

# The Correlation between Mother's Age and Birth Weight in Ten Public Health Centers in Pasuruan Regency with the Highest Number of Childbirths

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## Abstract

LBW is the biggest cause of death in Pasuruan Regency, East Java, Indonesia. In 2019, East Java became the province with the highest number of LBW in Indonesia (7.1%). One of the factors for LBW is the age of the mother at delivery, and different results have been obtained correlation between maternal age and birth weight. This study is an analytical observation with a cross-sectional approach to find the correlation between the age of pregnant women and birth weight in ten public health centers in Pasuruan Regency with the highest number of childbirths. The number of samples was 5376. The sampling technique uses total sampling. The independent variable is the age of the pregnant woman. The dependent variable is birth weight. The method of data collection is carried out through secondary data, namely in the form of data from the District Health Office Pasuruan Regency regarding the age of mothers giving birth and birth weight, then the results obtained were analyzed using the Mann-Whitney U. The highest age of pregnant women is the age of mothers who are not at risk (84.32%;  $\bar{x}=28,72\pm6,992$ ;  $\tilde{x}=28$ ). The prevalence of low birth weight babies is quite high (3.79%;  $\bar{x}=2299,31\pm55,052$ ;  $\tilde{x}=2300$ ). Age of pregnant women related to birth ( $p=0.001$ ). Thus, there was a correlation between the age of pregnant women and birth so public health center needs to pay attention the mother's age before pregnancy.

Keyword: Age of pregnant women, LBW, birth weight, risk age.

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## 1. Introduction

The prevalence of low birth weight babies (LBW) in Indonesia in 2019 was 3.4%<sup>15</sup>. In 2019, East Java became the province with the highest number of LBW in Indonesia, namely 7.1%. Based on data from the Directorate General of Public Health, Ministry of Health of the Republic of Indonesia, in 2019, the most common cause of neonatal death (0-28 days) in Indonesia is LBW with a prevalence of 35.3%. Likewise, LBW cases in Pasuruan Regency is the biggest cause of death in infants, which is equal to 38.5%<sup>5</sup>. With the high infant mortality rate caused by LBW in Pasuruan Regency compared to Indonesia, of course this is a problem that needs attention.

One of the risk factors for LBW is the age of the mother when giving birth who is too young or too old<sup>35</sup>. Based on the Central Bureau of Statistics (2020) most LBW cases in Indonesia occur from pregnancies in women aged 45-49 years at 16.85% and the second highest is in mothers with gestational age under 20 years, namely 15.41%. Early marriage is one of the causes of pregnancy in teenage mothers. Based on data from the KB-PP (Family Planning and Women's Empowerment) Office of Pasuruan Regency, the number of teenage boys who married underage as of December 2020 was 72 people. While the number of young women who married underage was 432 with the percentage of first marriage under 17 years of 17.07% and 17-18 years of 23.83%.

Babies born to mothers aged less than 20 years have a higher risk of LBW, premature delivery, and other aggravating conditions<sup>9</sup>. If there is a repetition soon, it can pose a health risk to both the mother and the baby being born<sup>32</sup>. Pregnant teenage mothers generally do not receive proper prenatal care because they lack experience and sometimes experience malnutrition too<sup>35</sup>. Adolescent pregnant women who suffer from malnutrition can cause a risk of low birth weight babies and premature babies because pregnant women who are less than 20 years old have a uterus, pelvis that have not fully grown and are still in their infancy so that the amount of nutritional needs needed between mother and fetus is also more and more<sup>9</sup>. Meanwhile, mothers over 35 years of age have organ function that begins to decline due to degeneration such as a decrease in the hormone estrogen which plays a role in blood flow to the uterus and the distribution of maternal nutrition to the fetus so that it can allow bleeding and prolonged parturition, even babies born with LBW<sup>35</sup>.

Wahyu Ernawati (2017) stated that there was no correlation between the age of the mother and the incidence of low birth weight babies at PKU Muhammadiyah Hospital, Bantul. Ummy Yuniantini (2017) revealed that there was no correlation between maternal age and the incidence of LBW at Gunung Kidul Hospital, Yogyakarta. Meanwhile, there are several other studies stating that there is a correlation between maternal age and the incidence of LBW, in mothers aged under 20 years have a uterus, pelvis that has not grown properly, and the possibility of malnutrition, while in mothers aged over 35 years have organ function and health that begins decreased<sup>9, 16</sup>. Based on the background and the differences in the research results obtained, the researchers were interested in conducting a study on the correlation between the age of pregnant women and the birth weight of babies in ten public health centers in Pasuruan Regency with the highest number of childbirths.

