

## Kangaroo position in low birth weight preterm newborns: descriptive study

Samilly Rodrigues Farias<sup>1</sup>, Flávia de Souza Barbosa Dias<sup>2</sup>, Juliana Bastoni da Silva<sup>3</sup>,  
Ana Lidia de Lucca Ribeiro Cellere<sup>4</sup>, Lidia Beraldo<sup>5</sup>, Elenice Valentim Carmona<sup>6</sup>

<sup>1</sup> Nurse. Assistance Nurse at Hospital Professor Doutor José Aristodemo Pinotti from Universidade Estadual de Campinas. Campinas, SP, Brazil. E-mail: [samillyfarias@gmail.com](mailto:samillyfarias@gmail.com).

<sup>2</sup> Nurse, Master in Children and Adolescent Health. Student of the Nursing Graduate Program, Doctoral level, at Universidade Estadual de Campinas. Campinas, SP, Brazil. E-mail: [flaviabdias@gmail.com](mailto:flaviabdias@gmail.com).

<sup>3</sup> Nurse, Ph.D. in Adult Health Nursing. Professor at the Nursing Faculty of Universidade Estadual de Campinas. Campinas, SP, Brazil. E-mail: [jbastoni@unicamp.br](mailto:jbastoni@unicamp.br).

<sup>4</sup> Nurse. Assistance Nurse at Neonatal ICU of Hospital Estadual Sumaré. Sumaré, SP, Brazil. E-mail: [ana\\_cellere@yahoo.com.br](mailto:ana_cellere@yahoo.com.br).

<sup>5</sup> Nurse. Supervisor at Neonatal ICU of Hospital Estadual Sumaré. Sumaré, SP, Brazil. E-mail: [lidiaberaldo@yahoo.com.br](mailto:lidiaberaldo@yahoo.com.br).

<sup>6</sup> Nurse, Ph.D. in Nursing. Professor at the Nursing Faculty of Universidade Estadual de Campinas. Campinas, SP, Brazil. E-mail: [elenicevalentim@uol.com.br](mailto:elenicevalentim@uol.com.br).

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### ABSTRACT

To describe the number of periods that very low birth weight preterm newborns were in kangaroo position during admission in the neonatal unit and to look for relations between maternal and neonatal variables with kangaroo position. A retrospective and descriptive study with all preterm newborns admitted in 2012, weighing 1500g or less and, gestational age lower than 31 weeks, classified as high clinical risk patients according to the Clinical Risk Index for Babies. We identified 38 babies whose admittance time ranged from 18 to 136 days. The beginning of kangaroo position occurred on average at 30.8 days of post-natal life (SD=18.5) and the number of periods in kangaroo position was on average 10.7 times. The occurrence of kangaroo position was less frequent than opportunities from the maternal presence, and the position was related to a higher offering of free milk demand.

**Descriptors:** Kangaroo-Mother Care Method; Infant, Premature; Infant, Very Low Birth Weight; Nursing Care; Neonatal Nursing.

### INTRODUCTION

Globally, about 15 million premature babies are born each year, and Brazil is in the first ten countries with the higher number of these births. The low weight at birth, associated with prematurity, is responsible for about 60 to 80% of neonatal deaths. Besides neonatal deaths, another important outcome is the compromising in the

neurological development of survivor children<sup>(1-2)</sup>.

The use of sophisticated technologies specialized for the preterm newborn (PTNB), and low birth and very low birth weight (VLBW) newborn (NB) (weight at birth less than 2,500 and 1,500 g, respectively) have

been allowing the decrease in perinatal and neonatal mortality indexes. However, the life maintenance of the small patient implicates in hospitalization and intensive assistance that can be prolonged for many days or months, affecting the natural bonding process between parents and children<sup>(3)</sup>.

For trying to minimize the negative effects caused by this separation, the Brazilian Health Ministry has been implementing the humanized attention to low-weight NB policy, denominated Kangaroo Method, defined as a perinatal assistance model aimed at humanization, gathering biopsychosocial intervention strategies, and its main component is the skin-to-skin contact in kangaroo position. This position consists in accommodating vertically the NB, without clothes, laying the parent's or family member's chest, to promote skin-to-skin contact for the low birth weight and/or preterm NB<sup>(4)</sup>.

