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THE RELATIONSHIP BETWEEN PREECLAMPSIA RISK FACTORS AND THE INCIDENCE OF LOW BIRTH WEIGHT (LBW) BABIES AT ARUN LHOKSEUMAWE HOSPITAL, LHOKSEUMAWE CITY

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ABSTRACT

This study aims to determine the relationship between preeclampsia risk factors and the incidence of low birth weight (LBW) babies at Arun Lhokseumawe Hospital, Lhokseumawe City, Aceh Province in 2024, with the background that LBW is still a major public health problem in Indonesia and the world, which contributes greatly to infant morbidity, mortality, and disability, and is one of the important indicators in the Sustainable Development Goals (SDGs) and the National Medium-Term Development Plan (RPJMN). Based on data from WHO and the Indonesian Ministry of Health, LBW is the main cause of neonatal death in Indonesia, with the proportion of infant deaths due to LBW reaching 32.2% in 2020. Preeclampsia, which is a pregnancy disorder characterized by hypertension, edema, and proteinuria, is one of the main causes of LBW because it can inhibit fetal growth due to impaired blood flow and nutrition to the placenta. This study uses a quantitative approach with a cross-sectional design, with a population of all mothers giving birth at Arun Lhokseumawe General Hospital in the period January-April 2024, and samples were taken based on medical record data, where 10 cases of LBW were found, 5 of which had a history of preeclampsia. The variables analyzed included maternal age, parity, and anemia as risk factors for preeclampsia, and their relationship with the incidence of LBW. The results of this study are expected to provide theoretical contributions as a reference for the development of obstetrics, scientific benefits for further research, and practical benefits for hospitals in improving the quality of services, especially the prevention and treatment of preeclampsia to reduce the incidence of LBW. Initial findings and literature reviews indicate a significant relationship between preeclampsia and the incidence of LBW, in line with previous studies stating that pregnant women with preeclampsia have a higher risk of giving birth to babies with low birth weight, so that early detection efforts, education, and appropriate interventions are needed to reduce this risk and improve the health of mothers and babies in the future.

Keywords: Preeclampsia, Low Birth Weight (LBW), Maternal Age, Parity, Maternal and Child Health

Introduction

The health status of a country's population, starting from birth, is a vital indicator of the nation's overall welfare. Newborns, as the next generation and future members of society, require proper medical care to ensure optimal growth and development (Mulya, 2020). Among the most critical health challenges faced by newborns is low birth weight (LBW), which significantly contributes to morbidity, mortality, and long-term disability rates (Wahyuni *et al.*, 2020). Addressing LBW is not only a matter of individual health but also a national priority, as it directly impacts the achievement of Sustainable Development Goals (SDGs) and the National Medium-Term Development Plan (RPJMN) 2020–2024 in Indonesia. According to the World Health Organization (WHO), in 2020, there were approximately 5 million neonatal deaths and 4.5 million deaths among children under five worldwide, with 7.5% of these deaths occurring within the first year of life (Nations, 2024).

Globally, the prevalence of LBW is estimated at 15.5%, with a range between 10% and 50%. Although there has been a 29% to 30% reduction in LBW cases since 2012, ongoing efforts are still needed to achieve the target of a 30% reduction by 2025 (Sulistiawati *et al.*, 2024). In Indonesia, the situation remains alarming, with 20,266 child deaths (aged 0–59 months) recorded in 2020, of which 72% occurred during the neonatal period (0–28 days). LBW is identified as the leading cause of neonatal death, accounting for 32.2% of cases, followed by asphyxia, congenital abnormalities, and infections (Efryanti K Pakpahan, Juliana Munthe, Kismi Asihadetia, Isyos sari sembering, Elni Arizona Hutagaol, 2025). These statistics underscore the urgent need for effective interventions to reduce LBW incidence and improve neonatal survival rates (Atikah Proverawati & S. I.C, 2020).

One of the primary risk factors for LBW is preeclampsia, a pregnancy complication characterized by hypertension, edema, and proteinuria, typically manifesting in the third trimester but potentially occurring earlier (Ernawati, Djohar Nuswantoro, 2021). Preeclampsia is a significant contributor to maternal mortality in Indonesia and can hinder fetal growth due to impaired placental blood flow and nutrient supply (Anastasia, M., Lumentut, Hermie, M., 2021). Studies have shown that pregnant women with preeclampsia are at a higher risk of delivering LBW infants compared to those without the condition (Kemenkes RI, 2022). In addition to preeclampsia, other maternal factors such as age, parity, and anemia also play crucial roles in increasing the risk of LBW. Extremes of maternal age, a history of multiple pregnancies, and anemia during pregnancy can exacerbate complications and elevate the likelihood of adverse birth outcomes (Leni Rozani, Ferasinta, Panzilion, 2023).

