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The Relationship Between Mother's Age at Childbirth and The Incidence of Low Birth Weight at PKU Muhammadiyah Yogyakarta Hospital in The Years 2017-2021

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ABSTRACT

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Low Birth Weight (LBW) is a critical health issue, particularly in developing countries with low socio-economic conditions. The World Health Organization (WHO) reveals that more than 80% of 2.5 million babies born worldwide each year experience deaths due to LBW. Indonesia falls into the category of countries with a significant incidence of LBW in the Southeast Asian region. In 2019, the highest Infant Mortality Rate (IMR) in Indonesia was linked to LBW cases. This research adopts a quantitative approach with an observational analytic design, focusing on the analysis of relationships between variables. The research method used is a cross-sectional approach. The study was conducted at RS PKU Muhammadiyah Yogyakarta in June 2023. The sampling method applied is non-probability sampling with purposive sampling variations. The research findings indicate a significant relationship between the age of mothers during childbirth and the incidence of LBW (p-value = 0.000). Rejection of the null hypothesis (H0) and acceptance of the alternative hypothesis (H1) depict a strong association between the age of mothers during childbirth and LBW incidents. The results of the Odds Ratio (OR) analysis show a figure of 10.427. Overall, this research concludes that a significant relationship exists between the age of mothers during childbirth and the occurrence of LBW. These findings highlight the potential impact of maternal age during childbirth on the risk of LBW in newborns.

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INTRODUCTION

Low Birth Weight (LBW) is a significant health-related issue, especially in developing countries or those with low socio-economic status. The World Health Organization (WHO) states that more than 80% of the 2.5 million babies born worldwide each year die due to being born with Low Birth Weight. World Health Organization divides LBW into three groups: LBW with weights

between 1500-2499 grams, Very Low Birth Weight (VLBW) with weights between 1000-1499 grams, and Extremely Low Birth Weight (ELBW) less than 1000 grams.¹

Low Birth Weights have garnered attention as part of the Sustainable Development Goals (SDGs). By 2025, a reduction of up to 30% in LBW rates is targeted. It is estimated that between 2021 and 2025, there will be a decrease in LBW rates by 3%.²

Indonesia is among the countries with a fairly high incidence of Low Birth Weight in Southeast Asia. In 2019, the highest Infant Mortality Rate (IMR) in Indonesia was experienced by infants with LBW. Based on data from the Directorate of Community Nutrition in 2019, it was reported that infants with LBW accounted for 3.4% of cases, originating from 25 out of 34 provinces. Meanwhile, the Riskesdas (National Basic Health Research) in 2018 indicated that 6.2% of children under five years old had records of LBW out of a total of 5.6% of children. Additionally, the prevalence of LBW in Yogyakarta in 2021 reached a rate of 5.71%.³

Low Birth Weight is one of the major contributors to the Infant Mortality Rate (IMR). Infant Mortality Rate can influence the overall health rates within a region. In Yogyakarta itself, the infant mortality rate increased from 2015 to 2020. However, in 2021, there was a decrease in the infant mortality rate compared to the previous year.⁴

Various factors can influence a baby's birth weight, and one of them is the mother's age at childbirth. The optimal reproductive age range is between 20 to 35 years. Being below 20 years old or above 35 years old can increase risks such as Low Birth Weight, miscarriage, premature birth, susceptibility to infections, and anemia during pregnancy.⁵

At an age below 20 years, the uterus and pelvis may not be sufficiently developed to support pregnancy physically. If pregnancy occurs above the age of 35, it can increase health risks for the mother due to aging organs. Potential dangers for the mother may include hypertension, bleeding, anemia, premature rupture of membranes (PROM), and for the child, there is a higher likelihood of Low Birth Weight.⁶

The high incidence of Low Birth Weight in Yogyakarta has attracted the attention of researchers to conduct more in-depth studies on the relationship between a mother's age at childbirth and the occurrence of LBW.

METHODS

This study is a quantitative research with an analytical observational research design, using secondary data from PKU Muhammadiyah Yogyakarta Hospital. The study population consists of mothers who gave birth to babies with Low Birth Weight from 2017 to 2021. The sampling of research subjects was conducted using a cross-sectional approach with purposive sampling method, in accordance with specific criteria.

This research was conducted at PKU Muhammadiyah Yogyakarta Hospital in June 2023. Data collection was carried out using secondary data, specifically the medical records of patients who gave birth at PKU Muhammadiyah Yogyakarta.

Data analysis in this research employs univariate and bivariate analysis techniques using the chi-square test. The analysis is conducted to analyze each data variable using SPSS (Statistical Package for the Social Sciences) on a computer or laptop.

RESULTS

1. Univariate Analysis Results

a. Characteristics of Mother's Age

Characteristics of the data sample obtained from maternal age medical records at PKU Muhammadiyah Yogyakarta Hospital from 2017 to 2021.

Table 1: Distribution of respondent characteristics based on maternal age at PKU Muhammadiyah Yogyakarta Hospital from 2017 to 2021.

Mother's Age	Frequency (f)	Percentage (%)	Median
< 20 Years and > 35 Years (Risk Age)	41	24.4 %	30.00
20-35 Years (Non- Risk Age)	127	75.6 %	
Total	168	100 %	

Based on the table above, it can be observed that the majority of maternal age data falls within the non-risk age group, which is between 20-35 years, with a sample size of 127, accounting for 75.6%.

b. Incidence of Low Birth Weight

From the conducted research, the following results were obtained:

Table 2: Frequency distribution of Low-Birth-Weight incidents at PKU Muhammadiyah Yogyakarta Hospital from 2017 to 2021.

