



The Effect of Kangaroo Mother Care on Rooting – Sucking Reflex on Low Birthweight Infant

Parida Hanum^{1*}, Seri Wahyuni Harahap², Verawaty Fitrinelda Silaban¹, Kristina L. Silalahi¹, Rahmaini Fitri Harahap¹, Elis Anggeria¹

¹Department of Midwifery and Nursing, University of Prima Indonesia, Medan, Indonesia; ²Academy of Midwifery, Kholisaturrahmi Binjai, Binjai, Indonesia

Abstract

BACKGROUNDS: Kangaroo Mother Care is a comprehensive method given for all newborn especially for premature and low birthweight infants. This treatment is the most feasible and preferred intervention to reduce morbidity and mortality, especially in infants with low birth weight who are more susceptible to disease or infection, including disorders of the rooting – sucking reflex

AIM: The objective of this study was to the effectiveness of Kangaroo Mother Care on Rooting – Sucking Reflex on low birthweight infant

METHODS: This type of study is a quasi-experimental design with pre-test and post-test with control group design. This study was conducted at RSUD Dr. R.M Djoelham Binjai in October - November 2021 and consisted of infants with low birthweight equally divided into the intervention group and control group, each group consists of 20 low birthweight infants. Low birthweight infants in the intervention group were treated with kangaroo mothers for 2 h after birth, while low birth weight infants in the control group was treated using standard NICU unit procedures. The instrument used in this study is an observation sheet to assess the rooting - sucking reflex. The statistical test used is the Wilcoxon Signed-Rank Test

RESULTS: The result of the study showed that there was a difference in the mean Rooting – Sucking Reflex on Low Birth Weight for the pre-test of the intervention group and the post-test of the intervention group ($p < 0.001$). In the control group, $p = 0.001$ was obtained, which means that there was a difference in the average Rooting-Sucking Reflex on Low Birthweight infant for the pre-test of the control group and the post-test of the control group ($p = 0.001$).

CONCLUSION: Kangaroo Mother Care has effectiveness against Rooting-Sucking Reflex on Low Birthweight infant.

Edited by: Sasho Stoleski
Citation: Hanum P, Harahap SW, Silaban VF, Silalahi KL, Harahap RF, Anggeria E. The Effect of Kangaroo Mother Care on Rooting – Sucking Reflex on Low Birthweight Infant. Open Access Maced J Med Sci. 2022 Feb 11; 10(E):550-554.
<https://doi.org/10.3889/oamjms.2022.8300>
Keywords: Kangaroo mother care; Rooting reflex; Sucking reflex; Low birthweight; Infant
***Correspondence:** Parida Hanum, Department of Midwifery and Nursing, University of Prima Indonesia, Medan, Indonesia. E-mail: paridahnum@unprimd.ac.id
Received: 17-Dec-2021
Revised: 06-Jan-2022
Accepted: 01-Feb-2022
Copyright: © 2022 Parida Hanum, Seri Wahyuni Harahap, Verawaty Fitrinelda Silaban, Kristina L. Silalahi, Rahmaini Fitri Harahap, Elis Anggeria
Funding: This research did not receive any financial support
Competing Interests: The authors have declared that no competing interests exist
Open Access: This is an open-access article distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (CC BY-NC 4.0)

Introduction

Newborns must adapt to the environment outside the womb. This adaptation process is expanded by the birth of premature babies or low birthweight (LBW) because various organs of the body are not functioning optimally so they require special needs [1]. The percentage of LBW incidence is higher in rural areas than in urban areas. This is related to families with economic and educational levels [2].

LBW is one of the main causes of newborn mortality. Health problems or even death often occur in babies weighing <2500 g at birth [3]. Research conducted by ZL Chen and FY Liby examining 19 hospitals in 18 cities showed that the incidence of premature and low birth weight babies in live births was 4.9% and 5.1%, respectively. Mortality rates were as high as 85.5/1000 and 97.7/1000 and deaths accounted for 45.9% and 54.5% of total neonatal deaths, respectively [4].

