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Maternal Factors, Gender, and Relationship to the Length at Birth

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***Abstract* - Birth length is an essential indicator for assessing stunting risk and for subsequent development in adulthood. Maternal factors, height, and gender characteristics have implications for fetal linear growth. This study aimed to determine the correlation between maternal factors: upper arm circumference (LILA), maternal height, father's height, and baby's gender and its relationship to the length of the baby's birth in Kota Bengkulu. The study design was a cross sectional study. Subjects in this study were 145 pairs of pregnant women and their babies who were selected by consecutive sampling technique. Data is obtained by direct measurement and examination — data analysis using correlation test, independent t-test, and multiple linear regression. The average baby's birth length is 48.7 cm, the baby is born short (<48 cm) 31%. There was a significant relationship between maternal factors (height and LILA) and gender with infant birth length (p <0.005) and father height not correlated with birth length (p> 0.005). Maternal height is the dominant factor associated with the period of the baby's birth.**

Keywords — Maternal factors, Gender, Birth length

I. INTRODUCTION

Birth length is an important indicator of the assessment of nutritional status and health during the fetus in the womb. Birth length is also used to assess the risk of stunting and the risk of subsequent growth and development in adulthood. Birth length is classified as short if <from 48 cm [1]. According to Kusharusupeni, babies with short birth lengths have a higher chance of growing short compared to babies with normal birth length [6]. A longitudinal study of the growth of children aged 0-23 months in Bogor, in 2012-2016, short-born babies have a 1.6-fold risk of stunting compared to normal birth [2]. Stunting is a global health problem including Indonesia with the highest prevalence of 37.2 in Southeast Asia and the top 5 in the world. National data for 2013 in short birth length 20.2% increased compared to 2010. For Bengkulu Province, short-term infants were 39.7% and short birth length 11.8% [1].

Factors related to birth length include maternal factors including genetics (height) and maternal nutritional status [3], while other factors such as gender and father's height [4,5]. Height is one of the genetic factors that are passed on to children and is related to birth length. Children with short parents both mothers and fathers are more at risk for quick birth [7]. Research results in Egypt show that children born to mothers with a height of less than 150 cm are more at risk of growing stunting [8].

Besides, the mother's nutritional status during pregnancy is usually seen from the size of the upper arm circumference (LILA) which is an indicator of the occurrence of SEZ, that is if the LILA <23.5 cm, this risks giving birth to a short body length baby because the linear the growth of the baby starts from the period mid-gestation [9]. Research in Guatamala Timur shows that maternal nutritional status during pregnancy is one of the factors that contribute to fetal growth [9]. Research in Semarang shows that the length of a baby born is influenced by Hemoglobin levels, upper arm circumference (LILA) in the third trimester and weight gain during pregnancy [4].

II. METODE

The study used a cross sectional design. I have performed in the City of Bengkulu in January - April 2018. The research subjects were 145 couples of pregnant women and babies born. Consecutive sampling sample technique with inclusion criteria: single pregnancy, term aterm birth (≥ 37 weeks based on last menstrual period/fundus height examination or Ultra Sono Grafy examination), pregnant women ≥ 35 weeks' gestation. Exclusion criteria: mothers during pregnancy suffer from chronic diseases, infectious diseases, babies born with congenital malformation.

Data obtained through interviews with pregnant women for maternal characteristics data and measuring height with microtoice stature with an accuracy of 0.1 cm. Likewise with your father's height. The LILA band measures the size of a mother's LILA. The baby's birth length data is measured as soon as the baby is born with a Seca brand length board (type 231/231 Corp Hamburg, Germany), the accuracy is 0.1 cm. The baby's sex data is known by looking at the baby's sex.

Data were analyzed in stages, including univariate, expressed by mean, and percentage. Bivariate analysis using independent correlation and t test. Multivariate analysis using multiple linear regression test. Statistical analysis uses SPSS for window version 21. Significant if p <0.05.

III. RESULTS

Characteristics of 145 babies born, the highest number were women (54.8%). Infants with low births (<48 cm) are 31%. The average birth length is 48.7 cm, the smallest size is 45 cm, and the longest is 53 cm.

Based on maternal characteristics, the average maternal age was 27 years eight months, 11 people (7.6%) aged <20 years and 15 people (10.3%)> 35 years old were classified as at risk — the average parity of mothers with two children. Mothers with short height (> 150 cm) were 77%, the average mother's height was 154 cm, normal LILA ((23.5 cm) was 92%. High father's height (> 162) is 61.4%, and the average father's height is 164.6 cm.