Baby's weight	Frequency (f)	Percentage (%)
Low Birth Weight	69	41.1%
Non Low Birth Weight	99	58.9%
Total	168	100%

Based on the table above, it can be observed that the majority of babies were born with a normal birth weight, with a sample size of 99, accounting for 58.9%.

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2. Bivariate Analysis Results

a. The Relationship between Mother's Age and the Incidence of Low Birth Weight at PKU Muhammadiyah Yogyakarta Hospital

The Relationship between Mother's Age and the Incidence of Low Birth Weight at PKU Muhammadiyah Yogyakarta Hospital

Table 3: Cross-tabulation of the relationship between maternal age at childbirth and the incidence of LBW at PKU Muhammadiyah Yogyakarta Hospital from 2017 to 2021.

Mother's Age	LBW		Non-LBW		TOTAL		P value
	F	%	F	%	F	%	
< 20 Years and > 35 Years (Risk Age)	33	19.6	8	4.8	41	24.4	0.000%
20-35 Years (Non- Risk Age)	36	21.4	91	54.2	127	75.6	
Total	69	41.1	99	58.9	168	100	

From the presented table, it can be concluded that out of 41 mothers who gave birth at a risky age, the majority (33 babies) were born with Low Birth Weight, accounting for 19.6%. Meanwhile, out of 127 mothers who gave birth at a non-risky age, the majority (91 babies) had normal birth weights, representing 54.2%.

Bivariate analysis in this study was conducted using a statistical test with a chi-square test at $\alpha = 0.05$. The obtained correlation coefficient or P-value was 0.000 ($P < 0.05$), which means the null hypothesis (H_0) is rejected, and the alternative hypothesis (H_1) is accepted. This indicates a significant relationship between maternal age and the occurrence of LBW. In this research, an Odds Ratio (OR) value of 10.427 ($OR=10.427$) was also obtained, meaning that mothers of risky age are 10 times more likely to experience Low Birth Weight.

DISCUSSION

Based on the results of the research conducted in June 2023 on 168 mothers who gave birth to Low Birth Weight babies at PKU Muhammadiyah Yogyakarta Hospital from 2017 to 2021, the following discussions can be presented:

1. Maternal Age at Childbirth

Based on Table 1, it can be observed that some mothers gave birth at a risky age (<20 and >35 years), totaling 41 with a percentage of 24.4%, while those at a non-risky age (20-35 years) were 127 with a percentage of 75.6%. The research results indicate that the majority of mothers who gave birth were at a non-risky age (20-35 years).

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At a non-risky age, which is 20-35 years, it is considered the reproductive age, ideal for women to conceive and give birth because it is favorable both physically and for the mother's overall health, as well as emotionally and mentally. Conversely, at a risky age, below 20 years and above 35 years, there is a higher risk during pregnancy and childbirth. Physically, those below 20 years may not be prepared for pregnancy, and their reproductive organs may not be fully mature, potentially leading to Low Birth Weight, birth defects, or premature birth. On the other hand, those at a risky age above 35 years' experience organ changes, especially in the reproductive system, which can also pose risks such as LBW, less flexible birth canals, high blood pressure, premature rupture of membranes, and bleeding.⁷

These findings are consistent with research conducted by Qurniyawati⁸ in BPM Titik Harningrum, Madiun City. The safe age for pregnancy is between 20-35 years because it minimizes the risks associated with pregnancy and childbirth.⁸

2. Low Birth Weight (LBW) Incidence

In Table 2, out of a total of 168 data, it can be observed that there were 69 cases of LBW births, accounting for 41.1%, and 99 cases of normal birth weight babies, accounting for 58.9%. This study indicates that the most common occurrence is normal birth weight babies.

The results of this study are consistent with the research conducted by Sari and Wahyuni (2021). In the conclusion of this study, it was found that the incidence of LBW is 14.62%, while babies without LBW account for 85.38%. This indicates that there are more births with normal birth weight babies compared to LBW babies.⁹

3. The Relationship between Mothers and LBW Incidence

Based on Table 3, it can be observed that mothers at risk who give birth to LBW babies account for 19.6%, while mothers who are not at risk give birth to LBW babies at a rate of 21.4%. The results of this study regarding the relationship between early pregnancy and the incidence of low birth weight babies show a significant correlation when the p-value is less than 0.005. In this study, a p-value of 0.000 was obtained, indicating a significant correlation between the mother's age history and the occurrence of low birth weight.

Statistical analysis conducted in this study reveals a significant relationship between the mother's age and LBW. Conversely, a study conducted by Sujianti stated that their research found no statistically significant relationship.¹⁰

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CONCLUSION

Based on the findings of this research, it can be concluded that the majority of mothers who give birth at a non-risky age, which is between 20-35 years old, account for 75.6%, while those who give birth to LBW babies are 21.4%. Mothers who give birth at a risky age, which is below 20 years old or above 35 years old, have a rate of 19.6% for LBW babies. It can also be concluded that the chi-square test results show a relationship between the mother's age at childbirth and the occurrence of LBW (p value = 0.000). Therefore, H₀ is rejected, and H₁ is accepted, which means there is a significant relationship between the mother's age at childbirth and the occurrence of LBW. An Odds Ratio (OR) of 10.427 was obtained, indicating that the risk of LBW is 10.4 times greater for mothers who give birth at a risky age, significantly affecting the baby's birth weight.

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