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RISK FACTORS FOR LOW BIRTH WEIGHT (LBW) BABIES AT RSUD KOJA DKI JAKARTA

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ABSTRACT

One of the main causes of perinatal and neonatal mortality is low birth weight (LBW) babies, which account for 15% of all births worldwide, and more than 97% of them occur in developing countries.The risk of death of premature or LBW infants is 70 times higher than that of full-term infants. The researcher's objective was to determine the risk factors for LBW incidence at Koja Hospital. The research design used was an analytic survey with a retrospective approach, the sampling technique used was purposive sampling with inclusion and exclusion criteria and obtained a sample of 202 people. The results of the study based on the Odds Ratio statistical test showed that mothers with risky parity, risky gestational age, preterm gestational age, anemia, pre-eclampsia and exposure to cigarette smoke had a higher risk of giving birth to LBW babies with odds ratio values; parity 1.75, maternal age 1.003, gestational age 2.909, pre-eclampsia 3.379 and exposure to cigarette smoke 1.690. Based on the results of the research conducted, it is necessary to improve the skills of officers in efforts to detect the risks of pregnant women, fill out the MCH book routinely, provide health information related to healthy pregnancy planning.

Keywords: Low Birth Weight Babies, LBW, Newborn Babies, Event Factors

BACKGROUND

Many people believe that low birth weight (LBW) exclusively affects premature newborns or those who are not full-term. However, LBW does not only affect premature babies; it can also occur in full-term babies who have growth challenges throughout pregnancy (Ministry of Health, 2015). Low birth weight is a major public health concern worldwide due to its short and long-term health consequences. LBW cases are primarily prevalent in underdeveloped nations, including Indonesia, particularly in places with vulnerable populations. LBW is a leading cause of prenatal mortality and morbidity, as well as an increased risk of noncommunicable diseases like diabetes and cardiovascular disease. The World Health Assembly in 2012 adopted the Comprehensive Implementation (Eshete *et al*, 2020).

The majority of low birth weight babies are born prematurely or as a result of growth abnormalities while in the womb. Premature or low-birth-weight newborns are 70 times more likely to die than full-term infants. (Pujiadi et al 2013). According to the 2017 Indonesian Demographic and Health Survey (IDHS), the IMR ranged from 15 to 24 per 1,000 live births, with up to 6.2% being born with LBW. According to data from the Indonesian Ministry of Health, in 25 provinces that reported to the Directorate of Community Nutrition in 2019, 3.4% of 111,827 newborns were born underweight. The DKI Jakarta Provincial Health Office report in 2020 documented approximately 2,145 newborns with low birth weight (Riskesdas, 2018; DHO, 2020).

Several studies have found significant results between gestational age, baby's sex, type of delivery, mother's age, mother and husband's education, religion, mother and husband's

occupation, mother's height, mother's weight, family type, hemoglobin level, chewing tobacco, planned/unplanned delivery, history of LBW, distance between pregnancies, poor obstetric history, time and first antenatal care (ANC) visit, comorbidities, number of ANC visits In to these studies, the factors that lead to LBW are parental (mother and husband) and infant factors (Agustina, 2018; Chen et al, 2013).

Fetal factors that can cause births with LBW are infections such as *rubella, syphilis and* toxoplasmolysis, multiple pregnancies (twins not only tend to be born small but also born prematurely) due to the great stimulation of both babies so that they are faster, hydramnios. While placental factors that can cause LBW birth are placenta previa and placental abruption (Maryuni, 2013; Hockenberry et al, 2016).

Further assessment and identification needs to be done in the management of LBW. It has now become a priority in many countries to address the incidence of LBW, as the short- and long-term impacts are profoundly affecting the current generation of the nation. The highest socioeconomic categories are more likely to receive adequate health care with standards similar to those of high-income countries.

Identifying groups at most risk of a low birth weight, as well as those most likely have problems to getting health and nutrition interventions, is thus a global priority and critical to the success of large-scale programs to combat LBW. The results of research conducted in 2022 show that the group of pregnant women with Chronic Energy Deficiency (KEK) is at risk of giving birth to LBW babies with a p value <0,05 (Amelia Rida, Sartika, 2022).

METHODS

This is an analytic survey study, which means it examines risk factors retrospectively. In other words, the effect is identified now, and the risk factors are identified as existing or occurring in the past. In 2022, samples had been taken at Koja Hospital, including 202 LBW respondents who matched the prerequisites namely babies with birth weight <2500 grams.

