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RELATIONSHIP BETWEEN LOW BIRTH WEIGHT (LBW) AND NEONATAL ASPHYXIA INCIDENCE AT HJ. BUNDA HALIMAH HOSPITAL, BATAM CITY IN 2024

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Abstract

Neonatal mortality in Indonesia is still high, one of the factors causing asphyxia is the weight of the newborn. As the results of a preliminary study conducted in May 2023-May 2024, there were 557 deliveries. This study was conducted to determine the relationship between low birth weight and the incidence of neonatal asphyxia at Hj. Bunda Halimah Hospital, Batam City in 2024. The design of this study is an analytical survey using a retrospective descriptive approach. The population of this study were newborns who were recorded in medical records who met the inclusion criteria, with a sample population of 72 respondents. The sampling technique was purposive sampling. The location of the study was at Hj. Bunda Halimah Hospital, Batam City in August. The data collection tool used medical records. The data analysis used was univariate frequency distribution and bivariate analysis through the chi-square statistical test. The results of the study obtained respondents who experienced LBW as many as 69 respondents (95.8%) babies who experienced BBLER as many as 3 respondents (4.2%) babies who experienced asphyxia with a severe category as many as 35 respondents (48.6%), babies who experienced moderate asphyxia 12 respondents (16.7%), indicating that there is no relationship between LBW and the incidence of Asphyxia with a p value of 0.191> (0.05) meaning that there is no significant relationship between low birth weight babies and the incidence of asphyxia at Hj. Bunda Halimah Hospital, Batam City in 2024. It is expected that the Hospital will provide direct education to pregnant women regarding further monitoring of infant growth and development and complications that often occur in LBW babies.

Keywords : Asphyxia, Newborn weight.

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INTRODUCTION

Globally, the incidence of asphyxia in newborns is estimated to range from 2 to 10 per 1000 live births. This figure is higher in developing countries compared to developed countries, due to the lack of skilled medical care during delivery. Asphyxia accounts for more than 24% of neonatal deaths worldwide. In Africa, asphyxia accounts for 24% of neonatal deaths, with two-thirds of the incidence (15.9%) occurring in East and Central Africa (Techane et al., 2021). In 2019, the global infant mortality rate (IMR) was 28 per 1000 live births, and is expected to increase to 30.8 per 1000 live births in 2020 (WHO, 2019).

In Indonesia, 57% of all infant deaths occur in children under one month of age, with an average of one infant dying every six minutes. The main causes of neonatal mortality in Indonesia include low birth weight, asphyxia, birth trauma, neonatal tetanus, congenital abnormalities, and various other infections (Triana et al., 2015).

According to the 2021 Indonesian Health Profile, there were 25,256 cases of infant mortality, with an infant mortality rate of 5.0 per 1000 live births. The main causes of infant mortality in that year were Low Birth Weight (LBW) conditions which reached 34.5% and asphyxia at 27.8%. Other causes of death included congenital abnormalities, infections, COVID-19, neonatal tetanus, and others (Ministry of Health of the Republic of Indonesia, 2021.

The infant mortality rate (IMR) in Batam city is lower than the national figure. The national IMR is 16.8 per 1,000 births, while in Batam, IMR is only 2.67 per 1,000 births. The main causes of neonatal death are Low Birth Weight (LBW) at 33%, asphyxia 22%, congenital abnormalities 11%, sepsis 2%, and other causes 31% (Profile of the Batam City Health Office, 2023).

Asphyxia is defined as the failure of a baby to initiate and maintain breathing at birth. It can also be defined as impaired gas exchange in the placenta or lungs leading to hypoxemia and hypercarbia. To identify asphyxia, the signs to look for include a baby who is breathing weakly or not breathing at all, bluish or very pale skin, low heart rate, poor muscle tone, or experiencing seizures a few hours after birth. In more severe cases, asphyxia can cause death in babies (Tasew et al., 2018).

Causes of asphyxia that occur before birth include hypertension during pregnancy, antepartum hemorrhage, lack of antenatal visits, too little amniotic fluid (oligohydramnios), maternal age that is too young or too old, and low educational status. During the birth process, asphyxia can be caused by prolonged labor, home birth, labor obstacles, use of oxytocin, abnormal fetal position, and meconium-stained amniotic fluid. Fetal factors associated with asphyxia include low birth weight, multiple pregnancy, tight umbilical cord, premature labor, and fetal distress (Techane et al., 2021).

