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Correlation of Nutritional Status Bades on Upper Arm Circumference (LiLa) of Pregnant Woment with Low Birth Weight Infants (LBW)

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Abstract

Poor nutritional status of pregnant women is associated with adverse births including intrauterine growth disorders and low birth weight (LBW), which have a detrimental impact on the development of their lives. The purpose of this study was to find out about the relationship between upper arm circumference (LiLa) in pregnant women and low birth weight babies. This type of research is a type of quantitative analytic study using a cross-sectional design, by taking a sample with a total sample. The results of the research on the nutritional status of pregnant women showed that 35 respondents (34.3%) experienced CED and 67 respondents (65.7%) did not experience CED, 30 respondents had LBW babies (29.4%) and 72 respondents did not have LBW (70.6%). The relationship between the nutritional status of pregnant women and the incidence of LBW was found that most of the respondents who experienced CED had babies who were LBW, namely 16 respondents (45.7%) and the respondents who did not experience CED were mostly not gave birth to LBW babies, namely as many as 53 respondents (79.1%). The conclusion is that there is a relationship between the nutritional status of pregnant women based on Lila and the incidence of LBW at the Bangetayu Health Center, Semarang City

Keywords: neonatus; nutrition; pregnancy

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Introduction

Low Birth Weight Babies (LBW) according to the WHO definition, namely birth weight <2500 grams regardless of gestational age (Cutland et al., 2017). Infants with low birth weight (LBW) are the main determinants of newborn survival, infant morbidity, mortality, and the risk of developmental disabilities and non-communicable diseases in the future. Globally, WHO estimates that around 30 million low birth weight babies are born each year (23.4% of all births), and often face short and long term health consequences (Tassema et al., 2021).

The incidence rate for LBW in 2020 in Indonesia was 129,815 (3.1%) cases and the most common cause of neonatal death was low birth weight (LBW) (Kemenkes RI, 2021). Central Java Province, the incidence of LBW in 2021 is 22,240 cases which will increase in 2020 to 21,001 cases. The incidence of LBW in Semarang City is 449 cases in 2021 (BPS, 2021). Pregnant women really need sufficient energy and nutrients to meet the nutritional needs for fetal growth and meet the increased needs of the mother's body. Poor maternal nutritional status is associated with adverse births including intrauterine growth disorders and low birth weight (LBW), which have a detrimental impact on the development of life. (Woldeamanuel et al., 2019).

The degree of nutritional status can be seen from the main nutritional problems, such as Chronic Energy Deficiency, Iodine Deficiency, and Anemia. The parameter to determine the nutritional status of pregnant women is the maternal upper arm circumference (LILA) indicator. Chronic Energy Deficiency (KEK) is a state of energy deficiency for a long time. Chronic Energy Deficiency can be identified by measuring the Upper Arm Circumference with results <23.5 cm. This occurs due to an imbalance between intake and expenditure to meet energy needs (Maryani et al., 2019). Chronic Energy Deficiency (CED) is usually caused by a lack of energy and protein intake in pregnant women. Pregnant women who experience CED are at risk of giving birth to babies with low birth weight (LBW), then if they are not treated properly they will be at risk of experiencing stunting. According to research (Zaif et al., 2017), if there is a lack of nutritional status in early life it will have an impact on later life, such as stunted fetal growth (CHD), low birth weight (LBW), stunting, low endurance and risk of death (Mulianingsih et al., 2021).

Research from Restu, Sri et al (2017) states that there is a relationship between chronic energy deficiency in pregnant women and low birth weight babies (LBW). Pregnant women with chronic energy deficiency (CED) have four times the risk of giving birth to babies with low birth weight (Restu et al., 2017. This is in line with research conducted by Maryani, Febri (2019) namely pregnant women with malnutrition have a 6.5 greater probability of giving birth to babies with low birth

weight than pregnant women with very good nutrition (Maryani et al., 2019). However, research from Mulianingsih, et al (2021) found that there was no significant relationship between maternal nutritional status and birth weight. This could mean that maternal nutritional status did not correlate with birth weight, as seen P value of 0.084. This is because birth weight is not only influenced by the nutritional status of the mother, but the causes of low birth weight are most often it is premature birth or problems at gestational age (Mulianingsih et al., 2021).

