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Relationship between kremer score with length of infant care in perinatology of Harapan and Doa Hospital, Bengkulu City in 2024

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ABSTRACT

Background:*Jaundice occurs when the skin and scleroses become yellow due to increased levels of bilirubin in the blood. It can be physiological or pathological. Pathological jaundice that has a pathological basis or Kreamer score degree reach a value called hyperglycaemia. The assessment of Kreamer score degree from each number is adjusted to the average number with the Kramer degree score. Causes that can be factors include gestational age, birth weight and gender. There are 1.8% of infant deaths caused by hyper bilirubin from all existing perinatal cases.*
Objectives:*This study aims to determine the relationship between Kramer's degree score and the length of stay of infants in the peregrination room of Saharan and DOA Hospital, Bengkulu City in 2024.*
Methods:*This study used a cross-sectional design with a retrospective method. The data taken were secondary data from medical records of jaundice cases. The sample in this study was 138 infants taken using the total sampling technique.*
Results:*The results of the Chi-Square test obtained a p-value of the Kramer degree score for grade 5 Kreamer score degree p=0.000, gestational age p=0.000, birth weight p=0.001, and gender p=0.003 with the incidence of long-term infant care and the most dominant variable was grade 5 Kreamer score degree with an OR value of 6,237;p=0.000 means that grade 5 Kreamer score degree are most related to the incidence of long-term infant care in the peregrination room of Saharan and DOA Hospital, Benelux City.*
Conclusion:*There is a significant relationship between Kramer's degree score, gestational age, birth weight and gender with the length of stay of the baby.*

KEYWORD*: kramer degree score; gestational age; birth weight and gender*

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INTRODUCTION

According to the World Health Organization (WHO), 2.3 million children die in the first month of life. The global agreement made by the Sustainable Development Goals (Sags) has 17 targets, one of which is to reduce the Infant Mortality Rate (IMR) to at least 12 per 1,000 live births by 2030. The most common causes of death are low birth weight, asphyxia, birth trauma and neonatal jaundice with hyperglycaemia (1). There are 1.8% of infant deaths caused by hyper bilirubin from all perinatal cases that occur in the world. Factors that cause neonatal jaundice in developing countries such as Indonesia are around 50% of normal babies who experience changes in skin color, mucous and face turn yellowish (jaundice), and 80% in premature babies.

Health profile data of Benelux Province in 2022 shows that the Neonatal Mortality Rate of Benelux Province is 2.8 per 1000 live births, the Infant Mortality Rate is 2.9 per 1000 births. The causes of infant mortality are complications of intramuscular events 28.3%, respiratory and cardio-vascular disorders 21.3%, LBW and premature 19%, congenital abnormalities 14.8%, and infections 7.3%(2).

Jaundice is a change in skin color and scleroses to yellow due to increased levels of bilirubin in the blood. In infants, jaundice can be physiological or pathological (3). Pathological jaundice that has a pathological basis or the bilirubin level reaches a value called hyperglycaemia. This pathological basis is for example, the type of bilirubin when the jaundice appears and disappears and its cause(4).

Jaundice often appears first on the face then to the neck, upper body and so on. And divide the newborn's body into five lower parts, heels, ankles and shoulders, wrists and feet and hands including the soles of the feet and palms of the hands. The examination method is by pressing the index finger on a place where the bones protrude such as the nose bone, sternum, knees and others. Then the assessment of Kreamer score degree from each number is adjusted to the average number with the Kramer degree score(5).

Length of stay is the number of days a patient is treated in hospital, from the day of admission to the day of discharge as an indicator of service(6). Length of stay shows how many days a patient is hospitalized in one treatment period. The unit for length of stay is days, while the way to calculate length of stay is by calculating the difference between the discharge date and the hospital admission date (7). Review conducted by (6) said that the factors that are estimated to influence the length of neonatal hospitalization are gestational age, birth weight and gender.

Treatment of jaundice is highly dependent on when jaundice occurs, serum Kreamer score degree, type of bilirubin, and the cause of jaundice. To get a good grip, the treatment and examination that needs to be done are based on the day of jaundice onset

and the increase in serum Kreamer score degree (5). Treatment with photo-therapy is one of the treatments to reduce hyperglycaemia. To find out the amount of decrease in serum Kreamer score degree in jaundiced babies, measurements were taken at 24 hours and 72 hours in order to predict the length of photo-therapy treatment in the hospital (8).

