Open Access Health Scientific Journal
https://oahsj.org/index.php/oahsj Vol. 4 No. 1 February 2023, pp. 25-33
Research article

Influence Of Giving Kangaroo Mother Care on Body Temperature and Oxygen Saturation On Low Birth Weight

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ARTICLE INFO

Keywords:
Body Temperature, Kangaroo Mother Care, Low Birth Weight, Oxygen Saturation.

ABSTRACT

Background: Treatment of Kangaroo Methods has begun to be recommended at this time for women with low birth weight (LBW) babies because the birth of low birth weight babies both premature and dismatur is one of the biggest causes of infant death. This study aimed to analyze the effect of the kangaroo treatment method on changes in body temperature and oxygen saturation in newborn babies**.**

Methods: The research design is a pre-experimental one group pre-and post-test conducted in the perinatology room. The population of this research is the whole LBW in the Perinatology Room of the Soedomo Trenggalek Regional General Hospital. There are 15 newborn babies who meet the inclusion criteria selected as a sample by using Purposive Sampling technique. This research uses observation sheets as instruments. Results of statistical analysis using paired t test.

Results: The results showed that there was a significant effect of kangaroo mother care on changes in body temperature and oxygen saturation in newborn babies ie pre temperature obtained mean 36.2^0C and post temperature obtained mean 37^0C this shows an increase of body temperature towards normal temperature (p value = 0.000) < value of α of 0.01. While the pre-saturation mean is 90% and the post-95% saturation mean, this indicates an increase in oxygen saturation towards normal (p value=0.000) < value of α of 0.01.

Conclusion: The kangaroo treatment method is an effective, easy and inexpensive way to care for a baby with LBW while in hospital or for home treatment. Baby's and mother's skin contact directly on the treatment of kangaroo methods can maintain the stability of body temperature and oxygen saturation. The more often the mother performs kangaroo treatment on the baby then the satability of body temperature and oxygen saturation will be more awake and this will accelerate the process of improving the condition of LBW towards better which can also improve the relationship (bonding) between mother and baby.

Received 3 December 2022; Accepted 3 January 2023; Published 1 February 2023
 DOI: https://doi.org/10.55700/oahsj.v4i1.36

I. Introduction

Baby being born with heavy born not enough from 2500 grams without looked age gestation called with baby birth weight low (Ministry of Health, 2020). LBW is one results from Mother suffering pregnant energy chronic and will have poor nutritional status. LBW exists relation with height number death babies and toddlers, also have impact serious about quality generation future that can slow down growth and development as well as decline intelligence in children (Ministry of Health, 2020). LBW births can caused by birth before the time (premature) and also because disturbance growth During in content or called PJT (Growth Fetus inhibited) (Li, 2022)

According to WHO report cited from State of the world's mother 2007 obtained that 27% of deaths neonates caused by LBW. Based on National Economic Survey (SUSENAS) 2005, 38.85% LBW is reason death neonates. (Ministry of Health, 2021). Prevalence baby heavy born low birth weight (LBW) is estimated at 15% of whole birth in the world with limit 3.3% - 38% and this more often happens in developing countries with socio-economic low (Sharma, 2016). LBW is contributor highest Neonatal Mortality Rate (AKN).

From study field that has conducted by researchers in Tri month IV (October to November) data obtained that born baby with LBW are hospitalized in the perinatology room of RSUD dr. Soedomo Trenggalek a number 95 babies (17.37 %) from 547 total baby born and cared for stay in the Perinatology Room of RSUD dr. Soedomo Trenggalek. Of the ninety five babies with low birth weight, most or almost 100% were hospitalized due to hypothermia and respiratory problems or experiencing asphyxia, namely 15 babies or 15.8%.

To provide care for LBW during hospitalization in the perinatology room at RSUD dr. Soedomo Trenggalek is still using incubators and closed boxes that use lights due to the limited number of incubators. Whereas LBW babies who experience asphyxia to the point where severe breathing problems occur always get nasal oxygen assistance to the use of a ventilator. Although treatment with Kangaroo Mother Care has been encouraged and carried out, the number of KMC administration in the fourth trimester has decreased compared to the third trimester. Of the number of LBW treated in the fourth quarter, namely 95 LBW, only 28 LBW underwent kangaroo mother care before the baby was sent home.