The complete implementation of the Kangaroo Method consists of three sequential steps, the first and second steps happen in the hospital and the third, at home. On the first step inside the neonatal intensive care unit (NICU), the family is welcomed, and there is the first contact between parents and child, culminating the kangaroo positioning. The second step occurs outside NICU, in a particular interning unit, denominated kangaroo unit, where the mother is invited to return to the hospital and to provide integral care to the child under supervision and guidance of the health team. The third step occurs after early hospital discharge, that the NB stays in kangaroo position in his house mostly all day<sup>(4)</sup>.

The use of the Kangaroo Method (KM) is listed as one of the three priority interventions that are most effective in the attention to the PTNB. The evidence of morbidity and mortality, and sepsis reduction, from systematic reviews, recommend the use of KM in PTNB in middle and low-income countries<sup>(5-6)</sup>.

The kangaroo position is associated with breastfeeding promotion, contributing to longer breastfeeding period and increase of produced milk volume. Besides, there is evidence that this method enhances the bond between mother and child, and promotes parent's participation in the NB care, strengthening the performance of the father and mother roles. Similarly, the kangaroo position favors a better thermic regulation and physiological stability; it stimulates the neuro-behavioral development and, it brings benefits for NB's sleep and pain relief<sup>(7-9)</sup>.

The kangaroo position should be encouraged by professionals working in the NICU, and it can be pleasurable and stimulate to form affective bonds between parents and child, provide heat, love, and stimuli for a period in which both feel well<sup>(10)</sup>. Given its importance to reduce PTNB morbidity and mortality, and the breastfeeding promotion, within other benefits, neonatal units should promote this strategy, registering it so they can accompany its implementation and, maternal and neonatal results. Thus, this study objective was to describe the number of periods in which PTNB under the weight of 1500g, were in kangaroo position throughout hospitalization and to look for relations between maternal and neonatal variables with Kangaroo position.

## METHODS

We conducted a descriptive study with retrospective data collection, developed from medical records

data of newborns admitted in the NICU during 2012. The neonatal unit has 12 intensive care beds, ten semi-intensive care beds and, two beds in the kangaroo unit. It is according to Baby Friendly Hospital Initiative, at a public teaching, assistance and research hospital in the city of Sumaré, São Paulo state. Thus, the hospital is managed by a public university and kept with Brazilian Unified Health System resources.

All records of PTNB admitted in 2012 were part of our study, considering as higher risk patients according to the Clinical Risk Index for Babies (CRIB) score. This severity index is useful to assess mortality risk according to the variables weight at birth, gestational age, presence of congenital malformations, excess of basis and inspired oxygen fraction. Each one of assessed items receives a scoring in which the sum can vary from zero to 23, and the patients are classified into four levels, where the highest level corresponds to greater severity<sup>(11)</sup>.

The inclusion criteria were: to weight at birth 1500g or less, less than 31 weeks of gestational age and, to have been born in the hospital where the study took part. The exclusion criteria were malformations incompatible with life; death before the first 12 hours of life and, NB who evolved to death before the first kangaroo positioning could be performed.

The present study was approved by the Ethics in Research Committee of the Medical Sciences Faculty at Universidade Estadual de Campinas (UNICAMP), under nº 320.981. We obtained a waiver from Free and Informed Consent Term, once the study used data from hospital records, not needing contact with the study subjects.

We identified the records at the Medical Archive and Statistics Service of the referred hospital, where we collected data and, after, we entered them into an electronic spreadsheet. To extract the data from records, we created an instrument containing various sociodemographic and clinical variables from mothers and neonatal babies. Regarding maternal variables, we searched for the following information: age, parity, marital status, type of delivery, use of prenatal corticoid, prenatal accompaniment, the number of visitations. About the neonatal variables, we collected gender, weight at birth, intrauterine growth, Apgar at 1<sup>st</sup> and 5<sup>th</sup> minute, presence of respiratory disorder, days of hospitalization, weight and age at the first day in kangaroo positioning, CRIB level classification, type of milk, number of times receiving breastmilk and, ways of feeding at hospital discharge. We also registered the number of opportunities to be in Kangaroo positioning and the periods when the Kangaroo positioning happened.

