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THE EFFECTIVENESS OF KANGAROO MOTHER CARE (KMC) USING *METKA* INFANT SLING ON INCREASED TEMPERATURE OF LOW-BIRTH WEIGHT BABIES (LBW)

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ABSTRACT

Introduction: Weight is one indicator of newborn health. Babies born with low weight need serious treatment because in this condition the baby is easily got hypothermic. As much as 40.5 percent of infant deaths in Central Java Province in 2019 were also caused by LBW. Efforts to maintain the baby's body temperature in LBW still need to develop low-cost technology so that hypothermia does not occur.
Methods: This study aimed to determine the effectiveness of kangaroo mother care (KMC) using a *metka* infant sling on the increasing temperature babies. This type of quantitative research was a quasi-experimental method was used a two-group pretest-posttest design. The sampling technique uses purposive sampling. The number of samples in the study was 30 respondents according to the specified criteria. The instrument used was a digital thermometer where the thermometer was only placed in the baby's armpit.
Results: The result of this research showed that there was significant effectiveness in kangaroo mother care (KMC) using *metka* infant sling on LBW body temperature $p < 0.05$.
Conclusion: The conclusion was there is the effectiveness of kangaroo mother care with a *metka* infant sling on the temperature in LBW. Giving the kangaroo method with the *metka* sling is considered very effective in meeting very basic baby needs such as warmth, breast milk, protection from infection, stimulation, safety, and affection.

Keywords: *Low Newborns Babies, Metka Infant Sling, Body Temperature*

INTRODUCTION

WHO (2017) explains that 60–80% of the Infant Mortality Rate (IMR) that occurs is caused by LBW. LBW babies have a greater risk of experiencing morbidity and mortality than babies born with average weight. A gestation period of fewer than 37 weeks can cause complications in the baby due to the imperfect growth of the organs in the body. The possibility of what will happen will worsen if the baby's weight is lower.[1]

Weight is one indicator of newborn health. Birth weight is a general parameter used to describe fetal growth and intrauterine nutrition. The average normal baby weight is 3200 grams with a gestational age of 37 to 41 weeks. Low birth weight babies (LBW) are babies born with a birth weight of less than 2500 grams regardless of gestational age.[2] As defined by WHO, low birth weight babies are babies born with a weight of less than 2500 grams. Babies with low birth weight are prone to experiencing rapid changes in body temperature.[3]

46.4 percent of neonatal deaths in Central Java Province in 2019 were due to LBW. As much as 40.5 percent of infant deaths in Central Java Province in 2019 were also caused by LBW.[4] Infants with low birth weight (LBW) are a risk factor for infant death. Therefore, as one of the efforts to prevent infant mortality is the handling of LBW. The causes of LBW among others because pregnant women experience anemia, lack of nutritional intake during pregnancy, or being born prematurely.[4]

The percentage of LBW in Indonesia in 2017 reached 12.7%, while in 2018 the percentage of LBW reached 12.5% (Ministry of Health RI, 2019). In Central Java, the percentage of low-birth-weight babies (LBW) in 2019 was 4.7 percent, an increase compared to the percentage of 4.3 in 2018.[4]

LBW will have a long-term impact, affecting the quality of the nation's next generation. Therefore general management of LBW is vital to prevent complications. General management that can be given to babies with LBW is maintaining body temperature, regulating and monitoring nutritional intake, preventing infection, weighing, administering oxygen, and watching the airway.

