



# KMC dan LBW

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# Relationship Between Kangaroo Mother Care Practice and Weight of Low Birth Weight's Infants in North Jakarta

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## ABSTRACT

Infant and neonatal mortality rates are still high in Indonesia, where the main problem of infant mortality is neonatal. One of the causes of neonatal death is Low Birth Weight (LBW)'s infants who currently reach a prevalence of 10.2%. Kangaroo Mother Care (KMC) is one of the interventions to reduce death in LBW's infants, by making direct contact between the baby's skin and the mother's skin. The practice of KMC has various benefits, one of which is to increase the baby's weight. The purpose in this study is to analyze the relationship between KMC practice and weight of LBW's infants in North Jakarta. This research was conducted in North Jakarta with a research population is a mother who has LBW's infants post discharge from Koja Regional General Hospital, North Jakarta. Sampling was conducted by consecutive sampling. Dependent variable was infants' weight and independent variable was KMC practice. Data collection was conducted through questionnaires and analyzed using Mann-Whitney analysis. Most LBW's infants' mothers' practice KMC in a good position with an average duration of KMC practice of 3,02 hours per day. Based on Mann-Whitney's statistical tests, there is a significant relationship between KMC practice and infants' weight. Infants' weight is one the important factors of health, growth, and survival of LBW infants.

**Keywords:** Kangaroo Mother Care, Low Birth Weights' Infants, Weight

## 1. INTRODUCTION

Infant Mortality Rate and Neonatal Mortality Rate in Indonesia are still very high compared to other ASEAN countries, which is 32 deaths of 1,000 births (IMR) and 19 per 1,000 live births (NMR) (1). The main cause of infant death is neonatal, which contributes to 59% of infant deaths in Indonesia (Ministry of Health, 2016). Neonates are newborns up to 28 days old. Infants less than one month old are the age group that has the highest risk of health problems, such as asphyxia, hypothermia, neonatorum tetanus, infection/sepsis, birth trauma, Low Birth Weight (LBR), respiratory disorder syndrome, and other congenital abnormalities. The weight of the baby at birth is an important factor for the survival of the baby. LBW is a group of babies born weighing less than 2500 grams regardless of gestational age, either premature or sufficient months. The percentage of LBW in Indonesia in 2018 reached 10.2%. Infants with LBW conditions have a higher risk of death from hypothermia and generally should be treated in an incubator. Babies of low or very low weight produce NMR of 66 deaths of 1,000 live births (1). LBW

is a significant public health issue due to its impact on cognitive, motor, and social/emotional health and development, both short and long term. Kangaroo Mother Care (KMC) is one of the interventions to reduce death in LBW, by making direct contact between the baby's skin and the mother's skin (skin to skin contact) in order for the baby to get warmth from the mother's body (2). Based on a systematic review and meta-analysis of the impact of KMC on neonates found that KMC has been shown to decrease mortality, risk of neonatal sepsis, hypothermia, hypoglycemia, and hospitalization as well as increase exclusive breastfeeding. LBW receiving KMC's lower average levels of breathing and pain, as well as higher oxygen saturation, temperature, and head circumference growth (3). Babies with LBW can get KMC inside and outside the hospital. Babies who still need specialist care facilities should be hospitalized, while babies with stable general condition, good drinking tolerance and mothers considered able to do KMC can be treated at home with the supervision of trained health workers (4). KMC in the community or KMC implemented at home is the implementation of KMC

carried out on LBW born at home or early discharge from the hospital (2). The goal of KMC in the community is to prevent hypothermia, respiratory-related diseases, diarrhea and improve newborn nutrition (5).

