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**Relationship Between Adequacy of Breastfeeding and The Incidence of Neonatal** **Jaundice in The NICU at Darus Syifa’ Islamic Hospital Surabaya**

Yuanita Syaiful1Icon

Description automatically generated , Lilis Fatmawati \*2Icon

Description automatically generated , Sumiyati3Icon

Description automatically generated

*1 Nursing Study Program, Faculty of Health, Universitas Gresik, Gresik, Indonesia*

*2 Nursing Science Study Program, Faculty of Health Sciences, Universitas Gresik, Gresik, Indonesia*

*3 Nursing Science Study Program, Faculty of Health Sciences, Universitas Gresik, Gresik, Indonesia*

\*Corresponding Author: lilisfatmawati13@gmail.com

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| **ARTICLE INFO** |  | **ABSTRACT** |
| **Article history:**  Received  Revised  Accepted  Available online xxx  E-ISSN: 2685-7162 | *Inappropriate early breastfeeding is associated with reduced caloric intake and increased bilirubin serum occurs due to lack of caloric intake to increase enterohepatic circulation. Early breastfeeding for neonates can reduce the occurrence of jaundice. This study aimed to determine the relationship between adequacy breastfeeding and the incidence of neonatal jaundice at the Darus Shifa Islamic Hospital Surabaya. This study used an analytical research design with a cross-sectional approach. Using purposive sampling method. The population of this study was 35 respondents. The sample in this study was 32 respondents and there were 2 variables. The dependent variable was the adequacy of breastfeeding using an instrument on an observation sheet and the independent variable was the incidence of jaundice using instrument a checklist. Data analysis used Spearman rho. The results of the statistical analysis test used the Spearman rho statistic test with the help of SPSS obtained a significance value of p = 000 which means there is a relationship between the adequacy of breastfeeding and the incidence of neonatal jaundice r =0,912 the means that it has a very strong correlation between the adequacy of breastfeeding and the incidence neonatal jaundice. Adequacy breastfeeding is one way to prevent neonatal jaundice with the support of professional health workers' information to mothers about breastfeeding and benefits, thereby affecting the continuity of mothers in breastfeeding so that babies do not experience neonatal jaundice.*  **Keyword:** ASI, neonatal jaundice |
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| **ABSTRAK** |
| Pemberian ASI awal yang tidak sesuai dikaitkan dengan pengurangan asupan kalori dan meningkatnya bilirubin serum terjadi oleh karena kurangnya asupan kalori sehingga dapat meningkatkan sirkulasi enterohepatik. Pemberian ASI secara dini pada neonatus dapat mengurangi terjadinya ikterus.Tujuan penelitian untuk mengetahui Hubungan Kecukupan Pemberian ASI Dengan Kejadian Ikterus Neonatorum di RSI Darus Syifa’ Surabaya. Penelitian ini menggunakan desain penelitian analitik dengan pendekatan crosssectional menggunakan metode purposive sampling Populasi penelitian ini adalah 35 responden, sampel pada penelitian ini sebanyak sebanyak 32 responden dan pada penelitian ini ada 2 variabel. Pada variabel dependen adalah kecukupan pemberian ASI menggunakan lembar observasi dan variabel independen adalah kejadian ikterus menggunakan lembar ceklist. Analisa data menggunakan uji spearman rho.Hasil uji analisis statistik dengan menggunakan uji statistik spearman rhodengan bantuan SPSS didapatkan nilai signifikasi p =0,00 yang artinya ada hubungan kecukupan pemberian ASI dengan kejadian ikterus neonatorum r =0,912 berarti mempunyai korelasi sangat kuat antara variabel kecukupan pemberian ASI dengan kejadian ikterus neonatorum. Kecukupan pemberian ASI adalah salah satu cara untuk mencegah terjadinya ikterus neonatorum dengan dukungan petugas kesehatan yang professional untuk memberikan informasi kepada ibu tentang ASI dan manfaatnya, sehingga mempengaruhi kontinuitas ibu dalam memberikan ASI agar bayi tidak mengalami ikterus neonatorum.  **Keyword:**ASI, Ikterus |
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**1. Introduction**

