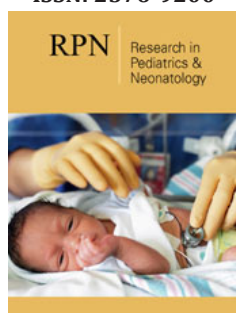


# Impact of Kangaroo Mother Care, Music Therapy and Psychological Support to Mothers of VLBW Preterm Newborns on The Breast Milk Production and Neonatal Outcome: Our Experience

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## Abstract

**Background:** Kangaroo mother care (KMC) is a method of care of preterm and low birth weight infants. The method involves infants being carried, usually by the mother, with skin-to-skin contact.

**Objectives:** We evaluated the hypothesis that KMC could have beneficial effects on breast milk (BM) production, neonatal neurological development and onset of ROP. We also evaluated the type of lactation during and after hospitalization and the duration of admission in the two groups.

**Methods:** Our sample was made of 46 mothers of 46 preterm newborns (gestational age <34 weeks, birth weight <1500g) admitted at our NICU. They were divided into 2 groups: Group A, made of 23 mothers who have performed a regular extraction of BM and KMC in a dedicated space with a psychological support; group B, made of 23 mothers who have not performed a regular extraction of BM and KMC in a similar setting.

**Results:** The average amount of BM extracted by mothers in group A was greater than group B. Moreover, the comparative analysis showed that 78% of newborns who performed an efficient KMC had a significantly better neurological outcome ( $p < 0.05$ ). A statistically significant difference ( $p < 0.05$ ) was found in the percentage of mothers who continued breastfeeding after discharge (A 52% versus B 26%). The average length of hospital stay was lower in the group A than group B ( $p < 0.05$ ). On the other hands there were no statistically significant differences between the two groups concerning the onset of ROP.

**Conclusion:** KMC performed in comfortable settings with the help of psychological support figures increases the production of BM, promotes the continuation of breastfeeding at the time of discharge and improves the neurological outcome of preterm infants.

**Keywords:** Breast milk; Kangaroo mother care; Music therapy; Neonatal care

## Introduction

It's universally known that breast milk (BM) is the best food for each newborn, preterm newborn included [1]. In the last decades multiple and specific benefits of breastfeeding have been made clear, in term of maternal health, but especially concerning benefits on preterm newborns. Breast feeding reduces the incidence of infections, necrotizing enterocolitis, retinopathy of prematurity and mortality; furthermore, it improves cardiovascular and neurocognitive outcomes [2]. Despite there is no doubt that BM needs to be fortified with specific products to satisfy the metabolic demands of preterm newborns, BM is unique, thanks to its specific composition in bioactive and immunomodulant compounds, such as gastrointestinal enzymes, lysozyme, hormones, immunoglobulins, lactoferrin, nucleotides, growth factors, antioxidants and cellular components, like oligosaccharides, able to promote bacterial flora growth and to prevent the adherence of pathogens to the mucosa [3].

An appropriate education about the importance and value of breastfeeding should be started during pregnancy and it should be enhanced if a preterm delivery is expected. Preterm birth usually occurs in an emergency and dramatic context and it can be classified

as one of the “life events”, that are the events which could represent important stressors. Mother is premature too, lacking in knowledge and psychological training, since she didn't carry out her path, making her feel guilty. Encouragement and psychological support provided by a health care professional within NICU are essential to promote a good lactation among restless mothers worried about inadequate initial lactation. Indeed, it's known that lactation decreases in the case of stress, insomnia, maternal depression and wrong diet; and on the other hand, it increases in case of high frequency BM expression and if the time spent holding a skin to skin contact increases [4]. BM pumping should be started within 6-12 hours after delivery and it should be continued for 8-12 times per day until it stabilizes [5].

Many randomized trials and a systematic review have recently reported that skin to skin contact is associated with increased breast milk expression and long-lasting exclusive breast-feeding [6]. Further studies have shown that kangaroo mother care (KMC) increases mother-infant attachment and parents' emotional involvement to the infant care [7].

Therefore, the aim of this study was to demonstrate a higher BM expression among mothers who have performed a regular BM pumping and who have performed a constant KMC in a suitable setting with the help of a support staff, in order to reduce as much as possible any stressors for infants and mothers and to raise the mother will to long term breastfeeding. Moreover, the aim of this study was to show that breastfeeding and KMC, performed in a suitable setting, improve neurological outcome and the incidence of retinopathy of prematurity (ROP) among preterm infants.

