

Original articles

## Feeding profile and oral motor development of low birth weight infants

*Perfil alimentar e desenvolvimento motor oral dos neonatos nascidos com baixo peso*

Adriana de Medeiros Melo<sup>(1)</sup>  
Thamyres Grazielle dos Santos Martins<sup>(1)</sup>  
Tuany Lourenço dos Santos<sup>(1)</sup>  
Aline dos Santos Silva<sup>(1)</sup>  
Nayara Nerlin da Silva Santos<sup>(1)</sup>

<sup>(1)</sup> Universidade Estadual de Ciências da Saúde de Alagoas (UNCISAL), Maceió, AL, Brasil.

Source of help: Support Foundation for Research in the State of Alagoas - FAPEAL, form of aid: PROBIC Scholarship

Conflict of interest: non-existent

Received on: April 09, 2015  
Accepted on: September 29, 2015

**Mailing address:**

Thamyres Grazielle dos Santos Martins  
Conjunto João Sampaio 2 Quadra 2F  
Lote 24, nº192. Benedito Bentes  
Maceió – AL – Brasil  
CEP: 57084-639  
E-mail: thamyres\_grazi@hotmail.com

### ABSTRACT

**Purposes:** to describe the feeding profile and analyze the Oral Sensory Motor System of preterm low birth weight who participated or not the Kangaroo method.

**Methods:** this is a non-interventional, observational quantitative study with 60 preterm low birth weight. A specific form was used to describe the feeding profile. Evaluations of Oral Sensory Motor System were made by the protocol of Castro<sup>1</sup>.

**Results:** preterm and low birth weight babies evaluated formed two groups: 30 participants of the Kangaroo Method (G1) and 30 non-participants of this method (G2). They presented Gestational Age 25-36 weeks, which were 34 female and 26 male; 8 children were fed by nasogastric tube, 46 by exclusive breastfeeding, 4 fed through the cup and 1 just by the cup. In the Grupo1, 9 (30%) infants showed oral reflexes as expected. In the Group 2, 12 (40%) showed all reflexes.

**Conclusion:** this study shows that babies who went through the kangaroo method do not revealed statistically significant difference in relation to the feeding profile and oral sensory motor system, when compared to babies who did not went through this method.

**Keywords:** Infant, Newborn; Infant, Premature; Feeding Behavior

### RESUMO

**Objetivos:** descrever o perfil alimentar e analisar o Sistema Sensório Motor Oral em neonatos prematuros e de baixo peso que participaram ou não do Método Canguru.

**Métodos:** trata-se de um estudo observacional não-intervencionista, quantitativo, realizado com 60 neonatos prematuros e de baixo peso. Foi utilizado um formulário específico para descrição do perfil alimentar. Nas avaliações do sistema sensório motor oral dos neonatos utilizou-se, o protocolo de Castro<sup>1</sup>.

**Resultados:** os neonatos prematuros e de baixo peso avaliados formaram dois grupos: 30 participantes do Método Canguru (G1) e 30 não participantes deste método (G2). Apresentaram Idade Gestacional de 25 a 36 semanas, sendo 34 do sexo feminino e 26 do sexo masculino; 8 neonatos se alimentavam por sonda, 46 por aleitamento materno exclusivo, 4 recebiam aleitamento materno e copinho; e 1 apenas pelo copinho. No Grupo1, 9(30%) neonatos apresentaram todos os reflexos orais dentro do esperado. Já no Grupo 2, 12 (40%) apresentou todos os reflexos presentes.

**Conclusão:** este estudo revela que os neonatos que passaram pelo Método Canguru não obtiveram diferença estatisticamente significativa em relação ao perfil alimentar e ao sistema sensório motor oral, quando comparados aos neonatos que não passaram por esse método.

**Descritores:** Recém-Nascido; Prematuro; Comportamento Alimentar

## INTRODUCTION

Faced with the expansion of technology and assistance resources, the chances of survival of the newborn preterm have increased. However, even with the availability of modern equipment and qualified professionals, food difficulties, particularly breastfeeding this population is still cause for concern<sup>1</sup>. Even with the stimulus to maintain lactation and breastfeeding, mothers of preterm infants (newborn preterm births) often have more difficulty in initiating and maintaining breastfeeding during their child's hospital stay. Often, these are not kept in exclusive breastfeeding (EBF) after discharge, even after the guidance and encouragement to mothers<sup>2</sup>.

Regarding the performance of breastfeeding, suction is needed because it will promote an adequate development of the functions and structures of the stomatognathic system. The masticatory muscles begin their maturation process and positioning, along with the movement of the muscles occurs bone development thus enhancing neuromuscular condition of oral structures. Breastfeeding will provide the child a proper breathing, proper posture and provide a language and sealing lips. This unique power is also related to the development of temporomandibular joint (TMJ) in the period that has not yet occurred tooth eruption<sup>3,4</sup>. One can also highlight the importance of breastfeeding in the nutritional and immune framework of the preterm neonate, providing the iron and protect children against infections. Infants who are breastfed for some period of time show no infection by parasites and are less frequently present.