In less developed countries high rates of LBW are due to preterm birth and impaired intrauterine growth, and their prevalence is decreasing slowly. Since

causes and determinants remain largely unknown, effective interventions are limited. Moreover, modern technology is either not available or cannot be used properly, often due to the shortage of skilled staff [5]. One of the interventions that can be done in preventing complications due to LBW is with baby massage and KMC [6].

Kangaroo Mother Care (KMC) also known as Kangaroo Method Care (PMK) is one of the methods used for LBW, especially those with birth weight <2000 g. KMC is skin to skin contact between mother and baby, known as skin to skin contact [7]. Study conducted by Oksuz and Inal (2021) on The effect of kangaroo mother care applied to the healthy newborns in the early postpartum period on breastfeeding obtained the result that KMC administered to healthy newborns immediately after birth encouraged the newborns to take to the breast sooner, more frequently, and for longer periods. It also increased their suckling skills [8].

Study Rhomawati in 2016 obtained the results that in Sleman Hospital, there was a change in the rooting-sucking reflex of LBW neonates who were

treated with a combination of LBW massage and the KMC method [9]. Brown fat reserves in babies who are not full term are less at birth, so, it takes a massage touch on the muscle tissue around the lips to provide initial stimulation so that blood circulation is smooth, muscle function increases and stimulates the suction reflex and can improve the function of other body organs. This is an effort to reduce the mortality rate of LBW by overcoming problems associated with a weakened suction reflex and preventing cold stress. KMC therapy technique is often used as an alternative to using an incubator to warm the baby [10].

KMC is a natural and inexpensive approach and is very easy to use. This method also contributes to the stabilization of vital signs, development of the nervous system, nutrition in the early period, rapid weight gain and achievement of ideal birth weight in a short time, decreased crying, fewer medical problems, reduced morbidity, and improved sleep quality of the baby [11].

In low birthweight infant and premature, skin-to-skin contact between mother and baby reduces symptoms of postpartum depression. Apart from being beneficial for the health of both mother and newborn, KMC is an important alternative in reducing the cost and length of postnatal hospital stay, thereby providing economic benefits for parents. LBW and LBW given by KMC spent less time in hospital than those given standard care [12].

It has been emphasized in many studies that KMC increases the rate of suckling associated with rooting and sucking reflexes [13]. Although in practice in several hospitals, KMC is still carried out intermittently due to the unstable condition of the baby and postpartum mother and the limited space in the nursery, varying findings were stated. Therefore, the main objective of this study is for the continuation of KMC in LBW to improve the breastfeeding process and the rooting – sucking reflex

Materials and Methods

This type of study is using a quasi-experimental design with pre-test and post-test with control group design, namely the intervention group is given treatment, and then the effect of the treatment is measured and analyzed [14]. This study was conducted at RSUD Dr R. M. Djoelham Binjai in October–November 2021 and consisted of infants with low birth weight equally divided into an intervention group and a control group.

The population in this study were all LBW infant as many as 65 people. The sample in this study was all LBW from August to November 2021 that met the criteria. Inclusion criteria consisted of LBW infants

aged 0–28 days, birth weight <2500 g. Exclusion criteria consisted of LBW infants with congenital abnormalities (congenital defects), Infants who are seriously ill (included with ET, cytop, and other stabilizer aids) and infants are declared unable to do so. The number of samples is obtained from the sample size formula to test the hypothesis on the mean of the two populations [15], namely:

$$n_1 = n_2 = 2 \left[\frac{(z_\alpha + z_\beta) s}{(X_1 + X_2)} \right]^2$$

Description:

s = standard deviation of both groups (from the literature)

$X_1 - X_2$ = desired clinical judgment (clinical judgment)

α = level of significance (determined by the researcher)

z_β = power (set by researcher)

The results of the previous studies conducted by Hikmah on the effect of touch therapy on the temperature and pulse frequency of premature infants who were treated in the perinatology room at the RSU Tangerang with the number of each for the control group and the intervention group were 15 infants, the standard deviation of the two mean differences was paired. Is 0.20. In this study, the results of the measurement of the average body temperature before the intervention were 36.69 and the average body weight after the intervention was 36.87 [16].

