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Chronic Energy Deficiency Status in Pregnant Women as a Risk of Low Birth Weight

Mumpuni Intan Pertiwi[1*], Mekar Anggun Permatasari[2], Adzka Fahma Rodliya[1]
[1] Study Program of Midwifery, Faculty of Health Science, Universitas Duta Bangsa Surakarta, Indonesia
[2] Study Program of Midwifery, Faculty of Medicine, Universitas Sebelas Maret Surakarta, Indonesia
*Corresponding author's email: mumpuni_intan@udb.ac.id

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Abstract

Background: The condition of pregnant women with chronic energy deficiency (CED) could cause bad influence on mothers and children such as delivering infant with low birth weight (LBW). In 2020 the proportion of CED in Surakarta was 4,16% and experienced increase compared to 2019. The highest LBW case in Surakarta was obtained in work area of Pajang Pajang Health Center with case proportion 2,8%. The CED status is included into maternal factor of LWB because of insufficient nutrition of mothers and infants.This study aim to find out the status of CED on pregnant women towards the risk of LBW.
Method: Analytic observational research with case control design retrospective approach using secondary data of Pajang Public Health Center in 2020. The research samples consisted of case sample with total sampling technique and control sample comparison 1:2 until obtained case sample 25 and control sample 50.
Results: The results of the chi-square test analysis stated that there was a statistically significant relationship between the CED status of pregnant women and the incidence of LBW, with a p-value of 0.005 and an odd ratio = 4.935
Conclusion: Pregnant women with CED has risk of 4,935 times higher to give birth with LBW compared to pregnant women with no CED.

Keywords: Keywords: CED; LBW; pregnant women.

INTRODUCTION

The infant mortality rate (IMR) is one of the indicators used to determine the health and welfare of the community in a country, and it is included in the Sustainable Development Goals (SDGs) target. In 2020, there were 2.4 million child deaths in the first month of life worldwide every year. Every day, there are around 6,500 neonates who die. Of the total births worldwide, around 15% - 20% are born with low birth weight (1,2).

Based on the Indonesian Health Profile, the leading cause of neonatal death in 2020 was low birth weight (LBW), with a percentage of 35.2% (3). According to WHO, LBW is a baby's birth weight of less than 2,500 grams. The percentage of LBW births in Indonesia in 2020 was 3.1%, with the highest number of LBW in Central Java Province, 4.5%. Based on the Central Java Provincial Health Profile, Surakarta City ranks second in terms of the percentage of the ever-married female population aged 14-49 years who gave birth to babies with LBW in the last 2 years in Central Java, namely 17.59%, and Pajang Health Center as the health center with the highest number of LBW in Surakarta with a proportion of 2.8% (4,5).

The proportion of LBW at the Pajang Health Center increased from 2% in 2018 to 2.8% in 2020. Most mothers who gave birth to LBW at the Pajang Health Center had a high school education level and above. According to Mijayanti, the higher the level of education in the area, the lower the incidence of LBW (6). The gap between the level of education and the incidence of LBW is the basis for conducting research on other factors of LBW at the Pajang Health Center (5,6).

According to Suharta, the occurrence of LBW is caused by fetal and maternal factors. Factors from the baby are congenital disabilities and infections in the womb. Maternal factors are maternal age (pregnancy at too young and too old), pregnancy spacing is too close, history of LBW delivery, heavy work activities, socio-economic conditions, education, nutritional status, alcohol, use of illegal drugs and smoking, maternal health problems (7).

The role of midwives in providing care to pregnant women is vital in the form of health education and counseling. It is hoped that pregnant women will understand how important it is to check their pregnancy and the mother's nutrition during pregnancy so that the incidence of LBW can be reduced and can be overcome immediately (8).

The nutritional status of pregnant women can be assessed by measuring the upper arm circumference (LILA); if the mother's LILA size is <23.5 cm, then it is categorized as experiencing chronic energy deficiency (CED). The results of Riskesdas (2018) stated that there were 17.3% of pregnant women who experienced CED. Central Java is included in the top 10 proportions of CED in women of childbearing age, with a proportion of CED in pregnant women of 19%. Percentage of KEK in mothers pregnant in Surakarta in 2020, as many as 441 people (4.16%) experienced improvement compared to in 2019, namely 3.48%, followed by maternal data pregnant KEK Puskesmas Display which is 4.13%. The study shows that there is a connection between KEK and LBW incidents. Following the results, the study found that a mother's nutritional status is connected with BBLR. However, other studies show a significant relationship between KEK and BBLR (4,5).

Based on the data and gaps described, it is necessary to examine the relationship between CED and the incidence of LBW and determine how significant the risk of CEK status in pregnant women is in the incidence of LBW.

METHOD

The design used in this study was a case-control with a retrospective approach using secondary data from the Pajang Health Center in 2020. The study sample consisted of case samples with a total sampling technique and a control sample with a ratio of 1:2, so 25 case samples and 50 controls were obtained per the inclusion and exclusion criteria provisions. The inclusion criteria in this study were complete medical records and cohort data, making the first pregnancy visit at the Pajang Health Center, and live births. The exclusion criteria were babies with congenital abnormalities. Data collection used secondary data from the maternal cohort and medical records. To determine the relationship between CED status in pregnant women and the incidence of LBW, the data analysis used was the chi-square test, and to determine the magnitude of the risk posed, the odd ratio was used. This study used a confidence level of 95%. To test the validity of secondary data, inspect data sources, compare data with others, and evaluate the credibility of data sources.

