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Factors of Maternal Influence on Low Birth Weight

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ABSTRACT

Introduction: Low birth weight (LBW) is classified by World Health Organization (WHO) as a weight at delivery of under 2500 g. LBW has now become a substantial public health concern worldwide, and it is connected to a variety of short and long term outcomes. The goal of this study is to identify maternal variables that impact the occurrence of low birth-weight infants.

Material and Methods: The research used a cross-sectional study design with descriptive analysis, aiming to explain the characteristics and maternal risk factors that influence low birth weight over a period of 1 year at Soedomo Trenggalek Regional Hospital. Research subjects were women that delivered due to infants weight fewer than 2500 grams at Soedomo Trenggalek Regional Hospital from July 2022 to June 2023.

Results: A sample of 105 patients was obtained. The mean age of the mothers were 29, pregnancies at age <20 years (n=6), age >35 years (n=19), gestational ages were at term (n=64), vaginal delivery (n=80), anemia (n=32), preeclampsia (n=16), Oligohydramnios (n=18), premature rupture of membranes (n=30), miscarriage or stillbirth (n=22).

Conclusion:: Clinicians are expected to detect early risk factors or comorbid conditions in the mother and carry out appropriate and immediate management to prevent babies from being born with small birth weight.

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INTRODUCTION

Low birth weight (LBW) is a serious public health concern for babies worldwide [1]. The World Health Organization (WHO) defines LBW as a weight at delivery of below 2500 g. LBW is a substantial public health concern worldwide and is associated with a variety of both long- and short-term problems [2]. Premature Rupture of Membrane PROM problems can affect both the mother and the developing baby. PROM can induce an intrauterine infection in the mother, but in the fetus, it leads to premature delivery with a low birth weight [3].

LBW It is predicted that 15% of all pregnancies are LBW, or more than 20.5 million births each year, with almost all of LBW occurring in low and medium-income nations [4]. Bangladesh had the greatest estimated national rate in 2014, at 19.1%. In 2014, the top five nations for the prevalence of preterm births globally were India, China, Nigeria, Bangladesh, and Indonesia [5].

History of delivering preterm or small baby, history of abortion, maternal anemia, and preeclampsia were associated with LBW. Maternal body mass index (BMI) <18.5kg/m2 and maternal height <1.5m were also associated factors of LBW [6, 7]. Nearly 16 to 20 percent very preterm (VPT) or very low birth weight (VLBW) infants had a cognitive or motor delay respectively, and one of fifteen infants developed to be cerebral palsy (CP) [8]. Approaches have been undertaken to minimize newborns with below-normal birth weight, with a focus on the various types of care given during the prenatal, antenatal, intranatal, and postnatal periods [7]. The objectives of this study was to identify maternal variables that impact the occurrence of low birth weight infants.

MATERIAL AND METHODS

The research used a cross-sectional study design with descriptive analysis, aiming to explain the characteristics and maternal risk factors that influence low birth weight over a period of 1 year at Soedomo Trenggalek Regional Hospital. Research subjects were women who gave birth to babies weighed < 2500 grams at Soedomo Trenggalek Regional Hospital from July 2022 to June 2023. Data were taken from the patients' medical record files. Multiple pregnancies, stillbirths, and babies with congenital abnormalities were not included as research subjects. Maternal risk factors such as maternal ages, hemoglobin levels, preeclampsia, gestational age, and amniotic fluid condition were included in the study characteristics, while risk factors for the history of pregnancy loss were classified as a history of abortion or stillbirth. All data are calculated and displayed in tables and percentages.

RESULTS

A sample of 105 patients was obtained. The median ages of the mothers was 29. The percentage of pregnancies at a young age (<20 years) was 5.7% (n=6), and pregnancies at a risky old age (>35 years) were 18.1% (n=19). Only a few babies were born weighing <1500 grams (n=6, 5.7%). The majority of gestational ages were at term (n=64, 60.9%), with vaginal delivery accounting for 80% (n=80). According to WHO, anemia in pregnant women is defined if the hemoglobin (HB) level is <11 g/dL and 30% (n=32) of mothers experienced anemia in this study. Risk factors for preeclampsia were present in 16 (15.2%) subjects. Oligohydramnios was experienced by 17.1% (n=18) of patients. The incidence of premature rupture of membranes was 28.6% (n=30), while 22 (20.9%) patients experienced miscarriage or stillbirth.

