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Effect of Maternal Age, Parity and Placental Weight on Birth Weight in Otanaha Hospital, Gorontalo City

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Abstrak

Berat badan lahir merupakan indikator pertumbuhan janin yang sehat atau mengalami gangguan selama dalam kandungan. Kejadian bayi berat lahir rendah (BBLR) memberi pengaruh terhadap tingginya angka kesakitan dan kematian bayi. Data yang diperoleh dari ruang bersalin RSUD Otanaha, kelahiran BBLR tahun 2018 dengan prevalensi kasus 1,83% dan mengalami peningkatan pada tahun 2019 menjadi 3,25%. Faktor yang mempengaruhi berat badan lahir diantaranya adalah faktor umur ibu, paritas dan berat plasenta. Tujuan penelitian adalah untuk mengetahui pengaruh umur ibu, paritas dan berat plasenta terhadap berat badan lahir di RSUD Otanaha Kota Gorontalo. Jenis penelitian observasi analitik dengan pendekatan cross sectional study. Teknik pengambilan sampel menggunakan teknik accidental sampling dengan jumlah 60 responden. Analisis data menggunakan uji statistik Chi-Square. Hasil penelitian analisis univariate dari 60 responden kelompok umur tidak berisiko sebanyak 42 (70,0%), paritas tidak berisiko sebanyak 41 (68,3%), berat plasenta normal sebanyak 31 (51,7%) dan berat lahir bayi Normal sebanyak 46 (76,7%). Analisis bivariat menunjukkan variabel umur ibu dan paritas dengan p-value 0,065 dan 0,526 (p>0,05) serta variabel berat plasenta dengan p-value 0,000 (p<0,05). Kesimpulan penelitan, Umur ibu dan paritas tidak memberi pengaruh terhadap berat badan lahir, berat plasenta memberi pengaruh terhadap berat badan lahir bayi di RSUD Otanaha Kota Gorontalo.

Kata Kunci*: berat badan lahir; umur ibu; berat plasenta*

Abstract

Birth weight is an indicator of fetal growth whether healthy or experiencing problems during the womb. Low birth weight (LBW) has an effect on high infant morbidity and mortality rates. Data obtained from the delivery room of the Otanaha Hospital showed the prevalence of LBW births in 2018 was 1.83% and had increased in 2019 to 3.25%. The factors that influence birth weight included the age of the mother, parity and weight of the placenta. The research objective was to determine the effect of maternal age, parity and placental weight on birth weight at the Otanaha Hospital, Gorontalo City. This research type was analytic observation with cross sectional study approach. The sampling technique used was accidental sampling technique with a total of 60 respondents. The data analysis used was the Chi-Square statistical test. The results of the univariate analysis of 60 respondents showed that the age group without risk was 42 (70.0%), parity without risk was 41 (68.3%), normal placental weight was 31 (51.7%) and normal birth weight was 46 (76.7%). Bivariate analysis showed the variable maternal age and parity with p-value 0.065 and 0.526 (p> 0.05) and placental weight variable with p-value 0.000 (p <0.05). The conclusion of the study showed that maternal age and parity had no effect on birth weight, while placental weight had an effect on birth weight of infants at Otanaha Hospital, Gorontalo City.

Keywords: *birth weight; maternal age; placental weight*

INTRODUCTION

Birth weight is an indicator of newborn health and a strong predictor of infant mortality, incidence of morbidity, and risk of disease that will be experienced later in life (1). Adequate supply of oxygen and food obtained from the mother's blood circulation through the placenta makes an important contribution to growth and development so that it has an impact on the survival of the fetus.

Low birth weight (LBW) ranked third highest (19%) neonatal cause of death, after the first cause of death complications of intrapartum events (28.3%) respiratory and heart disorders (21.3%). Some of the policies implemented by the government to reduce neonatal mortality include providing quality health services, increasing the use of health services, increasing public support in implementing healthy living community movements (2).