Based on initial survey data conducted at 3 government hospitals, namely Saharan and DOA Hospital, Benelux City, Dr. Yunnan Hospital, Benelux City and Bharatanatyam Hospital, Benelux City. Through data tracing on February 12, 2024, the number of cases of infant jaundice in the peregrination room of Saharan and DOA Hospital, Benelux City in 2022 was 18.9% of infants or 54 out of 286 infants treated with a diagnosis of jaundice, in 2023 it increased to 26.4% of infants or 84 out of 318 infants treated with a diagnosis of jaundice.

As comparative data to ensure the largest number of jaundice cases, researchers conducted an initial survey at RSMY Dr. M. Yunnan, Benelux City on February 22, 2024, where data on the number of jaundice cases in the peregrination room in 2022 was 14.4% of babies or 42 babies out of 291 babies treated, in 2023 it increased to 20.9% or 63 out of 302 babies treated with a diagnosis of jaundice. Furthermore, researchers also conducted an initial survey at Bharatanatyam Hospital, Benelux City on February 24, 2024, data on the number of jaundice cases in the peregrination room in 2022 was 13.2% of babies or 9 babies out of 68 babies treated, in 2023 it increased to 14.8% of babies or 12 babies out of 81 babies treated. From the description above, this study was conducted to determine the "Relationship between Kramer's degree score and the length of stay of infants in the peregrination room of Saharan and DOA Hospital, Bengkulu City in 2024.

MATERIALS AND METHDOS

This study is an observational analytical study, where researchers only make observations without intervening on the research subjects. The research design used is cross-sectional with a retrospective method, which is one of the observational studies to determine the relationship between Kramer's degree scores and the length of stay of infants. The data taken is secondary data from medical records in the peregrination room of Saharan and DOA Hospital, Benelux City.

The population of this study was all jaundiced babies in 2022 totaling 54 babies and 2023 totaling 84 babies who were treated recorded in the register in the peregrination room of Saharan an DOA Hospital, Benelux City. The sample in this study was 138 babies taken using the total sampling technique which means that the entire population became a research sample that met the requirements according to the inclusion criteria and exclusion criteria: a. Inclusion Criteria: 1) Jaundiced

babies who were treated were recorded in the register in the peregrination room of Saharan an DOA Hospital, Benelux City, 2) Patients have complete medical record data to be studied, namely gestational age, birth weight, gender and length of stay, 3) Medical record data with laboratory results of Kreamer score degree, b. Exclusion Criteria: 1) Newborns with congenital defects recorded in the register in the peregrination room of Saharan and DOA Hospital, Benelux City, 2) Patients who do not have complete medical record data, especially not including information on gestational age, birth weight, gender and length of stay, 3) Patients who do not have medical record data on laboratory results of Kreamer score degree.

RESULTS AND DISCUSSION

RESULTS

Uni-variate Analysis

Uni-variate analysis was conducted to determine the frequency distribution of characteristics consisting of Kreamer score degree, gestational age, birth weight, gender and length of infant care, which can be seen in the following **Table 1**.

Based on the results of the analysis of **Table 1**, it can be seen that of the 138 babies treated with jaundice, the majority (68.8%) had grade 5 kreamer score, almost all (77.5%) of the jaundice babies had a length of stay of 4-7 days, the majority (66.7%) of the jaundice babies were born at a preterm gestational age, the majority (53.6%) of the jaundice babies were born with an abnormal

Table 1. Frequency distribution of characteristics based on kramer degree score, gestational age, birth weight, gender and length of infant care in the Perinatology Room of Harapan Dan Doa Hospital, Bengkulu City

Variables	Frequency n=138	Percentage 100%
Kreamer Degree Score		
Degree 5	95	68.80%
Degree 4	43	31.20%
Gestational Age		
Premature	92	66.70%
Aterm	46	33.30%
Birth Weight		
<2500->4000 gram	74	53.60%
≥2500-4000 gram	64	46.40%
Gender		
Man	79	57.20%
Woman	59	42.80%
Length of Care		
4-7 days	107	77.50%
≤3 days	31	22.50%

birth weight and also the majority of the jaundice babies were born at a preterm gestational age (57.2%) of jaundiced babies were male.