The difference condition between hospital and home will affect the implementation of KMC when mother post discharge from. When in the hospital, the mother gets education and supervision from health workers, while at home there are various factors that can prevent the mother from practicing KMC optimally. According to Quase et al., (6), the sustainability of the KMC depends on local conditions in the home and community. Some studies have suggested that most mothers continue to practice KMC at home, but there are various obstacles that can affect the practice of KMC (6), (7), (8). A study in India (8) found that KMC is practiced with an average duration of 3,3 hours per day and 5,1 days per week. The obstacle in practicing KMC is the lack of motivation and privacy at home. While other studies in India (8) found that mothers continue to practice KMC at home with an average KMC duration of 1,3 hours per day, with support from family members. A study in Ghana (7) mentioned that mothers prefer to practice KMC intermittently, while another study in Nigeria (8) found that mother's practice KMC only alone at home because they do not know that KMC can practiced by other family members. Some research in Indonesia also explains the experience of mothers in practicing KMC after leaving the hospital. The results of the study on LBWs' infants' mothers post discharge from Koja Regional General Hospital, North Jakarta (9) stated that as many as 75% of mothers continue KMC at home, with a median KMC duration of 3.75 hours per day. Some obstacles in practicing KMC at home are the unpreparedness to become a mother due to too young an age, unwanted babies, mothers not knowing the period of KMC, working mothers, busy mothers taking care of other children, unmotivated mothers doing KMC, and nothing to help mothers do household chores during KMC. Research conducted by Tambunan et al (2018) shows that mother's practice KMC at home with an average duration of 1,5 hours per day. The supporting factors in implementing KMC in the community are one of the important factors in the success of KMC in the community. Various studies discuss the supporting factors of the implementation of KMC in the community, consisting of maternal, family, community, and health care factors (10), (11), (12), (13), (8), (7), (6).

North Jakarta is an area with a prevalence of IMR (0,7%) and LBW (0,46%) 2nd highest in DKI Jakarta. Based on preliminary study among LBWs' infants' mothers post discharge from Koja Regional General Hospital, North Jakarta found that KMC practice has been done at home, but the mother does not practice KMC for a long period of time and cannot do it continuously for 24 hours. The implementation of sub-optimal PMK will have an impact on weight gain among LBWs' infants. Based on the above problems, this study aims to analyze the relationship between KMC practice and weight of LBWs' infants in North Jakarta.

## 2. METHOD

This research is quantitative research with a cross-sectional approach. Measurements was conducted during home visits on LBWs' infants' mothers post discharge from hospital. Data collection is done through questionnaires and observations on mothers and weighing on infants during home visits. Data collection through questionnaires aims to identify demographic characteristics and practice of KMC and data collection through observation aims to observe KMC practice, and weighing aims to measure infants' weight. The data analysis in this study consists of univariate and bivariate analysis. Univariate analysis is used to present proportional and numerical data, such as the spread of demographic characteristics and the spread of each variable to be examined. Bivariate analysis is used to determine the relationship or difference between at least two variables. The bivariate analysis used in this study is Mann-Whitney test.

## 3. RESULTS

### Socio-Demographic Characteristics of Respondents

The average age of LBWs' infants' mothers in the study was 31 years, while the husband was 32 years old. The average age of maternal gestation is 34 weeks. The average weight of infants born is 1918.52 grams, the weight of the infants' weight return home is 1974.52 grams. The majority of LBWs' infants' mothers are highly educated (62%), multipara (90%), in-action childbirth (56%), and have no post-delivery health problems (84%). The majority of husbands of LBWs' infants' mothers are highly educated (82%) and work as a labourer (46%). As many as 86% of babies do not have post-treatment health problems from Koja Hospital. Data on the socio-demographic characteristics of respondents can be found in the following table.

### KMC Practice among LBWs' Infants' Mothers

In this study, all LBWs' infants' mothers' practiced KMC post discharge from Koja Hospital, North Jakarta. This can be because previously mothers have been educated about KMC in hospitals and they continue to practice KMC when they return home. The duration of KMC in this study was 3,02 hours per day.

Based on observations about KMC practices conducted by LBWs' infants' mothers, it was found that most LBWs' infants' mothers' practice KMC well (72%) than LBWs' infants' mothers who practice KMC poorly (28%). The practice of KMC is observed using an observation sheet. Observation of KMC position is measured from 7 components of KMC practice, which consists of maternal preparation before KMC, KMC equipment, KMC position (baby is placed between the mother's breast in a perpendicular position, there is skin-to-skin contact between the mother and baby, the baby's head is turned left or right with a slight lying position, the baby's hands and feet are in a frog-like bending position), and how to tie the fabric to KMC (ties are not too tight or too loose). Based on the observations, it was found that all LBWs' infants' mothers have practiced KMC in the absence of skin-to-skin contact



between the mother and the infants. However, the study found that there are a small number of LBWs' infants' mothers who are less precise in positioning KMC, for example only a small part of the baby's body that attaches to the mother's skin and KMC bonds that are too tight or loose. The lack of proper positioning can reduce the benefits of skin-to-skin contact between mother and baby. Too tight a bond can cause the baby to be uncomfortable and unable to breathe properly, while too loose a bond can result in

an unsafe position of the baby when carried and can make the mother uncomfortable when doing activities while doing KMC.

