



Relationship Of Gestational Age With Hyper Bilirubin Incidence In 3 Days Neonates At Dustira Cimahi Hospital

Oryza Tri Novita^{1*}

¹Bachelor of Midwifery, Institut Kesehatan Rajawali, Jl. Rajawali Barat No 78, Bandung, 40184

ARTICLE INFORMATION

Received: February 1, 2022
Revised: August 11, 2022
Available online: August 2022

KEYWORDS

Gestational Age, Hyper bilirubin.

CORRESPONDENCE

E-mail: oryza.trinovita@gmail.com

A B S T R A C T

One of the most typical clinical manifestations of the infant is hyperbilirubinemia. Jaundice sends more than 85% of term newborns back to the hospital within the first week of life. 60% of term newborns and 80% of preterm (less term) infants have hyperbilirubinemia. If hyper bilirubin is not appropriately treated, it can damage brain cells, cause seizures, and progress to kernicterus, even causing death. Even if the newborn gets kernicterus and recovers and can be passed, the baby can grow but not develop optimally and can even cause long-term effects such as mental impairment. This type of research is analytical research. This study was an observational study that related two variables: namely, the relationship between gestational age and the incidence of hyperbilirubinemia in neonates aged three days. The type of approach in this research is cross-sectional. Sampling was done using a purposive sampling technique with as many as 286 samples. The median gestational age for neonates with hyperbilirubinemia at Dustira Cimahi Hospital in 2021 was 36 weeks, still considered preterm, with a minimum gestational age of 30 weeks and a maximum of 43 weeks. The median bilirubin level in neonates with hyperbilirubinemia at Dustira Cimahi Hospital in 2021 was 10 mg/dL which was still classified as physiological hyper bilirubin, with a minimum level of 5.52 mg/dL and a maximum level of 16.03 mg/dL. There was a significant relationship between gestational age and the incidence of hyperbilirubinemia in neonates aged 3 days at Dustira Cimahi Hospital in 2021 with moderate strength and negative correlation direction.

INTRODUCTION

Hyperbilirubinemia is one of the most common clinical phenomena found in newborns. More than 85% of term infants return to the hospital for jaundice within the first week of life. Hyperbilirubinemia occurs in 80% of preterm (less term) infants and 60% of term (term) infants. This situation will cause the dominance of unconjugated bilirubin in the blood. In some infants, unconjugated bilirubin is a normal transition state, but in some infants, an excessive increase in bilirubin can potentially be toxic and cause death. Therefore, baby who experiences jaundice must be distinguished, whether physiologically or pathologically. The activity benefit for appropriate treatment can be given (Kosim *et al.*, 2014). Hyper bilirubin, if not appropriately treated, can damage brain cells, cause seizures, and develop into kernicterus, even causing death. If kernicterus can be passed, the baby can grow but not develop and can even cause long-term effects, namely mental retardation (mental retardation) (Indonesia, 2015).

In Indonesia, in 2009, there were 80,000 children with mental retardation, which increased until 2015 from 0.69% to 2.45% of the total number of children in Indonesia (Indonesia, 2017). According to the West Java Health Profile (2017), there were 5,215 children with mental retardation with various

etiologies. The biological factor is the cause of mental retardation in West Java (15%), one of which is kernicterus.

Inappropriate treatment in Hyperbilirubinemia neonates can lead to kernicterus. Kernicterus can harm the brain and cause long-term effects. The long-term effects include mental retardation (mental retardation), cerebral paralysis (abnormal muscle control, cerebral palsy), deafness and immobility of the eyes, and even death. This long-term effect can be prevented by fast and appropriate treatment so that it will not develop into kernicterus. Prevention can also be done from the antenatal period with antenatal monitoring and examination according to standards so that one of the factors causing hyperbilirubinemia, namely preterm labor, can be prevented. Dustira Cimahi Hospital is the most prominent type B referral hospital in the City and Regency of Bandung, so many referrals come both at the time of delivery and during the neonatal period. The incidence of hyperbilirubinemia in neonates at Dustira Hospital Cimahi has been relatively high for the last three years occupying the second position of the four most problems with sick babies. This study objective was to determine the relationship between gestational age and the incidence of hyperbilirubinemia in neonates aged three days at Dustira Cimahi Hospital.