Based on the above formula and referring to the results of the study, the minimum required sample size is as follows:

$$n_1 = n_2 = 2 \left[\frac{(1.96 + 0,842)0,20}{(81,1 + 53,0)} \right]^2$$

$$n_1 = n_2 = 20$$

Based on these data, the minimum number of samples used is 20 people for each group. The sample was taken by consecutive sampling, that is, all subjects who came and met the selection criteria were included in the study until the number of study subjects was met. The sampling flow can be seen in the flowchart of sampling below Figure 1.

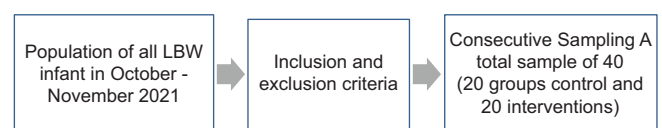


Figure 1: Sampling flowchart

The use of the KMC method in this study is the care of newborns by attaching the baby to the mother's chest (contact with the baby's skin and mother's skin). LBW in the intervention group that provided KMC

treatment was intermittent KMC, KMC with a short period of time (attachment of more than 1 h/day). The duration of KMC measured in this study was 2 h with a frequency of 1 time a day. The tool used to measure the duration of KMC itself is a stopwatch. How to measure the duration starting from the first baby is attached to two hours. While LBW infants in the control group were treated using standard NICU unit procedures.

Assessment of the rooting-sucking reflex is done by bringing the fingers and touching them to the cheeks and the area around the baby's mouth and then evaluating. The instrument used in this study is an observation sheet. The value is 0 if the baby is non-reactive, 1 if the baby moves the mouth or corners of his mouth, 2 if the baby moves the corners of his mouth while turning and or sucking. The classification of scoring is based on the characteristics of the rooting-sucking reflex. Measurements were carried out for 3 consecutive days. Then see the mean difference before and after the intervention. After the data are collected, it is analyzed using the statistical test Wilcoxon Signed-Rank Test

Results

The univariate analysis in this study obtained, frequency distribution, and percentage of characteristics. Following are the respective groups (Table 1).

Table 1: Distribution of respondents frequency by age, type of pregnancy, weight birth body, and gender (n1 = n2 = 20)

| Characteristics | Subject | | | | Total | |
|----------------------------|--------------------|-----|---------------|-----|-------|-----|
| | Intervention group | | Group control | | Mean | |
| | n | (%) | n | (%) | n | (%) |
| Gestational age | | | | | | |
| Preterm (<37 weeks) | 14 | 70 | 14 | 70 | 28 | 70 |
| Term (37–42 weeks) | 6 | 30 | 6 | 30 | 12 | 30 |
| Post-term (42 weeks) | 0 | 0 | 0 | 0 | 0 | 0 |
| Amount | 20 | 100 | 20 | 100 | 40 | 100 |
| Birth weight (in g) | | | | | | |
| LBW | 12 | 60 | 16 | 80 | 28 | 70 |
| VLBW | 8 | 40 | 4 | 20 | 12 | 30 |
| ELBW | 0 | 0 | 0 | 0 | 0 | 0 |
| Amount | 20 | 100 | 20 | 100 | 46 | 100 |
| Gender | | | | | | |
| Woman | 6 | 30 | 6 | 30 | 12 | 30 |
| Man | 14 | 70 | 14 | 70 | 28 | 70 |
| Amount | 20 | 100 | 20 | 100 | 40 | 100 |

