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BREASTFEEDING AND *BABY FIELD MASSAGE* LOWER TOTAL BILIRUBIN IN NEWBORNS

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Abstract

Neonates are newborns aged 0-28 days. One of the causes of neonatal death is caused by jaundice. The therapy applied is breastfeeding. One of the non-pharmacological approaches is baby field massage. This study aims to determine the effect of breastfeeding and baby field massage on the decrease in newborns' total bilirubin. Quantitative research with quasi-experimental design and one group pre and post-test design. The location of this research was carried out in the Perinatology Room from October to December. Infant bilirubin data is collected using secondary data, namely medical records. With breastfeeding and baby field interventions. Data analysis aims to describe the data being studied. With the Wilcoxone test type. Using a purposive sampling technique with a sample of 31 respondents with inclusion criteria: Babies born at full term on the 3rd to 28th day, jaundiced babies receive phototherapy, babies are given breast milk, Babies are given infant massage techniques. Exclusion criteria: Babies born under the moon, Babies born prematurely, Low birth weight, Very low birth weight of extra babies. The difference in total bilirubin levels before and after the intervention decreased with a significance value of p-0.000 less than 0.05. There is a significant difference in breastfeeding and baby field massage to lower total bilirubin in newborns Always support optimal breastfeeding for newborns and correctly learn baby field massage techniques.

I. INTRODUCTION

Neonates are newborns who are 0-28 days old. Babies who have just undergone the birth process must adjust from intra-uterine to extra-uterine life (Ministry of Health, 2023). Newborns are said to be normal when babies have characteristics such as spontaneous crying, reddish-red skin color, and active muscle tone. According to UNICEF, the normal newborn birth rate in the world in 2020 is 13,020 babies to be born and babies from Indonesia will account for around 3.32% of the total 392,078 'new year' babies. Based on the Sustainable Development Goals (SDGs), the third goal regarding health and welfare, the neonatal mortality rate in Indonesia in 2020 was 24 per 1000 lives (Chairunisa & Widya Juliarti, 2022). One of the causes of neonatal death is caused by jaundice, with a mortality rate of 2.6%, and occurs at the age of 7-28 days. Jaundice is included in the list of neonatal diseases that can cause disability/death, along with tetanus neonatorum, sepsis, and birth trauma (Basic Health Research, 2017). Infant mortality is influenced by many factors, one of the causes of which is blood disorders (hyperbilirubinemia)

Icteric is a problem that often arises in neonates and occurs due to excessive accumulation of bilirubin in the blood and tissues. The incidence of neonatal jaundice in Indonesia reaches 50% in full-term infants and 58% in premature or premature infants. (Pratiwi & Supliyani, 2023). According to the WHO (World Health Organization),

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hyperbilirubinemia is a condition in which yellow color appears on the skin and eye membranes in newborns due to the presence of bilirubin (bile pigment) on the skin and eye membranes as a result of increased bilirubin levels in the blood (Suradi, R., 2018). Bilirubin is the main product of the reticuloendothelial system's breakdown of red blood cells.

Complications of hyperbilirubinemia will have an impact on the quality of the baby's growth and development in the later stages. These pathological conditions require proper management of hyperbilirubinemia. Therapies that are often recommended for hyperbilirubinemia conditions are phototherapy and fluid management, in this case, breastfeeding (Sardjito, 2022). To control bilirubin levels in newborns, breastfeeding can be carried out as early as possible. Administration of colostrum may reduce the incidence of physiological hyperbilirubin. This effectiveness includes the correct frequency, duration, and procedures for breastfeeding. (Pratiwi & Supliyani, 2023)

Breastfeeding babies is recommended every 2-3 hours or 8-12 times daily for the first few days. The study (Indanah et al., 2019) showed that the average decrease in bilirubin in babies who were given breast milk every 2 hours was 7.17 mg/dl. In infants who are given breast milk every 3 hours, the average decrease in infant bilirubin levels is 7.01 mg/dl, This shows that breastfeeding every 2 hours is effective in reducing bilirubin levels in infants with hyperbilirubinemia with a p-value of 0.000 (α: 0.05) The results of a study conducted by Setiawati et al., (2023) show that total bilirubin levels after phototherapy and breast milk management have decreased by an average of 6.076 mg/dl with a significance level of 5% (p-value=0.05). Phototherapy and periodic breastfeeding within 24 hours can effectively lower infant serum bilirubin levels.