The results of a preliminary study at Hj. Bunda Halimah Hospital in Batam City by studying medical records in May 2023–May 2024, there were 557 deliveries, 130 babies were born with neonatal asphyxia, the number of babies with low birth weight (LBW) reached 104 babies, of which there were 72 babies who experienced LBW and asphyxia. The results of previous

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research at Budi Kemulian Hospital in Batam City in 2021, there were 7 babies with neonatal asphyxia

RESEARCH METHODS

The research design used in this study is an analytical survey using a retrospective descriptive research approach, which is a study conducted with the main objective of creating a picture or description of a condition objectively by looking back (Notoatmodjo 2019). The sample in this study was 72 babies born with LBW and asphyxia as seen from medical record data from May 2023-May 2024 at Hj. Bunda Halimah Hospital, Batam City. The sampling technique in this study used the Purposive Sampling Technique.

RESULTS AND DISCUSSION

1. Research Results

Based on the research results entitled: "The Relationship between Low Birth Weight (LBW) and the Incidence of Neonatal Asphyxia at Hj. Bunda Halimah Hospital, Batam City in 2024". Data on the frequency distribution of respondents were obtained based on the following research results:

a. Univariate Analysis

In this study, there were two characteristics of respondents, namely low birth weight and neonatal asphyxia as can be seen in the following table:

Table 4.1
Frequency of Low Birth Weight (LBW) Incidents

Birth Weight (Gram)	Frequency (f)	Percentage (%)
LBW (1500-2500 Grams)	69	95.8
BBLSR (1000-1500 Grams)	0	0
BBLER (1000 Grams)	3	4.2
Total	**72**	**100**

Based on table 4.1, it shows that of the 72 respondents studied, 69 babies (95.8%) had low birth weight (LBW) of 1500-2500 grams, 3 babies (4.2%) had birth weights that were included in the category of extreme birth weight babies (LBW 1000 grams), there were no babies born with very low birth weight (LBW).

Table 4.2 Frequency Based on Neonatal Asphyxia Incidents

Asphyxia	Frequency (f)	Percentage (%)
Severe Asphyxia	35	48.6
Moderate asphyxia	12	16.7
Mild/Normal Asphyxia Normal Baby	25	34.7
	0	0
Total	**72**	**100**

Based on table 4.2, it shows that from the 72 respondents studied, it can be seen that as many as 35 babies (48.6%) experienced severe asphyxia, as many as 12 babies (16.7%) experienced moderate asphyxia, as many as 25 babies (34.7%) experienced mild/normal asphyxia and there were no normal babies who experienced neonatal asphyxia.

b. Bivariate Analysis

Table 4.3 Relationship between Low Birth Weight (LBW) and Neonatal Asphyxia Incidence at Hj. Bunda Halimah Hospital, Batam City

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Weight Born	Asphyxia Category								Total	p
	Rijust		Currently		Heavy		Normal			
	n	%	n	%	n	%	n	%	n	%
LBW	25	34.7	12	16.7	32	44.4	0	0	69	95.8
BBLER	0	0	0	0	3	4.2	0	0	3	4.2
BBLSR	0	0	0	0	0	0	0	0	0	0
Total	25	34.7	12	16.7	35	48.6	0	0	72	100

Based on the table above, it shows that from the 72 respondents studied, it can be seen that babies who experienced Low Birth Weight (LBW) with severe asphyxia were 32 respondents (44.4), Low Birth Weight (LBW) with moderate asphyxia were 12 respondents (16.7), Low Birth Weight (LBW) with mild asphyxia were 25 respondents (34.7%), while Extreme Birth Weight (LBW) with severe asphyxia were 3 respondents (4.2%) and there was no asphyxia in the Low Birth Weight (LBW).

Medium Low (LBW). Based on the Chi- Square statistical test, the Pearson Chi- Square p = 0.197 was obtained where the p value > 0.05, which means there is no relationship between LBW and the occurrence of Neonatal Asphyxia at Hj. Bunda Halimah Hospital).

DISCUSSION

a. Low Birth Weight Babies

Based on research conducted on 72 respondents at Hj. Bunda Halimah Hospital, Batam City in 2024, it was found that 69 babies (95.8%) had a birth weight of 1500-2500 grams, 3 babies (4.2%) had a birth weight included in the BBLER category of 1000 grams. This is because birth weight has a direct influence on the quality of the baby, low birth weight if the baby is born weighing less than 2500 grams. LBW can occur if there is premature and immature so that it will affect the respiratory system. Asphyxia is often experienced by LBW babies because they have several problems including metabolic disorders, immune disorders, jaundice and asphyxia.