Data collection techniques using secondary data obtained from patient medical records. The tools used in the study using a checklist containing the mother's name, LBW, history of pregnancy labor, maternal age, gestational age, Preeclampsia, gemeli and smoking habits. Univariate analysis was used to analyze respondent characteristics, and then bivariate analysis using the Odds Ratio statistical test.

RESULTS

A. Univariate Analysis

Table 1. Characteristics of LBW in Koja Hospital

Respondent characteristics	n	%
Category		
LBW	179	88,6
VLBW	23	11,4
Gender		
Male	97	48
Female	105	52
Total	202	100

Based on table 1, it can be seen that most of the respondents belonged to the LBW category, namely born with a body weight of 1500-2500 grams as many as 179 babies and 52 babies were female.

B. Bivariate Analysis

1. Parity with LBW

Table 2. Risk of Parity with LBW Incidence

Parity	LBW f	VBLW f	Total	OR
High Risk	71	6	77	1,745
Low Risk	108	17	125	
Total	179	23	202	

In table 2, the odds ratio value is 1.745, signifying that mothers with high parity have a twofold greater probability of giving birth to WLBW babies. Repeated pregnancies can have an impact on the circulation of nutrients to the fetus, resulting in fewer nutrients than the previous pregnancy. One of the health consequences of high parity is LBW (Prawirohardjo, 2012).

2. Mother's age

Table 3. Risk of maternal age at pregnancy with LBW incidence

Mother's Age	LBW f	VLBW f	Total	OR
At Risk	39	5	44	1,003
Not at Risk	140	18	158	
Total	179	23	202	

Based to table 3, mother's who are at risk during pregnancy are 1x greater than average of giving birth to LBW babies, with an odds ratio of 1.003. The mother's age during pregnancy is an influence on the mother's pregnancy due to it is related to the age and maturity of the reproductive organs or the psychological variables, especially her ability to accept pregnancy.

3. Gestational age

Table 4. Risk of gestational age with LBW

Gestational age	LBW f	VLBW f	Total	OR
Aterm	80	5	85	2,909
Preterm	99	18	117	
Total	179	23	202	

The statistical test results showed that preterm gestational age had a 3 times greater risk of delivering LBW babies (odds ratio 2.909) compared to mothers who gave birth at term. Generally, LBW is caused by preterm birth and late fetal growth (PJT). Birth at less than 37 weeks is considered preterm birth. Meanwhile, late fetal growth (LGF) is the occurrence of disturbances in fetal growth until the fetal weight is below the 10th percentile.

4. Anemia

Table 5. Risk of anemia with LBW

Anemia	LBW f	VLBW f	Total	OR
Yes	6	2	8	2,310
No	173	21	194	
Total	179	23	202	

Based to table 5, pregnant women with anemia about 2.3 times greater than normal to deliver birth to VLBW youths, with an odds ratio of 2.310. The primary cause of anemia in pregnant women is a shortage of iron, which is needed for the formation of hemoglobin. This affects the distribution of oxygen to the tissue, which lowers tissue metabolism and slows fetal growth, and leads to LBW.

5. Pre eclampsia

Table 6. Risk of Pre-eclampsia with LBW Incidence

Pre-eclampsia	LBW f	VLBW f	Total	OR
Yes	26	1	27	3,739
No	153	22	175	
Total	179	23	202	

The statistical test results demonstrate that mothers with pre-eclampsia have a 4x greater danger of giving birth to LBW children with an odds ratio of 3.739. The effect of pre eclampsia or eclampsia on pregnancy is the presence of placental isufficiency, causing incomplete fetal growth. In pre eclampsia or eclampsia, maternal endothelial dysfunction occurs so that placental ischemia occurs and causes placental circulation to be disrupted and reduced then causes the baby to not get an adequate supply of nutrients and oxygen, causing LBW.

6. Cigarette smoke exposure and the incidence of LBW

Table 7. Risk of cigarette smoke exposure with LBW incidence

Smoking	LBW f	VLBW f	Total %	OR
Yes	123	13	136	1,690
No	56	10	66	
Total	179	23	202	

The statistical test results show that mothers with environmental conditions exposed to cigarette smoke have a 2x greater risk of giving birth to LBW babies with an odds ratio value of 1.690. Harmful substances from cigarettes smoked by pregnant women will be carried into the mother's

bloodstream, causing the baby and placenta to receive less oxygen, which means less nutrition for the baby. This will result in cell death due to lack of oxygen. Hypoxia in the fetus and decreased umbilical blood flow can cause growth disorders in the fetus, causing LBW.