LBW care requires an incubator while at home ill, meanwhile besides the amount limited, treatment this also requires high cost. Besides problem cost care number incident infection nosocomial in LBW at home sick enough high. Heavy baby born low to be treated in indicated incubator happening separation Mother with baby. Use incubators can hinder contact early Among mother and baby as well as hinder giving breast milk, On generally mother who has premature baby or baby heavy born low not enough believe self in nurse the baby compared with mother who has baby heavy born enough (Boundy, 2016)

Care this is alternative replacement incubator in LBW and premature care with a number of excess among others are effective way for fulfil need the most basic baby that is exists contact skin baby to skin mother, where body Mother will Becomes thermoregulators for the baby so that baby get warmth (avoid hypothermia), ease breastfeeding, stimulation, safety and love Dear Mother to baby (bonding) and stability physiological baby including saturation oxygen, prevent infection and reduce cost care (Choudhary, 2016)

Kangaroo Mother Care is one of the programs in service essential neonates and is intervention effective for speed up decline number death neonates and infants (Ministry of Health, 2021). KMC is method gentle and effective for avoid anxiety baby because situation hard to activate ward. According to Venancio and de Almeida, advantage KMC is lower number death baby, for development physiological and psychological as well as decline cost treatment (Dehghani, 2015).

Kangoroo Mother Care could conducted in two ways that is Kangoroo Mother Care Intermittent for baby with disease or tough conditions conducted with period short time, and Kangoroo Mother Continuous Care for baby in circumstances stable and viable conducted for 24 hours a day (Rahman, 2017). The three study with methodology testing controlled in a manner random comparing Kangaroo Mother Care with care conventional (using an incubator). Cochrane data show that total death baby done Kangoroo Mother Care more a little compared treated baby in an incubator.

This study aim for know influence gift Kangoroo Mother Care to temperature body and saturation oxygen in LBW in the Perinatology Room of RSUD Dr. Soedomo Trenggalek. This study aimed to analyze the effect of the kangaroo treatment method on changes in body temperature and oxygen saturation in newborn babies.

II. METHODS

Design used in study this is use pre experimental with type one-group pre-post test without control design. Population in study this is all LBW a number of 30 respondents and the sample is part from LBW in the Perinatology Room of RSUD Dr. Soedomo Trenggalek amounted to 15 respondents.

In study this the sampling technique used is Purposive Sampling. Deep data processing study this includes: Observation, Interview, and Questionnaire. Instruments and tools measuring in research this is an observation sheet consisting of from data on the implementation of kangaroo mother care, temperature body and saturation oxygen. Measuring device temperature with a digital thermometer for axillary and pulse oximetry for saturation monitoring oxygen. The data were processed using a computerized program, the bevariate analysis used in this study was the paired sample t test for interval and ratio data. The test was used because it used the same sample but underwent different treatment, namely before administration and after administration of KMC. The study was approved by the Surya Mitra Husada High School of Health Sciences Research Ethics and Review Committee (579/KEPK/LPPM/II/2017) and written consent was obtained from those who met the inclusion criteria and voluntarily agreed to participate in the study.

III. RESULTS

Characteristics of Respondents

Characteristics Respondents in study this includes: Characteristics of *kangaroo mother care respondents* based on the age of the baby's mother, education, occupation Mother, Newborn Weight, Parity or birth baby, Age pregnancy and birth history.

Table 1 Characteristics of *kangaroo mother care respondents*.

No	Characteristics	∑	%
1	Mother's age		
	<20 years	4	27
	20-30 years	3	20
	31-40 years	7	47
	> 40 years	1	6
2	Education		
	Elementary School	11	73
	Junior High School	4	27
	Senior High School	0	0
	College	0	0
3	Profession		
	Housewife	15	100
	Employee private	0	0
	Farmers / Breeders	0	0
	Government employees	0	0
4	LBW		
	< 1000gr	0	0
	1000-1500gr	2	13
	1600-2000gr	7	47
	2100-2500gr	6	40
5	Parity / pregnancy to -		
	First	7	47
	Second	3	20
	Third	4	27
	Fourth, etc	1	6
6	Age Pregnancy		
	Premature	9	60
	Disture	6	40
7	Childbirth History		
	Normal	11	73
	SC	4	27
	Total	15	100

Table 2 Tabulation cross Among baby weight born with temperature body LBW before and after conducted *kangaroo mother care* in the room perinatology at dr. Soedomo Trenggalek.

lbw (grams)	Pre KMC temperature				Post KMC temperature		
	Hypo-thermia	%	Normal	%	Hypo-thermia	Normal	%
1000-1500	1	6%	1	6%	0	2	13%
1600-2000	6	40%	1	6%	0	7	47%
2100-2500	4	27%	2	13%	0	6	40%
Amount	11	73%	4	27%	0	15	100%

