APPROPRIATENESS OF MOTHER'S WEIGHT GAIN DURING PREGNANCY WITH THE INCIDENT OF LBW IN THE NEONATE WARD AT HASAN SADIKIN HOSPITAL BANDUNG

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ABSTRACT

Introduction: The mortality rate of children, especially infants, is still quite high, with the largest contributor to infant deaths was low birth weight (LBW). The incidence of LBW is related to maternal factors, including maternal weight gain during pregnancy. This study aims to identify the suitability of maternal weight gain during pregnancy with the incidence of LBW in the neonatal ward at Hasan Sadikin Hospital, Bandung. Methodology: The research design used cross-sectional. The research sample was babies treated in the neonate ward. The sampling technique used consecutive sampling with a sample size of 100. Data collection was carried out by filling out a questionnaire. Data analysis used univariate and bivariate analysis, the frequency distribution of each variable and the relationship between variables are known. Research findings: The results of the research showed that the incidence of LBW was found to be 88 LBW out of 100 respondents, and a history of inappropriate maternal weight gain was 74 respondents, but there was no relationship between maternal weight gain and the incidence of LBW with p value of 0.07. Conclusions: Based on the results of this study, it can be identified that maternal weight gain during pregnancy is not the dominant factor causing LBW.

***Key Words**: low birth weight, Maternal Weight, Neonate*

1. Introduction

Low Birth Weight (LBW) is the largest cause of neonate's death in Indonesia, which contributes 35.3%, apart from asphyxia, congenital abnormalities, sepsis, neonatal tetanus and other conditions[2]. Likewise, in West Java the infant mortality rate caused by LBW is 42%[14]. LBW is a baby with a birth weight of less than 2500 grams[3]. LBW with premature conditions tend to experience disorders in various body organs, from disorders of the respiratory, cardiovascular, nervous, digestive, urinary, musculoskeletal and integument systems[8]. This condition makes the baby vulnerable to disease and easily experiences infections and complications which can result in the death of the baby. LBW is related to various factors, including maternal factors[3]. Maternal factors are caused by malnutrition during pregnancy[15,17].

Malnutrition during pregnancy results in reduced nutritional intake for the mother and fetus, so the fetus experiences obstacles in growth and experiences weight gain that is not ideal during pregnancy. Factors associated

with LBW are conditions that can be prevented through treatment during pregnancy. Therefore, along with the high incidence of LBW, it is necessary to identify the factors that cause LBW so that the incidence of low birth weight babies can be anticipated. Through these efforts, efforts to prevent the incidence of LBW can be developed, thereby reducing morbidity and mortality rates in infants.

2. Methode

The design of this research is cross-sectional analytic, looking for the relationship between the independent variable in the form of maternal risk factors, maternal weight gain during pregnancy, and the dependent variable, LBW, by taking measurements at one time.

The target population in this study were babies with low birth weight who were treated in the neonatal ward at Hasan Sadikin Hospital, Bandung, with a total of 80 babies during the last 3 months. The sampling technique used in this research is consecutive sampling, which is a non-probability or non-random sampling technique, a sample determination technique by selecting all observed samples that meet the sample selection criteria and then adding them to the sample until the sample size is determined. required to fulfill □4□. The sample size is based on the estimated proportion of a population with a confidence level of 95%, the figure is 100.

3. Results

3.1 Prevalence of LBW

Table 1: Prevalence of LBW

LBW	Frequency (n)	Percentage (%)
LBW	88	88%
Not LBW	12	12%
Total	100	100%

Based on Table 1 above, it can be seen that the majority of respondents, 88 babies (88%) out of 100 respondents experienced LBW.

3.2 Maternal weight gain during pregnancy

Table 2: Maternal weight gain during pregnancy

Maternal wight gain	Frequency (n)	Percentage (%)
Appropriate weight	26	26%
Inappropriate weight	74	74%
Total	100	100%

Based on Table 2 above, it can be seen that the majority of respondents, 74 respondents (74%) out of 100 respondents, had a history of inappropriate maternal weight gain.

3.3 Relationship between maternal weight gain during pregnancy and the incidence of LBW

Table 3: Relationship between maternal weight gain during pregnancy and the incidence of LBW

Maternal Wight Gain	LBW		Did'nt LBW		Total		*p-value*
	n	%	n	%	n	%	
Appropriate	20	76.9	6	23.1	26	100	0.07
In appropriate	68	91.9	6	8.8	74	1000	
Total	**88**	**88**	**12**	**12**	**100**	**10**	

Based on Table 3 above, it shows that the majority of respondents, 68 babies (91.9%) who experienced LBW, had a history of inappropriate maternal weight gain during pregnancy. Meanwhile, 6 babies (8.8%) of respondents who did not experience LBW had a history of inappropriate maternal weight gain during pregnancy. The statistical test results obtained p-value = 0.07 (>0.05), H0 failed to be rejected, so it can be identified that there is no relationship between maternal weight gain during pregnancy and the incidence of low birth weight

babies.

