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PROFIL KLINIS BAYI BERAT LAHIR RENDAH DI NICU RSUD DR. HASRI AINUN HABIBIE GORONTALO

Fadel Bilondatu[1], Nabila Rizki Sakinah[2]

[1] Program Studi Kedokteran FK Universitas Muhammadiyah Gorontalo / RSUD dr. Hasri Ainun Habibie Gorontalo
[2] Dokter Internship RSUD dr. Hasri Ainun Habibie Gorontalo, Gorontalo

*Corresponding author: Telp: +62852555712012, email: fadelbilondatu@umgo.ac.id

ABSTRAK

Bayi berat badan lahir rendah (BBLR) merupakan masalah kesehatan yang membutuhkan perhatian khusus, oleh karena masih meningkatnya angka morbiditas dan mortalitas neonatal. Dengan memahami profil klinis BBLR maka dapat meningkatkan strategi dalam upaya penurunan angka kematian pada neonatal. Studi ini bertujuan untuk mengetahui profil klinis dan faktor penyebab BBLR yang dirawat di Unit Perawatan Intensif Neonatal (NICU) di RSUD dr. Hasri Ainun Habibie, Gorontalo. Desain penelitian menggunakan studi *cross-sectional* dengan menggunakan data rekam medis dari 191 bayi yang dirawat di NICU. Data tersebut meliputi berat lahir, usia kehamilan, usia ibu, dan paritas. Analisis statistik digunakan untuk mengeksplorasi hubungan antara faktor-faktor ini dan kejadian BBLR. Hasil dari studi ini melaporkan bahwa 32% termasuk BBLR dengan berat lahir ≤ 2500 gram. Hubungan yang signifikan secara statistik antara usia kehamilan dan terjadinya LBW ($p < 0,001$). Sebaliknya, tidak ada korelasi signifikan yang diamati antara BBLR dan faktor ibu seperti paritas dan usia. Dari hasil penelitian ini disarankan pentingnya perawatan prenatal yang terfokus dalam mencegah persalinan prematur dan menurunkan insiden BBLR secara efektif di wilayah tersebut.

Kata kunci: BBLR, Usia Gestasi, Profil Klinis.

ABSTRACT

Low birth weight (LBW) infant is a significant public health concern, often linked to increased neonatal morbidity and mortality. Understanding the clinical profile of LBW infants can inform strategies to improve neonatal outcomes. This study aims to investigate the clinical profile and associated factors of LBW infants admitted to the Neonatal Intensive Care Unit (NICU) at RSUD dr. Hasri Ainun Habibie, Gorontalo, from January to April 2024. A cross-sectional descriptive study was conducted using medical record data from 191 infants admitted to the NICU. The data included birth weight, gestational age, maternal age, and parity. Statistical analysis was used to explore the associations between these factors and the incidence of LBW. This study reported that 32% of infants had a birth weight of less than 2500 grams, classifying them as low birth weight (LBW). A statistically significant association was identified between gestational age and the occurrence of LBW ($p < 0.001$). In contrast, no significant correlations were observed between LBW and maternal factors such as parity and age. Gestational age emerged as a primary determinant of LBW in this study, highlighting the crucial importance of prenatal care in preventing preterm deliveries and lowering the incidence of LBW. Maternal age and parity were not found to have a significant influence, indicating the need for focused prenatal interventions to effectively address this issue in the region.

Keywords: *LBW Infant;Gestational Age; Clinical Profile*

INTRODUCTION

Low birth weight (LBW) is defined as the weight of the newborn recorded at the time of birth, ideally measured within the first hour of life. The World Health Organization (WHO) defines LBW infants as those weighing less than 2500 grams irrespective of age, gestation, or maturity. According to estimates, about 15-20 percent of all live births or more than 20 million newborns are born within the LBW limits. Most of the burden of low birth weight is in low and middle-income countries. In East Asia and Pacific, the proportion of low birth weight was found to be around six per cent of infants. And in Sub Saharan Africa, this figure reached thirteen per cent. The highest concentration of low birth weight babies – is 28% in South Asia. South Asia accounts for almost half of all LBW cases. On the contrary higher-income regions have lower prevalence of LBW such as United Kingdom, where about 6.9% of the population suffers[1].