In addition, several studies have also explored the use of massage therapy in infants as one of the non-pharmacological approaches to reduce serum bilirubin levels. Massage therapy in infants, such as *baby field massage*, has been thought to positively improve blood circulation, stimulate liver function, and facilitate excessive bilirubin excretion from the body. *According to several recent studies, baby massage* is a complementary therapy that is thought to increase the baby's bilirubin excretion during phototherapy. *Accorded massage* has many benefits, including increasing weight, increasing calorie intake, increasing vagal activity, increasing gastric motility, improving the immune system, sleep, lowering bilirubin levels, and shortening hospital stays (Nisa & Sayekti, 2024)

Based on data from PKU Muhamadiyah Banjarnegara Hospital, the number of babies who received phototherapy was 332 in 2022. In 2023, the number of babies receiving phototherapy is 381, which shows an increase, so the study conducted an intervention on reducing bilirubin by breastfeeding and *baby field massage*. Therefore, nurses, as an integral part of the client's care team, must find solutions to address these problems.

This study aims to analyze the effect of breastfeeding and *baby field massage* on the decrease in total bilirubin in newborns in the perinatology room of PKU Muhammadiyah Hospital Banjarnegara.

II. RESEARCH METHODS

This study uses a quantitative research method with a quasi-experimental design and one *group pre* and *post-test design research types.* Before being given breast milk and *baby field massage*, one group was first measured total bilirubin, then given breast milk and *baby field massage*, after which total bilirubin was measured again. The location of the research at RSU PKU Muhammadiyah Banjarnegara, the perinatology room, the research time is from October to December 2024

The population in this study was infants diagnosed with hyperbilirubin. This sampling technique is purposive sampling, namely, the population whose inclusion criteria are a

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sample of 31 respondents with inclusion criteria:

a. Full-term babies from days 3 to 28
b. Jaundice babies who get phototherapy
c. Breastfed babies
d. Babies who are given baby massage techniques

The data collection technique was carried out using secondary data, namely medical records at the PKU Muhammadiyah General Hospital Banjarnegara. Data on babies who receive breastfeeding and *Baby field massage*. Breastfeeding intervention is given to babies every 2-3 hours; breast milk is accommodated and then given through a pacifier, pipette, syringe, or orogastric tube. For the baby, *field massage intervention* is done before bathing. Frequency of massage: 1 time for < 10 minutes placed in the infant warmer during massage

Univariate analyses in this study were age, gender, weight, total bilirubin, breastfeeding, and baby field massage. The data is presented in the form of a frequency distribution table that describes each data.

This analysis was carried out to determine the relationship or correlation between two variables. This bivariate analysis was used to identify the effect of breastfeeding and baby field massage on total bilirubin reduction. The data is tested for data normality first to determine whether the distributed data is normal. The basis for decision-making in the normality test of Shapiro-Wilk and Kolmogorov. Smirnov: If the Sig value is >0.05, the data is normally distributed, and if the Sig.< value is 0.05, then the data is not normally distributed. This study uses the Wilcoxon Test, which has gone through an ethical review process conducted by the Health Research Ethics Committee of the University of Muhammadiyah Kudus with Number 123/Z-7/KEP/UMKU/1/2025.

III. RESULTS AND DISCUSSION

A. Result

Characteristics Respondent

The characteristics of the respondents in this study include the age of the baby in days (hr), weight (grams), and gender.

Table 1 Characteristics of Respondents

Characteristic	F	Min	Max	Average	Median	%
Baby's age	31	3 days	18 days	8 days	8 days	-
Baby weight	31	2540 gram	4200 gram	3062,9 gram	3030 gram	-
Gender						
Woman	11	-	-	-	-	35,48%
Man	20	-	-	-	-	64,52%

Table 1 shows that the average age of respondents who receive breastfeeding and baby field massages is 8 days, the youngest is 3 days, and the oldest is 18 days. The average weight of the respondents was 3062.90 grams, with the lowest weight of 2540 grams and the highest weight of 4200 grams. The total number of respondents was 31, with the largest number being men, with 20 (64.52%) respondents and 11 (35.48%) women.

Total Bilirubin Levels Before and After Breastfeeding and *Fiels Massage Pigs*

Table 1 Total Bilirubin Levels Before and After Breastfeeding and *Baby Field Massage*

Variable	Before (mg/dL)	After (mg/dL)
Average	15,61	7,38
SD	3,69	1,71

Table 2 shows the total bilirubin value before breastfeeding and *baby field massage* averaged 15.61 mg/dL. After breastfeeding and *baby field massage, the total bilirubin value* averaged 7.38 mg/Dl.

