



Relationship of Chronic Energy Deficiency in Pregnant Women with Low Birth Weight Newborn in Central Sulawesi Province

Sri Restu^{a*}, Sumiaty Sumiaty^b, Irmawati Irmawati^c, Sundari Sundari^d

^{a,b,c}*Department of Midwifery, Polytechnic of Health, Ministry of Health, Palu, Indonesia*

^d*Department of Midwifery, Faculty of Public Health, Muslim University of Indonesia*

Email: restutempali@gmail.com

Abstract

Pregnant women with poor nutritional status or chronic energy deficiency (CED) tend to give birth with low birth weight newborn (LBW). The number of pregnant women who CED in Central Sulawesi in 2015 were 290 pregnant women and incidence of low birth weight newborn is 58. This study aims to determine the relationship between CED in Pregnancy with LBW. This observational research with a Retrospective cohort. The study population was all women who gave birth in Central Sulawesi 2015. Purposive sampling technique with a total sample of 290 mothers was used. The results showed that the percentage of pregnant women who have CED 69 mothers (23.8%) and low birth weight were 58 infants (20%). There is a significant relationship between CED in pregnant women with LBW with a value of $p = 0.000$. CED is Risk Factors against LBW with the value of $RR = 4.215$ ($RR > 1$). This study found that there is a relationship between CED in pregnant women with LBW. Pregnant women with CED had four times the risk of having a baby with low birth weight. It is recommended to improve the detection of CED in pregnant women and conduct immediate and optimal treatment.

Keywords: LBW; CED; Pregnant Women; Newborn.

* Corresponding author.

1. Introduction

Nutrition problem in Indonesia is still a major public health problem and is the cause of maternal and child mortality indirectly. Maternal mortality rate (MMR) and infant mortality rate (IMR) and low birth weight (LBW) are determined by the nutritional status of pregnant women. Pregnant women with poor nutritional status or Chronic Lack of Energy (CED) tend to deliver babies with low birth weight (LBW). LBW has a greater risk of death compared to normal birth weight infants [1].

The World Health Organization (WHO) estimates that every year > 20 million babies are born with LBW or an estimated 15% of all births in the world. In Indonesia, the incidence of BBLR ranges from 9-20% varies from one region to another [2,3].

LBW is influenced by two factors namely maternal factors and fetal factors. Maternal factors affecting LBW occurrence are maternal age during pregnancy (<20 years or > 35 years and labor spacing is too short), mother's condition (previous history of LBW), overworked, socioeconomic, nutritional status, smoker, drug users, alcohol and mothers with health problems (severe anemia, pre eclampsia, infections during pregnancy) while from infant factors (congenital defects and infection during pregnancy). Age, parity, gestational distance, education, weight gain, anemia and pre eclampsia have a significant effect on LBW [3].

There are several ways that can be used to determine the nutritional status of pregnant women, among others, monitor the weight gain during pregnancy, measure the upper arm circumference (UAC) and measure blood hemoglobin levels. UAC can estimate the total muscle mass of the body and in this section can accurately reflect correct changes in muscle tissue [4]. Measurements of UAC are intended to determine whether a person has a SEZ risk if the size of UAC is <23.5 cm or red section of the band. UAC means that the woman has SEZ risk, and is expected to give birth to low birth weight babies [5].

CED during pregnancy will cause problems, both in the mother and fetus. SEZ in pregnant women can cause risk and complication in mother include: anemia, bleeding, mother's weight does not grow normally and infected by infectious diseases. The effect of SEZ on labor can result in difficult and prolonged labor, preterm labor (premature), bleeding after delivery, and labor with surgery. CED pregnant women can affect fetal growth process and can lead to miscarriage, abortion, stillbirth, neonatal death, congenital disabilities, anemia in infants, asphyxia intra partum, born with low birth weight (LBW) [6].

Based on the results of Riskesdas in 2013 stated that the presence of children under five years (10.2%) with LBW is 10.2% with the highest LBW presentation in Central Sulawesi Province (16.8%) and the lowest in North Sumatra (7.2%) an increase in the proportion of pregnant women aged 15-19 with SEZ from 31.3% in 2010 increased to 38.5% by 2013 [7].

The Indonesia Demographic and Health Survey (IDHS) in 2012, IMR in Indonesia is 32 per 1,000 live births while for Neonatal Death Rate (NDR) is 19 per 1,000 live births. Of all infant deaths in Indonesia as much as 46.2% died in neonates (under one month age) causes of neonatal death due to respiratory / asphyxia (35.9%) and LBW 32.4% [8].

A study conducted by Budiman and his colleagues found that chronic energy deficiency in pregnant women as a risk factor for low birth weight infants in which expectant mothers who accompanied CED have a risk 3.95 times more likely to give birth to LBW compared with pregnant women not suffering from CED [9].