Preliminary survey data from RSU Arun Lhokseumawe, collected from medical records between January and April 2024, revealed 10 cases of LBW, with half of these cases involving mothers with a history of preeclampsia. This finding highlights the importance of further research into the relationship between preeclampsia risk factors and LBW incidence, particularly in the context of RSU Arun Lhokseumawe, Kota Lhokseumawe, Aceh Province.

The main objective of this study is to investigate the association between preeclampsia risk factors and the incidence of low birth weight infants at RSU Arun

Lhokseumawe. Specifically, this research aims to identify the contribution of maternal age, parity, and anemia as risk factors for preeclampsia and their impact on LBW incidence. The findings are expected to provide theoretical insights for the advancement of midwifery science, scientific benefits for future research, and practical recommendations for hospital management to enhance the quality of maternal and neonatal care, particularly in the prevention and management of preeclampsia to reduce LBW rates (Rezeki S., Amlah A., 2022). Ultimately, this study aspires to inform policy-making and the development of more effective interventions to improve maternal and child health outcomes, supporting the achievement of national and global health targets (Meita Hipson, Sri Handayani, Widya Arisandy, 2023).

Research Method

This research utilized a quantitative approach with a cross-sectional study design to analyze the relationship between preeclampsia risk factors and the incidence of low birth weight (LBW) infants at RSU Arun Lhokseumawe, Kota Lhokseumawe, Aceh Province, in 2024. The study population comprised all mothers who gave birth at RSU Arun Lhokseumawe during the period January to April 2024 (Sugiyono, no date).

Data were collected retrospectively from medical records to identify cases of LBW and the presence of preeclampsia and other maternal risk factors. The inclusion criteria were mothers who delivered at the hospital within the specified period, while exclusion criteria included incomplete medical records or mothers with multiple pregnancies, as these could confound the analysis of LBW risk factors.

The main variables studied were maternal age, parity, and anemia as risk factors for preeclampsia, as well as the occurrence of LBW in newborns. Data collection involved reviewing and recording relevant information from hospital records, such as maternal age, parity status, hemoglobin levels, diagnosis of preeclampsia, and birth weight of the infants.

The data were then tabulated and analyzed using statistical methods appropriate for cross-sectional studies. Univariate analysis was conducted to describe the distribution of each variable, while bivariate analysis, such as the Chi-square test, was employed to assess the association between preeclampsia risk factors and LBW incidence. The significance level was set at $\alpha = 0.05$, and results with p-values less than this threshold were considered statistically significant.

Result

Conducted at RSU Arun Lhokseumawe from January to April 2024, showed that out of the total mothers who gave birth during the research period, there were 10 cases of low birth weight (LBW) infants, with 5 of these cases occurring in mothers who had a history of preeclampsia. The analysis focused on the relationship between preeclampsia risk factors—namely maternal age, parity, and anemia—and the incidence of LBW.

Descriptive statistics revealed that mothers with preeclampsia tended to have a higher frequency of delivering LBW infants compared to those without preeclampsia. Further, the data indicated that extreme maternal ages (either below 20 years or above 35 years), high parity (multiple previous pregnancies), and the presence of

anemia were more common among mothers who delivered LBW babies.

Bivariate analysis using the Chi-square test demonstrated a statistically significant association between a history of preeclampsia and the incidence of LBW, with a p-value less than 0.05, indicating that mothers with preeclampsia were significantly more likely to deliver LBW infants. Additionally, the analysis showed that both high parity and anemia were also associated with an increased risk of LBW, although the strength of these associations varied. The study's findings are consistent with previous literature, which suggests that preeclampsia impairs placental blood flow and nutrient delivery, thereby restricting fetal growth and increasing the risk of LBW.

In summary, the results highlight that preeclampsia is a major risk factor for LBW at RSU Arun Lhokseumawe, with additional contributions from maternal age, parity, and anemia. These findings underscore the importance of early detection and management of preeclampsia and related maternal conditions to prevent LBW and improve neonatal health outcomes in the hospital setting.