Low birth weight (LBW) is considered critically important public health information, which is a consequence of maternal health, nutrition, healthcare services, and poverty levels in a given country. An average birth weight of 2500 grams puts a newborn's risk of mortality at 1, but those born with LBW are up to 20 times more likely to die. Aside from early fetal weight disorders, LBW also means an increased risk developing chronic discorders such as cardiovascular diseases and diabetes[1]. The most vital arrangements full sure loan menor Meeting meeting cause as a low birth weight (LBW) may include age of the gestation, illness of the mother and some environmental factors. Preterm birth, which is defined as giving birth to children before 37 weeks of gestation, is one of the major reasons why many babies have LBW. In most instances, low birth weight infants are preterm; hence, they tend to have low birth weight when compared to infants that are delivered healthy[2].

In Indonesia, data from the 2018 Basic Health Research (Riskesdas) survey revealed that the prevalence of low birth weight (LBW) reached 6.2% of all live births. This figure highlights significant challenges in improving maternal and child health in the country. In Gorontalo, the incidence of LBW is estimated to be higher than the national average, indicating an urgent need to enhance access to healthcare services and prenatal care in the region[3].

Investigating the risk factors associated with the incidence of low birth weight (LBW) is essential, as the long-term effects of LBW can significantly impact an individual's quality of life in the future. Therefore, the researchers have chosen to study various factors that may influence the occurrence of LBW.

METHOD

This is a cross-sectional study utilizing secondary data from the medical records of infants admitted to the NICU at RSUD Dr. Hasri Ainun Habibie, Gorontalo between January to April 2024. The study population included all patients who either were born int the NICU or received treatment there. A total sampling technique was used where all infants who met the eligibility criteria were included in the analysis and 191 infants were finally assessed. The inclusion criteria encompassed infants with a birth weight of ≤ 2500 grams who were admitted to the NICU, while those with incomplete medical records were excluded. Following this, data collection was conducted using the medical records.

We were collecting data from medical record and it included birth weight, gestational age, age of the mother and parity. Only reliable data that met the set criteria for analysis was used. The timely data collected were then edited and cleaned for efficiency. It was subsequently uploaded to appropriate

statistical software for analysis. Univariate analysis was undertaken to explain various descriptive characteristics of the individual variables such as the frequency distribution of gestational age, maternal age, parity and birth weight. Frequency distributions were used to describe the sample characteristics, while chi-square tests were employed to assess associations between LBW and independent variables. A p-value < 0.05 was considered statistically significant. Odds ratio (OR) and 95% confidence intervals (CI) were calculated to quantify the strength of associations.

RESULTS

A total of 191 subjects were successfully recruited and included in this study. The detailed results and data are summarized and presented in the table below for comprehensive analysis and interpretation.

Table 1. Clinical Profile of Subjects

Variables	Not LBW n (%)	LBW n (%)	Total n (%)
Gestational Age			
Normal	117 (86,0)	19 (14,0)	136 (100)
Preterm	13 (23,6)	42 (76,4)	55 (100)
Maternal Parity			
Multiparity	60 (67,4)	29 (32,6)	89 (100)
Primiparity	70 (68,6)	32 (31,4)	102 (100)
Mother's Age			
20 – 35 years	115 (71,0)	47 (29)	162 (100)
<20 - > 35 years	15 (51,7)	14 (48,3)	29 (100)

Table 1 demonstrates that 117 neonates (86%) born at term had a normal birth weight, while 19 (14%) were classified as LBW. In contrast, among preterm neonates, 42 (76.4%) had LBW, compared to only 13 (23.6%) with normal birth weight. From this table also showed that 89 mothers (46,5%) were multiparous, 102 (53.5%) were primiparous. Of the mothers, 162 (84.8%) were within the low-risk age range of 20-35 years. In contrast, 29 mothers (15.2%) were under 20 years and over 35 years.

Table 2. Risk of LBW based on Gestational Age

Gestational Age	Not LBW n (%)	LBW n (%)	*P* value
Normal	117 (86,0)	19 (14,0)	< 0.001
Preterm	13 (23,6)	42 (76,4)	
Total	130	61	
OR(95% CI) 19,89 (9.041 – 43.777)			

A significant association was found between gestational age and LBW (p <0.001). Among preterm infants, 42 (76.4%) were classified as having LBW, compared to only 19 (14.0%) of term infants. The odds of LBW were approximately 19.89 times higher in preterm infants compared to term infants, highlighting the critical role of gestational age in determining birth weight (Table 2).