Table 3 Tabulation cross Among baby weight born with saturation oxygen LBW before and after conducted *kangaroo mother care* in the room perinatology at dr. Soedomo Trenggalek

lbw (grams)	saturation pre-KMC oxygen				saturation post-KMC oxygen			
	Not enough	%	Normal	%	Not enough	%	Normal	%
1000-1500	2	13%	0	0%	1	7%	1	7%
1600-2000	5	33%	2	13%	1	6%	6	40%
2100-2500	4	27%	2	13%	0	0%	6	40%
Amount	11	73%	4	27%	2	13%	13	87%

Table 4 Test *paired t test* body temperature pre *kangaroo mother care* and post *kangaroo mother care body temperature* in newborns in the room perinatology at dr. Soedomo Trenggalek .

Paired Samples Statistics					
		Means	N	std. Deviation	std. Error Means
Pair 1	pretemp	36,247	15	.1959	.0506
	temperaturepost	37,053	15	.2800	.0723

Table 5 Test *paired t test* oxygen saturation pre *kangaroo mother care* and post *kangaroo mother care oxygen saturation* in newborns in the nursery perinatology at dr. Soedomo Trenggalek

Paired Samples Statistics					
		Means	N	std. Deviation	std. Error Means
Pair 1	saturationpre	90.47	15	1,187	.307
	saturationpost	95.80	15	2,336	.603

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	saturationpre & saturationpost	15	.294	.288

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	suhupre & suhupost	15	-.374	.169

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	suhupre - suhupost	-.8067	.3973	.1026	-1.0267	-.5867	-7.865	14	.000

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Means	std. Deviation	std. Error Means	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	saturationpre - saturationpost	-5,333	2,289	.591	-6,601	-4,066	-9025	14	.000

IV. DISCUSSION

Identify Temperature Body before and after conducted Kangaroo Mother Care in LBW

From the results research conducted on March 2- May 15 2017 in the Perinatology Room of RSUD dr. Soedomo Trenggalek with total respondents 15, obtained results temperature body LBW before conducted kangaroo mother care almost all LBW own temperature body below normal (hypothermic) with the average temperature is 36.2^0C. There are 4 respondents (26.7%) who have temperature body 36^0C and 4 respondents (26.7%) have temperature body 36.3^0C. From research this only there were 4 respondents (26.7%) who had temperature normal body.

Based on results research also shows that temperature body LBW after conducted kangaroo mother care experience meaningful improvement that is of the average temperature body LBW 36.2^0C to 37^0C. Research results the state that all LBW after conducted kangaroo mother care 100% have temperature normal body. According to Proverawati (2010), one characteristics LBW with premature is easy very experience hypothermia, this caused because thin and less subcutaneous fat tissue.

Basiri (2014) states that hypothermia causes the ability to retain heat and the ability to increase heat production to be very limited due to inadequate muscle growth, little sub-cutaneous fat, immaturity of the nervous system that regulates body temperature, body surface area is relatively larger than body weight so it loses heat easily. In the womb the baby is in a normal and stable environmental temperature, namely 36^0C - 37^0C, immediately after birth the baby is faced with an environment temperature which is generally lower. This temperature difference affects the baby's body heat loss.

Bisanalli (2019) states that newborns not only lose heat easily but also have difficulty retaining heat in various environments because newborns have little subcutaneous fat to cover them and they rarely shiver, which causes metabolism and generates heat. According to Gable (2022) the mechanism of heat loss in newborns is by means of radiation, conduction, convection and evaporation.

Based on the theory and the results of the research that has been done, there is agreement that when the body temperature of the LBW baby is exposed to the outside environment without using heating aids, it will easily experience a decrease in temperature (hypothermia) caused by the release of heat from the baby's body to a cold environment (Bera, 2014). This happens because newborn babies

have thin subcutaneous fat and also newborn babies have a relatively large body surface compared to their body weight.

In addition, premature babies have an immature thermoregulation system so that when they are exposed to the outside environment without heating devices, it is very easy for them to release heat from their bodies, causing them to experience hypothermia. For this reason, as a way to adapt babies to environmental exposure, giving kangaroo mother care is very effective.

The active role of the mother is needed in the care of her baby, especially babies with low birth weight, both premature and dismature. The mother is an excellent thermoregulator for her baby, so by doing KMC the mother's body heat will transfer to the baby's body through skin contact from the mother's chest to the baby's skin which will keep the baby warm so that the baby avoids hypothermia (Xie et al, 2021).