Based on Table 1 above it can be seen that based on gestational age, the majority were preterm (<37 weeks) There were a total of 28 (70%) responses, with 14 from the interventions group and 14 from the control group. and gestational age minority, 12 people (30%) were of term gestational age, with a distribution of six people in the intervention and control groups. There were no respondents with a gestational age of more than 42 weeks in this study. Based on birth weight, the majority of respondents were in the LBW category (more than 1500 to <2500 g) and the minority in the LBW category (<2500 g). The LBW category has

28 respondents (70%), with 12 in the group and 16 in the control group. Based on gender, the majority were male as many as 28 people (70%) of which six people were in both the intervention and control groups and the minority was female as many as 12 people (30%) consisting of six people both in the intervention group and control group.

Data Analysis of Pre-test and Post-test Experimental Group can be seen as below (Table 2).

Table 2: Descriptive statistical results

| Group | n | Mean | Standard deviation |
|------------------------|----|------|--------------------|
| Pre-test intervention | 20 | 0.35 | 0.489 |
| Post-test intervention | 20 | 1.20 | 0.410 |
| Pre-test control | 20 | 1.60 | 0.503 |
| Post-test control | 20 | 0.70 | 0.470 |

Based on the analysis of the pre-test data, the Mean value was 0.35 and the Standard Deviation was 0.489 and in the intervention group (post-test) the Mean value was 1.20 and the Standard Deviation was 0.410. In the control group, the mean value is 1.60 and the standard deviation is 0.503 (pretest) and the mean value is 0.70 and the standard deviation is 0.470 in the control group (posttest).

The results of statistical tests conducted to determine the effect of the Kangaroo Mother Care Method on Rooting-Sucking Reflex on Low Birthweight Infant are shown in Table 3.

Table 3: The effect of the kangaroo mother care method on rooting – sucking reflex on low birthweight infant

| Group | N | Z | p-value |
|------------------------|----|--------|---------|
| Pre-test intervention | 20 | -3.690 | < 0.001 |
| Post-test intervention | 20 | | |
| Pre-test control | 20 | -3.448 | 0.001 |
| Post-test control | 20 | | |

In Table 3, it can be seen that in the Intervention group the $p < 0.001$ which means that there is a difference in average Rooting – Sucking Reflex on Low Birthweight infant for pre-test in the intervention group and post-test in the intervention group (Kangaroo Mother Care Method). In the control group, $p = 0.001$ was obtained, which means that there is a difference in the average Rooting – Sucking Reflex on Low Birthweight infant for the pretest of the control group and the post test of the control group, so it can be concluded that the Kangaroo Mother Care Method has effectiveness against the Rooting – Sucking Reflex on Low Birthweight infant.

Discussion

Based on birth weight in this study, the majority of respondents are in the LBW category. Data analysis revealed that newborn weighing <2500 g had a gestational age of preterm (<37 weeks) or term (more than 37 weeks) (more than 37 weeks to <42 weeks). Gestational age greatly determines the development

of newborn in adapting to the environment outside the womb. Pregnancy <42 weeks are study respondents in the intervention and control groups [17].

KMC is a method that warms the baby's body and can provide comfort and stimulate premature babies to achieve optimal development [18]. Moore *et al.* in their systematic review of randomized controlled studies concluded that KMC increases the likelihood of initiation of breastfeeding [19]. KMC is the most natural and most effective method for optimizing skin-to-skin contact. In addition to touch, the baby feels warmth and smells the mother's smell, hears the mother's heartbeat and breathing, and listens to the mother's words. The method can last for several hours (even on a baby on a ventilator) and is also very effective at building a strong bond between father and baby [20].

Breastfeeding activities are related to reflex movements that occur automatically outside of consciousness. One of the reflexes that greatly affect breastfeeding is the rooting and sucking reflexes [21]. Study conducted by Mekonnen *et al.* found premature and low birth weight infants who used KMC intervention initiated breastfeeding 2 days 14 h 24 min earlier than conventional care of radiant warmer/incubator method. Kangaroo mother care promotes early initiation of breastfeeding as compared to conventional care method [22].