Table 1. Characteristic of Maternal Factors and Baby Weight

Characteristics	N	Percentage
Weight		
< 1500 gr	6	5,7%
< 2500 gr	99	94,3%
Maternal Age		
< 20 years	6	5,7%
20 - 35 years	80	76,2%
> 35 years	19	18,1%
Gestational Age		
Preterm	41	39,1%
Aterm	64	60,9%
Deliveries		
Sectio caesarea	25	23,8%
Vaginal delivery	80	76,2%
Anaemia		
Yes	32	30,5%
No	73	69,5%
Preeclampsia		
Yes	16	15,2%
No	89	84,8%
Oligohydramnion		
Yes	18	17,1%
No	87	82,9%
PROM		
Yes	30	28,6%
No	75	71,4%
History of pregnancy loss		
Yes	22	20,9%
No	83	79,1%

DISCUSSION

WHO classified LBW as weight at delivery less than 2500 g. LBW subsequently became a substantial public health concern internationally, It is associated with a variety of immediate and long-term effects [2]. The projected global preterm birth (PTB) rate in 2014 was 10.6%. Out of the expected 139.95 million live births, 14.84 million were preterm. Bangladesh had the highest estimated national rate in 2014, at 19.1%. In 2014, the top five countries for preterm births (India, China, Nigeria, Bangladesh, and Indonesia) contributed to approximately 41.4% of live births and 44.6% of preterm births worldwide [5]. The prevalence of LBW or preterm birth in Indonesia is likewise high, with around 675,700 cases per year, making it the sixth highest country. Approximately 16 to 20 percent of very preterm or very low birth weight newborns had a cognitive or motor impairment, and one out of fifteen infants acquired cerebral palsy [8]. Malaria during pregnancy, history of delivering preterm or tiny babies, women who experienced pregnancy complications, moms with a history of abortion, maternal anemia were related with LBW. Maternal BMI <18.5kg/m2 and height <1.5m were related with LBW. Primipara, Interpregnancy period is shorter than 24 months, and unplanned pregnancies were positively related to LBW. [7].

A research conducted in Surabaya comprising 210 patients indicated that the early pregnancy (under the age of 20 years) group was at risk of 19.243 times the incidence of LBW than the group with pregnancy at an early age [9]. The risk of LBW and PB increased with increasing age beyond the age of 30 [10]. The factors twinning and pregnancy age suggest protection for neonates of pregnant mothers aged ≥18 years and <35 years [11]. Mothers aged 14 to 19 years had not completely matured reproductive organs. Nutritional needs were also not met properly owing to competition for nutrients between the mother and the developing baby, which may impact fetal growth and development in the form of LBW [12]. Another study showed that

maternal age is a risk factor for severe speech delays. However, this study could not distinguish whether increased maternal age was the cause of significant speech delay or was just typical of confounding [13].

A study from Ghana indicated a significant prevalence of LBW. Women's marriage history, especially among single moms, and The gestational age before 37 weeks of pregnancy are risk factors related with LBW [14]. Research done in rural Iran also demonstrated a strong association between pregnancies lasting fewer than 37 weeks and the frequency of low birth weight newborns [15]. Another investigation revealed that there was a substantial correlation among premature labor and low birth weights, so infants of mothers who had preterm deliveries suffered a low birth weight that was 19.8 times larger than the infants who had been delivered at 37 weeks [16].

Cesarean section (CS) deliveries were linked to the prevalence of LBW [11]. The prevalence of LBW among babies birth by caesarean section was significantly larger than that of babies birth by vaginal delivery (VD) [17]. Another study found that CS lowers newborn mortality by 37% when comparing with VD in premature vaginal birth [18]. This relationship should be regarded with care in some instances. They might need an emergency lower segment caesarean section (LSCS) because of anticipated maternal complications while continuing with preterm pregnancy, such as serious pre-eclampsia, eclampsia, and hemorrhage placenta praevia [17]. As a result, cesarean birth at extremely early gestation for VLBW infants provides no benefit to the infant and may lead to increased maternal morbidity. Decisions on the most beneficial delivery procedure for preterm VLBW neonates should be based on obstetric justifications and concerns, not the child's possible improved result [18].