Jaundice is a condition that often occurs in neonates. One of the causes of mortality in newborns is bilirubin encephalopathy which is the most severe complication of neonatal jaundice. Neonatal jaundice is one of the causes of neonatal death (Okta, 2014). Neonatal jaundice is a clinical condition in newborns which is characterized by yellow staining of the skin and sclera due to excessive accumulation of unconjugated bilirubin. Clinical jaundice will begin to appear in newborns when the blood bilirubin level is 5-7 mg/dl (F.B. Monika, 2014). The causes of increased levels of bilirubin in the blood are hemolysis, rhesus disease, ABO incompatibility, G6PD deficiency, breastfeeding, gestational age, birth weight, and asphyxia (Rahmawati, 2013). Based on the World Health Organization (WHO) Maternal Mortality Rate (AKI) globally which is the Infant Mortality Rate 19 per 1000 KH. This figure is still quite far from the SDGs (Sustainable Development Goals) target which is targeted in 2030, namely IMR 12 per 1000 live births (WHO, 2017).

The results of the 2015 Ministry of Health report that the causes of death for newborns 0–6 days in Indonesia were respiratory disorders 36.9%, prematurity 32.4%, sepsis 12%, hypothermia 6.8%, blood disorders/icterus 6.6%, etc. Various causes of the high Infant Mortality Rate (IMR) in Indonesia, 6.6% of them are the result of jaundice which has the potential to become bilirubin encephalopathy (better known as Kern Jaundice). Indonesia is now ranked fifth in the country with the highest infant mortality rate in the world. One of the highest causes of infant mortality in Indonesia is due to jaundice, which is 660,000 per year and the estimated incidence is 230,000 new cases per year. The number of deaths due to jaundice in infants is 61,000 deaths per year (Kemenkes, 2016). In Indonesia, according to data from one hospital, namely in RSUD. Dr. Soetomo showed an increase in the incidence of neonatal jaundice, in 2012 there were 380 cases, in 2013 there were 392 cases of neonatal jaundice, and in 2018, there were 395 cases of neonatal jaundice. Newborns (BBLareis about 50% in term infants and 75% in preterm infants (LBW). It is evident from the data obtained at RSUD Ibnu Sina Gresik in 2018 that from 417 babies born, 151 babies (34%) had weight lightweight. Of the 151 LBW, 86 babies (57%) had jaundice. The incidence of jaundice in Dr. Sarjito Hospital is around 23.8% of cases, and Dr. Soetomo's Hospital is 13% and 30% (N, 2018).

The results of a preliminary study was carried out at Darus Syifa' RSI Surabaya in March-May 2021 55 babies were treated and 40 babies were treated in the NICU with neonatal jaundice. Observations showed an increase in the incidence of neonatal jaundice from the observations that the average rate occurred with pathological mothers giving birth, the separation of care in postpartum pathology cases was a trigger for disruption of adequate breastfeeding for infants. And infants with pathological conditions requiring treatment in the NICU also experienced problems. in the adequacy of breastfeeding. Jaundice risk factors are divided into 3 factors, namely, maternal factors that including race, pregnancy complications (DM, ABO, and Rh incompatibility), use of oxytocin infusion in a hypotonic solution, and breast milk. Perinatal factors include birth trauma (cephalhematoma, ecchymosis), and infection (bacteria, viruses, protozoa). Neonatal factors consist of prematurity, genetic factors, polycythemia, drugs, low milk intake, hypoglycemia, and hypoalbuminemia. In most cases, the level of bilirubin that causes jaundice is harmless and does not require treatment, but also pathological jaundice, which is jaundice that occurs when the total bilirubin level exceeds 12 mg/dl, if not treated properly it will cause dangerous complications because bilirubin can accumulate in the brain. which is called kernicterus (Ira, M. S. & Dasnur, 2018).