A small number of LBWs' infants were practice KMC in an inappropriate position because they have difficulty tied KMC fabric when no one helps tie the fabric. They tend to tie the fabric too tight or loose when tying it themselves. But there are some LBWs' infants' mothers who try to tie the fabric of KMC alone without being helped by others.

**Table 1. Socio-Demographic Characteristics of**

Respondents Variable	Mean	Standar Deviation
Age of mothers	30,74 years old	5,74
Age of mothers' husband	32,08 years old	4,62
Gestational age	33,71 weeks	1,83
Infants' born weight	1918, 52 gr	167,08
Infants' return home weight	1974,52 gr	113,54
Variable Frequency Presentation		
Mothers of level education		
- Low	19	38
- High	31	62
Husbands of level education		
- Low	9	18
- High	41	82
Parity		
- Primipara	5	10
- Multipara	45	90
Delivery		
- Normal	22	44
- In-Action	28	56
Mothers' health problem		
- No	42	84
- Yes	8	16
Infants' health problems		
- No	43	86
- Yes	7	14

**Table 2 KMC Practice among LBWs' Infants' Mothers**

Variable	N (%)
KMC practice	
- Bad	14 (28)
- Good	36 (72)
Time of KMC practice	
- Morning	10 (20)
- Afternoon	22 (44)
- Night	18 (36)
People who practice KMC	
- Mothers	28 (56)
- Mothers and fathers	14 (28)
- Mothers, grandmothers, aunty, etc	4 (16)

**Table 3 Relationship between KMC Practice and Weight of LBWs' Infants**

Infants' Weight	KMC Practice Mean+SD	p value
Good 2102,78+71,02	Bad 1970±72,54	0,0005

If the mother is alone at home, the mother's way of tying the KMC cloth to the infants is to put the infants on her mother's bed or thigh first, then the mother bends down and ties the cloth behind her mother's body. But if there are family members who live with the mother or accompany the mother, then they can help the mother to tie the fabric of KMC. Most LBWs' infants' mothers in the study were practiced KMC during the day (44%), while other LBWs' infants' mothers were practiced in the morning (20%) and night (36%). During the day or night, LBWs' infants' mothers in this study get help from other family members to tie the fabric of KMC. LBWs' infants' fathers usually help mothers to tie KMC cloth at night when coming home from work.

Most LBWs' infants' mothers in this study practiced KMC alone (56%). This can be because they are less aware that there are others who can replace mothers to practice KMC. In addition, mothers also do not agree that others can also practice KMC. According to the mother, the practice of KMC can only be done by the mother because of concerns to hold her small baby. Family members are also sometimes afraid to carry babies in pmk positions. But there are also some LBWs' infants' mothers in this study who are assisted by other family members such as husbands, grandmothers, and aunts in practicing KMC. When the mother lives with a large family, then the grandmother or aunt can replace the mother to practice KMC. While the husband can replace the mother to practice KMC at night after coming home from work. Data on the KMC practice among LBWs' infants' mothers can be found in the following table.

#### 1 Relationship between KMC Practice and Weight of LBWs' Infants

Breastfeeding is part of the implementation of KMC which is very important for the growth of infants, therefore to increase the infants' weight. Most LBWs' infants' mothers breast milk while doing KMC. If the mother is holding the baby in a KMC position, then the mother will easily position the baby to breastfeed, as it is only left to shift the position of the baby to the right or left to breastfeed. Most LBWs' infants' mothers in this study benefited from KMC practices such as proximity to their babies, feelings of comfort in the mother, more breastfeeding, healthier babies, and increased baby weight each week.

The infants' weight in the study was measured by weighing infants when researchers made home visits. In this study, infant weight in mothers who practiced KMC well (2102.78 grams) was higher than the baby's weight in mothers who practiced KMC poorly (1970 grams). Before the bivariate analysis is carried out, a normality test is carried out first for numerical variables, namely the weight of the infants. Based on Kolmogorof Smirnov's test found that the infants' weight was abnormally distributed ( $p > 0.05$ ), so the statistical test to be conducted was Mann-Whitney non-parametric statistical test. Based on Mann-Whitney statistical tests,

there was a significant relationship between KMC practice and infants' weight ( $z = -4.82$ ,  $p \text{ value} < 0.05$ , CI 95%). This can be seen in the table below.