## 2. Method

All figures This was an analytic observational study using a cross-sectional design. The data were in the form of secondary data obtained from the District Health Office Pasuruan Regency regarding the age of mothers giving birth and birth weight of babies in ten public health centers in Pasuruan Regency with the highest number of childbirths in January-June 2022. The samples were collected by total sampling method, with the results of 5376 patients. The samples were mother giving birth with a live born baby in January-June 2022. Mothers who experiencing multiple pregnancies were excluded from this study.

The data ten public health centers in Pasuruan Regency with the highest number of childbirths, mother age and birth weight. The data were collected using Microsoft Excel 2019 and google spreadsheet, then analyzed using the IBM SPSS Statistic version 23 application. The first test was the Kolmogorov-Smirnov normality tests to determine the distribution of the data. The data were reported as percentages for categorical variables on non-normally distributed numerical data. Mother age between low birth weight babies and non low birth weight babies will be compared with the Mann-Whitney U test. The statistical significance was determined at  $p < 0.5$ .

## 3. Results

A total of 5376 patients met the inclusion and exclusion criteria and became study participants. The average mother's age was 28.72 years The percentage of mother's ages between 20-35 years old was the highest (84.32%). The percentage of normal birth weight was the highest (94.70%) with maximum weight 4396 grams and minimum weight 2200 grams.

Table 1. Sample Characteristics

Variables	Total (5376)
Mother's Age (years)	$\bar{x}=28.72\pm6.992$
	$\tilde{x}=28$
15-20	218 (4.06%)
20-35	4533 (84.32%)
35-49	625 (11.63%)
Birth Weight (grams)	$\bar{x}=3183.30\pm451.040$
Max=4396	$\tilde{x}=3188$
Min=2200	
Low Birth Weight	204 (3.79%)
Normal Birth Weight	5091 (94.70%)
High Birth Weight	81 (1.51%)

$\bar{x}$ =mean $\pm$ SD,  $\tilde{x}$ =median, n (%)

The baby birth weight based on mother's age are shown in Table 2. In each maternal age group, the largest population is normal birth weight. The overall percentage of LBW found was 3.79% and the highest percentage of LBW based on maternal age was in the 15-20 years age group with a percentage of 22.48%.

Table 2. Distribution of Birth Weight Frequency Based on Mother's Age

Mother's Age	LBW	%	NBW	%	HBW	%	n
15-20 years old	49	22.48	164	75.23	5	2.29	218
20-35 years old	121	2.67	4363	96.25	49	1.08	4533
35-49 years old	34	5.44	564	90.24	27	4.32	625

LBW (Low Birth Weight) = birth weight <2500 grams, NBW (Normal Birth Weight) = birth weight 2500-4000 grams, HBW (High Birth Weight) = birth weight >4000 grams, n (total childbirth), and % (percentage LBW/n).

Differences between the two groups were analyzed using Mann-Whitney U test, as the Mother's Age and birth weight were not normally distributed. Mann-Whitney U test results showed significant differences in mother's age and birth weight ( $p<0.05$ ).

#### 4. Discussions

The results of this study showed that the birth weight of babies in the ten public health centers in Pasuruan Regency with the highest number of childbirths had a LBW percentage of 3.79%, 94.7% for LBW, and 1.51% for LBW. This shows that the birth weight of the babies in the ten public health centers in Pasuruan Regency with the highest number of childbirths mostly had normal birth weight babies. However, the incidence of LBW in the study sample is still relatively high because the results obtained are above the prevalence of LBW in Indonesia in 2019, which is 3.4%<sup>15</sup>. These results are supported by the research of Aprillya et al (2019) which stated that the percentage of LBW incidence at the Harmoni Ambarawa Maternity Clinic was also above the LBW prevalence in Indonesia in 2019, which was 6.86%<sup>3</sup>. However, this is contrary to the results of research by Alice et al, 2017 which stated that in their study the percentage of LBW found was 2.2%, so it is still below the prevalence of LBW in Indonesia in 2019<sup>40</sup>.

The results of this study indicate that the age of the mother giving birth who is not at risk in the ten public health centers in Pasuruan Regency with the highest number of childbirths has a percentage of 84.32%. While at risk, the percentage of the 15-20 years old group was 4.06% and 11.63% for the 35-49 years old group. This figure illustrates the still high incidence of childbirth at the age of mothers who are at risk. This can happen because of the high number of early marriages and the lack of understanding of the public regarding the age range that is at high risk when experiencing pregnancy. These results are supported by research by Julina et al, 2017 which states that most childbirths occur at the age of risk<sup>40</sup>. However, this contradicts the results of Susilo's study, 2017 which stated that in his study most childbirths occurred at the age of mothers who were at risk<sup>14</sup>.