Bivariate Analysis

The statistical test used was chi-square with a computerized system with a significance level of p = 0.05, the results showed in **Table 2**.

Based on **Table 2**, it shows that there is a relationship between grade 5 kreamer score and length of stay of 4-7 days. The results of statistical tests with chi-square calculations obtained a p value = 0.000 < 0.05 smaller than 0.05 with OR5.476 (CI 2.332- 12.858). The OR value shows that jaundiced babies with grade 5 Kreamer score degree have a 5.476 times greater risk of experiencing long hospitalization.4-7 encompassed to jaundiced babies with grade 4 Kreamer score degree.

Based on **Table 2**, it shows that there is a relationship between preterm gestational age and length of stay of 4-7 days. The results of the statistical test with chi-square calculations obtained a p value = 0.000 < 0.05, smaller than 0.05 with OR4.691 (CI 2.017-10.912). The OR value shows that jaundiced babies with preterm gestational age have a 4.691 times greater risk of experiencing long hospitalization 4-7 days compared to jaundiced infants with term gestational age.

Based on the **Table 2**, there is a relationship between abnormal birth weight and a length of stay of 4-7 days.. The results of the statistical test with chi-square calculations obtained a p value = 0.001 < 0.05, smaller than 0.05 with OR4.628 (CI

Table 2. Relationship between Kremer Degree Score, Gestational Age, Birth Weight and Gender with Length of Infant Care in the Perinatology Room of Harapan Dan Doa Hospital, Bengkulu City

Variables	Length of Care				Total		*P-Value*	OR
	4-7 days		≤ 3 days					
	n	%	n	%	n	%		(95% CI)
Kreamer degree score								
Degree 5	83	87.40%	12	12.60%	95	100%	0	5.476
Degree 4	24	55.80%	19	44.20%	43	100%		
Gestational age								
Premature	80	87.00%	12	13.00%	92	100%	0	4.691
Aterm	27	58.70%	19	41.30%	46	100%		
Birth Weight								
Abnormal	66	89.20%	8	10.30%	74	100%	0.001	4.628
Normal	41	64.10%	23	35.90%	64	100%		
Gender								
Man	69	87.30%	10	12.70%	79	100%	0.003	3.813
Woman	38	64.40%	21	35.60%	59	100%		

1.893-11.314). The OR value shows that jaundiced babies abnormality birth weight have a 4.628 times greater risk of experiencing long hospitalization 4-7 days compared to jaundiced babies normality birth weight.

In the table above, there is a relationship between male gender and length of stay of 4-7 days.. The results of the statistical test with chi-square calculations obtained a p value = 0.003 < 0.05, smaller than 0.05 with OR3.813 (CI 1.629-8.928). The OR value shows that jaundiced babies with-male underhanded a 3.813 times greater risk of experiencing long hospitalization 4-7 encompassed to jaundiced babies with female gender.

Multivariate Analysis

In this study, the multivariate analysis used is multiple logistic regression which is conducted to determine the relationship between many independent variables with one dependent variable. Multiple logistic analysis is conducted by entering the independent variables in the bi-variate selection analysis that have a p value = 0.25.

Based on **Table 3**, four factors are known to be most related to the length of stay. After conducting a logistic regression test, Kreamer Score with the length of stay that is most related to the Exp.B value =6,237 which means the kreamer score degree effect 6,237 times the length of care for the baby.