We assumed as an opportunity to be in Kangaroo positioning, the periods (morning, afternoon or night) when the NB were clinically apt and possible to up to three daily opportunities. In the unit of the study, the PTNB receive the medical prescription for the Kangaroo positioning after the assessment of the baby's clinical condition, considering adequate and progressive weight gain, thermic stability, respiratory pattern and absence of apnea episodes.

We conducted the data analysis using the program Statistical Analysis System, version 9.2 and, we used descriptive and inferential analyses. To describe the sample's demographic and clinical profile, we built tables of absolute (n) and relative frequencies (%).

We assessed the correlations between quantitative variables using the Spearman's correlation coefficient. This non-parametric coefficient ranges from -1 to 1. We considered the following correlation classification: 0.1 to 0.29 (weak), 0.30 to 0.49 (moderate),  $\geq 0.50$  (strong)<sup>(12)</sup>. We used the non-parametric Mann-Whitney's test for comparisons between categorical and quantitative variables. We considered a significance level of 5% for all analyses.

## RESULTS

During 2012, 46 NB were admitted in this unit, weighing 1500g or less, and/or at a gestational age lower than 31 weeks, who were born in this hospital. We excluded 8 NB that died before starting the Kangaroo position. Thus, 38 babies were part of our sample. In the group that evolved to death, the mean lifetime was 8.4 days (SD =14.2) of average weight at birth of 602.5g (SD=215.4).

The birth weight of babies ranged from 650g to 1,500g, with an average of 1,096g (SD=217) and median of 1,092g. The hospitalization period varied from 18 to 136 days, with an average of 53 days. The mean NB weight at hospital discharge was 2.285g, with a median of 2.162g, minimum weight of 1.875g and maximum of 4.630g. Table 1 brings other data related to PTNBs.

**Table 1:** Demographic and clinic characteristics of very low birth weight preterm newborns. Sumaré, SP, Brasil, 2012.

| Variable  | n  | %    |
|---|----|------|
| <b>Gender</b>   |    |      |
| Male  | 15 | 39.5 |
| Female  | 23 | 60.5 |
| <b>Intrauterine growth*</b>                           |    |      |
| SGA   | 17 | 47.2 |
| AGA   | 19 | 52.8 |
| No information  | 2  |      |
| <b>Apgar at the first minute of life</b>              |    |      |
| $\geq 7$  | 25 | 65.8 |
| $< 7$   | 13 | 34.2 |
| <b>Apgar at the fifth minute of life</b>              |    |      |
| $\geq 7$  | 36 | 94.7 |
| $< 7$   | 2  | 5.3  |
| <b>Respiratory disorder at birth</b>                  |    |      |
| Yes   | 33 | 89.2 |
| No  | 4  | 10.8 |
| No information  | 1  |      |
| <b>CRIB classification level**</b>                    |    |      |
| 1   | 28 | 73.7 |
| 2   | 8  | 21.0 |
| 3   | 2  | 5.3  |
| <b>Feeding type described at hospital discharge</b>   |    |      |
| Exclusive breastfeeding                               | 11 | 29.7 |
| Mixed breastfeeding                                   | 18 | 48.6 |
| Formula   | 8  | 21.6 |
| No information  | 1  |      |
| <b>Breast milk*** at the last hospitalization day</b> |    |      |
| $\geq$ six times                                      | 9  | 23.7 |
| $<$ six times   | 17 | 44.7 |
| None  | 12 | 31.6 |

**Milk offering via at the last hospitalization day**

|                |    |      |
|----------------|----|------|
| Probe          | 1  | 2.6  |
| Probe and oral | 3  | 7.9  |
| Oral           | 34 | 89.5 |

\* Intrauterine growth: SGA = Small for Gestational Age and AGA = Adequate for Gestational Age.

\*\* Clinical Risk Index for Babies: level 1 for scores of 0 to 5, level 2 from 6 to 10, level 3 from 11 to 15, and level 4 for scores higher than 15.

\*\*\* Fresh and/or pasteurized breastmilk.

The average maternal age was 26.8 years (SD=7.4), ranging from 19 to 41 years. About the number of pregnancies, the sample presented an average of two pregnancies, varying from one to eight. We present other characteristic aspects of mothers in Table 2.

