The Relationship Between Preeclampsia Accompanied by Severe Symptoms The Incidence Of Low Birth Weight (LWB) in 2024

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Abstract

Mortality Rate (IMR) and Under-five Mortality Rate (AKABA) reflect the welfare of the community, one of the main causes is low birth weight (LBW). The incidence of LBW in Sidoarjo is quite high, one of the contributing factors is preeclampsia which disrupts blood flow to the placenta, inhibits fetal oxygen and nutrient intake, and increases the risk of complications in the fetus. The purpose of this study was to analyze the relationship between preeclampsia and the incidence of LBW. Quantitative research with a cross-sectional approach. The study sample consisted of 87 mothers with preeclampsia selected from 112 populations in January – December 2024 according to the inclusion criteria. The results showed that LBW was higher in mothers who experienced preeclampsia with severe symptoms (62.8%) compared to mothers with preeclampsia without symptoms (31.8%). The results of the chi-square test obtained a p value = 0.004. The conclusion of the study is that there is a relationship between preeclampsia and LBW. Suggestions for medical personnel are preeclampsia screening and prevention of LBW babies.

INTRODUCTION

Infant Mortality Rate (IMR) and Under-Five Mortality Rate are key indicators used to evaluate population health and the level of socioeconomic development. One of the major contributors to infant mortality is low birth weight (LBW), which reflects maternal health conditions, the quality of antenatal care, and overall health system performance. Reducing the incidence of LBW is therefore essential to improving neonatal survival and long-term health outcomes (Novitasari et al., 2020).

Low birth weight is defined as a birth weight of less than 2,500 grams measured within the first hour after birth. Infants with LBW face a higher risk of neonatal morbidity, mortality, and long-term developmental complications compared to those born with normal birth weight. Previous studies conducted in hospital and perinatology settings have shown that LBW remains a significant public health problem in developing countries, including Indonesia (Hartati et al., 2018; Aisah et al., 2024).

Maternal health during pregnancy plays a critical role in determining fetal growth and birth outcomes. Among various maternal complications, preeclampsia is one of the most important risk factors associated with adverse neonatal outcomes, including low birth weight. Preeclampsia is a pregnancy-specific hypertensive disorder that occurs after 20 weeks of gestation and is characterized by elevated blood pressure and proteinuria. This condition remains a leading cause of maternal and perinatal morbidity and mortality, particularly in low- and middle-income countries (Sudarman et al., 2021; Veri et al., 2024).

Several maternal factors have been identified as contributing to the development of preeclampsia, including maternal age, parity, obesity, and a history of hypertension. Although the risk is higher among women younger than 20 years or older than 35 years, preeclampsia can also

occur in women of optimal reproductive age due to the interaction of multiple risk factors (Hermawati, 2020; Dasarie et al., 2023; Silvana et al., 2023).

Preeclampsia can impair uteroplacental blood flow, leading to reduced oxygen and nutrient delivery to the fetus. This condition may result in intrauterine growth restriction and subsequently increase the risk of low birth weight. The pathophysiology of preeclampsia involves an imbalance between proangiogenic and antiangiogenic factors, particularly elevated levels of soluble fms-like tyrosine kinase-1 (sFlt-1), which inhibits vascular endothelial growth factor (VEGF) and placental growth factor (PlGF), causing impaired placental vascularization and suboptimal uteroplacental perfusion (Rahmi et al., 2016; Veri et al., 2024).

Previous studies have consistently demonstrated a significant association between preeclampsia and the incidence of low birth weight. Mothers with preeclampsia, especially those with severe symptoms, are more likely to deliver infants with LBW compared to mothers without preeclampsia. These findings highlight the importance of early detection and effective management of preeclampsia to prevent adverse birth outcomes (Sari, 2021; Titisari et al., 2019; Aisah et al., 2024).

METHOD

This study used a quantitative cross-sectional design to determine the relationship between preeclampsia and low birth weight (LBW) incidence. The population was all mothers giving birth with preeclampsia between January and December 2024. The technique for sampling uses probability sampling with the simple random sampling method. obstructing blood flow to the placenta, resulting in the placenta lacking oxygen and nutrients, thus affecting the fetus's weight. The psychological impacts of low birth weight can include problems with the child's development, communication difficulties, hyperactivity, and the inability to participate in normal childhood activities. The physical impacts of low birth weight can cause various complications, including chronic lung disease, vision and hearing loss, birth defects, Down syndrome, anemia, bleeding, heart problems, seizures, and even death. by lottery method. The population of mothers giving birth who experienced preeclampsia was 112 people. Determination of the number of samples using the Slovin formula obtained 87 samples that met the inclusion criteria: maternal age 20-35 years, mothers with primipara and multipara, mothers who did not experience multiple pregnancies, mothers who did not have a history of LBW before, pregnant women who did not experience hydramnios, mothers who did not experience infections during pregnancy, mothers who did not experience STIs, HIV / AIDS, TORCH. Meanwhile, the exclusion criteria: Mothers who gave birth whose medical record data was incomplete. The variables in this study were mothers giving birth with preeclampsia as the independent variable and LBW as the dependent variable. Data collection was carried out by observing medical records of mothers giving birth with preeclampsia to be used as secondary data. Data processing used editing, coding, processing, cleaning, tabulating. The research ethics used are anonymity, confidentiality, and justice. The analysis used by the author is univariate analysis with frequency distribution and bivariate analysis using the chi-square test with an ÿ value of ÿ 0.05. This research has received a statement of ethical feasibility. Recommendation from the research ethics committee with number: **000.9.2/048/438.5.2.1.1/2025** on April 26, 2025.