Table 3. Dominant factor

Variables	B	Sig.	95%CI for Exp (B)		
			Exp(B)	Lower	Upper
Step 1					
Kreamer Degree Score	1.649	0.001	5.204	1.977	13.698
Gestational Age	1.338	0.008	3.81	1.421	10.216
Birth Weight	0.999	0.053	2.714	0.989	7.45
Gender	0.9	0.067	2.459	0.938	6.448
Step 2					
Kreamer Degree Score	1.83	0	6.237	2.456	15.841
Gestational Age	1.684	0.001	5.389	2.123	13.68

DISCUSSION

Frequency Distribution of Kreamer Degree Score, Gestational Age, Birth Weight, Gender and Length of Infant Care

Based on **Table 1**, it shows that of the 138 jaundiced babies, the majority (68.8%) of the jaundiced babies had grade 5 Kreamer score degree. This is in accordance with the theory put forward (5). Kreamer score degree that can cause pathological effects. High levels of bilirubin that can cause pathological effects in each baby are different. It can be interpreted as jaundice with serum bilirubin concentrations that may lead to pernicious if Kreamer score

degree cannot be controlled. Other signs include yellowing of the tip of the nose, mouth, chest, and extremities, lethargy, decreased ability to suck and seizures.

Based on **Table 1**, it shows that of the 138 jaundiced babies, the majority (66.7%) of the jaundiced babies were born with preterm gestational age. This is in accordance with what was stated (9). The incidence of jaundice is higher in premature babies, where it occurs in 60% of full-term babies and in premature babies it occurs in around 80%. This jaundice in some sufferers can be physiological and some pathological which can cause permanent disorders or cause death.

One of the causes of hyperglycaemia is premature birth. Hyperglycaemia experienced by premature babies is due to the immaturity of the baby's liver function to process the breakdown of erythrocytes. At birth, the baby's liver is not good enough to do its job. The remaining breakdown of erythrocytes is called bilirubin, this bilirubin causes jaundice in babies and if the amount of bilirubin accumulates in the body, it causes the baby to look yellow (10).

Based on **Table 1**, it shows that of the 138 jaundiced babies sampled, the majority (53.6%) had abnormal birth weight. This is in accordance with the theory put forward (11). Jaundice often occurs in babies weighing <2500 grams. This is due to the immaturity of the baby's liver function to process erythrocytes (red blood cells). Many newborns, especially small babies (babies weighing <2500 grams) experience jaundice in the first week of birth. In babies weighing <2500 grams, the formation of the liver is not yet perfect (liver immaturity) so that the conjugation of indirect bilirubin into direct bilirubin in the liver is not perfect.

Based on **Table 1**, it shows that of the 138 jaundiced babies sampled, the majority (57.2%) were male at risk. This is in accordance with the theory put forward (12). Baby boys have a higher risk of jaundice compared to baby girls. This is because the prevalence of Gilbert's Syndrome (a genetic disorder of bilirubin conjugation) is reported to be more than twice as high in boys than in girls. G6PD deficiency is the most common enzyme disorder in humans, which is linked to the sex chromosome (x-linked) which generally only manifests in boys. The G6PD enzyme itself functions to maintain the integrity of red blood cells while preventing hydrolysis**.**

Based on **Table 1**, it shows that of the 138 jaundiced babies sampled, almost all (77.5%) of the jaundiced babies had a length of stay of 4-7 days. This is in accordance with the theory put forward (13). The longer the day of treatment for jaundice babies shows the higher levels of bilirubin in babies.

Treatment with photo therapy is carried out to assess the decrease in Kreamer score degree until it reaches the expected value. Photo therapy is used as a treatment therapy for newborns who experience hyperglycaemia because it is

safe and effective in reducing bilirubin in the blood.

The relationship between Kramer's degree score and the length of stay of infants Harapan dan Doa Regional Hospital, Bengkulu City

Based on **Table 2**, the results of the study showed that almost all (87.4%) of the increase in grade 5 Kreamer score degree experienced a length of stay of 4-7 days, the chi-square results obtained P-value = 0.000 <0.05 so that there is a relationship between the Kramer degree score of grade 5 Kreamer score degree and the length of stay of jaundice babies. This is in line with–(Santosa et al., 2022) Clinically based on the degree of jaundice (Kramer method), the majority (50.7%) were Kramer 4 jaundice. All subjects with hyperglycaemia had undergone photo therapy treatment with varying duration, with the longest duration of photo therapy treatment being 7 days.