Early breastfeeding in neonates can reduce the occurrence of physiological jaundice. There is an urge to move the intestines and accelerate the expulsion of meconium so that enterohepatic bilirubin is reduced. This is caused by the inhibition of uridine diphosphate glucuronic acid glucuronosyltransferase by the product of progesterone metabolism, namely pregnan-3-alpha 20 beta-diol which is found in breast milk (IDAI, 2013). One of the factors that cause jaundice in newborns is the function of the intestines and liver that have not worked perfectly so that a lot of unconjugated bilirubin is not wasted from the body. In addition, jaundice can occur due to a lack of milk in the first 2-3 days after birth (D, S, 2016). One way to expel meconium more quickly is through breastfeeding. Ideally, the frequency of breastfeeding is 8 to 12 times a day, so that the frequency of defecation in infants will be more than 4 times a day. Giving of breast milk (ASI) is very important for optimal growth and development both physically and mentally and baby's intelligence. Therefore, breastfeeding needs to get the attention of mothers and health workers so that the breastfeeding process can be carried out properly. In addition, breastfeeding can reduce the risk of infant mortality. Babies who are breastfed have a 25 times lower chance of dying in the first month of birth compared to babies who are fed other than breast milk. Babies also will avoid the risk of ear infections, food allergies, anemia, and obesity in the future (Sukadi, 2015). Research conducted by Nurlatifah N. Yusuf (2020) entitled the relationship between the Frequency of Breastfeeding and the Incidence of jaundice neonatorum at the NTB Provincial General Hospital 2020 results of the study the higher the frequency of breastfeeding in new babies birth, the lower the risk of jaundice. One of the recommended primary treatments for jaundice is early initiation of breastfeeding (IMD) (Prasetyono, 2012). One way to get meconium out Faster is through breastfeeding. Ideally the frequency of breastfeeding is 8 to 12 times every day, so the frequency of defecation on baby will be more than 4 times a day. Giving milk mother (ASI) is very important for the growth and development of optimal both physically and mentally and baby's intelligence. Therefore, breastfeeding is necessary attention of mothers and health workers so that the process breastfeeding can be carried out properly. Besides that, Breastfeeding can reduce the risk of death baby. Babies who are breastfed have 25 times the chance lower to die in months first birth compared to babies who given in addition to breast milk. The baby will also be spared from the risk ear infections, food allergies, anemia, and obesity in future (Yusuf, 2021).

Giving Breast Milk (ASI) immediately after birth or commonly called IMD and exclusive breastfeeding is one of the actions that are relatively inexpensive and easy to implement by the government to improve the health and survival of newborns. This is supported by the statement of the United Nations Childrens Fund (UNICEF), that as many as 30,000 infant deaths in Indonesia and 10 million deaths of children under five in the world each year, can be prevented through exclusive breastfeeding for six months from the date of birth, without having to provide food. as well as additional drinks for babies. Colostrum will make a lining that protects the intestines of babies who are still immature at once mature intestinal wall. Bilirubin will faster normal and issue meconium faster, so reducing the incidence of neonatal jaundice born (Ira, M. S. & Dasnur, 2018).

**2. Method**

The research design used analytically with the cross-sectional method. The population is babies who are cared for in the NICU Room of RSI Darus Syifa' Surabaya as many as 35 neonates for 2 months. The sample used was some infants aged 0-14 days who were treated in the NICU room of RSI Darus Syifa Surabaya as many as 32 neonates by non-probability sampling, namely, purposive sampling with inclusion criteria: 1) Infants aged 0-14 days, 2) Infants who received Breastfeeding, 3) Babies with gestational age 35 -40 weeks, 4) Infants with BBL 2000 –4000 g, 5) Infants with physiological jaundice is It starts to appear on the 2nd or 3rd day after the baby is born. indirect bilirubin level does not exceed 12 mg/dL and in premature infants the level is 10 mg/dL, 6) Infants with hospitalization days 1-14 days, 7) babies with a diagnosis of physiological jaundice, 8) babies who receive breast milk directly from the mother and pacifier milk.