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Influence Results

Normality Test

Table 2 Normality Test

Variable	Kolmogorov-Smirnov			Shapiro-wilk		
	statistic	df	Mr	statistic	df	Mr
Before the intervention	.157	31	.051	.944	31	.107
Intervention	.131	31	.187	.929	31	.042

This study conducted a Shapiro-Wilk normality test because the number of samples in this study was < 50 respondents. Based on Table 3, for the data before the intervention was carried out, the significance value p = .107 (p >0.05), so the data was normally distributed, while for the data after the intervention, the significance value p = .042 (p<0.05) which means the data was not distributed normally. In this study, both normally distributed and non-normally distributed research data were obtained, so the data analysis in this study used the Wilcoxon Test

Results of the Influence of the Intervention

Table 3 Results of Intervention Effects

Table 4. Wilcoxon Test Ranks

		N	Mean rank	Sum of Rank
After-before	Negative rank	31	16.00	496.00
	Positive rank	0	.00	.00
	Ties	0		
	Total	31		

Table 4.5 Test Statistik Uji Wilcoxon

	Before and After
With	-4.860
Asymp. Sig. (2-tailed)	.000

Table 4 shows the results of data analysis before and after breastfeeding interventions and *baby field massage*. The mean value of the difference between the total bilirubin value before and after the intervention decreased with a significance value of P-(0.000) less than 0.05, so there was a significant effect on the effect of breastfeeding and *baby field massage* on the decrease in total bilirubin.

A. Discussion

Based on the results of the research in the perinatology room of PKU Muhammadiyah Banjarnegara Hospital, there were a total of 31 respondents, with the most male respondents, with 20 (64.52%) respondents, and 11 (35.48%) females. The results of a previous study by Setiawati et al. (2023a) stated that the baby's weight at birth, sex, and childbirth have a relationship with the incidence of hyperbilirubin in newborns. These risk factors can cause hyperbilirubin, both physiological and pathological, requiring phototherapy and breast milk management.

The data obtained in this study shows that the average age of babies is 8 days. The youngest respondent was 3 days, and the oldest respondent was 18 days. This suggests that all infants in the study were newborns with an age range that allowed for analyzing bilirubin changes in the neonatal period prone to jaundice. Research conducted by Apriyani1 et al. (2021) stated that the average age of babies who experience hyperbilirubin is 8 days. Hyperbilirubinemia that occurs at 8 days can be categorized as pathological bilirubin. Hyperbilirubin is caused by insufficient milk production, often in the first few weeks of an infant's life. This is because breast milk has not come out or it is not easy to breastfeed, so there is an increase in bilirubin, which causes the baby to appear yellow (Amaliyah et al., 2023).

The average weight of babies in this study was 3062.90 grams, with the lowest weight being 2540 grams and the highest weighing 4200 grams. In this study, the weight of the respondents varied, which may affect the process of bilirubin metabolism. Low birth weight babies have a high risk of various systemic problems. Disorders of the organ system often occur in babies, especially in babies with low birth weight, such as impaired conjugation and excretion of bilirubin causing hyper bilirubin, lack of glucosyl transferase enzyme, which causes incomplete conjugation of bilirubin, and

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decreased levels of albumin in the blood which plays a role in the transport of bilirubin from tissues to the liver (Armatheina et al., 2023).

In this study, based on medical record data, the average total bilirubin level before the intervention was 15.61 mg/dL, with the lowest value of 10.1 mg/dL at the age of 13 days and the highest at 23.2 mg/dL at the age of 4 days. According to Rohimah et al. (2023), hyperbilirubinemia is a condition in neonates caused by elevated bilirubin levels in the blood of more than 10 mg/dl, which causes enteric in the baby's body. The study's results showed that most babies had quite high bilirubin levels. In neonates, the process of bilirubin glucuronidation has not occurred optimally because the liver has not functioned optimally, so unconjugated bilirubin in the blood is quite high. The buildup of bilirubin will cause the skin and sclera to appear yellow (Rompis et al., 2019).