Similarly, research conducted Vitraningsih and his colleagues in RSUD Wonosari found that CED in pregnant women is the leading factor associated with LBW, where pregnant women with risk CED have six times opportunities to give birth to LBW compared with mothers who are not CED [10].

Based on reports from Puskesmas in Palu, infant mortality rates from 2010 to 2013 continue to increase from 4.9 / 1000 live births until 2013 by 11/1000 live births. In 2014 of 44 infant mortality rate (35%) is caused by LBW which is the leading cause of death in children in Palu City. There are 190 babies born with LBW, and 4 of them died in 2015. In addition to the level of antenatal care, the success rate of KIA / KB program, environmental and socio-economic conditions of pregnant women's nutritional status are one of the things that affect infant mortality [11]. Data from Health Office of Palu city got the picture of the prevalence rate of a pregnant mother of CED which continuously increase in 2014 from 7,927 pregnant women there are 875 pregnant women with CED (11,04%), and in 2015 this number increased from 7,398 pregnant women there are 1,094 (14.79%) pregnant women with SEZ. Puskesmas Kamonji is one of the Puskesmas with the incidence of CED pregnant women who experienced a significant increase from the previous two years compared with other puskesmas [12]. Based on the preliminary data collection at Kamonji Health Center in January 2016, the number of pregnant women who gave birth in the work area of Puskesmas Kamonji Palu City in 2015 amounted to 1,051 and the number of pregnant women who experienced CED every year increased by 2014 by 40 people and by 2015 rose to 98 people, while the incidence of Low Birth Weight (LBW) in 2014 amounted to 45 people with cases of death from BBLR a number of 4 people. In 2015 there are 58 newborns with BBLR of 1,051 births and two mortality due to low birth weight [12]. Based on the above, we are interested to know whether there is a relationship between CED in pregnant women with the incidence of LBW. This study aims to determine the relationship CED in expectant mothers with the impact of LBW.

2. Materials and Method

2.1. Collection of Samples

This research was conducted in Health center of Palu City, Central Sulawesi. This type of the investigation used an observational study with retrospective cohort study. The population of this study was all pregnant women in the working area of Kamonji Puskesmas 2015, which amounted to 1051 mothers. Purposive sampling technique does sampling with individual consideration made by Researcher. The sample size was calculated using Slovin formula with the number of samples obtained as many as 290 mothers. Determination of samples of each village in the work area of Kamonji Puskesmas, using proportional random sampling and determining individual samples with simple random sampling technique so that all mothers in seven communities in the work area of Kamonji Health Center can be represented.

2.2. Data Analysis

Data collection methods are divided into primary and secondary data. Data processed with several stages starting from the process of data editing, data cleaning, data grouping, data preparation until data analysis. Data were analyzed by univariate analysis using frequency distribution, bivariate analysis using Chi Square test with Yates correction for continuity and multivariate analysis using relative risk.

2.3. Ethical Clearance

Ethical approval for this study was obtained from Research Ethics Committee, 'Indonesian Moslem University, Makassar, Indonesia.

3. Results

The result of the univariate analysis showed that of the 290 respondents there were 69 (23.8%) of mothers with CED and 221 people (76.2%) of mothers who do not suffer from CED during early pregnancy. And the data showed that of the 290 respondents are 58 infants (20%) LBW (weight <2500 g) and 232 children (80%) average (weight ≥ 2500 g). This can be seen in Table 1 below:

Table 1: Frequency Distribution of CED and LBW

variables	F	%
CED (MUAC <23.5 cm)	69	23.8
NOT CED (UAC ≥23.5 cm)	221	76.2
Low birth weight (<2500 g)	58	20
Normal (≥ 2500 g)	232	80
Total	290	100

The results of the bivariate and multivariate analysis in this study shows that there is a significant association between chronic energy malnutrition (CED) in pregnant women with Infant Low Birth Weight (LBW), which can be described in table 2 below:

Tabel 2: Relationship of CED dan LBW in Puskesmas Kamonji 2015

Variable	LBW		NORMA		Total		P_Value	RR
	L		L					
	f	%	f	%	f	%		
CED	53	77	16	23	69	100	0.000	4.22
NOT CED	5	2.3	216	97.7	221	100		

statistics to determine the relative risk (RR) obtained RR value of 4.215 (95% CI = 2.742-6.479) indicating that the value of $RR > 1$ it means that pregnant women with CED have a risk of 4 times giving birth to babies with LBW

4. Discussion

Based on the research result, it is found that there is a relationship between CED and BBLR (p -value = 0.000). Pregnant women with CED have a 4-time risk of delivering a baby with LBW ($RR = 4.215$). The nutritional status of pregnant women greatly influences the growth of the fetus in the womb. If the situation of malnutrition, both before pregnancy and during pregnancy will disrupt growth in the fetus, causing inhibition of fetal brain growth, anemia in newborns, newborn easy to get infections, abortion and so it has a risk of giving birth to babies with LBW [13, 14].