DISCUSSION

Risk of Parity with LBW

Parity is one of the important risk factors in determining maternal risk during pregnancy and childbirth. A mother who gives birth frequently has a great influence on the health of herself and her baby. Perinatal mortality in mothers with more than three parities was found to be 5 times greater than the second and third parities, proving to be the safest to give birth at a healthy reproductive age (Manuaba, 2010).

These results revealed that mothers with high parity had a twofold increased risk of giving birth to LBW kids, with an odds ratio of 1.745. The findings of this study were reinforced by Prawirohadjo's (2012) research, which found a link between parity and the occurrence of LBW.

According to Prawirohadjo, babies born with low birth weight, weighing less than 2500 grams, are caused by high parity history factors, because the reproductive system in high parity mothers has experienced thinning due to frequent childbirth. This is due to the higher parity of the mother, so that the quality of the endometrium will decrease. Repeated pregnancies can affect the circulation of nutrients to the fetus where the amount of nutrients will be reduced compared to the previous pregnancy. One of the health impacts that may arise from high parity is related to the incidence of LBW (Prawirohardjo, 2012).

Risk of Maternal Age with LBW

A healthy reproductive age is between the ages of 20-35 years, known as the safe age for pregnancy and childbirth. Mothers aged 35 years have organ function and health that begins to decline so that they may experience bleeding and prolonged partus which causes low birth weight newborns (Maryunani, 2013).

Results of this study suggested that mother's deemed at risk during pregnancy had a one-time higher risk of giving birth to LBW babies, with an odds ratio of 1.003. Mothers under the age of 20 can have an impact on pregnancy outcomes because, in addition to reproductive organ construction, there are also related to psychological settings, particularly preparedness to accept pregnancy. This study echoes the findings of prior research conducted by Trisnawati, et al(2021), which found a link between maternal age and the incidence of LBW at Ananda Hospital.

Age is an important part of maternal health because pregnancy in women under the age of 20 is included in high-risk pregnancies because the reproductive system is not optimal, blood circulation to the cervix and also to the uterus is still not perfect so this can interfere with the process of delivering nutrients from mother to fetus. Pregnancy in mothers over 35 years of age has health problems such as hypertension, diabetes mellitus, anemia and other chronic diseases. Another study found that high parity status increases the risk of LBW and stillbirth because the uterus' ability to provide nutrients for the next pregnancy decreases, disrupting the distribution of nutrients between mother and fetus, which can lead to LBW.

Risk of gestational age with LBW

Preterm labor is labor that occurs between 20 weeks of pregnancy and 37 weeks of pregnancy, calculated from the first last menstruation or with a fetal weight of less than 2500 grams. Babies born with a gestational age of less than 37 weeks have a risk of LBW because one of the factors is unbalanced and harmonious growth due to impaired retroplacenter circulation and chronic malnutrition / nutrition (Manuaba, 2010).

The results of this study show that preterm gestational age has a risk of giving birth to LBW babies 3 times greater odds ratio 2.909 compared to mothers who give birth at term. Generally, LBW is caused by preterm birth and late fetal growth (PJT). Birth at less than 37 weeks is considered preterm birth. Meanwhile, late fetal growth (LGF) is

the occurrence of disturbances in fetal growth until the fetal weight is below the 10th percentile.

Results of this study are consistent with Jumhati's (2018) research, which found that moms who give birth at a gestational age of less than 37 weeks had a 2.5 times higher risk of having an LBW baby than mothers who give birth at a gestational age of more than 37 weeks. According to Sembiring (2019), preterm gestation increases the risk of giving birth to low birth weight babies since the fetus in the womb has not fully developed, resulting in a lower weight than normal.

Risk of Anemia with LBW

Anemia is one of several risk factors for a mother's pregnancy. During pregnancy, the body's need for oxygen increases, resulting in increased erythropoetin production. This causes an increase in plasma volume and erythrocytes. However, the increase in plasma volume is higher than the increase in erythrocytes, resulting in a fall in hemoglobin concentration due to hemodilution. The most common cause of pathological anemia is nutrient insufficiency (Muthalib, 2020).

Based to the findings of this study, LBW kids are 2.3 times more inclined to be born to mothers who have anemia than mothers who do not. Efarina's (2022) results concur with this study, revealing that women with anemia have a bearing on the frequency of LBW. This study is also consistent with previous research done by Figueiredo et al (2018), which found that pregnant women with anemia are more likely to give birth to kids with low birth weight than women who do not have anemia during pregnancy.