Babies who are less than normal in weight will easily experience stress, this can be seen from changes in physiological functions such as an increased risk of hypothermia, increased heart rate, increased or decreased respiratory rate can even cause apnea, and very fatal consequences in the form of a decrease in the percentage of hemoglobin which binds oxygen (SpO2).[5]

Hypothermia is one of the main causes of infant mortality, where every 1°C decrease in axillary temperature increases the risk of death by 75%. The temperature instability is caused by the process of losing body heat, the temperature regulation center in the hypothalamus is not perfect, the amount of subcutaneous fat is small, the ratio of surface area to body weight is large, the vasomotor response is unstable so it cannot constrict optimally to slow down heat loss, reduced heat production due to a little brown fat, and the inability to shiver. LBW care is complex and requires expensive infrastructure and highly skilled staff, so it is often a very upsetting experience for the family. This is because the care of LBW babies requires high costs because these babies require care in an incubator. In addition, incubator care has constraints, namely the limited number of incubators, and the knowledge, and abilities of hospital staff so that other efforts can be made to care for premature babies, which is currently known as Kangaroo Mother Care (KMC) or kangaroo method care.

Efforts to maintain the body temperature of LBW babies still need to develop low-cost technology so that hypothermia does not occur. The method that can be developed is to design a sling to

be used as a tool when doing the kangaroo method. Generally, the kangaroo method is a treatment method that uses skin-to-skin contact, where the mother uses her body temperature to warm her baby, the baby is naked (wearing only a diaper and a hat), placed vertically on the mother's chest between the mother's two breasts and then covered.

The Kangaroo Mother Care method can be done in 2 ways, namely continuously within 24 hours or intermittently or alternately. However, the Kangaroo Mother Care method can be applied more frequently by using the kangaroo method. Apart from functioning in warming the baby's body in this way it also functions in strengthening the Bounding Attachment between mother and baby.

Metka sling is a type of shawl tool specifically designed to manage the kangaroo method in LBW babies. This *metka* sling is created from cotton with a width of 36 cm, a height of 33 cm, and a thickness of 0.5 cm. The function of this *methka* scarf is the same as the sling or shawl used for the management of the kangaroo method, which functions to stabilize the baby's temperature, create a barrier bond between mother and baby, and make the baby suckle firmly. However, the method of wearing it is different from the scarf in general, namely by tying it around the neck which is then buttoned at the front, and a rope at the bottom that binds at the back.

The design of the cotton material makes the baby more comfortable during treatment. The size of the *Metka* sling is also designed according to the size of the baby born with low birth weight in most cases, namely 36 cm wide, 33 cm high, and 0.5 cm thick.

The use of *metka* sling can be applied to both types of kangaroo treatment methods. During PMK, mothers can do light activities at home so they need a safe carrier that can support the baby's head and neck. The way to wear it is different from the scarf in general, namely by wearing it around the neck which is then buttoned at the front and there is a rope at the bottom which is tied at the back. The strap design takes into account the load-bearing strength and safety of the baby. Respondents' perceptions of the *methka* scarf consisted of the ease of putting it on, facilitating breastfeeding, and the ability to hold the baby on the mother's chest.

METHODS

The research was conducted from May 2021 to July 2022 in the Perinatology Room of Salatiga City Hospital. This type of quantitative research with quasi-experimental research methods. The research design used was a two-group pretest-posttest design. The technique used in this study using a purposive sampling technique. The number of samples in this study was 30 babies according to the specified characteristics and criteria. Inclusion criteria in this study were premature or term newborns, 2 days old, and newborns weighing 1700-2499 grams. The research instrument is a thermometer, a thermometer is a tool used to measure temperature and determine changes in temperature before and after. In this study, researchers used a digital thermometer where the thermometer was only placed in the baby's armpit until the thermometer sounded to measure body temperature and get the results of the measurements. The observation sheets used in the research instruments include SOP for the kangaroo method with a *metka* sling, SOP for measuring the baby's body temperature.

In the intervention group, before kangaroo method was carried out with the *metka* sling, then the researchers gave treatment to LBW babies with the kangaroo method with the *metka* sling to 15 respondents. The kangaroo method was given for 2 hours. After the posttest, temperature measurements were carried out to determine the effect after giving the kangaroo method treatment with *metka* Infant Sling on LBW, grouped with LBW.