**Table 2:** Demographic-clinical characteristics of mothers of very low birth weight preterm newborns. Sumaré, SP, Brazil, 2012.

| Variable                          | n  | %    |
|-----------------------------------|----|------|
| <b>City of origin</b>             |    |      |
| Sumaré                            | 24 | 64.8 |
| Others                            | 13 | 35.2 |
| No information                    | 1  |      |
| <b>Marital status</b>             |    |      |
| With a partner                    | 6  | 60   |
| Without a partner                 | 4  | 40   |
| No information                    | 28 |      |
| <b>Childbirth</b>                 |    |      |
| Vaginal                           | 10 | 27.1 |
| Cesarean                          | 27 | 72.9 |
| No information                    | 1  |      |
| <b>Use of prenatal corticoids</b> |    |      |
| Yes                               | 13 | 38.2 |
| No                                | 21 | 61.8 |
| No information                    | 4  |      |
| <b>Prenatal accompaniment</b>     |    |      |
| BHU*                              | 17 | 70.8 |
| Referenced unit                   | 6  | 25   |
| Without accompaniment             | 1  | 4.2  |
| No information                    | 14 |      |

\* BHU: Basic Health Unit

Table 3 presents the description of how the kangaroo position happened between mothers and children, considering periods of contact occurrence.

**Table 3:** Kangaroo position characteristics in very low birth weight preterms admitted to a Neonatal Intensive Care Unit. Sumaré, SP, Brazil, 2012.

| Variable   | Mean  | SD    | Minimum | Median | Maximum |
|--|-------|-------|---------|--------|---------|
| Number of periods that the mother was in the unit                      | 66.5  | 35.1  | 0       | 59.5   | 178     |
| Number of periods that the baby stayed in Kangaroo position            | 10.7  | 8.7   | 0       | 8      | 39      |
| Number of periods when the baby could be in Kangaroo position*         | 101.6 | 49.8  | 18      | 87     | 213     |
| Weight (grams) when the NB was in Kangaroo position for the first time | 1520  | 305.4 | 1060    | 1490   | 2490    |
| Days of life when the NB was in Kangaroo position for the first time   | 30.8  | 18.5  | 4       | 25     | 69      |

\* PTNB clinically apt for Kangaroo position.

The days of life when the preterm babies were positioned for maternal breast suction for the first time varied from four to 85 days of life, with a median of 46. The original weight in this process ranged from 1.220g

to 2.480g, with a median of 1.745g.

In Table 4, we verified a strong positive correlation between the days of life when the Kangaroo position started and the hospitalization days. There was also a strong negative correlation between the days of life when the Kangaroo position started and the weight at birth.

**Table 4:** The correlation between characterization data of the Kangaroo position and, maternal and neonatal variables (n=38). Sumaré, SP, Brazil, 2012.

|  | <b>Maternal age</b> | <b>Number of pregnancies</b> | <b>Days of hospitalization</b> | <b>Birth weight</b> | <b>CRIB level</b> |
|--|---------------------|------------------------------|--------------------------------|---------------------|-------------------|
| Periods of maternal presence<br>(p value)                        | 0.30<br>(0.06)      | - 0.11<br>(0.5)              | 0.58<br>(0.0001)               | -0.47<br>(0.002)    | 0.14<br>(0.3)     |
| Weight at the beginning of kangaroo position*<br>(p value)       | 0.13<br>(0.4)       | 0.17<br>(0.3)                | 0.19<br>(0.3)                  | 0.18<br>(0.3)       | 0.21<br>(0.2)     |
| Days of life at the beginning of kangaroo position*<br>(p value) | 0.05<br>(0.8)       | 0.09<br>(0.6)                | 0.80<br>(< 0.0001)             | -0.60<br>(< 0.0001) | 0.45<br>(0.005)   |
| Opportunities to be in kangaroo position*<br>(p value)           | 0.29<br>(0.08)      | -0.06<br>(0.7)               | 0.66<br>(< 0.0001)             | -0.45<br>(0.005)    | 0.48<br>(0.002)   |
| Periods in kangaroo position<br>(p value)                        | -0.02<br>(0.8)      | -0.35<br>(0.03)              | 0.11<br>(0.5)                  | -0.18<br>(0.2)      | 0.01<br>(0.9)     |

\* n=37 babies; Spearman's correlation.