Regarding the role of mothers, breastfeeding becomes important because of the sudden separation occurred at birth, satisfying the maternal instinct<sup>5</sup>.

Breastfeeding, even with its advantages and many features designed to make it easier, is an undervalued practice in the country. In 2001, the Indicators of Primary Care Information System (SIAB) showed that the exclusive breastfeeding rate was of 62,3% in Brazil and 49.9% in the State of Alagoas<sup>6</sup>.

Early weaning may lead to the interruption of proper oral motor development, this weaning is influenced by demographic variables (type of birth, maternal age, the child's father share), socioeconomic (family income, maternal and paternal education), attached to the assistance prenatal care (guidance about the importance gift breastfeeding) and the immediate post-natal care (aid health professionals)<sup>7</sup>.

The Ministry of Health in 2001 launched the National Humanization of Hospital Care Program (PNHAH), which proposed a set of actions that alter care standards to patients in the hospital setting, where the health care requires "aggregate technical efficiency and scientific ethics to consider and respect the uniqueness of user and professional needs, that embraces the unknown and unpredictable, that accepts the limits of each situation"<sup>8</sup>.

The Kangaroo Mother Care is framed in the humanization of health services shares, being characterized by the early mother-infant contact. The method is divided into three stages: the first stage the infant is hospitalized, the second stage amounts to kangaroo unit and eventually the outpatient treatment<sup>9</sup>.

Through this method the newborn receives more stimulation, which simulates the intrauterine conditions enabling the premature baby is gestational age in an environment that promotes their brain maturation. This environment has great importance, because a study indicated the influence of stress level in the active muscle tone and spontaneous movement; the improvement of muscle tone baby provides the approach of the midline members, which facilitates the acquisition of motor coordination<sup>10</sup>. In addition, to contribute to the establishment of breastfeeding on demand, controlling the physiological skills, organizes the sleep cycles and behavioral states<sup>11</sup>.

The objective of this study was to describe the dietary profile and analyze the Sensory Oral Motor System and in neonates and low birth weight who participated or not the Kangaroo Method.

## METHODS

This research was evaluated and approved by the Research Ethics Committee and UNCISAL of origin under N<sup>o</sup> 477.806. The study design was a prospective cross-sectional observational.

The survey was conducted from January to June 2014, the second stage of Kangaroo Mother Care (Accommodation Kangaroo) and Rooming Maternity Hospital Santa Monica, located in the city of Maceio-AL, reference institution for care to pregnant women and neonates high risk by the Unified Health System (SUS).

The sample included 60 preterm and low birth weight, 30 participants of the Kangaroo Mother Care (G1); and 30 non-participants (G2),

Socio-demographic characteristics, dietary and biological of the neonates; and maternal and paternal identification variables, education and income, location

and living conditions, obstetric history were collected by analyzing the records; and by applying a structured questionnaire with closed questions, which is answered by the heads of infants.

Initially they were selected the medical records of neonates who fits the established inclusion criteria. The Informed Consent was read, verbally explained the progenitors, delivered and signed.

It was adopted as inclusion criteria for the RNS: infants born with gestational age (GA) less than 37 weeks, weighing  $\leq 2,500\text{g}$ , because this group of newborns is more likely to develop changes in the Sensory Motor Oral System (Most Holy) due to prematurity and low birth weight.

Exclusion criteria for RNS were premature infants and low weight with diagnosis of neurological changes, genetic and/or morphological as the cases of carriers newborns of cleft lip and palate, presenting difficulties or limitations in the performance of oral reflexes and feeding the presence of these changes.

Interviews were conducted with mothers who measure up to the following inclusion criteria: mothers preterms of underweight admitted to the 2<sup>nd</sup> stage of the Kangaroo Method or rooming. In this interview there were asked socioeconomic aspects, data on the recent pregnancy, had previous experience of breastfeeding and was successful.

Then, to evaluate the sensory oral motor system, the Castro<sup>1</sup> protocol was applied. The evaluation was conducted during the hospitalization period when the newborn was close to being discharged, 30 to 40 minutes before receiving the diet, so there was no discomfort or disability, because if the infant had been fed, could not be made this assessment, since oral reflexes were tested (demand bite, GAG, sucking and swallowing), and if there cupping tongue and tongue peristalsis during non-nutritive sucking.

Handlings were performed consisting touches in the face and oral cavity, with the hands gloved examination, plus the observation of nutritive sucking during feeding of the newborn. After the diet offer that was conducted the questionnaire with the mothers and analyzed the medical records of the mother and the newborn, for information on gestational age, use of respiratory support (if used), use of medications and clinical events; apart from demographic data.