WHO has made several efforts to prevent low birth weight babies (LBW), including during preconception, namely by managing birth spacing, preconception daily folic acid supplementation to reduce congenital defects and promotion of smoking cessation during pregnancy. During pregnancy i.e. with monitoring of fetal growth and evaluation of newborn size at all levels of care, integrated into the latest WHO model of antenatal care, Daily iron and folic acid supplementation for women during pregnancy, Balanced protein-energy supplementation and Daily calcium supplementation for women in settings with low calcium intake (WHO, 2012).

Efforts to prevent and control LBW in Indonesia can be done in a number of ways, namely by providing adequate health education about LBW to pregnant women. In addition, it can also carry out supervision and monitoring, then make efforts to prevent hypothermia in infants and help achieve normal growth. As for other efforts, such as providing free therapy that can be done by the mother, measuring the nutritional status of pregnant women, calculating and preparing for steps in health (Antenatal Care), and monitoring the condition of the baby from birth who has experienced intrauterine growth retardation. (Novitasari et al., 2020).

Method

This type of research is a type of quantitative analytic research using a cross sectional design. This research took place at the Bangetayu Community Health Center, Semarang City. The data were collected using retrospective medical records of the respondents. The sampling technique used total sampling / all patients who gave birth at the Bangetayu Health Center, Semarang City in September 2022, namely 102 respondents who had fulfilled. The inclusion criteria in this study were all pregnant women who gave birth to babies with LBW at the Bangetayu Health Center, Semarang City. Exclusion criteria in this study were incomplete patient medical records, twin pregnancies and stillbirths. Secondary data was obtained from the patient's medical record, then collected by the midwife appointed by the researcher as the enumerator. data collection using questionnaires and checklists provided by researchers. Data analysis techniques used the Chi-Square statistical test

Result and Discussion

The nutritional status of pregnant women

Table 1. Frequency Distribution Based on Nutritional Status based on Upper Arm Circumference (LiLa) of Pregnant Women at Bangetayu Health Center, Semarang City

No	Status Gizi	Distribusi	
		F	%
1.	Kek	35	34.3
2.	Tidak Kek	67	65.7
	Total	102	100.0

Respondents who experienced SEZ were 35 respondents (34.3%) and those who did not experienced SEZ were 67 respondents (65.7%) (Table 1). The nutritional status of pregnant women in this study was carried out by measuring the upper arm circumference of pregnant women. The results of the research that has been done show that there are still some pregnant women who experience CED or chronic energy deficiency. This also means that the nutritional status of pregnant women is not all of them have good nutrition.

Nutritional status in the mother can be seen in anthropometric measurements in pregnant women such as low upper arm circumference or in laboratory tests found anemia or certain micronutrient deficiencies. Poor nutritional status during pregnancy is not only detrimental to the mother's health but also affects the health of the fetus and newborn. A recent study conducted in India reported an increased risk of low birth weight in babies born to women who had anemic pregnancies, and women who were underweight. Therefore, the nutritional status of the mother before and during pregnancy is very important for a healthy pregnancy outcome (Kpewou et al., 2020). Upper arm circumference and birth weight can be used as markers of skinfold thickness, which reflect total body fat in pregnant women and infants respectively (Babu et al., 2021). Upper arm circumference (LiLA) has been recognized as a rapid tool for monitoring nutritional status, and is strongly associated with BMI. This can be applied to monitor maternal malnutrition and fetal growth. Upper arm circumference can be used as an assessment of protein intake and storage, associated with severe malnutrition (Miele et al., 2021).

This research is in line with research conducted by Fabiana Meijon Fadul (2019) which states that the nutritional status of pregnant women greatly influences the growth of the fetus being conceived. If the mother's nutritional status is normal during pregnancy, it is likely that she will give birth to a healthy, full-term baby with normal weight. The quality of babies born is highly dependent on the nutritional state of the mother during pregnancy (Fabiana Meijon Fadul, 2019). Research from Erlyna Eva Sari, et al (2016) states that pregnant women who suffer from CED have a greater risk of illness, especially in the third trimester compared to normal pregnant women. As a result, they have a greater risk of giving birth to babies with LBW (Evasari &

Nurmala, 2016). Research by Hanny Desmiati (2020) states that pregnant women who are at risk of KEK are pregnant women who have an upper arm circumference (LILA) measuring less than 23.5 cm. the limit for LILA measurements in the WUS group with CED risk in Indonesia is 23.5 cm (Desmiati et al., 2020). Maternal nutritional status before and during pregnancy can affect the growth of the fetus being conceived. If the mother's nutritional status is normal before and during pregnancy, it is likely that she will give birth to a healthy, full-term baby with normal weight. Poor fetal growth from pregnant women with CED conditions will result in babies with low birth weight (Ruaida & Soumokil, 2018).