This is in line with previous research from (Sari & Saputra, 2023) based on the research results obtained in the case group, there were 38 babies (72%) with low birth weight (LBW), more than with non-LBW babies, namely 15 people (28%). In the control group, babies with low birth weight (LBW) were 13 people (25%) less than babies who were not BBLR, namely 40 people (75%). At the time of the study, there were also several factors that caused BBLR, including maternal factors such as age, parity, malnutrition, and pregnancy spacing.

According to previous research from (Astutik & Ferawati, 2018) almost half of the respondents, namely 46.9%, were born with LBW. While in table 3 shows that most of the respondents, namely 69.1%, were born at term gestational age and a small portion of the respondents, namely 9.9%, were born at postterm gestational age.

According to previous research from (Dinda Ango et al., 2023) the results of this study showed that out of 30 respondents, the number of respondents who had babies with LBW, BBLSR and

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BBLER was 10 respondents each (33.3%). The results of this study indicate that the incidence of LBW is still high).

According to the researcher's assumption, these results indicate that the BBLR rate is still high and can cause infections in infants. Infants with low birth weight can face various health problems, such as difficulty breathing, asphyxia, aspiration, and pneumonia. These problems occur due to a lack of pulmonary surfactant, imperfect coordination between the cough, sucking, and swallowing reflexes, and weakness of the respiratory muscles. In addition, the baby's sternum can bend, breathing can become periodic, and apnea can occur. The baby's health prognosis tends to worsen as the baby's weight decreases.

b. Asphyxia in newborns

Based on research conducted on 72 respondents at Hj. Bunda Halimah Hospital, Batam City in 2024, it can be seen that 35 babies (48.6%) experienced severe asphyxia, 12 babies (16.7%) experienced moderate asphyxia, 25 babies (34.7%) experienced mild or normal asphyxia and there was no asphyxia in normal babies. These results are quite large because more than half of the respondents experienced asphyxia. It was also found that respondents with asphyxia showed several symptoms such as the condition of newborns who were unable to breathe spontaneously regularly within 1 minute after birth. These symptoms show something similar to respondents who did not experience asphyxia, therefore further examination is needed.

This study is in line with the theory (Astutik & Ferawati, 2018) Neonatal asphyxia is an event of spontaneous and regular respiratory failure that occurs in Newborns (BBL) immediately after birth, as a result oxygen cannot enter the baby's body and carbon dioxide cannot be released. Asphyxia that occurs in infants is usually a continuation of fetal anoxia/hypoxia. Things that must be considered in this situation are the fetal heart rate, meconium in the amniotic fluid, examination of fetal blood pH. The cause of Neonatal Asphyxia has a multi-factor dimension, generally Low Birth Weight. The occurrence of Asphyxia is quite closely related to LBW, this is because the function of organs in infants who experience suboptimal growth, where birth babies under 37 weeks of age, this condition can be caused by a malfunction of the baby's respiratory organs (Dinda Ango et al., 2023).

Asphyxia incidents are quite closely related to LBW, this is due to the function of organs in babies who experience suboptimal growth, where the birth of a baby is less than 37 weeks old, this condition can be caused by a malfunction of the baby's respiratory organs (Hidayah, 2020). According to previous research from (Kartikaningsih et al., 2019) the results of the study showed that the most common category of asphyxia was mild

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category amounted to 22 people (53.66%) and moderate category 14 people (34.14%).

According to the researcher's assumption, it is necessary to increase competency training for maternal and neonatal health workers in particular, because neonatal asphyxia is caused by many factors and can occur in any baby. The goal is to ensure that these health workers can provide high-quality services and can handle neonatal asphyxia correctly and timely so as not to cause damage to the brain and other organs that will be borne throughout life.

c. The relationship between low birth weight and asphyxia incidents at Hj. Bunda Halimah Hospital

Based on research conducted on 72 respondents at Hj. Bunda Halimah Hospital, Batam City in 2024, it was found that respondents of babies who experienced Low Birth Weight (LBW) with severe asphyxia were 32 respondents (44.4%), Low Birth Weight (LBW) with moderate asphyxia were 12 respondents (16.7), Low Birth Weight (LBW) with mild asphyxia were 25 respondents (34.7%), while Extreme Birth Weight (LBW) with severe asphyxia were 3 respondents (4.2%) and there was no asphyxia in Moderate Low Birth Weight (BBLSR). Based on the results in the field, it was found that babies who experienced Low Birth Weight (LBW) with severe asphyxia were greater than babies who experienced Low Birth Weight (LBW) with mild or moderate asphyxia.