Several factors that influence birth weight include the maternal age, parity, and placental weight. Age 20 to 35 years is a safe age for pregnancy and childbirth. Pregnancy at a young age <20 years old requires more food intake because the mother is in her infancy to meet the nutritional needs, while pregnancies at the age of >35 years have decreased function of biological organs and digestive organs which will affect the intake of nutrients needed between mother and fetus, this results in LBW because there is competition for nutritional needs between mother and fetus (3).

High parity will have an impact on the emergence of various health problems for mothers who have babies born. The more frequent the mother pregnant and giving birth, the closer the pregnancy and birth are, the more impaired the elasticity of the uterus is, as a result the uterus does not contract completely and results in post-pregnancy bleeding, preterm birth and low birth weight (LBW). Mother giving birth with high parity had a risk of 1.703 times greater to give birth to low birth weight babies (4).

Birth weight has a significant relationship with placental weight, especially the surface area of the placental villus. Uterine blood flow as well as placental oxygen and nutrient transfer can be altered in the various vascular diseases that the mother suffers. Placental dysfunction that occurs often results in impaired fetal growth (5).

Data from the Gorontalo City Health Office for Community Health Development shows 135 cases of LBW births in 2018 and an increase to 148 cases in 2019. Otanaha Hospital is one of the General Hospitals owned by the Gorontalo City government which is in a strategic area because it is located on the border between Gorontalo District and Gorontalo City so as to facilitate access in the referral process from the two regions. Data from the delivery room at Otanaha Hospital shows that the prevalence of LBW births in 2018 was 1.83% and an increase in 2019 was 3.25%.

The purpose of this study was to determine the effect of maternal age, parity and placental weight on birth weight at Otanaha Hospital, Gorontalo City.

MATERIALS AND METHODS

The type of research used was analytic observation with a cross sectional study approach, it was by studying the relationship of disease and exposure by observing disease status and exposure simultaneously in individuals with a single population at a time or period. The

study was conducted at the Otanaha Hospital, Gorontalo City from January to June 2020. The population in this study were all mothers who gave birth at the Otanaha Hospital, Gorontalo City, with a total of 276 mothers. The sampling technique used was accidental sampling technique with a sample size of 60 mothers. The independent variables in this study were maternal age, parity and placental weight, while the dependent variable in this study was birth weight. The instrument used in this study was the observation sheet and the data analysis used was the Chi-Square statistical test.

RESULT AND DISCUSSION
Univariate Analysis

Based on the results of the study in Table 1, it shows that most of the respondents' ages were in the non-risk age group, namely 42 respondents (70.0%). The most considered safe age for pregnancy and childbirth is 20 to 35 years. The risky age is < 20 years old and > 35 years old as the trigger for LBW events. The development of reproductive organs and physiological functions are not optimal and emotions are not mature enough in pregnancy that occurs at the age of under 20 years, making the mother has not responded to her pregnancy perfectly and often there are complications while at the age of 35 years often appears diseases such as hypertension, benign tumors, and other degenerative diseases so that the tendency to give birth to LBW will likely occur (6).

Table 1. Distribution of Respondents Based on Mother's Age at the Otanaha Hospital, Gorontalo City

Mother's Age	Frequency	Percentage
Not risky	42	70,0%
Risky	18	30,0%
Total	60	100,0%

Based on the results of the study in Table 2, it shows that most respondents had parity, it was in not risky chategory as many as 41 respondents

(68.3%). Risk parity is >2 children are more likely to be at risk of giving birth to LBW ≤2 child parity. There is a decline in the suppleness of uterine tissue that has been repeatedly stretched so that it tends to cause abnormalities in the location, abnormalities of placenta and fetal growth and giving birth to LBW (7).

