

RELATIONSHIP BETWEEN GESTATIONAL AGE AND LBW WITH HYPERBILIRUBIN INCIDENCE IN NEWBORN BABIES AT ANGGABERI COMMUNITY HEALTH CENTER

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ABSTRACT

Hyperbilirubinemia in premature babies has a higher incidence. Gestational age is the period of time since the fertilization of the egg until the birth of the baby. LBW is a condition where a newborn baby weighs less than 2,500 grams. The purpose of this study was to determine the relationship between gestational age and LBW with the incidence of hyperbilirubinemia in newborns. This study used a descriptive correlation survey research design with a Cross Sectional approach. The sampling technique used purposive sampling with a sample size of 40. Data analysis using the Chi-Square statistical test. The results of the study: most of the gestational ages were term with no hyperbilirubinemia 18 respondents (69.2%), almost all of them were LBW with hyperbilirubinemia 17 respondents (77.3%), The results of the chi-square test showed gestational age with the incidence of Hyperbilirubin p-value (0.011), LBW with the incidence of hyperbilirubin p-value (0.000) which means there is a relationship between gestational age and LBW with the incidence of hyperbilirubinemia in newborns at the Anggaberri Health Center. It is expected that pregnant women routinely check their pregnancy with a midwife or hospital.

Keywords: Gestational Age, Low Birth Weight, Hyperbilirubinemia

INTRODUCTION

Hyperbilirubinemia in preterm infants has a higher incidence. Hyperbilirubinemia that enters an advanced phase can cause irreversible damage to the central nervous system, characterized by clear retrocollisopistotonus, high pitched cry, inadequate for breastfeeding, apnea, fever, decreased consciousness to coma, sometimes can experience seizures and can end in death. (Aulia, et al., 2022). Hyperbilirubinemia occurs when there is an accumulation of bilirubin in the blood. In some neonates, jaundice will be found in the first week of life. It was stated that the incidence of jaundice was found in 60% of full-term infants and in 80% of preterm infants. Hyperbilirubinemia is a disease related to the immune system (Lamdayani, et al., 2022). Factors that cause the risk of hyperbilirubinemia in neonates can come from maternal and neonatal factors. Hyperbilirubinemia in neonates is influenced by ABO-Rh incompatibility, breast milk intake. The type of delivery, gender of the neonate, prematurity and induction of labor can also affect the risk of hyperbilirubinemia. Hyperbilirubinemia is also influenced by gestational age, complications during pregnancy and childbirth, type of delivery, inadequate breastfeeding. (Triani, et al., 2022). In the Hidayati's research (2016) stated that from 125 respondents, the results of the Chi Square test of gestational age with hyperbilirubinemia p value 0.001 were obtained, which means there is a significant correlation between gestational age and hyperbilirubinemia.

Based on Basic Health Research data (2018), the incidence of hyperbilirubin/neonatal jaundice in newborns in Indonesia is 51.47% with the following causative factors: Asphyxia 51%, LBW 42.9%, Sectio Cesarean 18.9%, Premature 33.3%, Congenital Abnormalities 2.8%, Sepsis 12%. (Ministry of Health of the Republic of Indonesia, 2024).

Gestational age or gestational age is the period of time from fertilization of the egg to the birth of the baby, calculated from the first day of a woman's last menstrual period (HPHT). In other words, gestational age is the duration of pregnancy. (Jaya, et al., 2021). Gestational age is an important factor and determines the quality of health of the baby born, because newborns from a less gestational age are associated with low birth weight and of course will affect the baby's immune system which is not

ready to accept and adapt to the environment outside the womb so that it has the potential to experience various complications, one of which is neonatal jaundice which can cause. (Khotimah & Subagio, 2021). Low Birth Weight (LBW) is a condition in which a newborn weighs less than 2,500 grams or 2.5 kilograms. Hyperbilirubinemia that occurs in low birth weight babies is due to liver function that is still not perfect or there are disorders in liver function such as hypoxia, hypoglycemia, acidosis, and others. The study of Susi Widiawati (2017) which states that there is a relationship between low birth weight and the incidence of neonatal jaundice with a p value of 0.0000 and an Odd Ratio (OR) value = 8.820, which means that babies with low birth weight have an 8.820 times risk of experiencing neonatal jaundice compared to babies with normal birth weight.

A survey conducted by researchers at the Anggaber Health Center in 2023 out of 279 newborns, 12 babies experienced complications at birth or 1.20% of complications. Based on an initial study of 68 respondents, there were 12 babies with LBW, 3 babies with hyperbilirubinemia, 5 babies with gestational age factors and 48 babies born normally. The results of the observations obtained were that babies weighing less than 2500 grams looked yellow in the sclera, skin and nails. This is related to the gestational age of the mother giving birth, because a less gestational age results in premature babies, and babies born from less pregnancy are also related to low birth weight, and of course it will affect the immune system of babies who are not ready to adapt to the environment outside the womb so that they have the potential to experience various complications, one of which is hyperbilirubinemia (Anggaber Health Center Medical Records, 2024).

