					110/80	150	52	24
5	27/02 /2021	100/70	152	49	22				
	14/04 /2021					100/70	152	51.3	23.5
						110/80	152	52.5	24

Table 5 shows the results of the Wilcoxon test with a p-value of 0.038 (there is a significant relationship before the supplementary feeding intervention in the form of biscuits and milk for 90 days). Early detection of chronic energy deficiency was based on the MUAC measurement. In this study, this measurement was done before and after the intervention. The results showed that there was an increase in MUAC after the intervention

Table 5. Results of Wilcoxon test before and after the intervention

Statistical test	
	after - before
Z	-2.121 ^b
Asymp. Sig. (2-tailed)	.034

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

3.2. Discussion

The age range includes the age of adolescence who are still in their growing period. Thus, they need additional calories and nutrients to meet the needs of both their physical growth and pregnancy. The incidence of low birth weight (LBW) likely starts in pregnant women with chronic energy deficiency. The risk of chronic energy deficiency is higher in pregnant women under the age of 19 years with the proportion of pregnant women with energy deficiency aged lower than 19 years old of 31% [16].

Maternal education has a direct and statistically significant effect on low birth weight [17]. Besides, there is also an indirect and statistically significant effect between maternal education and birth weight based on mid-upper arm circumference and family income during pregnancy [18]. Maternal education has a positive indirect effect on the baby's birth length. It also directly affects maternal nutritional status and family income, which in turn can affect the length of the baby [19]. The experience of giving birth or parity and the mature age of pregnant women form a rational and mature mindset about the importance of having antenatal care [20]. The older the person, the more mature and strength the person can have in thinking and working. In terms of the trust, people who are more mature will be more trusted than those who are less mature [21]. In terms of parity, mothers with multiparous parity are expected to know more about high-risk pregnancies so that they can prevent those risks as a result of experience and maturity of mindset. The parity experience can lead to good perceptions and influence the behavior of pregnant women in their compliance with antenatal visits [22].

The symptoms that appeared in the five patients were almost similar to the theory of Herdman & Kamitsuru [23]. Based on the results of the study, all pregnant women with chronic energy deficiency experienced nutritional problems, namely the risk of nutritional deficits indicated by a decrease in food portions, reluctance to eat, attitudes towards healthy food, stable weight from before pregnancy, and dry mucous membrane [24]. and the other determinant of pregnant women with chronic energy deficiency is the mid-upper arm circumference of < 23.5 cm [25]. Pregnant women with chronic energy deficiency who received the intervention since the first visit got good results [26]. According to (Mirzamoradi et al., 2020), early detection of maternal and fetal health provides information to obstetricians [27]. Further, he emphasizes the importance of careful fetal ultrasound examinations, other additional examinations, and timely referrals that can provide the best results for maternal and fetal health [28].

The results showed that there was an increase in MUAC after the intervention. It is in accordance with the previous studies that there is an increase in MUAC after the intervention [13].

The weight gain recovery program for pregnant women with chronic energy deficiency was in the form of giving 6 boxes of milk and 2 kg of eggs per month for pregnant women. This has fulfilled some basic principles of Supplementary Food-Recovery, namely in the form of foods or ingredients, not in the form of money (Ministry of Health of the Republic of Indonesia, 2011). Previous studies have revealed that there is a relationship between providing supplementary foods and weight gain, which means that the more frequent consumption of supplementary foods, the greater the weight gain as indicated by the p-value of 0.007 [29]. Another study by Chandradewi (2015) concluded that the provision of supplementary foods in the form of biscuits with local ingredients had a significant effect on increasing the body weight of pregnant women with chronic energy deficiency ($p < 0.05$). It is also in line with other studies which showed that there was a statistically significant direct positive effect between MUAC and birth weight in which pregnant women with MUAC < 23.5 cm or suffering from chronic energy deficiency had a 3.95 times greater risk of having a low birth weight baby compared to those with pregnant women without chronic energy deficiency [14].

Chronic energy deficiency can affect the health of pregnant women and their fetus, for example, premature birth which can potentially cause newborn death [30]. To reduce this effect, premature babies are suggested to be treated with the kangaroo method [31]. Based on the results of the study, it is important to educate pregnant women, especially those with chronic energy deficiency about protein intake such as eggs, meat, milk, and fish and reducing excessive workloads that are likely to deplete the energy that is important in meeting the physiological needs of the mother during pregnancy [32].

Good nutrition is the best way to prevent chronic energy deficiency in pregnancy. Based on the results of observations in the five patients, all problems can be resolved [33]. In dealing with pregnant women with chronic energy deficiency, cross-program and cross-sector collaboration are needed to handle the problem properly [34]. In this case, it is necessary to collaborate with nutritional health workers and Community Empowerment Institutions (LPM). This collaboration can be done in terms of cooking supplementary foods using local ingredients and motivating pregnant women [34]. The results of this study are in line with other studies which stated that supplementary feeding can change the nutritional status of pregnant women with chronic energy deficiency to normal in 36.3% of pregnant women [30]. Mothers who have received nutritional counseling and carried out routine antenatal visits can improve their nutritional status [35].

4. Conclusion

Based on the results of the study, it can be concluded that pregnant women with chronic energy deficiency (MUAC less than 23.5 cm) will have a larger or normal MUAC with the supplementary feeding intervention in the form of biscuits and milk given for 90 days. Supplementary feeding is highly needed by pregnant women to assist the intake of nutrients for physiological growth during pregnancy. Future studies need to focus on supplementary feeding in the form of local ingredients that are preferred by pregnant women with nutritional content equivalent to the supplementary foods provided in this study.

Declaration

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Conflicts of Interest: Authors declare there is no conflict of interest in this research.

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