In the control group, the researchers measured LBW body temperature before the kangaroo method was used, then the researchers gave 15 respondents treatment for LBW babies with the kangaroo method. The kangaroo method was given for 2 hours. After the posttest, temperature measurements were carried out to determine the effect after giving the kangaroo method to LBW in the control group.

Figure 1. *Metka Sling*

Figure 2. How to use *Metka* Sling

Copyright Development of the *Metka* Sling Recording number: 000344004. Ethical number: 1127/KH.KEPK/KT/VII/2021.

Numerical data analysis used the mean or average, median, and standard deviation. Then the bivariate analysis was tested using Shapiro Wilk to find out the distribution of the data, then the Paired T Test was carried out to find out the meaningful effectiveness between the independent and dependent variables.

RESULT

The research was conducted at the Salatiga City Hospital in 2021-2022 with temperature measurements before and after being carried out in the intervention group and the control group.

Table 1. Statistical Analysis of the Effect of LBW Body Temperature Before and After Kangaroo Mother Care (KMC) Using *Metka* Infant Sling.

Body Temperature Variable LBW	**Mean**	**N**	**Std.**	**p-value**
Prior to KMC & *Metka*	36.33	15	1.2	.000
After doing KMC & *Metka*	37.07	15	2.3	

The test results for the effect of LBW body temperature before and after the use of kangaroo mother care (KMC) with the *Metka* infant sling, namely the significance value of 0.000, can be seen that p <0.05. There is an effect of LBW body temperature before and after kangaroo mother care (KMC) is performed with the *Metka* infant sling.

Table 2 Statistical Analysis of the Effect of LBW Body Temperature Before and After Kangaroo Mother Care (KMC)

Body Temperature Variable LBW	**Mean**	**N**	**Std.**	**p-value**
Prior to KMC	36.33	15	1.2	.000
After doing KMC	37.06	15	2.2	

The test results for the effect of LBW body temperature before and after kangaroo mother care (KMC) were carried out, namely a significance value of 0.000, it can be seen that p <0.05. There is an effect of LBW body temperature before and after kangaroo mother care (KMC).

The results of the Effectiveness test of Kangaroo Mother Care (KMC) Using *Metka* Infant Sling Against Increasing

Temperature in LBW. The results showed that there was no difference in difference in LBW body temperature. It can be concluded that they are equally effective in increasing LBW body temperature. So Effective Kangaroo Mother Care (KMC) Using *Metka* Infant Sling Against Increasing Temperature in LBW.

DISCUSSION

Kangaroo Mother Care (KMC) cares for newborns by attaching the baby to the mother's chest (contact between the baby's skin and the mother's skin) so that the baby's body temperature remains warm. When doing KMC the mother wears clothes that are larger than her body. So that mom and baby are in one outfit. If you do not have loose clothes, you can use a blanket.

Metka Sling is a type of sling tool specifically designed for the management of the Kangaroo Mother Care (KMC) method. This type of sling is shaped like a pouch where the baby is placed between the mother's chest and stomach attached skin to skin. Babies are left naked wearing only diapers, socks, and hats so that the baby's skin contact with the mother's skin is as wide as possible. The baby's position is secured with a long piece of cloth or another strap. The baby's head is turned to the right or left, with a slightly tilted position (extension). The end of the strap is just below the baby's ear. This *metka* sling is designed from cotton with a width of 36 cm, a height of 33 cm, and a thickness of 0.5 cm.[6]

The results of this study indicate that the body temperature of LBW in Salatiga City Hospital in 2021-2022 prior to the kangaroo method using the *metka* sling 36.34, which means that the LBW respondents who were respondents experienced hypothermia at a moderate level. Hypothermia in newborns is a body temperature below 36.5℃ which is measured in the armpit for 3-5 minutes. According to the SDKI DPP PPNI Working Group Team, (2016) hypothermia is defined as a body temperature below the body's normal range. The normal temperature for neonates is 36.5°C - 37.5°C (armpit temperature).