In Africa, inadequate dietary variety during the pregnancy raises the risk of pregnancy-related anemia along with low birth weight [20]. maternity anemia, especially during the initial period of the pregnancy, may be considered as a risk factor for the incidence of LBW [21]. According to a systematic study and meta-analysis done in Brazil, maternal anemia during pregnancy is connected with an elevated risk of bad birth and obstetric outcomes in South Asian nations [22]. Although the current results suggest that pregnancy anemia is related to LBW, they also underline the require for more investigation on this problem, including an analysis of the many types of anaemia in pregnant women [23]. Adequate food prior to and during pregnancy, iron supplementation, and screenings for anaemia during gestation are advised to enhance mother health and minimize a greater incidence of LBW, PTB, and perinatal deaths in South Asia [22].

Preeclampsia is a cause of fetal growth limitation (placental insufficiency) [24]. Pregnancy hypertension and preeclampsia can both increase the probability of LBW and a premature gestational age. Preeclampsia has a higher impact than gestational hypertension on the etiology of low birth weight and SGA status [25]. Premature birth was 4.4 times more prevalent among hypertension mothers [26]. The study indicated that the pre-eclampsia group had a substantially higher proportion of newborns with low gestational age (≥90th centile) compared to the normotensive group [27]. A comprehensive review and meta-analysis investigation indicated that the overall incidence of low birth weight among mothers with primary induced hypertension (PIH) was more than twice as high as The average estimate of low birth weight among general mothers. Women with PIH were more likely to develop LBW than normotensive women [4]. Understanding variables that can reduce the incidence of LBW and improve perinatal survivability. The outcomes suggest that perinatologists should approach the date of delivery in the context of preeclampsia as a greater predictor of associated fetal growth limitation than measures of preeclampsia seriousness [27].

Women having oligohydramnios had a higher risk of having babies with low birth weights and asphyxiated newborns [28]. Another research suggested that women having oligohydramnios had a greater risk of stillbirth and newborn mortality within 28 days than those without [23]. Oligohydramniosis and fetal growth limitation are caused by the same etiopathogenesis. Pregnancies with both conditions have inferior results [6]. The only difference in outcomes for individuals with oligohydramnios was An rise in probability of having a low birth weight child. This might be explained by a comorbid illness, almost all of which were linked to fetal growth restriction, or it could be an indication of a more serious sickness [29].

Early preterm premature rupture of membrane (PPROM) before 25 weeks gestation, as well as extended latency of PPROM, are potentially dangerous to preterm newborns [30]. PTB was almost nine times more likely among moms who suffered preterm membrane rupture [26]. The influence of newborn weight and premature rupture of membranes (PROM) on infant survival after one week of birth was 81% [31]. A research found a significantly elevated risk of bronchopulmonary dysplasia (BPD) related with PPROM, which is limited to children born between 27 and 31 weeks [32]. Among women accompanied PPROM prior to 37 weeks' pregnancy and without any limits to finishing the pregnancy, expected therapy with careful tracking was connected to better results for both mother and child [33].

Prior abortion is an important risk factor for LBW, TLBW, and PB, and the risk increases with the amount of miscarriages [10]. Mothers that had previously experienced an abortion had a 1.9 times increased risk of premature birth [26]. Stillbirth, PTB, and SGA are all

tightly linked, and each disease predisposes women to the other outcomes in subsequent pregnancies. Exposure to stillbirth in the preceding pregnancy resulted with a small increase in the likelihood of SGA [34]. In conclusion, this is the first systematic review and metaanalysis of the association between RPL and PTB, and it shows a substantial increase in the risk of PTB among women with a history of RPL [35].

CONCLUSION

This study describes maternal factors that influence low birth weight. Some LBW infants are born to mothers who face several risks, including being too young or too old, experiencing anemia, preeclampsia, oligohydramnios, PPROM, and having a history of miscarriage in previous pregnancies. Clinicians are expected to detect early risk factors or comorbid conditions in the mother and carry out appropriate and immediate management to prevent babies from being born with low birth weight.

Limitation

In this study, we did not conduct further Analysis of statistics because of the relatively small sample size, and there was also no control group for comparison.

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CONFLICT OF INTEREST

The authors stated no conflict of interest.

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