Table 3. Risk of LBW based on Maternal Parity

No significant association was observed between maternal parity and LBW (p = 0.981). Among multiparous mothers, 29 (32.6%) had LBW infants, compared to 32 (31.4%) of primiparous mothers. The odds ratio indicated no increased risk of LBW based on parity, suggesting that parity was not a major determinant of LBW in this cohort (Table 3).

Table 4. Risk of LBW based on Maternal Age

Maternal Age	Not LBW n (%)	LBW n (%)	*P* value
20-35 years	115 (71,0)	47 (29)	0.067
<20 - >35 years	15 (51,7)	14 (48,3)	
Total	130	61	
OR(95% CI) 2.284 (1.023– 5.100)			

Although no statistically significant association was found between maternal age and LBW (p = 0.067), the analysis revealed that mothers younger than 20 and older than 35 had a higher proportion of LBW infants (48.3%) compared to mothers in the 20-35 age range (29%). This suggests that maternal age may still play a role in the occurrence of LBW, even if the association was not significant in this sample (Table 4).

DISCUSSION

This study provide critical insights into the clinical profile of low birth weight (LBW) infants admitted to the Neonatal Intensive Care Unit (NICU) at RSUD dr. Hasri Ainun Habibie, Gorontalo. LBW, defined as a birth weight less than 2500 grams, remains a significant public health concern due to its association with increased neonatal mortality, morbidity, and long-term

Maternal Parity	Not LBW n (%)	LBW n (%)	*P* value
Multiparous	60 (67,4)	29 (32,6)	0.981
Primiparous	70 (68,6)	32 (31,4)	
Total	130	61	
OR(95% CI) 0.946 (0.514 – 1.740)			

developmental issues[2]. In this cohort, 48.2% of the infants were classified as LBW, a prevalence that aligns with global reports, particularly in low- and middle-income countries (LMICs), where prenatal healthcare access and maternal nutrition are often suboptimal[5].

Gestational Age and LBW

Based on this study, the results revealed a significant association between gestational age and the incidence of low birth weight (LBW), with preterm birth identified as a key determinant. A striking 76.4% of preterm infants were classified as LBW, compared to only 14% of term infants. The odds of LBW were approximately 20 times higher in preterm infants, highlighting the critical influence of gestational age on neonatal outcomes (p < 0.001). These findings align with existing literature, which consistently identifies preterm birth as a major contributor to LBW, particularly in resource-constrained settings where maternal healthcare services may be insufficient[2,6].

Preterm birth is often associated with incomplete intrauterine development, leading to a higher likelihood of LBW as well as various neonatal complications, including respiratory distress syndrome, infections, and neurodevelopmental delays[7]. The immaturity of organs such as the lungs, gastrointestinal tract, and immune system in preterm infants makes them highly vulnerable to these complications, further contributing to the elevated mortality rates

seen in LBW preterm infants[8]. A meta-analysis by Mwaniki et al.[9] similarly concluded that preterm LBW infants are at increased risk for long-term cognitive deficits, including impairments in memory, attention, and executive function, which can persist into adulthood.

In LMICs, the prevalence of preterm births has been steadily increasing, largely due to factors such as maternal malnutrition, infections, and inadequate prenatal care[10]. The situation is exacerbated by a lack of infrastructure for the early detection of high-risk pregnancies and insufficient access to antenatal services, which are crucial for identifying mothers at risk of preterm delivery and implementing timely interventions[11]. In this context, the high incidence of LBW in preterm infants observed in our study highlights the need for strengthened prenatal care services in Gorontalo and similar settings to prevent preterm births and their associated complications.

Maternal Parity and LBW

Interestingly, this study found no significant association between maternal parity and LBW, with 32.6% of multiparous mothers and 31.4% of primiparous mothers delivering LBW infants (p= 0.981). This lack of a statistically significant relationship contrasts with some previous studies that have suggested an increased risk of LBW in both primiparous and grand multiparous mothers[11,12]. In settings where maternal healthcare is accessible, parity may not play as significant a role in determining birth weight as other factors, such as gestational age or maternal health[14].