The results of this study indicate that there is a relationship between the age of pregnant women and LBW in ten public health centers in Pasuruan Regency with the highest number of childbirths. This is supported by the research of Sofiana et al, 2019 which states that there is a relationship between maternal age and LBW<sup>6</sup>. However, this contradicts with the research of Rokhmah, 2012 which states that there is no relationship between maternal age and LBW<sup>34</sup>.

Theoretically, the incidence of LBW births is described as a U-shaped curve, which means that LBW is often found in high-risk mothers, namely adolescent mothers (<20 years) and elderly mothers (>35 years), whereas those aged 20-35 years have a higher risk of smaller one. The age of a mother who is less than 20 years has a high risk because the mother is still in its infancy so that the number of nutritional needs for the mother and fetus will be greater so that the body will find it difficult to meet the nutritional needs of both<sup>29</sup>. Mothers under 20 years of age experience sub-optimal development of reproductive organs, lack of emotional and psychological maturity and sub-optimal physiological functions, causing more unwanted complications in pregnancy<sup>45</sup>. Mothers aged 14-19 years have a higher risk of experiencing eclampsia, postpartum endometritis, and systemic infections compared to mothers aged 20-24 years, and babies of teenage mothers have a higher risk of experiencing LBW, premature birth, and dangerous neonatal conditions<sup>44</sup>. According to Roy Prasajo et al, 2022, early pregnancy between the ages of 14-19 years influences problems with pregnancy and childbirth. Pregnancy at an early age also increases the likelihood of LBW events by 4.1 times compared to pregnant women who are more than 20 years old. Babies born under LBW to mothers at an early age usually have congenital abnormalities and physical problems, such as epilepsy, mental retardation, blindness and deafness<sup>42</sup>.

Pregnancy in women aged over 35 years also has a high risk due to decreased health of the reproductive organs and other organs due to degenerative processes. This decrease in physiological function is then followed by complications of chronic diseases such as diabetes, hypertension, obesity and preeclampsia<sup>29</sup>. According to Sarwono, 2014 in his study of gestational diabetes mellitus and macrosomia, states that diabetes mellitus is an independent risk factor in the occurrence of macrosomia or babies with more birthweight<sup>36</sup>. In

mothers with hyperglycemia conditions can also cause hyperglycemia in the fetus because glucose can easily penetrate the placenta so that the insulin response in the fetus increases and fetal growth also increases which leads to more birth weight babies. In obese mothers, lipase in the placenta will convert triglycerides into free fatty acids which are used as nutrition for the fetus. Increased levels of triglycerides in the body due to poor eating patterns of pregnant women cause an increase in free fatty acids, this is a trigger factor for the occurrence of macrosomia in the fetus. In addition, a decrease in the quality of the mother's eggs occurs with age. The decline in physiological functions in the mother results in the process of fetal development not being optimal and resulting in babies born with low birth weight<sup>45</sup>. The function of hormones that regulate the reproductive cycle also decreases, one of which is the hormone estrogen which functions to increase blood flow to the uterus and proliferation of the endometrium which ultimately also functions in the distribution of nutrients from mother to fetus. Low estrogen levels and incomplete development of the endometrium can cause blood flow to the uterus to decrease so that the distribution of nutrients from mother to fetus will be disrupted and cause low birthweight. Meanwhile, according to Sarwono, 2014 mothers with hypertension have an influence on perinatal death, namely preeclampsia and eclampsia. Preeclampsia and eclampsia have a negative impact on fetal health due to decreased utero-placental function, hypovolemia, vasospasm, and damage to the endothelial cells of the placental blood vessels<sup>36</sup>. The impact of preeclampsia and eclampsia on the fetus, namely: oligohydramnios, placental abruption, IUGR (Intrauterine Growth Restriction), premature and fetal death. Pregnancy with heart disease always affects each other because pregnancy can make heart disease worse. Heart disease can affect the growth and development of the fetus in the womb. Heart disease in pregnancy is one of the causes of high morbidity and mortality in pregnancy or childbirth. Severe heart disease can cause premature birth or intrauterine death due to impaired fetal oxygenation<sup>2</sup>. Parity is also one of the factors that affect elderly mothers because parity that is too high will disrupt the uterus, especially in terms of blood vessel function. Repeated pregnancies will cause damage to the walls of the uterine blood vessels. This will affect nutrition to the fetus in subsequent pregnancies and cause growth disturbances which in turn will give birth to babies with LBW<sup>6</sup>.

## Conclusions And Suggestions

This study figured out correlation between mother's age and birth weight in the ten public health centers in Pasuruan Regency with the highest number of childbirths. The highest age of pregnant women is the age of mothers who are not at risk with a percentage of 84.32%. prevalence of low birth weight babies is quite high, namely 3.79%. Age of pregnant women is related to the birth weight of the babies in the ten health centers in Pasuruan Regency with the highest number of deliveries.

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