Research from Maniraju states that neonatal thermoregulation is a physiological condition that is strongly influenced by physical maturity and body surface area as well as environmental factors around the neonate. Hypothermia is at risk for newborns in any climate, whether in the tropics or in cold areas.[7] Karnati in her journal added that the increased risk of hypothermia can also be caused by low amounts of brown and white fat, immature thermogenesis, and inefficient compensatory mechanisms.[8]

The kangaroo method can be done by placing or attaching the baby directly to the mother's chest. At the time of the study, some mothers felt afraid when they were going to do Kangaroo Mother Care (KMC) with a *metka* infant sling because the baby was small and it was their first experience of having a baby (first child) as well as their first experience doing Kangaroo Mother Care (KMC). Then the researchers assisted the mother in installing the sling through health education and helped overcome fear by accompanying the mother during Kangaroo Mother Care (KMC). After taking care of the kangaroo method, the mother feels the benefits of skin-to-skin contact between mother and babies.

The results of this study showed that the average body temperature of LBW in Salatiga City Hospital after the kangaroo method with the *metka* sling was carried out was 37.09 which is a normal body temperature in newborns. These results are in line with Parti's research, which showed that the baby's body temperature had increased after Kangaroo Mother Care (KMC) was carried out. This can be seen from the mean value before the Kangaroo Mother Care (KMC) was carried out, which was 37.16. Whereas after PMK the baby's body temperature increased with a mean value = 37.34. [9]

The baby's environmental temperature while in the womb is 36°C-37°C and immediately after birth the baby is faced with generally lower environmental temperatures.[10] Immediately after the baby is born the newborn's temperature will drop. A baby who is still wet can lose enough heat to bring his body temperature down by as much as 2-4°C. Because in a wet state, the baby will lose most of his body heat through evaporation (evaporation) from the wet skin surface, the baby's body touch with cold objects (conduction), exposure to the air around the environment (convection), or touch with objects. which has a lower temperature around it (radiation).

Zakiyah in her research journal explained that maintaining a warm environmental temperature in premature babies is needed for metabolic efficiency or the conservation of body energy as measured by reducing calories. It is hoped that reducing or saving calories can improve physiological changes, and result in faster growth in infants [11]

The use of the *metka* infant sling by itself for the management of the kangaroo method, which functions to stabilize the baby's temperature, creates a bonding attachment between mother and baby and makes the baby suckle firmly. Effect of *Metka* Infant Sling on Increasing Body Temperature of Low Birth Weight Babies.[6]

Based on the results of the paired t-test analysis, it obtained a significance value of 0.000. It can be seen that p <0.05, then Ha is accepted. This means that there is a significant difference between the LBW body temperature data before being given the intervention and the LBW body temperature data after being given the intervention. So it can be concluded that there is an effect of *metka* Infant Sling on increasing the body temperature of low birth weight babies. Also got the results of the influence of Kangaroo Mother Care (KMC) on the physiological functions of LBW including increased body temperature, heart rate and oxygen saturation. [12] Then research by Dehghani & Zahra Pour Movahed, [13] which compared the KMC method with conventional methods on vital signs and oxygen saturation of newborns in the ICU also explained that KMC can contribute to the increase in temperature and oxygen saturation and the stability of the baby's cardiovascular and respiratory systems. [14]. WHO Immediate KMC Study Group, found a reduction in mortality among infants receiving KMC care.[15] Implementation of kangaroo mother care interventions can be carried out in low-resource settings and is innovative. Such treatment has the potential to reduce mortality in low birth weight and premature babies. Implementation of kangaroo mother care interventions can be carried out in low resource settings and is innovative. Such treatment has the potential to reduce mortality in low birth weight and premature infants.[16] There is a decrease in stress and anxiety scores in postpartum mothers and makes mothers happier. on stress and anxiety scores reduced in postpartum mothers and made mothers happier.[17] In the utilization of KMC, knowledge, attitude, and application of KMC treatment are very much needed in developing countries, especially in Ethiopia, so KMC care is really needed to make it easier to use. In the utilization of KMC, knowledge, attitude and practice of KMC treatment is very much needed in developing countries, especially in Ethiopia, so KMC care is really needed to make it easier to use.[18]. The practice of KMC care for low birth weight babies in a regional hospital in Indonesia. This study found that 57.7% of infants received KMC. Babies with a birth weight of more than 1500 g. KMC promotion efforts are recommended, especially in infants with birth weights of more than 1,500 grams. The practice of KMC care for low birth weight babies in a regional hospital in Indonesia. This study found that 57.7% of infants received KMC. Babies with a birth