METHOD

This type of research is analytical research. This observational study relates two variables: the relationship between gestational age and the incidence of hyperbilirubinemia in neonates aged three days. The type of approach in this research is cross-sectional. The independent variable in this study was gestational age. The dependent variable was the incidence of hyperbilirubinemia in neonates aged three days. Gestational age is a medical record regarding gestational age/gestational age at delivery calculated from the first day of the last menstruation (LMP). At the same time, bilirubin level is a medical record ng the results of laboratory examinations in infants aged three days with bilirubin levels >5 mg/dL.

The population in this study were all infants with hyperbilirubinemia with bilirubin levels of more than 5 mg/dL at Dustira Cimahi Hospital in 2021, with as many as 400 infants. The samples in this study were all infants aged three days with hyperbilirubinemia. Laboratory tests for bilirubin levels were carried out, with the results of bilirubin levels being more than 5 mg/dL at Dustira Cimahi Hospital in 2021, totaling 286 babies. The procedure of this study was taken from secondary data from medical records of neonates aged three days in the perinatology room of the Bandung City Hospital on November 1 to 5, 2021. The procedure was to take data from the patient's medical record, beginning with asking permission to conduct research at Dustira Cimahi Hospital and the medical record unit. Furthermore, an explanation of the aims and objectives of the stand ends with recording the measurement results on the research sheet form.

This study aims to describe the frequency distribution of gestational age and the incidence of hyperbilirubinemia in neonates aged three days at Dustira Cimahi Hospital in 2021. This study will describe numerically with a ratio scale. In this study, after the normality test, the data distribution was not normal, so the univariate analysis used was the median for the measure of concentration and the minimum maximum for the size of the spread. In this study, the statistical test used was the Spearman test because the normality test results showed that the data distribution was not normal.

RESULT

This section describes the study results at Dustira Cimahi Hospital in December 2021. This study identifies the relationship between gestational age and the incidence of hyperbilirubinemia. The sample was 286 neonates aged three days using a Cross-Sectional design and purposive sampling technique. After the data is processed and analyzed, the data can be presented as follows:

Univariate Analysis:

Table 1. Frequency Distribution of Gestational Age in Neonates with Hyperbilirubin at Dustira Cimahi Hospital in 2021

| | Median (Minimum-Maximum) |
|-----------------|--------------------------|
| Gestational Age | 36 (30-42) |

In the table above, it can be explained that the median gestational age of neonates with hyperbilirubinemia is 36 weeks, with a minimum age of 30 weeks and a maximum of 42 weeks.

Table 2. Frequency Distribution of Bilirubin Levels in Neonates with Hyperbilirubinemia at Dustira Cimahi Hospital in 2021

| | Median (Minimum-Maximum) |
|-----------------|--------------------------|
| Bilirubin Level | 10,00 (5,52-16,03) |

In the table above, it can be explained that the median bilirubin level of neonates with hyperbilirubinemia is 10 mg/dL with a minimum level of 5.52 mg/dL and a maximum level of 16.03 mg/dL. The result means that it is still classified into the physiological hyperbilirubin.

Bivariate Analysis:

Table 3. Results of the Spearman Correlation Analysis of the Relationship between Gestational Age and the Incidence of Hyper bilirubin

| | Hyper bilirubin |
|-----------------|--------------------------------------|
| Gestational Age | r = - 0,493 p= < 0,001 n = 286 |

Table 3 shows that the p-value < 0.001, which means that there is a significant correlation between gestational age and the incidence of hyperbilirubinemia. There is a relationship between gestational age with hyperbilirubinemia in neonates Then the r-value results mean the strength of the statistical correlation is 0.493. The r-value result means it has moderate strength, with a negative correlation

direction, which means that the more mature the gestational age, the lower the risk of hyperbilirubinemia. According to Dahlan (2016), if the p -value <0.05 , it has a significant correlation. Furthermore, if the value of r is at 0.4 to <0.6 , it means that it has a moderate correlation strength, and the direction of negative correlation means that the higher the variable A, the lower the variable B.

DISCUSSION

Gestation Age in Neonates with Hyper bilirubin 3 Days

This study result shows that the median gestational age in neonates with hyperbilirubinemia is 36 weeks or can be categorized as preterm, with a minimum gestational age of 30 weeks and a maximum gestational age of 42 weeks. According to Kosim *et al.* (2014), hyperbilirubinemia often occurs in 80% of preterm infants and 60% of term infants. This result follows Nelson (2012), theory that one of the factors that can cause hyperbilirubinemia is a factor that can reduce the number of enzymes, and which can increase the permeability of the brain barrier. Gestational age is one factor that affects the number of enzymes and the permeability of the brain barrier. Prematurity and immaturity can reduce the number of enzymes and increase brain barrier permeability. Hyperbilirubinemia in term infants occurs on days 2 to 4, and in premature infants occurs on days 3 to 7 (Rudolph and Hoffman, 2006).