Anemia during pregnancy can be dangerous for mothers and babies because it can inhibit the growth and development of babies in the womb, prone to infection, premature rupture of membranes (KPD) and others. During pregnancy, if the mother experiences anemia, it cannot be separated from the changes in the mother from a physiological point of view, such as the body will need a larger volume of blood around 20-30% because the pregnant woman's body must produce more blood for the fetus (Rahadinda et al., 2022).

Based on the results of the study and related theories, it can be assumed that the occurrence of anemia in pregnancy associated with LBW at Koja Regional General Hospital, North Jakarta can be caused physiologically due to pregnancy or due to nutritional deficiencies such as iron during pregnancy. Anemia due to iron deficiency causes stunted fetal growth, which in turn causes LBW.

Risk of Pre-eclampsia with LBW Incidence

One of the causes of LBW is complications of pregnancy diseases such as preeclampsia, eclampsia, antepartum hemorrhage, placenta previa, physical and psychological trauma. The cause of preeclampsia is due to genetic factors that cause placental implantation and trophoblastic invasion to occur abnormally in the uterine blood vessels. This results in the arteriola spiralis uteri not undergoing extensive remodeling, namely the replacement of muscle cells and vascular endothelium due to endovascular trophoblastic invasion whose function is to widen the diameter of blood vessels (Domple, et al, 2016)

The results of this study indicate that mothers with pre-eclampsia have a 4x greater risk of giving birth to LBW babies with an odds ratio value of 3.739. The effect of pre eclampsia or eclampsia on pregnancy is the presence of placental isufficiency, causing incomplete fetal growth. In pre eclampsia or eclampsia, maternal endothelial dysfunction occurs so that placental ischemia occurs and causes placental circulation to be disrupted and reduced then causes the baby to not get an adequate supply of nutrients and oxygen, causing LBW.

Results of this study agree with prior research, which indicates that mothers with severe preeclampsia are 86.7 twice more likely for giving birth to LBW kids than mothers who do not have severe preeclampsia (Nurliawati, 2014). Utami (2017) found that severe preeclampsia is a risk factor for LBW, with mothers with severe preeclampsia having a 3.29 times higher risk of

giving birth to low birth weight babies than mothers without severe preeclampsia.

Based on research conducted by researchers and supported by several studies described above, the incidence of preeclampsia is very influential on the incidence of LBW. Based on the research, efforts are needed to overcome the incidence of low birth weight babies (LBW), one of which is by screening pregnant women with risk factors for pregnancy complications, especially preeclampsia, so that the incidence of preeclampsia can be minimized, prevented and can be overcome, so as not to cause complications to the fetus.

Risk of Cigarette Smoke Exposure with LBW Incidence

Tobacco smoke has close to 7,000 elements, comprising toxic compounds such as carbon monoxide (CO), polycyclic aromatic hydrocarbons (PAHs), and others, as well as cancer-causing particles including tar, benzopyrenes, vinyl chloride, and nitro-sonor nicotine. The longer pregnant women spend in the home with active smokers, with an average exposure to cigarette smoke of more than 7 hours per day, the greater the possibility of having a low birth weight baby (Ahadina, 2014).

Based to the outcomes of this study, mothers who are exposed to cigarette smoke are twice as likely to give birth to LBW kids, with an odds ratio of 1.690. The longer a pregnant woman spends with active smokers in the house, with an average of more than 7 hours of cigarette smoke exposure each day, the greater her chance of having a low birth weight baby. This will cause cell death due to oxygen deficiency. The fetus's hypoxia and reduced umbilical blood supply might induce growth problems, resulting in LBW.

The results of this study coincide with those of Nurlalila (2016), who found that pregnant women who are exposed to cigarette smoke from active smoking husbands during their pregnancy have a 5.80 times higher risk of giving birth to LBW than pregnant women who are not exposed to cigarette smoke during their pregnancy.

CONCLUSIONS

Multiple conclusions might be drawn out of the research conclusion, such as :

1. The percentage of LBW was mostly in the birth weight category of 1500-2500 grams as many as 179 (89%) and female 105 (52%).
2. The risk of LBW is 2.909 times greater in mothers with risky gestational age than in mothers with non-risky gestational age (OR = 2.909>1) and the risk of LBW is 3.379 times greater in mothers with pre-eclampsia (3.379>1).

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