## Methods

The study was conducted upon 46 mothers of 46 preterm newborns (gestational age <34 weeks, birth weight <1500g) admitted at our NICU in the period August 2017-March 2018. They have been divided into 2 groups: group A, made of 23 mothers who have performed a regular extraction of BM and KMC in a dedicated space with a psychological support; group B (control group), made of 23 mothers who have not performed a proper extraction of breast milk and who have not performed KMC regularly in a dedicated space with a psychological support because it didn't still exist at the time of their children admission into the ward (August 2017-November 2017). Finally, we evaluated the newborn neurological development (by examining the quality of general movements), the onset of ROP, the type of lactation during and after hospitalization, continuation of breastfeeding at the time of discharge, infant weight at birth and at discharge, and the duration of admission at the Hospital in the two groups. At the admission at least one parent or legal guardian of each patient gave their written informed consent to collecting and processing of personal data. The study was performed according to Declaration of Helsinki. Infant weight was estimated, at birth and at discharge, with a Seka scale. During the recovery, the time spent in KMC was 2 hours per day in the group A. This procedure was performed in a context of a psychological support offered by health care professionals and was carried out in our tisaneria. The tisaneria is a comfortable room where mothers

are educated about long term breastfeeding and informed about BM conservation; here they can benefit of electric breast pumps (Avent Philips) which allow milk extraction from both mammary glands at once, increasing, this way, BM expression. The described mechanical process plays a key role in the mother-new born emotional relationship because it makes mothers feel helpful for their children. During KMC and in the tisaneria mothers can benefit from music therapy, carried out as a group or individually through headset. So, mothers, while performing skin-to-skin contact with their infants, give them the positive energy taken from music. The data were processed through a descriptive analysis and calculating the mean values. The relationships between the qualitative variables have been studied by a bivariate analysis, through the application of the Chi-square test with expected frequencies greater than [5].

## Results

The anthropometric data of new borns are shown in the Table 1. In group A the BM volume extracted was higher than in the control group, in term of mean and standard deviation (Table 2). Mean duration of hospital stay was lower in group A than in the control group (Table 3). In both groups we evaluated the percentage of breastfeeding, continuation of breast feeding after discharge, the presence of general movements (GM) and the development of retinopathy of prematurity (ROP) (Table 4) (Figure 1 & 2). The comparative analysis between the two groups revealed that among patients who performed well the KMC, 78% showed a good neurological outcome examined by the general movement's evaluation. This percentage was significantly higher in this group than in control one ( $p<0.05$ ) (Figure 3). Furthermore, this study showed a statistically significant difference ( $p<0.05$ ) in the percentage of mothers who continued breast feeding after discharge: group A 52%, group B 26%. No statistically significant differences were found between the two groups concerning the incidence of ROP (Figure 3), though it was found a lower incidence of ROP in the group A. We showed that 100% of preterm infants' mothers, who received psychological support and an appropriate education about the benefits of breastfeeding, chose to breastfeed after the meetings.

**Table 1:** Anthropometric data of new borns.

	Group A (n=23)	Group B (n=23)
Birth weight (g)	1233±256	1323±196
Weightatdischarge (g)	2209±572	2546±537