Several previous studies corroborate this. In the research of Rai and Sharma (2018) in India, the results of babies born with gestational age <37 weeks to 38 weeks experiencing jaundice were 55.4%, while those born with gestational age 39-42 weeks were 33.1%. Anggraini research (2016) showed that out of 52 neonates with jaundice, 73.1% were born with preterm labor, and 26.9% were born with term gestational age.

In this case, the role and function of the midwife are in prevention efforts that can be carried out from the antenatal period to the neonatal period, including by carrying out good antenatal supervision, preventing preterm labor, and preventing hypoxia in the fetus and neonate.

Hyper bilirubin Incidence in Three Days Neonates.

Based on the results of data analysis, it can be explained that the median level of bilirubin in neonates with hyperbilirubinemia is 10 mg/dL with a minimum level of 5.52 mg/dL and a maximum level of 16.03 mg/dL. This result follows the theory of Fraser (2011) that hyperbilirubinemia, characterized by jaundice, will appear if the bilirubin level reaches 5-7 mg/dL, initially. According to Kosim *et al.* (2014). If not accompanied by abnormalities of bilirubin metabolism, an increase in bilirubin levels to 10-12 mg/dl is still within the physiological range. If the bilirubin level reaches > 12 mg/dl it is categorized as hyper bilirubin characterized by pathological jaundice. In addition, pathological jaundice appears for the first time in the first 24 hours and lasts 10-14 days, while physiological jaundice first appears on days 2-5.

In this case, midwife's role is to detect and differentiate between physiological and pathological jaundice based on the neonate's timing, clinical appearance, and behavior and to determine the appropriate management. With proper management, it can reduce mortality and morbidity in infants due to jaundice, as well as inform families of information about the event and its progress. In addition, the midwives' role in physiological jaundice management is to prevent infection. This prevention prevents pathological jaundice. The nurse should conduct health education regarding breastfeeding as early as possible and adequate, recommending mothers breastfeed their babies according to the baby's wishes or at least every 2 hours, recommending mothers dry the baby in the sun. Naked in the sun at 7-9 am for approximately 15-30 minutes, and recommends the mother to carry out good supervision, i.e., if the baby's jaundice does not go away in more than three days, it must immediately return to the health worker to have it checked.

Relationship of Gestation Age with Event of Hyper bilirubin in Three-Day Neonates at Dustira Cimahi Hospital In 2021

The Spearman correlation test showed that the p -value < 0.001 , which means that gestational age and the incidence of hyperbilirubinemia had a significant correlation. There was a relationship between gestational age and the incidence of hyperbilirubinemia in neonates. The r -value result is 0.493, which means it has moderate strength with a negative correlation direction. This statistical result means that the more mature the gestational age, the lower the risk of hyperbilirubinemia. According to Dahlan (2016), if the value of r is at 0.4 to <0.6 , it means that it has a moderate correlation strength, and the direction of negative correlation means that the higher the variable A, the lower the variable B. Furthermore, if the p -value <0.05 , it correlates. This result follows Nelson (2012) theory that one of the factors that can cause hyperbilirubinemia is a factor that can reduce the number of enzymes, and which can increase the permeability of the brain barrier. Gestational age is one factor that affects the number of enzymes and the permeability of the brain barrier. Prematurity and immaturity can decrease the number of enzymes and increase the brain barrier's permeability. Hyperbilirubinemia in term infants occurs on days 2 to 4, and in premature infants occurs on days 3 to 7 (Rudolph and Hoffman, 2006). It is corroborated by the theory of Kosim *et al.* (2014), which says that hyperbilirubinemia often occurs in 80% of preterm infants and 60% of term infants.