#### 4. DISCUSSION

Practice or action is the realization of the knowledge and attitude of a real deed. Action is a person's response to stimulus in real or open form (14). According to Notoatmodjo (15), action is the movement or action of the body after getting stimulation or adaptation from inside and outside the body of an environment. Babies with stable general condition and good drinking tolerance can practice KMC at home with the supervision of trained health workers (Ministry of Health, Ri, 2009). In this study, all LBWs' infants' mothers practiced KMC post discharge from Koja Hospital, North Jakarta.

This can be because previously mothers have been educated about KMC in hospitals and they continue to practice KMC when they return home. Some research shows that mothers and family members receive and want to practice KMC post discharge from hospitals (7), (12), (13), (16), (17), (18). Research conducted in India (19) shows that KMC is very well received in the community when LBWs' infants' mothers come home from the hospital. The practice of KMC in the study is universally applicable, where KMC is practiced both LBWs' infants and infants of normal weight. The practice of KMC in the community was also found in other studies in India (20) that the method is acceptable to mothers and family members in LBW care. Similarly, Mazumder et al.'s research, (16) that mothers and families want to practice KMC post discharge from hospital. The duration of KMC in this study was 3,02 hours per day. The results of this study are not far off with other studies that most mothers practice KMC for 2 hours a day (21), and other studies conducted in India found that the average mother practices KMC for five hours per day and 55.4% of the women initiate KMC within 72 hours of birth (Rasaily et al., 2017). While research conducted by Opara & Okorie (2017) shows that more than 95% of mothers feel comfortable in practicing KMC at home with KMC duration of  $3,25 \pm 2,85$  hours (0,5-12 hours) per day and no babies have problems with KMC. Research conducted by Roba AA, et al (2017) in Ethiopia mentioned that mothers' practice KMC for 2 hours / day.

A study in India (Dawar et al., 2019) found that KMC is practiced with an average duration of 3.3 hours per day and 5,1 days per week. While other research in India (Raajashri, R & Adhisivam, B, 2018) mentions that mothers' practice KMC at home with an average pmk duration of 1,3 hours per day. Research conducted by Parikh et al., (2013) in India also mentioned that mothers' practice PMK for 2,4 hours/ day. A study in Ghana (Nguah et al., 2011) stated that most mothers prefer to practice KMC intermittently even though they have been educated before in hospitals to provide KMC continuously because of its better benefits than intermittent KMC. Based on observations about KMC practices conducted by LBWs' infants' mothers, it was



found that most LBWs' infants' mothers' practice KMC well (72%) than LBWs' infants' mothers who practice KMC poorly (28%). The practice of KMC is observed using an observation sheet. Observation of KMC position is measured from 7 components of KMC practice (WHO, 2002), which consists of maternal preparation before KMC, KMC equipment, KMC position (baby is placed between mother's breast in a perpendicular position, there is skin-to-skin contact between the mother and baby, the baby's head is turned left or right with a slight lying position, the baby's hands and feet are in a frog-like bending position), and how to tie the fabric to KMC (ties are not too tight or too loose). Based on the observations, it was found that all LBWs' infants' mothers have practiced KMC in the absence of skin-to-skin contact between the mother and the infants. However, the study found that there are a small number of LBWs' infants' mothers who are less precise in positioning KMC, for example only a small part of the baby's body that attaches to the mother's skin and KMC bonds that are too tight or loose. The lack of proper positioning can reduce the benefits of skin-to-skin contact between mother and baby. Too tight a bond can cause the baby to be uncomfortable and unable to breathe properly, while too loose a bond can result in an unsafe position of the baby when carried and can make the mother uncomfortable when doing activities while doing KMC.

A small number of LBWs' infants were practice KMC in an inappropriate position because they have difficulty tied KMC fabric when no one helps tie the fabric. But if there are family members who live with the mother or accompany the mother, then they can help the mother to tie the fabric of KMC. Research conducted in India (Ramaiah, 2016) found that most mothers practice poorly positioned KMC (76.66%) compared to mothers who practiced KMC in good position (23.33%). The practice of KMC is related to the knowledge of LBW mothers, where the majority of LBWs' infants' mothers (65%) have poor knowledge of KMC. Most LBWs' infants' mothers in the study were practiced KMC during the day (44%), while other LBWs' infants' mothers were practiced in the morning (20%) and night (36%). During the day or night, LBWs' infants' mothers in this study get help from other family members to tie the fabric of KMC. LBWs' infants' fathers usually help mothers to tie KMC cloth at night when coming home from work. Research conducted by Nguah et al., (2011) showed that many mothers practice KMC at night due to the help of her husband to tie the fabric of KMC. Most LBWs' infants' mothers in this study practiced KMC alone (56%). This can be because they are less aware that there are others who can replace mothers to practice KMC. In addition, mothers also do not agree that others can also practice KMC. According to the mother, the practice of KMC can only be done by the mother because of concerns to hold her small baby. Family members are also sometimes afraid to carry babies in pmk positions.