4. Discussion

4.1 Prevalance of LBW

The normal weight of a baby at birth is 2500 to 4000 grams or 2.5 to 4 kg. Based on the data obtained, it is known that the majority of respondents in this study experienced LBW or low birth weight babies, babies born with a body weight of less than 2500 grams or 2.5 kg. This research is in line with research in 2020 that half of the respondents experienced LBW[1].

LBW can occur when a baby is born prematurely or at agestational age of less than 37 weeks. Apart from that, LBW can also occur due to growth disorders while in the womb. Baby growth is generally rapid in the last weeks of pregnancy, so babies born early do not have enough time to grow and develop, so they tend to have a lower body weight and small stature. Apart from that, LBW also often occurs due to Intra Uterine Growth Restriction (IUGR), namely when the baby does not grow well while in the uterus. This problem can be triggered by disorders of the placenta, maternal health conditions or fetal health conditions.

LBW babies have a different physical appearance compared to babies in general, babies look small and thin with a larger head, so the baby will look disproportionate because the baby's head is larger than the baby's body. LBW looks small and thin because they haveless body fat than normal weight babies[8]. Babies with low birth weight tend to be weaker. LBW are more susceptible to disease or infection[3].

LBW can also experience postnatal complications, especially in LBW who are born prematurely. The lower the baby's weight, the higher the risk of complications. Complications that can occur include hypothermia, infection, problems with the respiratory system such as respiratory syndrome disease (RDS), problems with the digestive system such as necrotizing enterocolitis (NEC), problems with the nervous system such as brain hemorrhage, problems with the hematological system such as polycythemia, and can even death occurs. Apart from that, LBW can also experience delayed growth and development, blindness, deafness and cerebral palsy[8].

Almost all LBW require hospital treatment. The interventions provided are adjusted to the symptoms, gestation period and health condition of the baby. LBW with complications, such as RDS or NEC, requires more intensive care in the neonatal intensive care unit (NICU). LBW are allowed to go home from the hospital if the body weight has reached the target or after complications have been resolved and the mother can breastfeed normally. For mothers of LBW babies, doctors will recommend giving breast milk. This is because breast milk can support the baby's growth, endurance and weight gain. If the mother cannot provide breast milk, the baby can be given breast milk from a breast milk donor. LBW can catch up with its growth over time. However, to ensure that their development goes well, LBW babies need to undergo regular check-ups with a doctor periodically after returning home from the hospital.

4.2 Maternal weight gain during pregnancy

The research results showed that the majority of respondents, 74 respondents (74%) out of 100 respondents, had a history of inappropriate maternal weight gain. At

the beginning of intrauterine fetal life, nutritional intake is very necessary to support optimal growth and development of the fetus (Hockenberry et al, 2017). The nutrients obtained by the fetus come from the mother, so if the mother experiences a lack of nutritional intake it can cause blood volume to decrease so that oxygen and nutrients carried through the placenta are also reduced, fetal growth becomes stunted and the baby is at risk of being born with a low birth weight[13].

The ideal weight gain during pregnancy is 11-16 kg from the pre-pregnancy body mass index (BMI)[5]. Based on WHO recommendations, the ideal weight gain for mothers during pregnancy is 1 kg in the first trimester, 3 kg in the second trimester, and 6 kg in the third trimester. Pregnant women whose weight gain is less than 10 kg can give birth with a low birth weight (LBW) baby. Lack of energy intake reaching 50% in the second and third trimesters can cause fetal weight to decrease by ± 330 grams[5].

Weight gain during pregnancy is associated with increased components in the mother's body. The increase in these components occurs throughout the second trimester, while the growth of the fetus and placenta as well as the amount of amniotic fluid takes place in the third trimester □5□. Several body components that influence maternal weight during pregnancy are an increase in total body water (TBW), an increase in fat mass, placenta, fetus, and amniotic fluid[16].