Table 2. Distribution of Respondents Based on Parity in the Otanaha Hospital, Gorontalo City

Parity	Frequency	Percentage
Not risky	41	68,3%
Risky	19	31,7%
Total	60	100,0%

Based on the results of the study in Table 3, it shows that most respondents had a normal placental weight as many as 31 respondents (51.7%). Normal placenta weight is 500 to 600 grams. The fetus can grow perfectly, it takes the distribution of blood that carries acids, amino acids, vitamins and minerals from the mother to the fetus, as well as the disposal of carbon dioxide and fetal metabolism waste into the mother's circulation (8). Placenta weight contributes greatly to the breadth of fetomaternal circulation and the smooth supply of uteroplasenta for the exchange of food and oxygen as well as fetal residual substances so that the fetus grows more optimally in the womb.

Table 3. Distribution of Respondents Based on Placenta Weight in Otanaha Hospital, Gorontalo City

Placenta Weight	Frequency	Percentage
Normal	31	51,7%
Abnormal	29	48,3%
Total	60	100,0%

Based on the results of the research in Table 4, it shows that most of the respondents gave birth to babies with normal birth weight as many as 46 respondents (76.7%). Normal birth weight in the range of 2500 to 4000 grams (9). Birth weight gives an indication of well-being or disorders experienced by the fetus during

pregnancy. Maternal health conditions before and during pregnancy are good nutritional fulfillment, good stress management, supportive environment and no less important factor is the placenta function that works well is an important contribution to the birth weight of a normal baby.

Table 4. Distribution of Respondents based on Birth Weight of Infants in Otanaha Hospital, Gorontalo City

Birth Weight	Frequency	Percentage
Normal	46	76,7%
Abnormal	14	23,3%
Total	60	100,0%

Bivariate Analysis

Based on the results of the research in Table 5, it shows that of the 42 respondents who were not at risk (20 to 35 years), 7 respondents (16.7%) gave birth to LBW and 35 respondents who gave birth with normal birth weight (83,3%). There were 18 respondents who were in the risk age range (<20 years and> 35 years), 7 (38.9%) of whom gave birth to LBW and 11 respondents (61.1%) gave birth with normal birth weight. The statistical test results obtained p-value 0.065 (p> 0.05), which means that the mother's age does not have an effect on the birth weight of babies in the Otanaha Hospital, Gorontalo City.

Table 5. The Effect of Maternal Age and Birth Weight at Otanaha Hospital, Gorontalo City

Mother's age	Birth Weight				Total		p-value
	NBW		LBW				
	n	%	n	%	N	%	
Not risky	35	83,3	7	16,7	42	100	0,065
Risky	11	61,1	7	38,9	18	100	
Total	46	76,7	14	23,3	60	100	

Note: Low Low birth weight (LBW). Normal birth weight (NBW)

The results of this study were in line with research conducted by Sujianti which stated that there is no relationship between the age of pregnant women and the incidence of LBW. This shows that the age factor is not the only factor that can cause LBW, there are still many factors that can affect the birth of LBW, namely fetal, placental and environmental factors (10).

In contrast to the results of a study conducted by Momeni M, et al, which stated that maternal age at delivery <18 and> 35 years was associated with the incidence of LBW. Most of the epidemiological studies show that LBW occurs at young and old age. Young mothers who give birth have a lack of social conditions such as low socioeconomic status, low maternal education, malnutrition and low body mass index. The risk of pregnancy for mothers who are too young usually arises because they are not psychologically or physically ready, so that it will affect the risk when pregnant and giving birth to LBW babies (11).

Khoiriah's research stated that pregnancies over 35 years old are not recommended, because at old age diseases such as hypertension, benign tumors, and other degenerative diseases begin to appear (6). In the process of childbirth itself, pregnancies aged 35 years and over will face difficulties due to weak uterine contractions and abnormalities in the middle pelvic bone. In pregnancy, old age can also affect the condition of the fetus because during the fertilization process, the quality of a woman's egg at this age has decreased when compared to eggs in women of healthy reproductive age (12).