The results of this study are in line with (14) the results of the measurement of the degree of esoteric carried out at 36 hours. Photo therapy treatment was carried out for respondents with a degree of esoteric less than or equal to degree 4. Measurements before the 36-hour photo therapy treatment were carried out with respondents with a degree of esoteric 5 of 6 respondents (30%) and a degree of esoteric 4 of 14 respondents (70%). After the 36-hour photo therapy treatment, 11 respondents with a degree of esoteric 4 (55%) were obtained and 9 respondents (45%) had a degree of esoteric 3. It can be concluded that intensive photo therapy treatment can reduce 30% to 40% in the first 36 hours, photo therapy can be stopped if the amount of Kreamer score degree drops below 13 to 14 mg/L.

Research conducted stated that the impact of photo therapy treatment will increase if the level of bilirubin in the skin is higher(13). Photo therapy treatment changes bilirubin in superficial capillaries and interstitial tissue with photochemical reactions and photo oxidation into isomers (structural and configuration serialization) quickly, which are soluble in water and can be excreted through the liver without conjugation so that they are easily excreted and non-toxic. The decrease in total bilirubin is faster in infants who are exchange transfused but there is a rapid increase in total bilirubin within 24 hours after exchange transfusion. In the photo therapy treatment group, the decrease in total Kreamer score degree continued for three days, and on the third day the subject no longer needed photo therapy.

The relationship between gestational age and length of stay of infants in the Harapan and Doa Regional Hospital, Bengkulu City

Based on **Table 2**, the results of the study showed that almost all (87.0%) experienced preterm pregnancy age experienced long hospitalization, the chi-

square results obtained P-value = 0.000 <0.05 so that there is a relationship between gestational age and the length of hospitalization of jaundice babies. This is in accordance with the theory put forward gestational age greatly affects the survival of the baby because the younger the gestational age is born and the higher the morbidity and mortality rates (15). Premature babies will experience liver immaturity which causes an increase in bilirubin which is marked by a yellow discoloration of the baby's skin and scleroses.

In the organs of the baby's body, especially those born with premature gestational age, are not so perfect compared to babies born mature, so that it can cause or experience jaundice where digestion is also not perfect so that it can interfere with the excretion of bilirubin which should be excreted through feces/ defecation (BAB) and urine/urination (BAK). Premature newborns, the problem is the increase in bilirubin load accompanied by low albumin production. The molecular concentration of serum albumin must be greater than the molecular concentration of bilirubin for binding to occur.

The results of this study are in line with research the statistical test results obtained a p value of 0.013 which is smaller than the alpha value (α = 0.05), this means that there is a significant relationship between gestational age and Kreamer score degree in newborns (16). The results showed that babies with preterm gestational age (<37 weeks) some of the babies experienced hyperglycaemia, while babies with full-term gestational age (37-42 weeks) most (71.5%) of the babies did not experience hyperglycaemia.

Gestational age is a risk factor for the occurrence of hyperglycaemia in newborns, because 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 hyperglycaemia. The lower the gestational age can result in longer days of care that will be experienced by the baby.

The results of this study are in line with research the results of this study indicate that babies born preterm are 3 times more at risk of experiencing pathological jaundice compared to term babies (17). The cause can occur in conditions where the liver is not yet mature, the excretion capacity is lacking, so that the increase in serum bilirubin is very high. Premature babies have higher levels of iron in their red blood cells, the process of hemoglobin breakdown occurs at the end of the red blood cell life span, which is 120 days, while premature babies have red blood cells that have a short life span, which is 80-90 days, because red blood cells must

be replaced quickly. Weakening of liver function causes high bilirubin to increase, reduced conjugation power in liver cells causes indirect Kreamer score degree to increase. Weakening of conjugated bilirubin excretion causes Kreamer score degree to increase. Obstruction of the bile duct will cause bilirubin to reverse direction back into the bloodstream. Bilirubin that accumulates in the blood beyond normal limits will become jaundice (18).

Relationship between birth weight and length of stay of infants in the Harapan and Doa Regional Hospital, Bengkulu City

Based on **Table 2**, the results of the study showed that almost all (89.2%) of abnormal birth weights experienced long hospitalization with the chi-square results obtained P-value = 0.001 <0.05 so that there is a relationship between birth weight and the length of hospitalization of jaundice babies. This is in line with the research conducted stated that there is a relationship between low birth weight and the incidence of neonatal jaundice with a p-value of 0.000 and an Odd Ratio (OR) value = 8.820, which means that babies with low birth weight have an 8.820 times greater risk of neonatal jaundice compared to babies with normal birth weight(19).