Various efforts have been made to reduce the Infant Mortality Rate (IMR) and minimize the negative impacts caused during treatment. Efforts made for babies with hyperbilirubinemia include carrying out phototherapy with the aim of preventing bilirubin levels from increasing and providing sufficient breast milk.

METHOD

This study uses a descriptive correlation survey research design with a Cross Sectional approach. The population in this study were all newborns at the Anggaber Health Center in October, totaling 68 babies. The sample was 40 respondents. The sampling technique used was purposive sampling, a sampling technique based on certain considerations according to inclusion and exclusion criteria. Inclusion criteria include : willing to be a respondent, present during the study, can read and write. Exclusion criteria include : refusing to become a respondent, sick and not present during the study. The dependent variables in this study were gestational age and LBW, while the independent variables in this study were the incidence of hyperbilirubinemia in newborns. This study will be conducted in the Anggaber Health Center working area from November 2024 to January 2025.

RESEARCH RESULT

Education	Frequency	Percentage (%)
Elementary School	5	12,5
Junior High School	7	17,5
Senior High School	17	42,5
3-Year Diploma	6	15
Bachelor	5	12,5
Total	40	100

Based on the table above, it shows that of the 40 people used as samples, almost half were in the high school education category, namely 17 respondents (42.5%).

Work	Frequency	Percentage (%)
Housewife	27	67,5
Self-Employed	8	20
Government Employees	5	12,5
Total	40	100

Based on the table above, it shows that of the 40 people used as samples, most of the housewife job category, namely 27 respondents (67.5%).

Gestational Age	Frequency	Percentage (%)
Preterm (< 37 weeks)	15	35
Aterm (37 – 42 weeks)	25	65
Post term (> 42 weeks)	0	0
Total	40	100

Based on the table above, it shows that of the 40 respondents, most of the gestational age is aterm (37-42 weeks), namely 25 respondents (65%).

LBW	Frequency	Percentage (%)
LBW	22	55
Not LBW	18	45
Total	40	100

Based on the table above, it shows that of the 40 respondents, the most of LBW namely 22 respondents (55%)

Hyperbilirubinemia Events	Frequency	Percentage (%)
Hyperbilirubinemia	14	35
No Hyperbilirubinemia	26	65
Total	40	100

Based on the table above, it shows that of the 40 respondents, most of them are not hyperbilirubinemia, namely 26 respondents (65%).

Cross Tabulation of Gestational Age with Hyperbilirubinemia Incidence

		Hyperbilirubinemia Events		Total	
		Hyperbilirubinemia	No Hyperbilirubinemia		
Gestational Age	Preterm	Frequency	12	3	15
		%	30 %	7,5 %	37,5 %
	Aterm	Frequency	7	18	25
		%	17,5 %	45 %	62,5 %
	Post Term	Frequency	0	0	0
		%	0 %	0 %	0
Total	Frequency	19	22	40	
	%	47,5 %	52,5 %	100%	

Based on the table above, almost half of the respondents were at term gestational age with no hyperbilirubinemia, namely 18 respondents (45%).

Cross Tabulation of LBW with Hyperbilirubinemia Incidence

		Hyperbilirubinemia Events		Total	
		Hyperbilirubinemia	No Hyperbilirubinemia		
LBW	LBW	Frequency	17	5	22
		%	42,5 %	12,5 %	55 %
	Not LBW	Frequency	2	16	18
		%	5 %	40 %	45 %
Total		Frequency	19	21	40
		%	47,5 %	52,5 %	100%

Based on the table above, it was found that almost half of the LBW respondents experienced hyperbilirubinemia, as many as 17 respondents (42.5%).

Statistical Test Results

Relationship Between Gestational Age and Hyperbilirubinemia

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	8.338 ^a	1	.004		
Continuity	6.532	1	.011		
Correction ^b	8.707	1	.003		
Likelihood Ratio					
Fisher's Exact Test				.007	.005
N valid Cases	40				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.65.

b. Computed only for a 2x2 table

Based on data analysis using the Chi-Square statistical test, the value obtained (p value = $0.011 < 0.005$). So H_0 is rejected and H_1 is accepted, which means there is a relationship between gestational age and the incidence of hyperbilirubinemia.

Relationship Between LBW and Hyperbilirubinemia

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	17.378 ^a	1	.000		
Continuity	14.826	1	.000		
Correction ^b	19.212	1	.000		
Likelihood Ratio					
Fisher's Exact Test				.000	.000
N valid Cases	40				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 8.55.

b. Computed only for a 2x2 table

Based on data analysis using the Chi-Square statistical test, the value (p value = $0.000 < 0.005$) was obtained. So H_0 is rejected and H_1 is accepted, which means there is a relationship between LBW and the incidence of hyperbilirubinemia.