RESULTS AND DISCUSSION
 A. Result

The age of the mother giving birth is depicted in the average form because at the time of data collection, it had been excluded and the non-risk age category (20-35 years) was obtained with an average age of 28 years, mode 26 years, median 28, and a standard deviation of 4.168. This standard deviation indicates moderate age variation, meaning there were not too extreme age differences among respondents in this study. Meanwhile, parity indicates that the majority of mothers were multiparous (69.0%).

Preeclampsia in women giving birth is divided into two categories: asymptomatic preeclampsia (50.6%) and severe preeclampsia (49.4%). Meanwhile, the incidence of low birth weight (LBW) shows that the majority of babies do not experience low birth weight (52.9%).

Table 1 General data (characteristics of mothers giving birth) and specific data (preeclampsia, LBW)

Variabels	LBW				Amount		P value
	Yes		No				
	n	%	n	%	n	%	
Preeclampsia with severe symptoms	27	62,8	16	37,2	43	100	
	14	31,8	30	68,2	44	100	0.004
Preeclampsia is not accompanied by symptoms							
Total	41		46		87		

Table 2 shows that the incidence of LBW is higher in mothers who experience preeclampsia with severe symptoms (62.8%) compared to mothers with preeclampsia without symptoms (31.8%). Meanwhile, babies who are not LBW are higher in mothers who experience preeclampsia without symptoms (68.2%) compared to mothers with preeclampsia with severe symptoms (37.2%). Based on the results of statistical tests, a p value of 0.004 was obtained, indicating a relationship between preeclampsia and the incidence of LBW.

Tabel 2 Cross-tabulation of preeclampsia with LBW incidence

Characteristics	Frequency n = 87	Persentase %
Age 20 − 35 tahun		
Mean	28,49	
Mode	26	
Median	28	
Standar Deviation	4,168	
Parity		
Primipara	27	31,0
Multipara	60	69,0
Preeclampsia Incident		
Preeclampsia Is Not Accompanied By Severe Symptoms	44	50,6
Preeclampsia With Symptoms	43	49,4
Low Birth Weight (LBW) Incident		
Low Birth Weight	41	47,1
No LBW	46	52,9

B. Discussion

Most mothers who gave birth in this study experienced non-severe preeclampsia compared to severe preeclampsia, although the proportions between the two groups were relatively balanced. This finding suggests that non-severe or asymptomatic preeclampsia is a common clinical condition and should not be underestimated, as it may progress to severe disease and lead to adverse pregnancy outcomes if not appropriately managed (Sudarman et al., 2021; Veri et al., 2024; Roberts & Hubel, 2009).

The majority of infants born to mothers with preeclampsia did not experience low birth weight (LBW); however, the proportion of LBW infants remained considerable. This indicates that preeclampsia, regardless of severity, can negatively affect fetal growth. Previous studies have reported that even mild preeclampsia can impair placental function and fetal development,

increasing the risk of intrauterine growth restriction and LBW (Hartati et al., 2018; Kurniasari et al., 2023; Steegers et al., 2010).

The ideal maternal age for childbirth is considered to be between 20 and 35 years due to optimal reproductive and physiological conditions. In this study, the mean maternal age was 28 years, which falls within the healthy reproductive age range. Although preeclampsia is more common among women younger than 20 years or older than 35 years, it may still occur in women of optimal reproductive age due to contributing factors such as primigravidity, obesity, nutritional status, family history of hypertension, and lifestyle-related factors (Hermawati, 2020; Dasarie et al., 2023; Silvana et al., 2023; Sibai et al., 2005).

Parity is an important indicator of reproductive health and is associated with pregnancy complications. The findings of this study showed that most mothers with preeclampsia were multiparous. This condition may be influenced by additional risk factors such as a previous history of preeclampsia, advanced maternal age, obesity, and chronic hypertension, which increase the likelihood of recurrent preeclampsia and adverse birth outcomes (Dasarie et al., 2023; Silvana et al., 2023; Duckitt & Harrington, 2005).

The incidence of low birth weight was higher among mothers with severe preeclampsia compared to those with non-severe preeclampsia, while normal birth weight was more common among mothers with non-severe preeclampsia. Statistical analysis confirmed a significant relationship between preeclampsia and LBW. These findings are consistent with previous studies conducted in Indonesia and other countries, which reported that severe preeclampsia significantly increases the risk of LBW due to compromised placental perfusion (Sari, 2021; Titisari et al., 2019; Kurniasari et al., 2023; Aisah et al., 2024).

From a pathophysiological perspective, preeclampsia is associated with abnormal placentation and endothelial dysfunction. Elevated levels of soluble fms-like tyrosine kinase-1 (sFlt-1) inhibit vascular endothelial growth factor (VEGF) and placental growth factor (PlGF), leading to impaired placental angiogenesis and reduced uteroplacental blood flow. This results in inadequate oxygen and nutrient delivery to the fetus, contributing to intrauterine growth restriction and an increased risk of LBW (Rahmi et al., 2016; Veri et al., 2024; Maynard et al., 2003).

Given the high prevalence of preeclampsia and its impact on low birth weight, comprehensive preventive strategies are essential. Government programs such as the Birth Planning and Complication Prevention Program (P4K) and the Healthy Indonesia Program with a Family Approach (PIS-PK) emphasize early detection, routine antenatal care, and community-based interventions. These approaches are consistent with international recommendations that highlight the importance of early screening and effective management of preeclampsia to improve maternal and neonatal outcomes (Novitasari et al., 2020; World Health Organization, 2011).

CONCLUSION

The conclusion of this study is that there is a relationship between preeclampsia and the incidence of low birth weight babies in 2024. Suggestions for health workers to conduct screening or early detection of preeclampsia in pregnant women so that they can carry out treatment and anticipatory measures to prevent LBW babies.

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