KMC is very beneficial if it can be done at the same time with baby massage. Giving the combination method will increase blood circulation, so that more oxygen is supplied to the brain and throughout the body, increasing energy. In addition, giving massage before KMC is able to improve blood circulation and make babies hungry so that when this method is used, babies are stimulated to seek and suck breast milk to meet their nutritional needs. Therefore, the rooting-sucking reflex, the cause of impaired coordination of the central nervous system in LBW due to hypoglycemic predisposing factors, can be overcome [23].

According to experts, this rooting reflex is known as a hunger cue for babies [24]. Reflexes in infants are said to be good if they meet 3 criteria, namely, the presence of a rooting reflex, a sucking reflex, and a swallowing reflex. The average suckling reflex that is not good occurs in infants who do not initiate early breastfeeding related to KMC which is known as skin to skin contact. Mother's age, educational status, baby's gestational week, birth weight, and other characteristics have an effect on breastfeeding [25]. The results of the current study showed that infants given KMC recognized their mother more quickly, started breastfeeding earlier, had higher rates of breastfeeding within the first 30 min, and all KMC infants had been breastfed within 1 h. The KMC recommended that midwives and nurses who provide breastfeeding guidance should be made more aware of the importance of KMC so that they can create opportunities to apply it to newborns with the aim of promoting breastfeeding.

The limitation of the study is that the number of samples is only 65 people. The distribution of the data in this study is homogeneous but not normally distributed. According to the researcher, a larger study sample is needed to describe the differences between the variables

Acknowledgments

The authors are grateful of this study to Universitas Prima Indonesia, especially the Faculty of Nursing and Midwifery.

Conclusion

The conclusion of this study is that there is a difference in the average Rooting – Sucking Reflex on Low Birth Weight infant for the pre-test of the intervention and control groups with the post-test of the intervention and control groups (Kangaroo Mother Care Method) so it can be concluded that the Kangaroo Mother Care Method has effectiveness against Rooting – Sucking Reflex on Low Birthweight Infant.

References

1. Daswati D. Menurunkan Kecemasan Ibu Nifas. Bandung: CV Media Sains Indonesia; 2021. p. 11-2.
2. Rahayuningsih FB. Peningkatan Kualitas Hidup Ibu Nifas. Makassar: PT Nas Media Indonesia; 2020.
3. Halosehat. Penyebab Kematian Bayi Baru Lahir yang Paling Umum di Indonesia. Hello Health Group, Jakarta; 2021.
4. Chen XL, Li FY. Mortality rate and causes of death of premature and low-birth-weight infants in 18 cities. *Zhonghua Fu Chan Ke Za Zhi*. 1993;28(1):27-30.
5. World Health Organization, Research RH and UNAIDS. Kangaroo Mother Care. WHO Library Cataloguing-in-Publication Data. Geneva: World Health Organization; 2013.
6. Davis DL, Tesler Stein M. Parenting Your Premature Baby and Child : The Emotional Journey. United States: Fulcrum Pub; 2016.
7. Docta R, Liva M, Maya SE, Rina Y. Buku Ajar Asuhan Neonatus, Bayi/Balita Dan Anak Prasekolah. Yogyakarta: Deepublish; 2015. p. 9.
8. Oksuz SK, Inal S. The effect of kangaroo mother care applied to the healthy newborns in the early postpartum period on breastfeeding: A randomized controlled trial. *J Pak Med Assoc*. 2021;71(9):2124-9. <https://doi.org/10.47391/JPMA.376> PMID:34580499
9. Rhomawati WS, Estiwidani D. Pengaruh kombinasi pijat BBLR dan KMC terhadap rooting-sucking reflex neonatus. *Kesehat*