DISCUSSION

1. Gestational Age at Anggaber Health Center.

Based on the study, it was found that most of the respondents' gestational age was in the atterm category, as many as 25 respondents (65%), almost half were preterm as many as 15 respondents (35%)> Gestational age or pregnancy period is the period from conception to birth, calculated from the first day of the last menstruation (menstrual age pregnancy). Gestational age is an important factor and determines the quality of the health of the baby born, because newborns from a less gestational age are related to low birth weight and of course will affect the immune system which is not ready to accept and adapt to the environment outside the womb so that it has the potential to experience various complications, one of which is neonatal jaundice which can cause hyperbilirubinemia. (Kholifah and Hadikasari, 2016).

The cross-tabulation results showed that almost half of the respondents with high school education experienced a term gestational age, as many as 9 respondents (22.5%). One of the strong influences of formal education obtained by the mother is the tendency to make better health care efforts for herself and the fetus she is carrying. With education, a person can gain knowledge, it is easier to get information from the mass media or online media, for example about pregnancy. Education can influence how a person acts or seeks causes and solutions in his life, and will be more receptive to new ideas. The higher the education, the better the quality of life and usually will act more rationally. Almost half of the work of housewives experienced atterm gestational age as many as 16 respondents (40%). The incidence of preterm labor was lower in pregnant women who were not workers compared to pregnant women who worked, especially more than 42 hours per week. Gestational age is an important factor that affects the quality of neonatal health. The lower the gestational age is one of the factors that increases neonatal morbidity and

mortality. The growth of the fetus that is not yet full term in neonates can cause the bilirubin metabolism process to become abnormal. In a study by Elvira et al (2020) it was stated that the gestational age in the aterm category as many as 46 respondents (69%) were susceptible to hyperbilirubinemia (Khotimah and Subagio, 2021).

According to the researcher's assumption, the more mature the gestational age, namely full term, the fetus' body will be able to function perfectly and can adapt to outside life after birth, so that it can avoid problems or diseases at birth.

2. LBW at Anggaber Health Center

Based on the results of the study, it was found that out of 40 respondents, the majority were in the LBW category, as many as 22 respondents (55%), almost half were not LBW as many as 18 respondents (45%). This is in line with Dahliana's research (2021) which stated that the majority of LBW incidents were 23 babies (71.9%). LBW at birth is an indicator of the health and nutrition of the mother and newborn. Malnutrition in the womb increases the risk of death in early life. Babies who survive tend to have impaired immune function and increase the risk of disease.

The cross-tabulation results showed that almost half of high school education experienced LBW as many as 13 respondents (32.5%). Education at the high school level plays an important role in forming a person's knowledge base. The higher the education, the broader the insight about LBW. Almost half of housewives experienced LBW as many as 16 respondents (40%). The mother's job can be seen from the extent of the burden that must be done both physically and mentally. The weight of the mother's work during pregnancy can trigger prematurity and give birth to babies with LBW. This is because during pregnancy the mother cannot rest so that it can affect the fetus she is carrying (Darmiati, 2021).

According to researchers, the incidence of LBW will have an impact on mothers who do not work (housewives), where housewives have heavy work such as sweeping, mopping, ironing, cleaning the house, taking care of children, cooking, and so on so that because they do not have a household assistant, the burden of work can cause the mother to become exhausted and depressed so that it can have an impact on the health of her fetus, for example the occurrence of LBW.

3. Hyperbilirubinemia incident at Anggaber Health Center

Based on the results of the study, it was found that most respondents were not hyperbilirubin as many as 26 respondents (65%), almost half were hyperbilirubin as many as 14 respondents (35%). Hyperbilirubinemia causes babies to appear jaundiced due to the accumulation of yellow bilirubin pigment in the sclera and skin. Hyperbilirubinemia can be influenced by gestational age, asphyxia, birth trauma, birth weight, infection and hypoglycemia, and its complications can result in encephalopathy and kernicterus. In the study by Rompis et al (2019) also stated that the incidence of hyperbilirubinemia at term gestational age was 44 respondents (81.5%).

The results of the cross tabulation showed that a small portion of high school education experienced hyperbilirubin as many as 10 respondents (25%). Education is very necessary for mothers to increase insight, knowledge, motivation, skills and self-confidence to prevent and detect neonatal jaundice early. High maternal education will make it easier for mothers to accept the information provided. A small portion of housewives experience hyperbilirubinemia, as many as 10 respondents (25%). The mother's work can be seen from the extent of the burden that must be done both physically and mentally and mentally. The burden of the mother's work during pregnancy can trigger prematurity and give birth to babies with LBW. This is because during pregnancy the mother cannot rest so that it can affect the fetus she is carrying (Darmiati, 2021).