The results of this study are in line with other studies in India (Parikh, 2007), that only mothers can practice KMC. Mothers lack the support of other family

members to practice KMC. This makes the practice of KMC discontinued early discontinuity. While another study in Nigeria (Opara, PI & Okorie, 2017) mentioned that mothers only practice KMC alone at home even though they have previously been educated in hospitals that others can help do KMC. This is due to a lack of strong information or poorly understood information. But there are also some LBWs' infants' mothers in this study who are assisted by other family members such as husbands, grandmothers, and aunts in practicing KMC. When the mother lives with a large family, then the grandmother or aunt can replace the mother to practice KMC. While the husband can replace the mother to practice KMC at night after coming home from work. The results of this study are in accordance with other studies in Ghana (Nguah et al., 2011) that mothers receive the help of husbands to replace mothers practicing KMC at night. Data on the KMC practice among LBWs' infants' mothers can be found in the following table.

Breastfeeding is part of the implementation of KMC which is very important for the growth of infants, therefore to increase the infants' weight. This is due to the benefits obtained from the practice of KMC carried out by the mother. The practice of KMC can increase affection and closeness between mother and baby, which can have an impact on increasing the amount of breast milk in the mother. Most LBWs' infants' mothers in this study benefited from KMC practices such as proximity to their babies, feelings of comfort in the mother, more breastfeeding, healthier babies, and increased baby weight each week. The infants' weight in the study was measured by weighing infants when researchers made home visits. Some studies have shown that skin-to-skin contact between mother and infants when KMC will reduce stress on the mother and infants, make the mother and infants calmer and relax, improve the emotional bond between mother and infants, and increase the mother's confidence in caring for her infants (22), (23), (24), (25), (26). Increasing emotional bonds between mother and baby and comfort in mother and baby will increase the reflexes that are important for breast milk production (27). Some studies have shown that KMC is beneficial for improving breastfeeding (3), (5), (17).

In this study, infant weight in mothers who practiced KMC well (2102.78 grams) was higher than the infants' weight in mothers who practiced KMC poorly (1970 grams). Before the bivariate analysis is carried out, a normality test is carried out first for numerical variables, namely the weight of the infants. Based on Kolmogorof Smimov's test found that the infants' weight was abnormally distributed ( $p > 0.05$ ), so the statistical test to be conducted was Mann-Whitney non-parametric statistical test. Based on Mann-Whitney statistical tests, there was a significant relationship between KMC practice and infants' weight ( $z = -4.82$ ,  $p$  value  $< 0.05$ , CI 95%).

Some studies have shown an increase in growth and development in infants who get KMC. This occurs because the infants is relaxed, resting in a pleasant position, similar to the position in the uterus,

resulting in the infants' anxiety diminishing and sleeping longer (24). In such circumstances, oxygen and calorie consumption is at its lowest level, so existing calories are used to increase weight. In a systematic study of the influence of KMC physiologically (25), it was found that KMC increases food absorption with an increase in the hormone Oxytocin. A quasi-randomised clinical trial conducted in India on the impact of KMC on LBW growth (28) found that KMC can increase growth in LBW (weight by  $19.28 \pm 2.9$ g/ day, body length by  $0.99 \pm 0.56$ cm/ week, head circumference of  $0.72 \pm 0.07$  cm/ week). Based on a meta-analysis of the influence of KMC on newborns (3), it was found that KMC is associated with the growth of the baby's head circumference, where babies with a birth weight of less than 2000g who get KMC have a longer head circumference of 0.19 cm per week than infants who do not get KMC (95% CI, 0.01 to 0.37; I<sup>2</sup> = 89%). In his research in India on the effect of KMC duration on the growth of premature babies and LBWs, Udani et al., (22) found an increase in weight in premature babies ( $20.3 \pm 7$ g/ day) with an increase in the duration of KMC. The longer duration of KMC, the bigger it will be to increase the baby's weight, but some babies take a long time to reach a weight of 2500g.

##### 5. CONCLUSION

Based on this research, it can be concluded that most of LBWs' infants' mother practice KMC in a good position with an average KMC practice duration of 3.02 hours per day. Based on Mann-Whitney's statistical tests, there is a significant relationship between KMC practice of LBWs' infants' mothers and infants' weight.

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