We also tried to investigate possible associations between the previously cited data related to the kangaroo position, and the maternal and neonatal variables, for example, type of childbirth; use of prenatal corticoids; baby's gender; intrauterine growth, within others, but there were no significant associations.

The sooner the Kangaroo position started, considering the weight and post-natal days of life when it happened for the first time, there was more milk offer, maternal and/or formula, in free demand on the last day of hospitalization, according to the Mann-Whitney comparison test (p=0.01).

## DISCUSSION

The low birth weight NB and preterm babies frequently need specialized neonatal assistance, and they present higher mortality and morbidity risk during their first year of life. The significant number of cesarean deliveries (72.9%) in this sample, indicates that such pregnancies were risky, and the surgical intervention was necessary to keep the mother's and/or fetus's life. This is commonly related to the need of intensive care for NB due to prematurity and related complications<sup>(1,13)</sup>.

Within the complications related to prematurity, we observed in this sample the respiratory disorders. To decrease the incidence of respiratory issues at birth, it is recommended to use prenatal corticoid for all expectant mothers between 24 and 34 weeks with the risk of premature childbirth<sup>(14)</sup>. In our study, we could verify that 61.8% of expecting mothers did not receive prenatal corticoid, which can relate to the higher risk of respiratory complications for the babies, showing a gap in the health assistance to these women. Such respiratory complications can represent a good initial clinical condition, that can be reversed, but it can also evolve to a more severe disorder, potentially fatal, which can increase the permanence time of the NB in

intensive care units<sup>(14)</sup>.

Regarding the prenatal accompaniment, we did not have information from 14 mothers (36.8% of 38), while 17 mothers (70.8%) from those which we obtained information, had them in the Basic Health Unit. The conduction of this accompaniment is one of the primary health promotion actions to the woman's and the fetus's health, once it helps to prevent adverse events during pregnancy and at birth. The improvement in conditions for this practice has allowed a reduction of perinatal morbidity and mortality determinants, reflecting an important goal reached in the primary attention<sup>(15)</sup>.

Considering the data presented in Table 1, we verified that, regardless of the known benefits of exclusive breastfeeding, especially for preterm babies, its prevalence in the hospital discharge was very low in our sample, even with the use of the Kangaroo method in this hospital. This result was even less in a study developed in the Northeast region of Brazil, in a tertiary hospital where they practice the Kangaroo Method. There, 56% of preterm babies were discharged with exclusive breastfeeding<sup>(16)</sup>. Besides, the lack of support and breastfeeding promotion by the health team can be a contributing factor for this low prevalence. The team interventions are fundamental in what refers to the lactating maintenance while the baby is not apt to be orally fed, as well as, the offering of breastfeeding guidance, incentive and clinical management<sup>(17)</sup>.

Although hospital discharge reports of patients describe that exclusive maternal breastfeeding was present for 11 babies (29.7%), the data from the last hospitalization day denote that breastmilk was not offered as exclusive nutrition to some of them. This can be related to the absence of the mother or breastmilk; once the unit does not have a milk bank, only a milk dispensary.

The Kangaroo method proposal is a humanized attention, of low cost for low birth weight newborns, consisting in promoting the skin-to-skin contact between mother and child as early as possible, through the Kangaroo position, as well as, the breastmilk and consequently early discharge<sup>(8)</sup>. Although many studies<sup>(18-21)</sup> show the safety and benefits from early Kangaroo position in newborns of extreme prematurity and very low weight, in our sample, the beginning of the Kangaroo position was late, especially for those of lower weight at birth. This should lead us to question if the clinical condition of these patients was not favorable for this strategy or if the criteria adopted by the medical team for its indication are adequate.

This data reflects a gap in the Kangaroo method practice for this population and, it can be related to the lack of training and insecurity from professional. According to the literature, the professional is concerned that it will alter the vital signs, the umbilical catheter mobilization or, central catheter of the peripheral insertion, cause an accidental extubating or loss of the venous access.

The unit of the study allows non-restricted access of parents to visit their children, regardless of that, we verified that the number of periods when the mother was present in the unit occurred in only 34.7% of times when the newborns could have been visited, considering the mean time of hospitalization. We did not investigate the motives for maternal absence in the unit, but we presuppose factors related to mobility, difficulty to leave their other children with someone else, the need to perform domestic tasks and, care with other family members. Besides, the emotional questions that involve being a mother of a newborn admitted

to a neonatal intensive care unit, which can affect the maternal presence in the unit.