**Table 2:** Breast milk volume extracted.

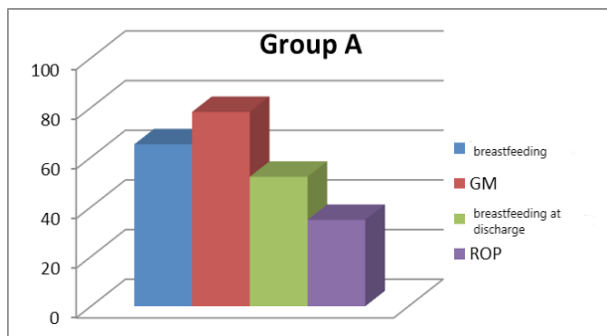
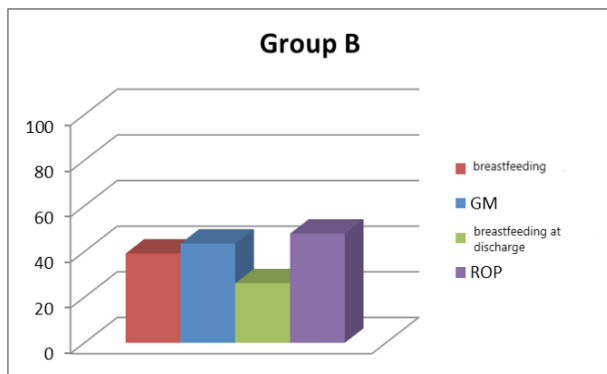
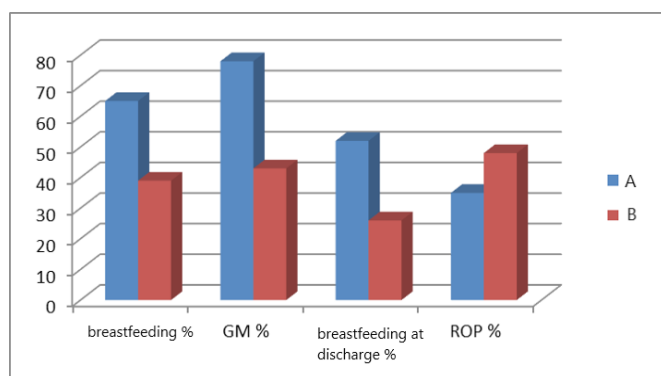
	Group A	Group B
Mean	84ml	15ml
SD	71ml	18ml

**Table 3:** Length of hospital stay.

	Group A	Group B
Mean	41,5 days	55 days
SD	18 days	37 days

**Table 4:** Group A Vs Group B.

	Group A % (n=23)	Group B % (n=23)	p
Breastfeeding	65 (15)	39 (9)	ns
GM	78 (18)	43 (10)	p<0.05
Breast feeding after discharge	52 (12)	26 (6)	p<0.05
ROP	35 (8)	48 (11)	ns

**Figure 1:****Figure 2:****Figure 3:**

## Discussion

The study has shown the positive effect of KMC and music therapy on breast milk expression, the continuation of breastfeeding at the time of discharge, the neurological outcome and the length of stay of newborns in the ward. These results are in accordance

with data emerging from the published literature. Hake et al. [6] & Renfrew et al. [9] showed that KMC is associated with longer duration and prevalence of breastfeeding and higher milk volume production [8,9]. Arnon et al. [10] showed the beneficial effects on preterm new borns of KMC associated with music therapy compared to KMC performed alone. Mother singing during kangaroo mother care could further increase stability, producing a calming effect on infant and decreasing anxiety [10,11]. Many studies evaluated the neonatal neurological development in connection with KMC, considering different parameters. Ludington et al. [12] found that sleep organization in preterm infants who performed KMC was similar to that of more mature ones [12]. Feldman et al. [13] evaluated the neurodevelopmental profile comparing two groups of preterm new born in connection with KMC. They found that infants who carried out KMC had a more rapid maturation of the autonomic system between 32 and 37 weeks of gestational age, a more rapid improvement in state organization in terms of longer periods of quiet sleep and alert wakefulness and shorter periods of active sleep [13]. Lauren M proposed that KMC could have a positive effect on long-term neurodevelopmental outcome (functioning and cognitive performance), modifying the stress of the NICU environment on preterm infants. This evidence is supported by neuroplasticity theory [14]. Our experience reports that KMC has a positive impact on short-term neurological outcome, revealed by different percentage of infants with normal GM in the group A versus controls (78% vs 43%, p<0.05). There were no statistically significant differences between the two groups with regard to the onset of ROP in our study. This result is probably due to the small sample investigated. On the other hands Manzoni et al. [15] Found benefits of exclusive breastfeeding on 314 preterm new borns versus 184 ones who received infant formula: in the first group the incidence of ROP, of any stage, was significantly lower than the other group (3.5% vs 15.8 p< 0.05) [15].

In conclusion, in view of the results found, we think that every NICU should have as aim to decrease any kind of stressors for preterm infants and mothers, in order to improve neonatal care and outcome. Kangaroo mother care, in association with psychological support and the establishment of dedicated areas to consolidate the link mother-new born, is consistent with this aim, promoting breastfeeding and parents' involvement to the infant care.

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