LBW Incident

Table 2. Frequency Distribution Based on LBW Incidence at Bangetayu Health Center, Semarang City

NoKejadian BBLR	Distribusi	
	F	%
1. BBLR	30	29,4
2. Tidak BBLR	72	70,6
Total	102	100.0

Thirty respondents had LBW babies (29.4%) and 72 respondents did not have LBW babies (70.6%) (Table 2). Although most of the respondents gave birth to babies who were not LBW, the results of the study showed that 30 (29.4%) respondents still experienced LBW babies. The incidence of LBW due to Chronic Energy Deficiency (CED) in pregnant women begins with pregnant women suffering from CED which causes the volume of blood in the mother's body to decrease and the cardiac output of pregnant women is insufficient, causing a decrease in blood flow to the placenta. Reduced blood flow to the placenta causes two things, namely reduced transfer of nutrients from the mother to the placenta which can cause fetal growth retardation and the growth of a smaller placenta which causes babies with low birth weight (LBW) (Sulistiani, 2014).

Many LBW events occur due to several factors, including maternal factors, such as disease, socioeconomic conditions, nutritional status, and lifestyle. Fetal factors such as chromosomal abnormalities, radiation, multiple pregnancies, infections. Placental factors and environmental factors. Efforts made by health workers in LBW cases are to keep the baby warm because LBW babies are very susceptible to hypothermia, besides that the kangaroo method can be used, some are even kept in an incubator if the baby's condition is still unstable. This is in accordance with the opinion of Puspitaningrum (2018) that the complication of LBW babies is hypothermia, which is characterized by temperatures below 36°C, cold skin and cyanosis (Puspitaningrum, 2018).

The Relationship between Nutritional Status based on LiLa in Pregnant Women with LBW Incidence at Bangetayu Health Center, Semarang City

Table 3. Relationship of Nutritional Status based on LiLa in Pregnant Women with Low Birth Weight Incidence at the Bangetayu Health Center, Semarang City

Status Gizi	Kejadian BBLR				Total		P Value
	Ya		Tidak		F	%	
	F	%	F	%			
KEK	16	45,7%	19	54,3%	35	100%	0.009
Tidak KEK	14	20,9%	53	79,1%	67	100%	
Total	30	29,4%	72	70,6%	102	100%	

Respondents who experienced CED mostly had LBW babies, namely as many as 16 respondents (45.7%) and respondents who did not experience CED most did not give birth to LBW babies, namely 53 respondents (79.1%). Based on the results of the Chi-Square test, there is a relationship between the nutritional status of pregnant women based on Lila and the incidence of LBW at the Bangetayu Health Center, Semarang City (p-value = 0.009) (Table 3). This is in line with the theory which suggests that if the mother's LILA before pregnancy is less than 23.5 cm, the pregnancy should be postponed because of the risk of giving birth to LBW (Kusumaningrum & Daryanti, 2022

This research is in line with research conducted by Sri Restu, et al (2017) that there is a relationship between KEK in pregnant women and LBW. Pregnant women with CED have four times the risk of giving birth to babies with low birth weight (Restu et al., 2017). Pregnant women who experience malnutrition or CED will affect the growth of the fetus they contain. This will affect the low birth weight babies. A small baby's weight will significantly affect the death of a bigger baby. A study in Guatemala (United States) showed that the lower the newborn's weight, the higher the mortality rate for the baby (Fatimah & Yuliani, 2019). Research from Ekowati, et al (2017) states that pregnant women with Chronic Energy Deficiency (KEK) are 5.6 times more likely to give birth to babies with LBW. KEK during pregnancy is caused by a lack of nutrients that enter the body. KEK during pregnancy can also reduce blood volume thereby reducing cardiac output and blood volume to the placenta. Lack of blood pumped to the placenta reduces the flow of nutrients from mother to baby and can cause fetal growth retardation. Measurement of upper arm circumference (Lila) is one method that can be used to detect KEK in pregnant women (Ekowati et al., 2017).

Conclusion

The conclusion of this research is that there is a relationship between the nutritional status of pregnant women based on Lila and the incidence of LBW at the Bangetayu Health Center, Semarang City (p-value = 0.009)

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