RESULTS

In the analysis and data processing, the results obtained were a description of the CED status of mothers in the case group (LBW) and control (non-LBW) in the Pajang Health Center area, which can be shown in the following table:

Table 1. Overview of the Status of CED Mothers in the Pajang Health Center Area

Status	LBW		Non- LBW	
	(n)	(%)	(n)	(%)
CED	13	52	9	18
Non CED	12	48	41	82
Total	25	100	50	100

Table 1 shows that the CED status of mothers in the case group was mainly experiencing CED at 52%, while in the control group, the majority did not experience CED at 82%. This shows that mothers who did not experience CED mostly gave birth to babies who were not LBW.

Based on the data, it is known that mothers with CED who gave birth to LBW

babies were 13 (52%), and mothers with CED who gave birth to non-LBW babies were 9 (18%). The table data also shows that mothers without CED gave birth to LBW babies 12 (48%), and mothers without CED gave birth to non-LBW babies 41 (82%).

Table 2. Relationship between CED Status in Pregnant Women and the Incidence of LBW

Status	LBW		Non-LBW		Total				
	(n)	(%)	(n)	(%)	n	(%)	*p*	OR	CI (%)
CED	13	52	9	18	22	29,33			
Non-CED	12	48	41	82	53	70,67	0.005*	4,93	1,70 -14,329
Total	25	100	50	100	75	100			

Data processing in Table 2, which determines the relationship between CED status in pregnant women and the incidence of LBW, is the Chi-Square Test. This test is used to prove whether or not there is a relationship between CED status in pregnant women and the incidence of LBW at the Pajang Health Center in 2020. Based on the Chi-Square test with a continuity correction value, a p-value of 0.005 <0.05 was obtained. A p-value <0.05 is a significant relationship between CED status in pregnant women and the incidence of LBW at the Pajang Health Center in 2020. This study obtained an odd ratio of 4.935 (95% CI: 1.70 - 14.329). According to the table above, it can be interpreted that pregnant women who have CED status have a 4.935 greater risk of giving birth to LBW babies.

DISCUSSION

The study subjects at the Pajang Health Center consisted of mothers who experienced CED during pregnancy, amounting to 29.33% and those who did not experience CED, amounting to 70.67%. CED in pregnant women hurts pregnancy outcomes because the quality of the baby's birth depends on the nutritional status of the mother before or during pregnancy. According to Aprilia, pregnant women who experience CED in the first week of pregnancy, the babies born tend to have brain and bone marrow damage because the central nervous system is very sensitive during the first 2 to 5 weeks. If the mother continues to experience CED until the end of pregnancy, the mother will give birth to a baby with LBW (9,10) .

Based on Table 2, 52% of LBW cases came from mothers who experienced CED with a p-value of 0.005. This proves that there is a significant relationship between CED status in pregnant women and the incidence of LBW at the Pajang Health Center in 2020, marked by a p-value <0.05. Research conducted by Yuliana shows that the LILA of pregnant women is significantly related to the incidence of LBW; in the study by Amima Fajrina, a p-value of 0.018 was obtained (11,12). According to Sahlu research, LILA is a good nutritional indicator for identifying pregnant women with acute malnutrition and predicting poor birth outcomes. According to theory, mothers need optimal nutritional intake before and during pregnancy to support fetal growth and development because the nutritional status of pregnant women affects fetal growth (13). If the mother's nutrition is poor before and during pregnancy, it can disrupt the growth and development of the fetus, such as brain growth, newborn anemia, newborn infections, abortion, and the risk of giving birth to a baby with low birth weight (14).

The calculation results obtained an odd ratio of 4.935 with a CI of 1.70 - 14.329. This can be interpreted that mothers who experience CED during pregnancy have a 4.935 times greater risk of giving birth to an LBW baby. Based on the p-value and odd ratio Ha, the study accepted that CED status in pregnant women is at risk of LBW at the Pajang Health Center in 2020. CED status in pregnant women is a risk of babies being born with LBW because the mother's nutrition is not sufficient to meet the nutritional needs of the fetus. In research conducted by Deriba and Jemal, which was conducted at the Shewa Utara health facility center, it was found that mothers who experience CED have a 2.85 risk of giving

birth to an LBW baby. This is because the mother's low nutritional status causes various complications that can cause LBW (15).

In addition, according research to Permana and Wijaya, pregnant women who suffer from CED can experience decreased blood volume in the mother's body and insufficient cardiac output of pregnant women, resulting in decreased blood flow to the placenta (16). Malnutrition in mothers can also cause stunted growth and development of the fetus due to very low transfer of nutrients in the blood from the mother to the placenta for the fetus, and cause babies to be born with LBW (15,17).

Based on the study, it is expected that the occurrence of LBW can be prevented by repairing the nutrition of mothers before and during pregnancy. Repair nutrition The mother can do this by improving education about preparation nutrition. The mother can plan pregnancy and fulfill nutrition during pregnancy in the work area of the Pajang public health center Surakarta.

CONCLUSIONS

There is a significant relationship between CED status in pregnant women and the incidence of LBW. Mothers who experience CED during pregnancy have a 4.935 times greater risk of giving birth to LBW babies compared to pregnant women without CED. Pregnant women or mothers planning a pregnancy need to increase their knowledge of nutritional intake before or during pregnancy so that the nutritional needs of the mother and fetus are met during pregnancy. Midwives increase awareness of the incidence of LBW in mothers suffering from CED by providing information regarding maternal nutrition before and during pregnancy.

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