The operational definition of ASI adequacy is assessing the adequacy of Breastfeeding baby signs enough breast milk (Azzahida, 2015): 1. Babies drink breast milk every 2-3 hours or in 24 hours minimum 8 times; 2. Baby urinating 6-8 times/ day (20-40 cc); 3. Urine is clear; 4. The baby poops large 2-5 times/day with a good score: 76%-100% Enough:56%-75% Not enough <56% (Sugiyono, 2016).

The independent variable is the adequacy of breastfeeding which is measured using an observation sheet in the form of a checklist of signs of the adequacy of breastfeeding, quoted from Dr. Taufiqa. This study using an observation sheet with 4 statements. That includes: 1. Drink breast milk at least 8 times in 24 hours; 2. BAK > 6 times/day; 3. Urine is clear yellow; 4. CHAPTER 2-5 times/day with the rating YES = 1, No = 0 Then add up using the criteria: Score 76% - 100%: Good, Score 56% - 76%: Enough, Score < 56%, Less. The instrument has been tested for reliability and validity.

The dependent variable was the incidence of neonatal jaundice which was measured using an observation sheet in the form of a checklist of laboratory results for blood bilirubin levels with a checklist assessment, namely Jaundice if Bilirubin > 5 mg/dl = 1, No jaundice if Bilirubin 5 mg/dl = 2. This study was conducted by assessing signs of the adequacy of breastfeeding for 24 hours. How to assess the adequacy of breast milk in infants, namely weight gain of more than 500 grams in a month and has exceeded birth weight at 2 weeks of age.

This research of the statistical test is Spearman's Rank. The level of significance used is 0.05 and the confidence interval is 95%. The test provisions of the Spearman hypothesis test are reported to be Ho rejected if the p-value < 0.05.

**3. Result and Discussion**

Table 1. Distribution of Respondent Characteristics

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| --- | --- | --- |
| **Category** | **Frequency** | **Percentage (%)** |
| **Age**  1 day  2 day  3 day  4 day  5 day  6 day  10 day  14 day | 1  8  13  3  3  1  2  1 | 3.1  25  40.6  9.4  9.4  3.1  6.3  3.1 |
| **Birth Weight**  Low < 2500 gr  Enough 2500 – 4000 gr | 2  30 | 6.3  93.75 |
| **Gender**  Boy  Girls | 15  17 | 46.9  53.1 |
| **Gestational Age**  < 37 week  37- 40 week  >40 week | 10  21  1 | 31.3  65.63  3.1 |

Based on Table 1 it can be seen that of the 32 respondents, it was found that the majority of respondents were 3 days old as many as 13 respondents (40.6%), most of the respondents were in the category of birth weight 2500 – 4000 grams of 30 respondents (93.75%), most were female as many as 17 respondents (53.1%), with a gestational age of 37-40 weeks as many as 21 babies (65.63%).

Table 2. Frequency Distribution of Adequacy of Breastfeeding and The Incidence of Jaundice in Infants

|  |  |  |
| --- | --- | --- |
| **Category** | **Frequency** | **Percentage (%)** |
| **Breastfeeding**  Well  Enough  Not Enough | 19  1  12 | 59.4  3.1  37.5 |
| **Jaundice Incidence**  No jaundice  Jaundice | 20  12 | 62.5  37.5 |

Table 2 shows that the adequacy of breastfeeding from 32 respondents was mostly in the Good category, namely 19 respondents (59.4%) and did not experience jaundice as many as 20 respondents (62.5%).