Based on the results of the data analysis, the Chi-Square statistical test was used. The results of the Chi-Square statistical test p = 0.197 where the p value> 0.05 which means there is no relationship between LBW and the occurrence of Neonatal Asphyxia at RS. Hj. Bunda Halimah. This is in line with research from (Kartikaningsih et al., 2019) that the results of the data analysis used the Chi-Square statistical test. The results of the Chi-Square statistical test p = 0.087 where the p value> 0.05 which means there is no relationship between LBW and the occurrence of Neonatal Asphyxia in the Perinatology Room of RSUD dr. Rubini Mempawah. The results of this study state that there is no relationship between Low Birth Weight (LBW) and the occurrence of neonatal asphyxia in the Perinatology Room of RSUD dr. Rubini Mempawah from the results of the Chi Scuare Statistic test explains that there are 4 cells where the value of each cell is less than 5.

Asphyxia is a condition in which a newborn baby cannot breathe spontaneously and regularly. Babies with a history of fetal distress before birth will generally experience asphyxia at birth. This problem is closely related to maternal health problems, umbilical cord abnormalities, or problems that affect the baby's well-being during or after delivery. Low birth weight babies can experience short-term risks, including asphyxia. Babies with low birth weight, whether less, enough or more

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months, can experience disorders in the respiratory adaptation process at birth so that they can experience neonatal asphyxia (Eka Frelestanty & Yunida Haryanti, 2021).

Babies born with low birth weight can have an impact on Asphyxia because the respiratory and digestive system control centers are not yet perfect, the ability to metabolize heat is still low so that it can result in asphyxia, acidosis and facilitate infection. Babies with LBW status generally have difficulty adapting to their new environment, and have an impact on inhibiting growth and development and can even be at risk for their survival, or are prone to respiratory tract infections (Hidayah, 2020).

The results of this study stated that there was no relationship between Low Birth Weight (LBW) and the occurrence of neonatal asphyxia at Hj. Bunda Halimah Hospital from the results of the Chi-Square Statistical test explained that there were 2 cells with a value of each cell less than 5. From this study, babies with low birth weight, whether less, sufficient or more months, can experience disorders in the respiratory adaptation process at birth so that they can experience asphyxia, so the occurrence of asphyxia is not always related to low birth weight (LBW).

CONCLUSION AND SUGGESTIONS

Based on the results of the research that has been conducted "The Relationship between Low Birth Weight (LBW) and the Incidence of Neonatal Asphyxia at Hj. Bunda Halimah Hospital", it can be concluded as follows:

a. The majority of low birth weight (LBW) babies at Hj. Bunda Halimah Hospital are babies with a LBW weight of 1500-2500 grams, 69 respondents (95.8%).
b. The majority of low birth weight (LBW) babies at Hj. Bunda Halimah Hospital had severe asphyxia, as many as 35 respondents (48.6%).
c. The results of the analysis using the chi- square test obtained a p value of 0.191 > (0.05) so Ho is accepted and Ha is rejected, meaning there is no significant relationship between low birth weight (LBW) babies and the incidence of asphyxia at Hj. Bunda Halimah Hospital.

1. Recommendations

a. For Hj. Bunda Halimah Hospital The results of this study are expected to make the Hospital create or hold a program to prevent low birth weight (LBW) and asphyxia. By providing counseling on good nutrition for pregnant women and providing education to pregnant women regarding further monitoring of infant growth and development and complications that often occur in babies with LBW.
b. For Educational Institutions It is expected that the results of this study can be a source of information, reference and learning material as well as broader research development for those who will conduct further research, can add to the literature as a means of enriching the reader's knowledge regarding the Relationship between Newborn Weight (LBW) and the incidence of

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neonatal asphyxia at Hj. Bunda Halimah Hospital, Batam City.

c. For Further Researchers This research can be used as information material by further researchers on the Relationship Factors between Newborn Weight (LBW) and the Incidence of Neonatal Asphyxia and it is recommended to consider or add these variables with a larger number of respondents and using different research techniques.

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