Korraa (2014) stated that LBW attachment to the mother for 24 hours will help the baby's body temperature remain stable because the mother conditions the same place as the conditions in the mother's womb. Meanwhile, according to Parsa (2018) states that another effect of KMC administration is the effective control of body temperature in infants and may be associated with a reduced risk of hyperthermia.

Based on results research already conducted there is suitability that temperature body LBW when exposed with environment outside without use tool help warmer will easy very experience decline caused hypothermia because happen release hot from body baby to cold environment. this happen because LBW have thin subcutaneous fat and also weight loss have surface relative body wide compared with heavy body.

Identify saturation Oxygen before and after conducted Kangaroo Mother Care for LBW

Research results show that of 15 respondents LBW before get kangaroo mother care own saturation no oxygen yet stable, in part big LBW who haven't conducted kangaroo mother care own saturation oxygen within the low normal range (90%) ie a total of 8 respondents or 53.3%. Based on results study this also shows that there is enhancement saturation oxygen in a manner meaning that is saturation oxygen after conducted kangaroo mother care on average to 95% of the previous average saturation the oxygen is 90%.

the data show that saturation oxygen LBW after get kangaroo mother care part big be normal and stable i.e. 87% of 15 total respondent. Oxygen levels in babies new birth is very important for is known because when rate saturation baby oxygen new born low so Thing this proper for watch out is baby the experience hemodynamics (Medvedev, 2020).

There is a number of observing research about rate saturation baby oxygen new born in minutes first until minute tenth, and obtained rate saturation baby oxygen new born enough months and premature birth ranged Among from 91% to 98%. With measure rate saturation baby oxygen new born We could with easy detect more early abnormalities congenital in infants (Medvedev, 2020).

One of the factors that causes oxygen saturation levels is body temperature, where increased body temperature (hyperthermia) or hypothermia will cause the body's metabolism to also increase. This requires a greater amount of oxygen levels, therefore if the baby's body temperature, especially in premature babies, has a fever, it will reduce their oxygen saturation (Gable, 2022).

Giving kangaroo mother care significantly reduces respiratory frequency and maintains body temperature stability so that it can affect the increase in oxygen saturation. This is because when KMC is performed, the baby's position is upright so that it is influenced by gravity and has an effect on ventilation and perfusion. Upright position optimizes respiratory function (Dehghani, 2015).

Based on the theory and the results of the study, it turns out that there is compatibility that babies with cold environmental conditions will cause hypothermia and this condition will also affect oxygen saturation levels, because babies who experience hypothermia will also experience a decrease in heart rate frequency which will affect blood circulation until to peripheral tissue.

With reduced blood circulation to the periphery, it will cause the newborn to experience acrocyanosis, both mild and severe. This, when detected using a pulse oximetry tool, will produce a low oxygen saturation value (Gable, 2022). Therefore, maintaining a stable temperature to stay warm will affect oxygen saturation levels. In addition, the upright position of the baby will also affect the smooth circulation of blood which affects oxygen levels in peripheral tissues

Based on results study from saturation oxygen after conducted kangaroo mother care found exists suitability Among theory and results research. Seen that exists meaningful improvement to saturation

oxygen in LBW that is from the average saturation 90% oxygen to average saturation 95% oxygen after conducted kangaroo mother care. this happen because at the moment conducted kangaroo mother care position baby in circumstances straight and looking up so that will open road breath cause baby ventilation baby Becomes more normal. Besides it was at the time of KMC temperature body baby awake its stability so that no experience hypothermia and stuff this is very influential big to rate saturation oxygen.

According to researcher this could assumed that gift kangaroo mother care separately routine and continuous will give effect stability from saturation oxygen. it because exists contact skin Among mother and baby cause baby feel quiet and comfortable so that will impact to frequency pulse heart Becomes stable so that circulation oxygen too fluent arrived on the network peripheral. With use pulse oximetry could be measured saturation oxygen LBW after KMC was carried out for 3 days consecutive 1 hour later state that results saturation oxygen within normal limits ie above 90%.

Influence Kangaroo Mother Care to Temperature Body and Saturation Oxygen for LBW in the Perinatology Room

The results of this study show that kangaroo mother care can significantly increase the baby's body temperature towards normal. The average body temperature of the baby before the kangaroo mother care is 36.2^0C and after doing kangaroo mother care is 37^0C. From the research conducted in the Perinatology room of dr. Soedomo Trenggalek shows that there is a significant difference, namely p = 0.000; α = 0.01. The results of this study are in accordance with research that has been conducted by Deswita with a total of 16 respondents with a p value <0.001 which indicates a significant increase in body temperature after kangaroo mother care.