According to researchers, education will affect the mother's knowledge about hyperbilirubinemia so that the incidence of hyperbilirubinemia can be prevented as early as possible. The higher the mother's education, the better the acceptance of the information given to the mother, especially in the prevention and treatment of hyperbilirubinemia.

4. Relationship between Gestational Age and Hyperbilirubinemia at Anggaber Health Center.

The results of the study showed that almost half of the respondents of term gestational age did not experience hyperbilirubinemia as many as 18 respondents (45%), almost half of the preterm gestational age experienced hyperbilirubinemia as many as 12 respondents (30%). Preterm gestational age (<37 weeks) is at greater risk of causing hyperbilirubinemia than term age (>37 weeks-42 weeks). This is because at preterm gestational age the growth of the baby's organs has not functioned perfectly so that at preterm gestational age many have difficulty living outside the womb and complications and mortality are more likely to occur.

The results of the Chi-Square statistical test obtained a p value = 0.011 which means that

HO was rejected which had a relationship between gestational age and the incidence of hyperbilirubinemia (p value = 0.011 <0.005). This is in line with Hidayati's research (2016) which stated that from 125 respondents, the results of the Chi Square test of gestational age with

hyperbilirubinemia p value 0.001 were obtained, which means there is a significant correlation between gestational age and hyperbilirubinemia. In preterm infants, liver immaturity occurs which causes disruption of conjugation and excretion of bilirubin, resulting in jaundice. Lack of the enzyme glucuronyl transferase causes the conjugation of indirect bilirubin to direct bilirubin to be imperfect and blood albumin levels which play a role in transporting bilirubin from tissue to liver are reduced. Bilirubin that accumulates in the body causes the baby to look yellow due to the accumulation of bilirubin pigment which is colored icterus in the sclera and skin. Gestational age is an important factor that affects the quality of neonatal health. The lower the gestational age is one of the factors that increases neonatal morbidity and mortality. The growth of a fetus that is not yet full term in neonates can cause the bilirubin metabolism process to become abnormal. In the study of Elvira et al (2020) it was stated that the gestational age in the at term category as many as 46 respondents (69%) were susceptible to hyperbilirubinemia (Khotimah and Subagio, 2021).

According to researchers, at term gestational age is less at risk of experiencing hyperbilirubinemia because at at term gestational age the baby's organs are functioning perfectly so that when born the baby will be able to adapt to the outside world and grow healthily after birth. Meanwhile, at preterm gestational age, the baby's organs are not yet functioning perfectly so that they will experience problems or difficulties in living after birth, and jaundice or hyperbilirubinemia often occurs.

5. Relationship between LBW and Hyperbilirubinemia at Anggaber Health Center.

The results of the study showed that almost half of LBW babies experienced hyperbilirubinemia as many as 17 respondents (42.5%), a small number of LBW babies did not experience hyperbilirubinemia as many as 5 respondents (12.5%). LBW occurs due to growth retardation, which is caused by 3 factors, namely fetal, placental and maternal factors. Maternal factors can affect the incidence of LBW such as maternal diseases such as severe anemia, infection during pregnancy and hypertension, also because of age <20 years or > 35 years, multiple pregnancies, too close pregnancy spacing, poor antenatal care and low socio-economic factors such as malnutrition (Akbar, 2020).

The results of the Chi Square statistical test obtained a p value = 0.000 which means that HO is rejected which means there is a relationship between LBW and the incidence of hyperbilirubinemia (p value = 0.000 <0.005). This study is in accordance with the study of Susi

Widiawati (2017) which states that there is a relationship between low birth weight and the incidence of neonatal jaundice with a p value of 0.0000 and an Odd Ratio (OR) value = 8.820, which means that babies with low birth weight have an 8.820 times risk of experiencing neonatal jaundice compared to babies with normal birth weight. Hyperbilirubinemia that occurs in low birth weight babies is due to liver function that is still not perfect or there are disorders in liver function such as hypoxia, hypoglycemia, acidosis, and others.

According to researchers, hyperbilirubinemia that occurs in babies with LBW is because the baby's organs are still not perfect or the liver is not mature so that the conjugation and excretion of bilirubin are disrupted which causes icterus or hyperbilirubinemia in newborns.

CONCLUSION

Based on the results of the study, it was found that out of 40 respondents, the majority of gestational age was aterm as many as 25 respondents (65%), the majority of LBW were 22 respondents (55%), the majority were not hyperbilirubin as many as 26 respondents (65%). There was a significant relationship between gestational age and the incidence of hyperbilirubin, with a p value = 0.011. There was a significant relationship between LBW and the incidence of hyperbilirubin, with a p value = 0.000.

It is expected that pregnant women routinely check their pregnancy with a midwife or hospital.

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