The age group based on the results of the study were 18 respondents, of which 8 respondents were <20 years old and 10 respondents were> 35 years old. In this study, the age of the mother had no effect on birth weight. Researchers assume that the tendency of all age groups to more easily access information media that provides knowledge about how to get a baby with normal birth weight and how to avoid LBW birth, so that age is no longer the main factor causing the incidence of LBW. In addition, researchers also assume that the intensity and quality of Antenatal Care from health workers to mothers is to carry out their pregnancy better so that the mother has the habit of living healthy

habits and giving birth to babies with normal bodies.

This is in line with Nur's research which states that mothers who have good antenatal quality are less likely to give birth to LBW compared to mothers with poor antenatal quality, so antenatal care is very important to do early on to identify risk factors and complications so that they can be reduced and addressed as early as possible (13).

Based on the results of the research in Table 6, it shows that of the 41 respondents who had no risk parity (≤2 children), 10 respondents gave birth to LBW (24.4%), and 31 respondents who gave birth with normal birth weight (75.6 %). There were 19 respondents who had risk parity (> 2 children), 4 respondents (21.1%) of whom gave birth to LBW and 15 respondents (78.9%) gave birth with normal birth weight. The statistical test results obtained p-value 0.526 (p> 0.05), which means that parity does not affect the birth weight of babies in Otanaha Hospital, Gorontalo City.

Table 6. The Effect of Parity on Birth Weight in Otanaha Hospital, Gorontalo City

Parity	Birth Weight				Total		p-value
	NBW		LBW				
	n	%	n	%	N	%	
Not risky	31	75,6	10	24,4	41	100	
Risky	15	78,9	4	21,1	19	100	0,526
Total	46	76,7	14	23,3	60	100	

Note: Low Low birth weight (LBW). Normal birth weight (NBW)

The results of this study were in line with the research conducted by Pinontoan et al. With the results of the chi-square test obtained p value 0.137> 0.05 so that there is no relationship between maternal parity and birth weight in the NICU room of Prof. Dr. R. D. Kandou Manado Hospital (14). Many factors affect birth weight including infectious diseases, gestational distance, maternal factors, fetal factors and placental factors.

The results of this study were not in line with the research conducted by Putri et al, which showed that there is a significant relationship between maternal parity and the incidence of LBW. Mothers with parity are at risk of weakness due to frequent pregnancy, childbirth, breastfeeding and caring for their children, resulting in various problems including anemia and malnutrition, which are causes of stunted fetal growth and development (15).

Research by Putri et al. showed that mothers with parity> 2 children had a 2.3 times greater risk of giving birth to LBW and could pose a risk for the birth of a baby with LBW. High parity pregnancy causes a deterioration of the tissues elasticity that have been stretched repeatedly by pregnancy, so that it tends to develop abnormalities in the location or abnormalities of placental growth and fetal growth, thus giving birth to LBW babies (7).

Mothers with first pregnancies usually feel anxious about the pregnancy they are experiencing as well as a lack of experience for mothers with parity <2 children, so that the mother does not take care of her health during pregnancy including the intake of nutrients needed by the mother and the fetus, so that it has an impact on the underweight of the babies born (16).

The study of Manuel et al. Showed that first pregnancy determines birth weight reduction and is a greater risk factor for LBW and IUGR due to the lower uteroplacental vascular capacity in mothers with first pregnancies, thereby reducing the supply of oxygen and nutrients to the fetus. Primiparous mother's body structure which has less intra-uterine space in the first pregnancy compared to subsequent pregnancies also tend to influence the low birth weight of the baby (17).

Parity at risk based on the results of the study were 19 respondents. In this study, parity had no effect on birth weight. Researchers assume that parity is not the only factor that can cause the incidence of LBW, there are still many factors that can influence the birth of LBW

including nutritional intake before and during pregnancy and also maternal psychological factors. By consuming adequate nutrients and good maternal psychology during pregnancy can affect the health of both the mother and the fetus, namely facilitating the transportation of nutrients through the placenta and helping uteroplacental vascularization so as to achieve optimal fetal growth and development. Researchers also assume that pregnancy spacing can affect the incidence of LBW, because of the success of the family planning program that is echoed by the government, so that even with parity it is risky, if it is to adjust the pregnancy spacing, it is possible to restore the uterine muscles to function optimally during pregnancy.