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TABLE I. CORELATION ANALYSIS RESULTS AND INDEPENDENT TEST WITH BIRTH LENGTH

Variable	Mean ± SD	n (%)	r	p
Mother's Height	154±4.29		0.312	0.000*
Mother's LILA	26.5±2.58		0.238	0.004*
Father's Height	164.6±5.75		0.113	0.175
Gender				0.004*
- Female		80(54.8)		
- Male		65(44.8)		

*significant (p< 0.05)

Table 1. Shows a significant correlation between maternal height and CWA variables as well as the sex of infants with infant birth length (p <0.05) with a Pearson correlation value of 0.312, 0.238, respectively while the results of the test between the father's height variable and infant's birth length showed no correlation (p => 0.05).

In Table 2. shows the most dominant factor correlated with the birth length of the baby is the height of the mother's body with the value of Coefision Beta (0.283) with a positive direction of the relationship. R2 is 0.134 which means that the birth length is 13%, can be explained by the baby's sex and maternal height. The rest is explained by other variables that are not researched.

TABLE 2. RESULTS OF MULTIVARIATE ANALYSIS (END MODEL)

Model	Coef β	P
Baby's Gender	0.194	0.015
Mother's Height	0.283	0.000
R=0.366 R2 = 0.134		

From the model in table 2, it can be explained that mothers who have a higher height, the baby's birth length will be 0.28 cm longer than the mother who has a lower-body level, after being controlled by the gender variables of the baby. Every increase in maternal height 1 cm, the birth length will increase by 0.28 cm after being controlled by the baby's gender variables.

IV. DISCUSSION

Based on the results of statistical tests showed that the p-value <0.000 on the variable height of the mother, on the baby's birth length which means that there is a significant correlation between the variable of the mother's height with the strength of the relationship between the variable of the mother's height with the baby's birth length is weak because of the Pearson correlation value of each - 0.312.

This is in line with the results of a study conducted by Frank R. Writer (2010) that infants born to mothers who have a high (150-157 cm) have a lower body length than babies born to mothers who have the height (168 -175 cm) [10]. The results of this study are also in line with the research of Addo, Y (2012) which shows that the height of the mother is related to the length of the baby's body [11].

Parental height is related to genetic inheritance of offspring related to the length of the baby's body born [13]. Height is a genetic factor, which is passed on to children; children born from short parents are at risk for quick growth compared to parents with standard height [7].

The results of this study also show that LILA correlates with the length of the baby's birth, the results of statistical tests show that the value of p (0.04) and the value of R: 0.238 means that the correlation is weak. LILA is an indicator of maternal nutritional status theory, a good nutritional status of the mother will affect fetal growth. Research in East Guetamala shows that poor nutritional status during pregnancy is one of the factors that contribute to poor fetal growth [8]. Research in Semarang shows that the length of a baby born is influenced by hemoglobin levels, upper arm circumference (LILA) in the third trimester and weight gain during pregnancy [4].

This is different from the results of the study by Justin (2014) [12] that SEZ which is marked by LILA less than 23.5 cm is no difference between the length of the body of a newborn baby and a SEZ in the mother.

The results of this study also showed that the sex correlated to the length of the baby born with a p value of 0.04 and a value of R 0.236. Gender is a risk factor for the occurrence of short birth lengths. The results of this study are different from the effects of Yustina's (2014) research that the body length of a newborn does not show the difference between male and female sex.

The results of this study also showed that the height of the father did not correlate with the length of the baby born with the p-value (0.175). The results of this study are in line with the results of Yustiana et al. (2014) [12] that there is no difference between the length of a baby born, between babies who have high fathers and short fathers.

The dominant factor related to the length of the baby born is the factor of the mother's height. The results of this study are in line with the results of Utami et al. (2018) research that maternal height is the most dominant risk factor affecting the length of infants aged 0-23 months [2].

V. CONCLUTION

Upper Arm Circumference Factor (LILA) and the height of the mother and the sex of the baby are correlated with the length of the baby's birth. Maternal height is the dominant factor associated with birth length. Efforts should be made to improve the nutritional status of mothers before pregnancy and to monitor the nutritional status of pregnant women during Ante Natal Care (ANC) until delivery to minimize the prevalence of short-term babies.

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