Both normal birth weight and low birth weight babies are at risk of neonatal jaundice. The maturity of the organs of LBW babies is not optimal compared to babies with normal birth weight. The process of excreting bilirubin through the immature liver causes jaundice in babies. So that there is a buildup of bilirubin and causes a yellow color on the surface of the skin. In LBW conditions, neonatal jaundice is caused by the immaturity of the liver organ which is not optimal so that the conjugation of conjugation bilirubin into conjugated bilirubin is not optimal. This sub optimal conjugation process can disrupt the process of excreting bilirubin through the liver and can cause a buildup of bilirubin and a yellow color on the surface of the skin(20).

Other relevant research was conducted the results of this study indicate a significant relationship between neonatal birth weight and the incidence of neonatal jaundice p value = <0.001(21). The odds of neonatal jaundice are statistically higher in low birth weight infants compared to others (OR = 0.22; 95% CI 0.11-0.47). As many as 24.7% of LBW infants experienced neonatal jaundice and 9.1% of LBW infants did not experience neonatal jaundice. This is because low birth weight infants can increase the risk of infection caused by decreased maternal immunoglobulin reserves, impaired ability to form antibodies and the integument system, and immaturity of the liver that is not yet optimal causing the conjugation of conjugation bilirubin into conjugated bilirubin to be imperfect.

Research conducted states that jaundice is one of the emergencies that often occurs in newborns. In LBW

conditions, jaundice is caused by the immaturity of the liver organ so that the conjugation of conjugation bilirubin into conjugated bilirubin is not optimal. This sub optimal conjugation process can disrupt the process of excreting bilirubin through the liver and can cause bilirubin accumulation and yellow color on the surface of the skin. Jaundice experienced by babies with low birth weight is caused by the immaturity of the baby's liver function to process erythrocytes.

In babies, the age of red blood cells is approximately 90 days, then erythrocytes must be processed by the baby's liver as a result of their breakdown. At birth, the baby's liver is not good enough to do its job. The remaining breakdown of erythrocytes is called bilirubin, this bilirubin causes jaundice in babies and if the amount of bilirubin accumulates in the body, bilirubin can stain the skin and other body tissues (18).

The relationship between gender and length of stay of infants in the perinatology room of Harapan and Doa Regional Hospital, Bengkulu City

Based on **Table 2** shows the results of the study which show that almost all (87.3%) of the male gender are at risk with the chi-square results obtained P-value = 0.003 <0.05 so that there is a relationship between the male gender at risk and the length of hospitalization of jaundice babies. This is in line with the research conducted gender with the incidence of hyperglycaemia in respondents obtained a p value = 0.028 (p <0.05) which indicates that there is a relationship between gender and the incidence of hyperglycaemia. The results of further analysis obtained an OR value = 3.609 (95% CI = 1.263-10.316) which means that male respondents have a 3.609 greater tendency to suffer from hyper-glycaemia compared to female respondents (20).

Another research in line with this was conducted the gender of the baby shows that the average gender of the male baby respondents is 58.9% and the female gender is 41.1%. The results of the analysis above show that male babies have a larger percentage, namely 100%, than female babies and the relationship between gender and hyper bilirubin has a significant value of 0.000 with an alpha value of 0.05, which means that there is a significant relationship between gender and hyper bilirubin (19).

Research conducted that there is a difference between the x chromosome in male and female babies where female babies have two x chromosomes while male babies only have one x chromosome. So that male patients have a higher risk of suffering from hyperglycaemia than female patients. Because the x chromosome is believed to have a role and is responsible for the function of enzymes in red blood cells. In addition, the difference in the x chromosome can also cause G6PD enzyme deficiency which can cause red blood cell dialysis. So

the potential for hyperglycaemia is greater (20).