- Ibu dan Anak. 2016;11(1):23-32.
10. Girsang BM. Asuhan Keperawatan-perawatan Metode Kangguru (PMK). Yogyakarta: Universitas Sumatera Utara; 2020.
 11. Walters MW, Boggs KM, Ludington-Hoe S, Price KM, Morrison B. Kangaroo care at birth for full term infants: A pilot study. *MCN Am J Matern Nurs.* 2007;32(6):375-81. <https://doi.org/10.1097/01.NMC.0000298134.39785.6c>
PMid:17968221
 12. Elhalik M, El-Atawi K. Breast Feeding and Kangaroo Care. *J Pediatr Neonatal Care.* 2016;4(6):4-5.
 13. Yılmaz F, Küçükoğlu S, Özdemir AA, Oğul T, Aşki N. The effect of kangaroo mother care, provided in the early postpartum period, on the breastfeeding self-efficacy level of mothers and the perceived insufficient milk supply. *J Perinat Neonatal Nurs.* 2020;34(1):80-7. <https://doi.org/10.1097/JPN.0000000000000434>
PMid:31895303
 14. Swarjana IK, Janner S, Ronal W, editors. *Metodologi Penelitian Kesehatan.* Yogyakarta: CV ANDI OFFSET; 2015.
 15. Santosa. *Buku Ajar Metodologi Penelitian.* Bogor: IPB Press; 2019.
 16. Hikmah E. Tesis : Pengaruh Terapi Sentuhan Terhadap Suhu Dan Frekuensi Nadi Bayi Prematur Yang Di Rawat Di Ruang Perinatologi RSUD Kabupaten Tangerang. Indonesia: Fakultas Ilmu Keperawatan Unieversitas Indonesia; 2016.
 17. Hikmah E. Pengaruh Terapi Sentuhan Terhadap Suhu Dan Frekuensi Nadi Bayi Prematur Yang Dirawat di Ruang Perinatologi RSUD Kabupaten Tangerang. Tangerang: Fakultas Ilmu Keperawatan Universitas Indonesia; 2010.
 18. Yusna D. *Arti Hadirmu, Nak-Jelajah Hidup Bersama Bayi Prematur.* Yogyakarta: Stiletto Book; 2020.
 19. Moore ER, Bergman N, Anderson GC, Medley N. Early skin-to-skin contact formothers and their healthy newborn infants. *Cochrane Database Syst Rev.* 2016;11(11):CD003519. <https://doi.org/10.1002/14651858.CD003519.pub4>
PMid:27885658
 20. EVertz K, Janus L, Linder R. *Handbook of Prenatal and Perinatal Psychology : Integrating Research and Practice.* Germany: Springer International Publishing; 2020. p. 802.
 21. Eveline PN, Djamaludin N. *Panduan Pintar Merawat Bayi and Balita.* Jakarta: PT Wahyu Media; 2010.
 22. Mekonnen AG, Yehualashet SS, Bayleyegn AD. The effects of kangaroo mother care on the time to breastfeeding initiation among preterm and LBW infants: A meta-analysis of published studies. *Int Breastfeed J.* 2019;14(1):12-7.
 23. Roesli U. *Pedoman Pijat Bayi Prematur and Bayi Usia 0-3 Bulan.* Jakarta: Trubus Agriwidya; 2001. p. 41.
 24. Adejuyigbe EA, Anand P, Ansong D, Anyabolu CH, Arya S, Assenga E, *et al.* Impact of continuous kangaroo mother care initiated immediately after birth (iKMC) on survival of newborns with birth weight between 1.0 to < 1.8 kg: Study protocol for a randomized controlled trial. *Trials.* 2020;21(1):1-13. <https://doi.org/10.1186/s13063-020-4101-1>
PMid:32188485
 25. Leahy-Warren P, Mulcahy H, Phelan A, Corcoran P. Factors influencing initiation and duration of breast feeding in Ireland. *Midwifery.* 2014;30(3):345-52. <http://doi.org/10.1016/j.midw.2013.01.008>
PMid:23473933