From the results of statistical analysis also showed that kangaroo mother care affects the increase in oxygen saturation in newborn babies. Average oxygen saturation before doing kangaroo mother care is 90% and after doing kangaroo mother care is 95%. This showed a significant increase that is p -value = 0.000 ; α =0.01. The results of this study are in line with research conducted by Almeida which stated that oxygen saturation before being given KMC was 93.8% and 30 minutes after giving KMC it had increased to 97.3%.

Another study that supports the increase in body temperature of premature babies after kangaroo mother care has been reported by Bisanalli. Bisanalli (2019) states that mothers are able to control the baby's body temperature better than an incubator. According to his research, premature babies after KMC for 1 hour had an average increase in body temperature of 0.3^0C with p <0.01, where this study used 16 respondents. Kangaroo Mother Care can cause the body temperature to increase by 2^0C if the baby is cold and can decrease 1^0C if the baby is hot (Jayaraman, 2017).

Another study showing that kangaroo mother care can increase oxygen saturation is a study conducted by Dehghani (2015). His research showed that there was a significant difference in oxygen saturation before and after KMC, namely p <0.001. Significantly reduced respiratory rate and increased oxygen saturation can be seen after the baby received kangaroo mother care.

This decrease in respiratory rate can cause a very good increase in oxygen saturation, this happens because the baby is in an upright position during KMC. Ventilation and perfusion are interdependent things, so that the baby's upright position during KMC will optimize the function of breathing which has an impact on the respiratory system and blood circulation (Gable, 2022).

Based on the theory about kangaroo mother care and from the results of research conducted by researchers, it was found that kangaroo mother care plays an important role in increasing body temperature and oxygen saturation in newborns. The more often the mother does kangaroo mother care for her baby, the more often the mother makes skin contact with the baby so that the stability of the baby's body temperature will also be maintained because the mother's body heat will transfer to the baby's body (Ranjan, 2019). Thus the baby will avoid hypothermia and will be free from the incubator as soon as possible. With attachment between mother and baby this will help the baby to adapt more easily to the outside environment.

Kangaroo Mother Care (KMC) is also very influential in increasing oxygen saturation in newborn babies. This happens because when kangaroo mother care is performed, the baby is in an upright position so that it will facilitate blood circulation to the peripheral tissues (Badiee, 2014). In addition, the baby's upward position will open the baby's airway during KMC so that the baby's ventilation will be normal and there will be no airway obstruction which will affect the amount of respiration in the newborn within normal limits (Yusuf, 2017). This will have an impact on the oxygen saturation value of the BBLR which

will also be normal.

It could proven from results research that has carried out by researchers who measure saturation oxygen before conducted kangaroo mother care is on average 90% and after he did kangaroo mother care for 3 days consecutively and on the day third, 1 hour after kangaroo mother care conducted measurement repeat obtained enhancement saturation oxygen to an average of 95%. this really clear that with the more often Mother do kangaroo mother care so will improve and maintain stability from saturation oxygen so that LBW will more fast in the process of repair condition. With the more fast LBW own good condition will possible LBW the could quick for sent home (Narciso, 2022).

From the results of statistical tests obtained score significance (p-value) good that for temperature body and saturation oxygen is $0.000 < \alpha = 0.05$, here state that that kangaroo mother care give very effective effect good for guard stability temperature body nor guard stability saturation oxygen . because it KMC highly recommended as one care alternative for Mother with baby LBW in the Perinatology Room of RSUD dr. Soedomo Trenggalek because with kangaroo mother care will awake stability temperature body and saturation oxygen on the LBW to be influential on the healing process and duration day take care for the LBW.

V. CONCLUSIONS

Temperature body LBW before and after conducted kangaroo mother care on newborn in room perinatology at dr. Soedomo Trenggalek with total respondent 15 experience meaningful improvement that is from an average of 36.2^0C to 37^0C. Percentage results temperature normal body before done by KMC was 26.7% to 100% after get KMC.

Saturation oxygen before and after conducted kangaroo mother care on LBW in the room perinatology at dr. Soedomo Trenggalek with total respondent 15 experienced meaningful improvement that is from an average of 90% to 95%. Based on results percentage saturation oxygen before done KMC only 27% have saturation normal oxygen to 87% have saturation normal oxygen after KMC did.

There is a significant difference in LBW body temperature before and after KMC that is with p-value = $0.000 < \alpha$. There is a significant difference in LBW oxygen saturation before and after KMC that is with p-value = $0.000 < \alpha$

VI. ACKNOWLEDGMENTS

Thank you to all respondents and all related parties who have contributed to this research

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