Plasma volume during pregnancy increases by up to 45%. Total body water varies greatly and is largely influenced by hormones. Next is the increase in fat mass, based on estimates of the deposition and distribution of adipose tissue, it was found that adipose increases during pregnancy with a total of 46% in the lower body, 32% in the upper body, 16% in the thighs, 1% in the calves, 4% in the arms upper, and 1% on the forearm. The Institute of Medicine (IOM) recommends increasing fat mass based on BMI, namely 6 kg (underweight), 3.8 kg (normalweight), 2.8 kg (overweight), < 0.6 kg (obesity).

Another factor is the placenta, placental volume can be measured using ultrasound. The initial phase of placental growth lasts for 36 weeks, characterized by parenchymal and non-parenchymal tissue. Further development takes place from 36 weeks until utero, characterized by increased fetal growth, but only non-parenchymal tissue increases without an increase in parenchymal tissue. At 21 weeks of pregnancy the volume of the placenta measures 200 cm2, at age 28 it increases to 300 cm2, and at 40 weeks it is 500 cm^2.

Next is the fetus, fetal weight is influenced by the gestational age factor, where as gestational age increases, the weight of the fetus will also increase. The exact measurement of the fetus' weight can be seen after the fetus is born. However, the fetus's weight still influences the mother's weight gain. Then the last one is amniotic fluid. Amniotic fluid or amniotic fluid is one component that also influences the increase in pregnancy weight. Amniotic volume will increase at a rate of 10 ml/week at 8 weeks of gestation, while at 13 weeks of gestation it increases to 25 ml/week. The maximum increase in amniotic fluid is 60 ml/week which occurs at 21 weeks of gestation. The volume of amniotic fluid will decrease

until it reaches zero when the fluid reaches its maximum.

4.3 Relationship between maternal weight gain during pregnancy and the incidence of LBW

The statistical test results obtained p-value = 0.07 (>0.05), which means that H0 failed to be rejected, so it can be identified that there is no relationship between maternal weight gain during pregnancy and the incidence of low birth weight babies. The results of this study are in line with a study conducted by Maidartati et al which showed that there was no relationship between maternal weight gain during pregnancy and low birth weight babies[11].

LBW can be caused by several factors, including maternal factors [6,7,11]. Maternal factors that can cause LBW are malnutrition. Mothers experience malnutrition due to nutritional intake that does not meet the needs of the mother and fetus during pregnancy. This condition is often experienced by pregnant women with low socioeconomic status. This results in the mother not gaining ideal weight during pregnancy.

The mother's weight gain which is not ideal during pregnancy is caused by malnutrition during pregnancy so that the fetus lacks a nutritional supply, because basically the fetus is very dependent on the mother. Nutritional status before and during pregnancy can influence fetal growth. Maternal nutritional status before and during pregnancy can influence 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 a normal weight. The quality of the baby born really depends on the mother's nutritional status before and during pregnancy.

In the late stages of the first trimester, the mother's blood volume increases rapidly, faster than red blood cell production. This event is a normal thing that causes physiological pregnancy anemia or hemodilution. This is not a serious problem unless the mother is deficient in iron at the time of conception. If the mother is deficient in iron, real anemia will occur. Nutrient levels in the blood increase or decrease during pregnancy. Most lipid fractions increased (e.g. cholesterol), whereas other factors (e.g. total protein) decreased. Currently there are no standards that can be used as a basis for evaluating nutrient levels in the blood of pregnant women. The basal metabolic rate (BMR) increases by around 20% during pregnancy[10].

Nahar et al's study identified that mothers with a pre-pregnancy weight of less than 40 kg had more than 3 times the risk of giving birth to LBW compared to mothers with a pre-pregnancy weight of more than 40 kg[12]. Meanwhile, women weighing 45 kg also had significantly more births than mothers who weighed more than 45 kg at the start of pregnancy. The pre-pregnancy weight tolerance limit of 40 kg is the most common figure in developing countries used to assess the risk of pregnancy outcomes. Nahar et al concluded that the best predictor of birth weight as a numerical variable is the mother's weight at the start of pregnancy [12]. Every 1 kg increase in maternal weight in early pregnancy is associated with an average 200 gram increase in baby birth weight. A minimum initial pregnancy weight of 43 kg predicts more than 80% of LBW events for 3-5 months of pregnancy.

Based on this, it is necessary to monitor the nutritional status of mothers, especially data on maternal weight gain during pregnancy, because although statistically it is related, based on the data there are 74 mothers who had inappropriate weight gain during pregnancy, with 68 of them giving birth to babies with the condition LBW.

5. Conclusion

The research results showed that the incidence of LBW was found to be 88 LBW out of 100 respondents, and a history of inappropriate maternal weight gain was 74 respondents, but there was no relationship between maternal weight gain and the incidence of LBW with a p value of 0.07.

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