Grand multiparity, defined as having five or more pregnancies, has been associated with an increased risk of adverse pregnancy outcomes, including LBW, due to the cumulative strain on uterine blood vessels, which can impair nutrient transfer to the fetus[15]. The absence of a significant relationship between parity and LBW in this study suggests that women in this population may have had access to sufficient maternal healthcare services, potentially reducing the risks typically associated with high parity. Regular prenatal check-ups, appropriate nutritional interventions, and effective management of maternal health conditions likely contributed to this finding. These factors may have helped mitigate the usual risks linked to parity, thus explaining the lack of a significant association with LBW in this cohort. Moreover, parity may interact with other risk factors such as maternal age and socioeconomic status to influence birth weight. In high-income settings, where maternal healthcare is universally accessible, parity has been shown to have a lesser impact on neonatal outcomes[14]. This study showed the importance of considering the broader healthcare context when interpreting the relationship between parity and LBW. In our study, the provision of adequate antenatal care in Gorontalo might have contributed to reducing the potential negative impact of multiparity on neonatal outcomes.

Maternal Age and LBW

Although the relationship between maternal age and LBW did not reach statistical significance in this study (p= 0.067), there was a trend toward higher LBW rates among mothers younger than 20 and older than 35. Of the 29 mothers in these high-risk age groups, 48.3% delivered LBW infants, compared to 29% of mothers aged 20-35 years. These findings are consistent with existing literature that identifies maternal age as a critical determinant of neonatal outcomes, particularly in LMICs where early and late pregnancies are more prevalent[16].

Adolescent pregnancies, in particular, have been linked to poor birth outcomes, including LBW, due to a combination of biological and socioeconomic factors[17]. Younger mothers may not have fully matured physically, and their bodies may be less capable of supporting the nutritional and developmental needs of the fetus. Additionally, adolescent mothers often have limited access to healthcare and are more likely to experience social and economic disadvantages, which can further exacerbate the risk of LBW[18].

On the other end of the spectrum, advanced maternal age (over 35 years) has been associated with an increased risk of pregnancy complications, including hypertension, gestational diabetes, and placental insufficiency, all of which can contribute to LBW[19]. The decline in oocyte quality with age also increases the likelihood of chromosomal abnormalities and pregnancy complications, which can negatively affect fetal growth[17]. Studies have shown that older mothers are more likely to require medical interventions during pregnancy, such as the use of assisted reproductive technologies, which are associated with a higher risk of LBW[20].

In LMICs, both adolescent and advanced maternal age pregnancies are more common due to cultural, economic, and healthcare factors[4]. The higher incidence of LBW among mothers in these age groups in our study reflects these global trends and underscores the need for targeted interventions. For adolescent mothers, improving access to education, healthcare, and family planning services could reduce the incidence of early pregnancies and improve maternal and neonatal health outcomes[21]. For older mothers, enhanced prenatal care focused on managing pregnancy complications and optimizing fetal growth is essential to reducing the risk of LBW[16].

While this study found no significant association between maternal parity and LBW, the trend toward higher LBW rates among grand multiparous mothers suggests that targeted prenatal care is necessary for this group. Ensuring that multiparous and grand multiparous women receive adequate nutritional support and monitoring during pregnancy can help mitigate the risks associated with high parity[22]. The elevated incidence of LBW among adolescent and older mothers highlights the importance of addressing the unique needs of these high-risk populations. For adolescent mothers, expanding access to comprehensive reproductive health services, including contraception, prenatal care, and education, is critical for reducing the incidence of LBW[21]. For older mothers, providing specialized prenatal care that focuses on managing pregnancy complications and ensuring optimal fetal growth is essential to improving neonatal outcomes[20]. Strengthening the healthcare system's capacity to deliver these interventions is crucial for reducing the incidence of LBW and improving survival rates among preterm infants[23].

CONCLUSION

In conclusion, this study confirms that gestational age is a critical determinant of LBW, with preterm birth being a major risk factor. Although no significant associations were found between maternal parity or maternal age and LBW, the higher incidence of LBW among adolescent and older mothers highlights the need for targeted interventions. Improving access to prenatal care, particularly for high-risk groups such as preterm infants, grand multiparous mothers, and mothers at the extremes of reproductive age, is essential for reducing the incidence of LBW and improving neonatal outcomes in

Gorontalo. Future research should focus on exploring additional factors that contribute to LBW, such as maternal nutrition, socioeconomic status, and healthcare access, to further inform interventions aimed at improving maternal and neonatal health.

SUGGESTION

Based on this study, we recommends improving comprehensive prenatal healthcare services, with an emphasis on gestational age monitoring to identify preterm birth risks. Moreover, educating pregnant women on the importance of balanced nutrition during pregnancy is essential, given its direct impact on birth weight. Further research is advised, involving a larger population and extended study duration, to better understand additional factors such as genetic and environmental influences on LBW, and to develop more effective interventions to reduce its occurrence.

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