Breast milk is the best nutrition for babies because breast milk contains antibodies, proteins, carbohydrates, fats, and vitamins. So, breastfeeding interventions were carried out in this study. Breast milk contains beta-glucuronidase, which breaks down bilirubin into a fat-soluble form called indirect bilirubin, which the intestines will then reabsorb (Indanah et al., 2019). During phototherapy, breast milk is given to babies by means of breast milk being accommodated and then given through measuring devices such as baby pacifiers, pipets, syringes, and orogastric tubes. The frequency of breast milk given to babies is according to the baby's fluid needs, once every 2-3 hours.

In this study, in addition to interventions in the form of breastfeeding, interventions in the form of baby field massage were also carried out. Babies who are given baby field massage intervention will experience an increase in the duration of breastfeeding and the frequency of bowel movements. Massage in neonates can stimulate meconium production, improve bowel movements, and increase bilirubin production (Canser et al., 2024). Massage of the baby is done once a day before the baby is bathed in the morning in the infant warmer (to keep warm). Baby field massage is carried out by gentle touching, holding, rubbing, and pressing movements on the surface of the baby's body for < 10 minutes.

After the intervention of breastfeeding and baby field massage, the total bilirubin level after phototherapy was measured. The average total bilirubin level of respondents after breastfeeding and baby field massage was 7.38 mg/dL. The lowest total bilirubin level value was 2.1 mg/dL, and the highest total bilirubin level was 9.8 mg/dL. This decrease in total bilirubin levels suggests that breastfeeding and baby field massage can contribute to a decrease in bilirubin levels, which is one of the main goals in treating neonatal jaundice. The results of the study conducted by (Setiawati et al., 2023b) showed that there was a significant decrease in total bilirubin values before and after the intervention. Before the intervention, it was found that the total bilirubin value was between 7.32 mg/dl and 22.68 mg/dL. After the intervention, it was found that the total bilirubin value was in the range of 5.05 mg/dl to 12.92 mg/dl.

Based on the results of the study before and after the intervention of breastfeeding and baby field massage, the total bilirubin value before and after the intervention decreased with a significance value of P-(0.000) less than 0.05 which showed a significant influence of breastfeeding and baby field massage on the decrease in total bilirubin in the perinatology room of RSU Pku Muhammadiyah Banjarnegara. A study by Setiawati et al. (2023) showed that total bilirubin levels after phototherapy and breast milk management decreased by an average of 6.076 mg/dl with a significance level of 5% (p-value=0.05). Another study conducted (Wahyuni & Rahmayanti, 2024) found that there were differences in the influence on physiological stability and bilirubin levels before and after field massage therapy with a p-value of 0.000. There are several basic mechanisms in baby massage, namely the release of beta-endorphins and the activation of vagus nerve activity. Hence, the absorption of food becomes better so that the baby will be hungry quickly. More breast

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milk will be consumed, causing the formation of bacteria in the intestines, which functions to help break down conjugated bilirubin.(Wahyuni & Rahmayanti, 2024)

Based on the results of this study, it can be concluded that breastfeeding and baby field massage significantly affect the decrease in total bilirubin in the perinatology room of PKU Muhammadiyah Banjarnegara Hospital. Breastfeeding and complementary therapy to baby field messages are very helpful in lowering bilirubin by binding bilirubin in the digestive tract and preventing bilirubin from returning to the blood. Limitations of the study Less effective in giving baby massage is done 1 time, it should be done more than 1 time, and breastfeeding is given in the same amount not according to the needs of the baby, There should be a control group as a comparison of interventions, This study still has the effect of pharmacological administration for hyper bilirubin.

IV. CONCLUSION

Based on the results of the study that showed a significant difference in breastfeeding and *baby field massage* decreasing the significance value of P-(0.000), we would like to thank you for the attention and support that has been given by various parties, especially educational installations that play an active role in providing training and workshops on optimal breastfeeding and *baby field massage* as a complementary therapy in the treatment of hyperbilirubinemia babies. We also propose that educational institutions in the field of Nursing can integrate the breastfeeding and *baby field massage* curriculum to improve the knowledge and skills of medical personnel in providing appropriate and useful care. In addition, we recommend that the hospital implement a comprehensive education program for parents and patients' families regarding the benefits of breastfeeding and baby field massage techniques as the first step in reducing bilirubin levels in infants. Families must provide full support for optimal breastfeeding and correctly learn baby field massage techniques. By following the existing medical instructions, it is hoped that the treatment provided to the baby can be more effective and on target. Hopefully, this study's results can willitively improve the quality of health services in the field of perinatology, especially in the treatment of hyperbilirubin in newborns.

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