Several previous studies corroborate this. Ratuain *et al.* (2015) study regarding the relationship between gestational age and the incidence of neonatal jaundice in Wates Hospital 2013 showed that there was a relationship between gestational period and the incidence of neonatal jaundice had the relationship between gestational age and the incidence of neonatal jaundice or hyperbilirubinemia. Moreover, the study results showed that the incidence of jaundice in premature infants was 59.1%, and infants were 40.9% in a term. Rahmy (2014) regarding the relationship between infant maturity or gestational age and the incidence of hyperbilirubinemia also showed a significant relationship, and the results of this study

showed that 15.2% of preterm infants had jaundice and 24.2% of term infants. Another study that showed that gestational age was associated with jaundice was conducted by Faiqah (2018) with the results of babies experiencing jaundice with a gestational age of 37 weeks and a gestational age of < 37 weeks of 33.3%. Anggraini research (2016) showed that out of 52 neonates with jaundice, 73.1% were born with preterm labor, and 26.9% were born with term gestational age. In the research of Rai and Sharma (2018) in India, the results of babies born with gestational age <37 weeks to 38 weeks experiencing jaundice were 55.4%, while those born with gestational age 39-42 weeks were 33.1%. In addition to several studies on gestational age with jaundice, research conducted by Rohani and Wahyuni (2017), Anggraini (2016) regarding factors related to the incidence of jaundice in neonates found that 50% of the factors The most related to the incidence of jaundice is gestational age.

CONCLUSION

It can be concluded that the median bilirubin level in neonates experiencing hyperbilirubinemia at Dustira Cimahi Hospital in 2021 is 10 mg/dL, which is still classified as physiological hyper bilirubin, with a minimum level of 5.52 mg/dL and a maximum level of 16.03 mg/dL. Based on the results of the Spearman correlation test, it was found that there was a significant relationship between gestational age and the incidence of hyperbilirubinemia in neonates aged 3 days at Dustira Cimahi Hospital in 2021 with moderate strength and negative correlation direction. For further researchers, it is recommended to develop this research, by examining other factors that affect hyperbilirubinemia in neonates. In this study, the results of the correlation were moderate. This may be due to the presence of multifactorial factors that affect hyper bilirubin in addition to gestational age.

REFERENCES

- Anggraini, Y. (2016) 'Hubungan Antara Persalinan Prematur Dengan Hiperbilirubin Pada Neonatus', *Jurnal kesehatan*, 5(2).
- Faiqah, S. (2018) 'Hubungan Usia Gestasi dan Jenis Persalinan Dengan Kadar Bilirubinemia Pada Bayi Ikterus di RSUP NTB', *Jurnal Kesehatan Prima*, 8(2), pp. 1355–1362.
- Indonesia, I.D.A. (2015) 'Mengenal keterlambatan perkembangan umum pada anak'. Diakses.
- Indonesia, K.K.R. (2017) *Profil kesehatan Kota Bandung tahun 2017*. Jakarta: Kemenkes RI.
- Kosim, M.S. *et al.* (2014) 'Buku Ajar Neonatologi Edisi Pertama', *Jakarta: Badan Penerbit IDAI* [Preprint].
- Nelson, E.W. (2012) 'Ilmu Kesehatan Anak (Volume 2. Edisi 15)', *Editor, Berhman, ER, at all. Editor edisi bahasa indonesia, Wahab, SA EGC: Jakarta* [Preprint].
- Rahmy, D.A. (2014) 'Hubungan Maturitas Bayi Dengan Kejadian Ikterus Neonatorum Fisiologis Di Ruang Gayatri RSU Dr. Wahidin Sudiro Husodo Mojokerto'. Laporan Penelitian, Mei.
- Rai R, Sharma D, P.R. (2018) 'Correlation of neonatal hyperbilirubinemia by clinical assessment, total

serum bilirubin and transcutaneous bilirubin among healthy neonates’, *Journal of neonatal and pediatric medicine*, 4(167), pp. 1–3.

Ratuain, M.O., Wahyuningsih, H.P. and Purnamaningrum, Y.E. (2015) ‘Hubungan antara masa gestasi dengan kejadian ikterus neonatorum’, *Jurnal Kesehatan Ibu dan Anak*, 7(1), pp. 51–54.

Rohani, S. and Wahyuni, R. (2017) ‘Faktor-faktor yang berhubungan dengan kejadian ikterus pada neonatus’, *Jurnal Aisyah: Jurnal Ilmu Kesehatan*, 2(1), pp. 75–80.

Rudolph, A.M. and Hoffman, J.I.E. (2006) ‘Buku ajar pediatri rudolph’, *Jakarta: EGC*, pp. 3–4.