Table 3. The Relationship Between The Adequacy of Breastfeeding and The Incidence of Infant Jaundice

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Breastfeeding** | **Jaundice Incidence** | | | | **Total** | |
| **No jaundice** | | **Jaundice** | |
| **N** | **%** | **N** | **%** | **N** | **%** |
| Good  Enough  Not Good | 0  0  12 | 0  0  37.5 | 19  1  0 | 62.5  3.1  0 | 19  1  12 | 62.5  3.1  37.5 |
| **Total** | **12** | | **20** | | **32** | **100** |
| *Spearman Rho p = 0,00 r = 0,912* | | | | | | |

From Table 3 the results of the cross-tabulation can be seen that respondents who stated the adequacy of breastfeeding in the good category 19 (62.5%) respondents did not experience jaundice. From the results of the SPSS analysis test using the Spearman rho correlation statistical test, it was known that the significance value or sig. (2-tailed) was 0.000, because the sig. (2-tailed) 0.000 < 0.05 or 0.01, it means that there is a significant (mean) relationship between the variable of breastfeeding adequacy and the incidence of jaundice. while r correlation = 0.912\*\*, which means that the level of strength of the relationship (correlation) between the adequacy of breastfeeding and the incidence of neonatal jaundice is 0.912 or very strong. The correlation coefficient in the variable above is positive, namely, 0.912 so the relationship between the two variables is unidirectional (type of unidirectional relationship), thus it can be concluded that the better the adequacy of breastfeeding, the baby does not have jaundice.

The results of the cross-tabulation can be seen that the respondents who stated the adequacy of breastfeeding were in the good category 19 (59.37%) respondents, the sufficient category was 1 (3.1%) respondents showed that the baby did not experience jaundice as many as 20 respondents (62.5%) while the category the adequacy of breastfeeding is less than 12 (37.5%).

In this study, there were 19 respondents in the adequacy of breastfeeding in the good category. Breast milk is the best food sources for babies, because it containing sufficient composition as nutrition for babies. Breast milk also can increase and strengthen the bond of love between mother and baby, besides that increase immunity for the baby itself. The amount of bilirubin in the baby's blood decreases a lot as colostrum is given which can overcome the deficiency, as long as the baby is given enough milk and is not given a breast milk substitute. The composition contained in breast milk will change according to the needs of the baby at any time, namely colostrum (early breast milk). On the fourth to seventh day followed by transitional milk from the third week to the fourth week, then mature milk, the milk that comes out of the beginning of breastfeeding (foremilk = early milk) is different from the milk that comes out at the end of breastfeeding (hindmilk = late milk).

This is because adequate breastfeeding will increase intestinal motility and cause bacteria to be introduced into the intestine. These bacteria can convert direct bilirubin into urobilin which cannot be reabsorbed so that bilirubin levels will decrease so that when bilirubin decreases, the degree of jaundice will decrease (Prasetyono, 2012). Control the level of bilirubin in newborns can be done drinking as early as possible with adequate amounts of fluids and calories. Feeding as early as possible will be improve intestinal motility as well cause bacterial introduction to the intestine. Bacteria can change direct bilirubin non-absorbable urobilin return. Accordingly, the level of bilirubin serum will drop. Giving a drink enough to help fulfillment glucose requirements in neonates (Yuliana et al., 2018).