weight of more than 1500 g. KMC promotion efforts are recommended, especially in infants with a birth weight of more than 1,500 g.[19]

Facilitating factors and barriers to the utilization of KMC care in low- and middle-income countries include access, support, coordination and collaboration, medical issues, motivation, social-obligation support gender empowerment, time, and traditional/cultural norms. Facilitating factors and barriers to the utilization of KMC care in low- and middle-income countries include access, support, coordination and collaboration, medical issues, motivation, social-obligatory support and gender empowerment, time and traditional/cultural norms. [20] The factors that influence the implementation of KMC are environmental factors, professional factors, parent/family factors, access factors, and cultural factors, and support from facility management and leadership and trained medical staff are very important for the successful integration of KMC into daily medical practice. Parents of premature infants and other family members should be educated and encouraged in KMC practices. Therefore the development of tools carried out in KMC care is very useful to increase satisfaction and comfort in KMC care. While the factors that influence the implementation of KMC are environmental factors, professional factors, parent/family factors, access factors, and cultural factors, and support from facility management and leadership and trained medical staff are very important for the successful integration of KMC into daily medical practice. day, while parents of premature infants and other family members should be educated and encouraged in KMC practices. Therefore the development of tools carried out in KMC care is very useful to increase satisfaction and comfort in KMC care.[21]

Giving the kangaroo method is considered very effective in meeting very basic baby needs such as warmth, breast milk, protection from infection, stimulation, safety, and affection. This shows that the kangaroo method is very useful for the management of LBW. Which, with the development of the era, the application of the kangaroo method can be carried out by innovation, one of which is in the tools used by adjusting the needs and comfort of its users.[6]

The Kangaroo Mother Care carrier (KMC needed is one that is comfortable, safe, and ergonomic, can support the baby's body in a frog-like position and the mother can use it herself. The *metka* sling is one of the innovations in kangaroo care. This type of sling is shaped like a pouch where the baby is placed in the area between the mother's chest and abdomen attached to the skin-to-skin. The design of the cotton material makes the baby more comfortable during treatment. The size of the *Metka* Infant Sling is also designed according to the size of the baby born with low birth weight in most cases, namely 36 cm wide, 33 cm high, and 0.5 cm thick.

The use of *metka* infant sling can be applied to both types of kangaroo treatment methods. While doing Kangaroo Mother Care (KMC), mothers can do light activities at home so they need a safe carrier that can support the baby's head and neck. The way to use it is different from the scarf in general, namely by placing it around the neck which is then buttoned at the front and there is a rope at the back. the lower part is tied at the back. The design of the straps takes into account the strength of the load-bearing and the safety of the baby. The respondents' perceptions of the *metka* Infant Sling consist of ease of putting on, facilitating breastfeeding, and the ability to hold the baby on the mother's chest.

CONCLUSION

There was a significant effect of the kangaroo method with *metka* shawls on LBW body temperature at RUD Salatiga

City in 2021. From these results, the *Metka* Infant Sling has significant benefits for the body temperature of babies with low birth weight.

The function of *metka* sling is to stabilize the baby's temperature, create a bonding attachment between mother and baby, and make the baby suckle firmly. However, the method of wearing it is different from the sling in general, namely by wearing it around the neck which is then buttoned at the front and there is a rope at the bottom which is tied at the back.

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