Dominant factors related to the length of stay of infants in the peregrination room of Harapan and Doa Regional Hospital, Bengkulu City

The results of this study indicate that the Kramer degree score, gestational age, birth weight and gender have an influence on the length of stay of jaundice babies. While the most dominant factor related to the length of stay of babies is the Kramer degree score of bilirubin level grade 5 which has a p-value of 0.000 with OR6.237 so that babies with jaundice with grade 5 Kreamer score degree are 6.237 times more likely to have an effect on the length of hospitalization of the baby.

In accord notwithstanding kreamer score degree decreased after 24 hours of treatment, which was approximately 2.1 mg/L. Factors that need to be considered in determining and implementing treatment from the light source, light intensity (irradiance), and body surface area being treated. The effective wavelength of light in the blue-green region is 460-490 NM. The closer the photo therapy distance is to the baby's body, the more effective it is. Beth nanobot reported that there was no significant difference in the position during treatment, either supine or changing positions, because the number of areas photo therapy was the same even though the position changed (21).

Based on kreamer score degree will have a bad aftereffect is an increase in indirect Kreamer score degree that have passed through the brain barrier, so that Kern rusticate or biliary encephalopathy can occur which can result in metathesis accompanied by hearing loss and mental retardation in the future. Therefore, all patients with Kreamer score degree are subject to regular examinations, both physical growth, motor skills, mental development and hearing acuity. Good management of patients with hyper brilliantine is very important to prevent early (22).

Based on the theory put forward the higher the Kreamer score degree, the longer the treatment days with photo therapy, so it can change Kreamer score degree into a water-soluble form for excretion through bile or urine. When bilirubin absorbs light, a photochemical reaction occurs, namely isomerization. There is an irreversible conversion to another chemical isomer called bilirubin which is rapidly cleared from plasma through bile. Bilirubin is the most abundant product of bilirubin degradation due to photo therapy in humans.

A small amount of conjugation plasma bilirubin is converted by light to dipole which is excreted in urine. Photo isomers of bilirubin are more polar than the native form and can be directly excreted in bile. Only photo oxidant products can be excreted in urine (22). Research conducted that photo therapy treatment is more effective in

reducing Kreamer score degree in infant hyperglycaemia with an average bilirubin level before photo therapy treatment of 15.3 ± 1.94 mg / L and after 24 hours of photo therapy treatment of 12.8 ± 1.88 mg / L / day. The decrease in Kreamer score degree was 2.5 ± 0.8 mg / L in 24 hours (down 16.3% in 24 hours) with p = 0.001 (23).

The longer the photo therapy treatment, the faster the decrease in Kreamer score degree, but it is necessary to pay attention to the side effects that can arise in the form of erythrocyte, oxidation damage, dehydration (trans epidermal fluid loss), hypothermia, diarrhea and retinal damage. Babies who undergo photo therapy treatment are placed under a light therapy lamp with an eye patch and the body surface is exposed to light as much as possible, change position every 3 hours, pay attention to fluid intake and output. The duration of photo therapy treatment is determined based on the neonatal Kreamer score degree and the period of photo therapy treatment is carried out for 24 hours against changes in Kreamer score degree and is repeated until the Kreamer score degree return to normal. Photo therapy is used to monitor the baby's condition, because it can cause hyper pigmentation, increased temperature and excessive Insensible Water Loss (IWL).

CONCLUSION AND RECOMMENDATION

The results of the study on the relationship between Kramer's degree score and length of stay in the Peregrination Room of Saharan and DOA Hospital, Benelux City in 2024 can be concluded, most (68.8%) of jaundiced babies had grade 5 Kreamer score degree, almost all (77.5%) of jaundiced babies had a hospital stay of > 3-7 days, most (66.7%) of jaundiced babies were born at preterm gestational age, most (53.6%) of jaundiced babies were born with abnormal birth weight and also most (57.2%) of jaundiced babies were male.

There is a relationship between Kreamer score degree, gestational age, birth weight and gender with the length of stay of infants in the Peregrination Room of Saharan and DOA Hospital, Benelux City in 2024.

The level of bilirubin in infants during hospitalization is the factor most associated with the length of stay of infants in the Peregrination Room of Saharan an doa Hospital, bengkulu City in 2024.

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