In this study, there were 12 respondents whose breastfeeding adequacy was in the less category. Infants who receive adequate breastfeeding have the 3.0 times greater chance of developing neonatal jaundice compared to infants who receive adequate breastfeeding babies who get inadequate milk tend to experience neonatal jaundice. In addition, the other factors that influence the incidence of jaundice are maternal factors that caused neonates who experience jaundice, are mostly born at term gestational age because babies born at term have a risk of jaundice neonatorum reaches 60% (Okta, 2014). Breast milk is produced by mothers who gave birth prematurely / fewer months the composition contained in breast milk is different from breast milk produced by mothers giving birth at term. In addition, breast milk also contains protective substances that can protect babies from various infectious diseases (Raharjo Kukuh, 2012). The results of this study are what was done by (Ira, M. S. & Dasnur, 2018) entitled the relationship between Breastfeeding and the Incidence of neonatal jaundice in Infants at Assalam Gemolong General Hospital. The results of the statistical test relationship between breastfeeding and the incidence of neonatal jaundice at RSU Assalam Gemolong, the result of count is 4.713, the p-value is 0.030 where the p-value obtained from the calculation is significant or there is a relationship between breastfeeding and the incidence of neonatal jaundice at RSU Assalam Gemolong. One of the causes of jaundice is inadequate breastfeeding for infants. This theory is in line with research conducted by (A. & Rahmawati, D., 2017) with the title of the relationship between the frequency of breastfeeding and the incidence of neonatal jaundice at the NTB Provincial General Hospital in 2020 with the results of the study that the higher the frequency of breastfeeding for newborns, the higher the risk of breastfeeding less jaundice. This research is in accordance with the research (Nurmayani et al., 2023) the pattern of breastfeeding with full breastfeeding mostly did not experience jaundice as many as 31 (47.7%), whereas partial feeding was given as many as 11 (16.9%), with a significant value (p = 0.004). Other studies conducted (Fortuna et al., 2018) the results showed almost half the sample, namely 45% received first breast milk at 1-6 hours, 40% given first breast milk at 6 hours. Mostly 77.5% were not jaundiced, 2.5% had jaundice I, 12.5% had jaundice II and 7.5% had third degree jaundice. The result of statistical test obtained p value=0.004.

Based on the results of the analysis and discussion, it can be concluded that: The adequacy of breastfeeding for infants who are cared for in the NICU room at RSI Darus Syifa Surabaya is mostly in the good category as many as 19 respondents (59.37%) and infants who do not experience jaundice as many as 20 respondents (62, 5%). There is a relationship between breastfeeding and the incidence of neonatal jaundice at RSI Darus Syifa Surabaya. This shows the role of midwives and breastfeeding counselors in providing IEC during pregnancy and breastfeeding, breastfeeding practices include the position of the breast attachment, implementation of IMD in newborns without complications, and breastfeeding immediately after the baby is born, all of which can support the frequency of breastfeeding and reduce the incidence of neonatal jaundice (Mayestika & Hasmira, 2021). Research from (Feny Fenesia Ridson et al., 2022) results showed eating 22 habits (p=0.000) exclusive breastfeeding (p=0.000), there is a significant difference in the degree of jaundice between babies who are breastfed and those who are fed formula. Breast milk-induced jaundice is the unconjugated hyperbilirubinemia reaches its peak late (usually by day 6-14). Distinguishable from other causes with reduced levels rapid bilirubin when substituted with formula milk for 1-2 days. it is for differentiate jaundice in breastfed infants. Breastfeeding during the first week of life. Some of the ingredients contained in Breast milk (beta glucuronidase) will break down bilirubin into a water-soluble form fat, so the indirect bilirubin will be increases, and then will be resorbed by intestines. Babies who are breastfed when compared to babies who got Formula milk has high levels of bilirubin higher relates to decreased intake on several days irst life. The treatment is not by stopping breastfeeding but by increasing the frequency gift (M. Nur et al., 2021).

**4. Conclusion**

There is a relationship between the adequacy of breastfeeding and the incidence of jaundice. The results of this study can increase knowledge and information about the incidence of jaundice in infants given breast milk properly, so it can prevent the occurrence of neonatal jaundice. It is necessary to research other factors that can affect the incidence of jaundice such as Infant factors (LBW, 2500 gr, hemolysis, asphyxia), maternal factors (term pregnancy, multipara, mothers giving birth at a young age of 29-35 years, delivery interval > 2 years), born normally/spontaneously, other factors (hypoxia, dehydration, hypoglycemia, polycythemia) with other variables.

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**6. Conflict of Interest**

The authors declare that there is no conflict of interest

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