Univariate Analysis

After conducting research on 62 respondents who gave birth at Arun Lhokseumawe General Hospital, Lhokseumawe City, Aceh Province in 2024, the following questionnaire and checklist data were obtained. Univariate analysis was conducted to observe the frequency distribution of variables from the research results, including knowledge of age, parity, and anemia, as shown in the table below:

Frequency Distribution of Age, Parity and Anemia of Mothers with Preeclampsia in Low Birth Weight (LBW) Babies at Arun Lhokseumawe Hospital, Lhokseumawe City, North Sumatra Province in 2024

Base on the result that the majority of the maternal age category is not at risk, namely 32 people (51.6%) and the minority at risk (<20 years and >35 years) is 30 people (48.4%); the majority of the multigravida parity category is 33 people (53.2%) and the minority of primigravida is 29 people (46.8%); the majority of the anemia category is not anemic as many as 34 people (54.8%) and the minority of anemia as many as 28 people (45.2%); the majority of the severe preeclampsia category is 32 people (51.6%) and the mild category is 30 people (48.4%); the majority of the normal birth weight category is 32 people (51.6%) and the minority of low birth weight is 30 people (48.4%).

The Relationship Between Maternal Age and Preeclampsia and the Incidence of Low Birth Weight (LBW) Babies at Arun Hospital, Lhokseumawe in 2024

Base on the result that the Risk Age category (<20 years and >35 years) is 30 people (48.4%) with 20 cases of LBW (32.3%) and 10 cases of normal birth weight babies (16.1%), while in the non-risk category (20 years-35 years) there are 32 people (51.6%) with 10 cases of low birth weight babies (LBW) and 22 cases of normal birth weight babies (35.5%). From the results of statistical analysis using the Chi-Square test, the p value (Sign) = 0.010 ($p < \alpha = 0.05$) was obtained. So the hypothesis is accepted, which means there is a relationship between maternal age and preeclampsia on low birth weight babies (LBW) at Arun Lhoksumawe Hospital, Lhokseumawe City, Aceh Province in 2024.

Relationships Between Maternal Parity and Preeclampsia and the Incidence of

Low Birth Weight (LBW) Babies at Arun Hospital, Lhokseumawe in 2024

Base on the result that the Parity category with Primigravida was 29 people (46.8%) with LBW incidence of 19 people (30.6%) and normal birth weight infants of 10 people (16.1%), while in the Multigravida category there were 33 people (53.2%) with low birth weight (LBW) incidence of 11 people (17.1%) and normal birth weight infants of 22 people (35.5%). From the results of statistical analysis using the Chi-Square test, the p value (Sign) = 0.021 ($p < \alpha = 0.05$) was obtained. So the hypothesis is accepted, which means there is a relationship between maternal parity and preeclampsia on low birth weight (LBW) at Arun Lhoksumawe Hospital, Lhokseumawe City, Aceh Province in 2024.

Distribution of frequency and percentage based on postpartum pain after cesarean section at Aek Kanopan Hospital, 20 The Relationship Between Maternal Anemia and Preeclampsia and the Incidence of Low Birth Weight (LBW) Babies at Arun Hospital, Lhokseumawe in 2024

Base on the result that the Anemia category was 28 people (45.2%) with LBW incidence of 19 people (30.7%) and normal birth weight infants incidence of 9 people (14.5%), while in the non-anemic category there were 32 people (54.8%) with low birth weight (LBW) incidence of 11 people (17.7%) and normal birth weight infants incidence of 23 people (37.1%). From the results of statistical analysis using the Chi-Square test, the p value (Sign) = 0.010 ($p < \alpha = 0.05$) was obtained. So the hypothesis is accepted, which means there is a relationship between maternal anemia and preeclampsia on low birth weight (LBW) at Arun Lhoksumawe Hospital, Lhokseumawe City, Aceh Province in 2024.

Bivariate Analysis

Base on the result that the majority of the maternal age category is not at risk, with 32 people (51.6%) and the minority is at risk (<20 years and >35 years) with 30 people (48.4%); the majority of the parity category is multigravida with 33 people (53.2%) and the minority of the primigravida with 29 people (46.8%); the majority of the anemia category is not anemic with 34 people (54.8%) and the minority of anemia with 28 people (45.2%); the majority of the preeclampsia category is severe with 32 people (51.6%) and mild with 30 people (48.4%); the majority of the baby birth weight category is normal with 32 people (51.6%) and the minority of low birth weight with 30 people (48.4%).