We consider crucial the stimuli, investigation, and registration by the nursing team of the social and economic conditions involving families of admitted babies. The data also showed the occurrence of periods in kangaroo position was less frequent than the current opportunities, that is, the babies were in contact with mothers during 10% of possible periods.

It is not possible to affirm here the motives that led mothers to not be more frequently in kangaroo position with their children in the studied unit. However, the maternal questions, difficulties, and limitations to be with their child should be part of neonatal nursing assessments, and to be contemplated in the plan of care<sup>(22)</sup>. Another pertinent investigation is the team's attitude regarding the kangaroo position promotion, relating to the knowledge of this proposal value, in detriment of the routine work and the accomplishment of specific tasks. Regardless of the known advantages of this strategy, the literature still brings that the method is not widely applied in neonatal units, corroborating with our findings<sup>(23)</sup>.

We verified the lower the weight at birth, the higher was the number of periods with a maternal presence in the unit, but it did not mean a higher number of periods in which the Kangaroo position occurred. Another possible association was found regarding pregnancies: the more pregnancies the mother had, the lower was the number of times that she stayed with the baby in kangaroo position. This can relate to the attention and care that the mother needs to dedicate to other children at home<sup>(10)</sup>. Higher CRIB values were associated to the late beginning of kangaroo positioning throughout hospitalization, which can indicate a wait for the clinical establishment to implement this strategy.

The Kangaroo position needs an individualized attention, and the mother should be stimulated to perform it since the moment when the baby has clinical conditions for it. However, it is essential to investigate maternal difficulties at this situation, the meaning given to the Kangaroo position, clarifying the importance for the baby related to psychological and physiological aspects, as well as, the response to treatment. On the other hand, the Kangaroo position proposal cannot ignore the mother's desire and, family and personal questions that can impede its realization<sup>(10,13,23)</sup>.

As re-affirmed in the literature<sup>(23-25)</sup>, the stimuli to the maternal presence in the unit favor more opportunities for Kangaroo position, as well as, all benefits coming from this contact, as the bond and the establishment of breastfeeding, as long as the health team supports this.

Some relevant information to characterize mothers was not in the records. The relevance of such data is given because they could direct nursing actions and interventions of health teams as a whole. Incomplete registers can have a negative impact on the assistance; once there is no possibility to apprehend the real clinical condition, as well as, the results obtained after the provided assistance. Another impact is that this limits the development of retrospective studies and the construction of reliable databases to characterize the attended population, as well as, the epidemiological evolution.

## CONCLUSION

From a total of 38 records of premature NB weighing less than 1.500g, in a public teaching hospital, it was seen the promotion of Kangaroo position although less frequently than the existing opportunities coming from the maternal presence in the unit. With hospitalizations period from 18 to 136 days, mothers were with their children in Kangaroo position on average 10.6 periods (SD=8.7). These results demonstrated that although the literature points many benefits from the Kangaroo Method, it is not adequately implemented in clinical practice. Implementation requires monitoring in neonatal units, in a way to comprehend its obstacles, with the intention to create strategies to reach the potential results from this method.

In this study, women who had children performed less Kangaroo positioning with their hospitalized child, probably due to care demands towards other children, besides the need to be in the hospital. The Kangaroo position was associated with the higher offering of free milk demand in our preterm newborn sample, but there was no association with exclusive breastfeeding. Therefore, the performance of individualized care, consisting in investigating and considering maternal needs in the neonatal assistance, can help to identify maternal characteristics and experiences limiting the interaction with the child. It can also allow her to be assisted during the mothering process to the hospitalized process.

As a limitation, it was impossible to assess the interurrences that might have happened during the positioning, as well as, the time in hours that each patient was in Kangaroo position, due to insufficient registries in the records. We saw that the Kangaroo method proposal needs to be accompanied and described through systematized and reliable records, so they can be useful to assess the provided assistance, its continuity, as well as, for research.

Future studies could investigate the meaning of this proposal for the Nursing team, once they are the ones with more opportunities to promote it. This low-cost technology needs to be better understood and valued in the neonatal assistance.

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