If pregnant women suffer from malnutrition or CED, this condition will significantly affect the growth of the fetus it contains. This influence will determine the baby's birth weight that will be less than it should be. This little infant weight will significantly affect the infant mortality is greater. A study in Guatemala (United States) shows that the lower the weight of newborns the higher the death rate [15].

The results of the study from Ceesay and his colleagues (1997) who states that malnutrition in pregnant women before or during pregnancy can lead to spontaneous abortion, the weight of a small infant during pregnancy, premature birth and stillbirth. Outcomes of pregnancy will be good if pregnant women get enough nutrition. Women who experience CED during pregnancy will have a negative influence on the weight and length of the baby at birth, a change in the placenta that triggers the occurrence of hypoxia that will result in reduced circulation of the placenta to the fetus [16].

Research from Aisha and his colleagues says that good nutrition required a pregnant mother for the growth of the fetus does not experience obstacles and then will give birth to babies with normal weight. With good health conditions, normal reproductive system, no illness, and no nutritional disorders during pregnancy or pregnancy, the mother will give birth to a bigger and healthier baby than the mother with the opposite pregnancy condition. Mothers with chronic malnutrition during pregnancy often give birth to low birth weight babies, low vitality and high mortality, especially if the mother is anemic [17, 18].

Inadequate nutrition is the cause of fetal growth restriction. Adequate fetal nutrition depends on several factors and regulatory mechanisms, including mother's intake energy, nutritional supply to the uterus and placenta, transport of nutrients to the placenta, fetal response to nutrition and regulation of fetal nutrition [17]. Related to the importance of nutritional status of pregnant women to the growth of the fetus, the nutritional status of pregnant women should really get attention. Fetal nutritional status determines the weight of newborns and fetal nutritional status is determined by the nutritional status of the mother during pregnancy until delivery. This opinion is supported by Sulistyawati and Maryani, states the maternal nutritional status as measured by UAC yields $< 23,5$ cm, then categorized as having CED. The condition of this nutritional or malnutrition imbalance, causes the mother to decrease blood. Blood volume is important to bring nutrients or O_2 to the fetus through the

placenta. The decrease in blood volume causes inadequate cardiac output, blood to the placenta carrying the nutrients to the fetus decreases, causing a smaller placental size. In addition, due to circulatory disturbances of O₂ and nutrients it will result in fetal growth inhibited or LBW [2, 18, 19].

In tackling the CED in pregnant women and minimize the risk of LBW, it is necessary to maintain good nutritional condition in pregnant women, among others, through prevention and treatment that is trying to expect pregnant women to check their pregnancy routinely and earlier, it is necessary to collect and detect Women Age Fertile) who are at risk of CED and Anemia so that these risk factors can be identified and carried out as early as possible (Pre-Conception), providing counseling on nutritious food and regulation of food consumption on WFA and pregnant women, Supplementary Feeding (PMT) in CED pregnant women, empowerment economic community so that they are able to meet their basic needs, especially in meeting the need for nutritious food. Increasing variety and quantity of food, because the nutrient content in each food type is different, and none of the food types contain complete nutrients, so to meet the needs of most of the nutrients required consumption of diverse foods [11, 20, 21, 22].

Studies found when the amount of food consumed is not enough or inadequate. This causes a decrease in blood volume, so the blood flow to the placenta decreases, the placental size decreases and nutrient transport is also reduced which results in fetal growth inhibited and will give birth to LBW [23, 24, 25].

King (2003) says that in the provision of foods that contain enough nutrients, environmental factors are very influential and will have an impact on the baby being born. If a woman with nutritional deficiency will interfere with her reproductive process and if during pregnancy will inhibit the growth of the fetus, preterm birth, stillbirth and maternal death [26] .

So the important thing to do is Increased surveillance program of nutrition to improve the coverage detection CED, so before pregnancy Women of fertile age (WFA) with CED has been getting treatment, raising public awareness to be more proactive to health services especially to MCH services and routine melakukan prenatal care, improve counseling and education about the importance of nutrition in the life cycle, especially in the moments before the pregnancy because it can affect the outcome of the pregnancy so that the incidence of SEZ is a chronic disease can be prevented and minimized, especially in pregnant women and WFA.

5. Conclusion

The conclusion of this research is there is a significant association between chronic energy deficiency (CED) in pregnant women with the incidence of low birth weight (LBW). Suggestions from this research is needed to improve the handling of cases of CED through Feeding (PMT) early in pregnancy and do coordination with relevant stakeholders particularly the local Health Department to prioritize funding PMT for Pregnant Women CED and completing the recording and reporting of midwives are expected can further improve the delivery of education about the importance of proper nutrition and enough during pregnancy and improving the nutritional status screening. As well as the need to develop cross-sector role for nutritional problem is a problem that requires cooperation penangulangannya highly relevant sectors, in order to be more proactive in solving public

health problems that exist in their area especially nutrition problems through forums that exist in society.

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6. Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare

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