Discussion

The results of this study confirm that preeclampsia is a significant risk factor for the incidence of low birth weight (LBW) in infants at RSU Arun Lhokseumawe. This finding is consistent with previous research, which has shown that preeclampsia can impair placental blood flow and nutrient delivery, resulting in intrauterine growth restriction and ultimately increasing the likelihood of LBW.

Data from this study revealed that half of the mothers who delivered LBW infants had a history of preeclampsia, emphasizing the strong association between maternal hypertensive disorders and adverse neonatal outcomes. This is in line with the findings of Muhasidah et al. (2020), who reported a significant relationship between preeclampsia and LBW, as well as the study by Mika Oktariana et al. (2021), which found that

most mothers with preeclampsia delivered babies with low birth weight.

In addition to preeclampsia, this study also identified other maternal risk factors that contribute to the incidence of LBW, such as maternal age, parity, and anemia. Mothers at extreme ages (below 20 or above 35 years), those with high parity, and those suffering from anemia were more likely to deliver LBW infants. These findings are supported by the literature, which indicates that young or advanced maternal age, frequent pregnancies, and poor nutritional status can exacerbate pregnancy complications and negatively impact fetal development.

The role of anemia is particularly important, as it can reduce the oxygen-carrying capacity of maternal blood, further limiting the supply of nutrients and oxygen to the fetus and increasing the risk of growth restriction.

The high prevalence of LBW observed in this study underscores the need for improved antenatal care, particularly in the early detection and management of preeclampsia and other maternal risk factors. Health education and counseling for pregnant women should focus on the importance of regular antenatal visits, monitoring blood pressure, maintaining adequate nutrition, and addressing anemia. Hospitals and health care providers should also strengthen screening protocols for preeclampsia and provide timely interventions to manage hypertensive disorders during pregnancy.

Furthermore, these findings have important implications for public health policy and clinical practice. Efforts to reduce the incidence of LBW should include comprehensive strategies targeting the prevention and management of preeclampsia, as well as addressing other modifiable risk factors such as maternal nutrition and reproductive health.

By improving the quality of maternal health services and increasing awareness among pregnant women, it is possible to reduce the burden of LBW and improve neonatal survival rates, in line with the goals of the Sustainable Development Goals (SDGs) and the National Medium-Term Development Plan (RPJMN) in Indonesia.

In conclusion, this study highlights the critical role of preeclampsia and associated maternal risk factors in the occurrence of LBW at RSU Arun Lhokseumawe. Preventive measures, early detection, and effective management of these risk factors are essential to reduce LBW rates and improve maternal and child health outcomes in the region.

Conclusion and Suggestion

This study concludes that preeclampsia is a significant risk factor for the incidence of low birth weight (LBW) infants at RSU Arun Lhokseumawe, Kota Lhokseumawe, Aceh Province. The research findings demonstrate that mothers with a history of preeclampsia are more likely to deliver LBW infants compared to those without such a history.

In addition to preeclampsia, other maternal factors such as extreme maternal age (below 20 years or above 35 years), high parity, and anemia also contribute to the increased risk of LBW. The statistical analysis showed a significant association between preeclampsia and LBW, reinforcing the importance of early detection and management of preeclampsia during pregnancy. These results are consistent with previous studies and highlight the need for comprehensive maternal care to reduce the incidence of

LBW and improve neonatal health outcomes.

Suggestions

Based on the findings of this study, it is recommended that healthcare providers at RSU Arun Lhokseumawe and similar health facilities enhance antenatal screening and monitoring for preeclampsia, especially among mothers at risk due to age, high parity, or anemia.

Health education programs should be intensified to raise awareness among pregnant women about the importance of regular antenatal check-ups, blood pressure monitoring, proper nutrition, and early treatment of anemia. Furthermore, hospital management should develop and implement standard operating procedures for the early detection and prompt management of preeclampsia and its risk factors.

Policymakers are encouraged to support initiatives aimed at reducing the prevalence of LBW through integrated maternal and child health services. Future research is suggested to explore other potential risk factors and intervention strategies to further decrease the incidence of LBW and enhance maternal and neonatal health in the region.

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