Micro and macro nutrients during pregnancy must be fulfilled properly, because nutrient intake during pregnancy can affect maternal anthropometry which can be seen from the mother's weight gain, maternal upper arm circumference (LILA), nutrition obtained by the fetus and birth weight at birth (18).

Based on the results of the study in Table 7, it shows that of the 31 respondents who had normal placental weight (500 grams to 600 grams) all of them gave birth with normal birth weight (100%), none of the respondents gave birth to LBW (0%). There were 29 respondents who had abnormal placental weight (<500 grams), 14 respondents (48.3%) of whom gave birth to LBW and 15 respondents (51.7%) gave birth with normal birth weight. The statistical test results obtained p-value 0.000 (p <0.05), which

Table 7. The Effect of Placental Weight on Birth Weight in Otanaha Hospital, Gorontalo City

Placental Weight	Birth Weight				Total		p-value
	NBW		LBW				
	n	%	n	%	N	%	
Normal	31	100	0	0	31	100	
Abnormal	15	51,7	14	48,3	29	100	0,000
Total	46	76,7	14	23,3	60	100	

Note: Low Low birth weight (LBW). Normal birth weight (NBW)

means that the weight of the placenta had an effect on the birth weight of babies in the Otanaha Hospital, Gorontalo City.

The results of this study were in line with Fitri and Isrowiyatun's research which found that there is a relationship between placental weight and birth weight using the chi suare statistical test with a p-value of 0.082 and a degree of confidence 90% (19). This study was also in line with the research conducted by Wahyuni who found that there is a significant relationship between placental weight and birth weight of infants in BPM N Panyalaian, X Koto District, Tanah Datar District with the statistical test results obtained p-value = 0.002 (20).

Patimah, et al's study showed that the weight of the placenta has a significant role in fetal growth because the placenta not only serves to transfer nutrients from mother to fetus, but also has an effect on metabolic and endocrine functions that regulate maternal and fetal metabolism. The placenta is not only a passive filter, but also plays an active role as a major regulator of fetal-placental metabolism (21).

The results of this study have proven Manuaba's theory which stated that the weight of the placenta can affect the birth weight of the baby because the placenta is the root of the fetus to absorb nutrients from the mother in the form of O_2, amino acids, vitamins, minerals, and other substances to the fetus and remove fetal metabolic waste and CO_2 (9). Research by Irtaniyah, et al. stated that the placenta consists of villi and cotyledons which function for food and oxygen transfusion for the fetus. The baby's birth weight depends on the mother's nutrition and the placenta's ability to transport nutrients to the fetus. The weight, size and the surface shape of the placenta reflect its ability to transfer nutrients (22).

Researchers assume that there is an effect of placental weight on infant birth weight because one of the factors that can affect babies born with LBW is the weight of the placenta, which is

an organ that is very important for maintaining pregnancy continuity. The structure and function of the placental villus will largely determine the growth and development of the fetus. The increase of the placental weight is supported by an increase in number of villi in the placenta which contributes greatly to the breadth of the fetomaternal circulation and the smooth supply of the uteroplacenta for the exchange of food and oxygen and fetal waste so that the fetus grows more optimally in the womb.

CONCLUSION AND RECOMMENDATION

Based on the results of the research that has been done, it can be concluded that maternal age and parity had no effect on birth weight at Otanaha Hospital, Gorontalo City, while placental weight had an effect on birth weight at Otanaha Hospital, Gorontalo City. The suggestions for pregnant women is to maintain their health conditions by carrying out health checks, diligently seeking information about pregnancy and early detection of risky pregnancies, and consuming balanced nutritional intake to produce quality pregnancy outcomes by giving birth to babies with normal birth weight.

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