The sample size calculation was based on the scientific paper 'Development of the Sensory System and Global Oral Motor Vehicles in preterm infants'<sup>1</sup>

because it is being used in this study the same Most Holy assessment protocol.

Data were organized in Excel spreadsheets and analyzed with the BioEstat 5.0 software for data analysis was performed using the Fisher's exact test and Chi-square as the disposal of the collected data. For all analyzes it will use the confidence level of 0,05%.

## RESULTS

At hospital discharge, the newborns were performed using the evaluation protocol of oral sensorium system engine Castro<sup>1</sup>, which are evaluated by the primitive oral reflexes and oral motor structures. Few differences were observed in the Most Holy among the participants of the Kangaroo Mother Care and Housing together, but in relation to food profile it was observed that the AME is more prevalent in participants Kangaroo newborns. Posture of lips and tongue cupping proved to be a reflection less present in these newborns, since the swallowing reflex and jaw movements showed the best results.

Of the 30 newborns in G1, there was a slight predominance of female sex (56,6%) compared to men (43,3%). Most newborns were ages ranging from 0-30 days old (63,3%). These newborns, only 5% of them had the lowest rating for gestational age ranging between 25-27 weeks. Thus, in view of the classification for gestational age, the minority of G1 neonates showed greater risk to present deviations or delays in the development of oral sensory-motor system. While 26,6% of G1 newborns being between 34 to 36 weeks demonstrate a tendency to present the best results in their oral reflexes, as the literature states that it is from 33-34 weeks of gestational age newborns are able to coordinate the mechanisms and suction swallowing and breathing.

Of all newborns have been observed most of them (66%) were any of these complications at birth (apnea, jaundice, respiratory distress or sepsis). Also it was observed that the majority of neonates (70%) made use of some form of respiratory support: Mechanical Ventilation (MV), Mechanical Ventilation Non-Invasive (NIV), nasal CPAP or HOOD.

Regarding the food profile for the G1 at the time of evaluation, during the hospitalization period, seven newborns were using nasogastric tube, 20 were exclusively breastfed, 2 fed by mother's womb more complement, which was offered through cup; and only 1 fed exclusively through the cup.

At the moment of hospital discharge, all infants were exclusively breastfed, showing how there was good evolution of sensory oral motor system.

In assessing the Sensory Oral Motor System participant newborns Kangaroo Method (G1), highlight the following aspects in relation to oral reflexes: in search, only 6% of infants had this reflex as not expected. The presence of this reflex is fundamental to trigger the sucking reflex that was present in most neonates (90%), favoring the performance of exclusive breastfeeding. Furthermore, the present tongue and jaw in more than half of neonates (66%) of infants is related to the power efficiency.

Of the 30 neonates of G2, there was a slight predominance of females (56,7%) compared to men (43,3%), ages ranged from 0-30 days old. These newborns, only 4% had gestational age of 24 weeks. Therefore, only a minority of G2 newborns also had a higher risk for developing deviations or delays in the sensory oral motor system, while 57% of them were in gestational age between 34 to 36 weeks, showing a greater tendency to outdo oral reflexes when related with gestational age.

Regarding the food profile of G2, during the clinical assessment, most newborns (N = 26) were exclusively breastfed, 2 fed by mother's womb more complement, which was given the cup; and only 1 infants fed only through a nasogastric tube.

Mothers not participating in the Kangaroo Mother Care (G2) 29 did prenatal care with family income up to 3 minimum wages, with respect to maternal education 13 had incomplete primary education, 5 to complete primary school, 21 know the benefits of breastfeeding (Table 2).

In evaluating the system Sensory Oral Motor on non-participating newborns Kangaroo Method (G2) during the non-nutritive sucking was observed that the tongue cupping was found as not expected in 40% of neonates, ie, this group is more likely to introduce changes in the food profile, hindering efficient power. The sucking reflex changed in only 3%, can bring benefits to the oral motor development, since it favors the performance of exclusive breastfeeding (Table 1).

Table 1 shows the prevalence of oral reflexes in newborns of both the participants of the Kangaroo Method, as non-participants, which shows good performance of the SSMO even in the face of prematurity and low birth weight.

Table 2 describes the socio-demographic data and nursing data show such signs of risk for the

development of oral motor sensorial system and AME, due to low maternal age, low education and low family income.

## DISCUSSION

In this study, we observed the oral motor development of infants with low birth weight prematurity history as well as its food profile.

Early introduction of foods in infants considered at risk at birth is worrying, given their physiological and neurological immaturity, and requires systematic monitoring<sup>12</sup>. In addition, the World Health Organisation recommends that breastfeeding is exclusively until six months of age and that breastfeeding can be maintained after six months<sup>13</sup>, adding the introduction of other foods due to higher energy demands of the infant; and because of exclusive breastfeeding no longer is sufficient to meet their nutritional needs.

The sample has few risk factors for early weaning, since the G1, 83% group of mothers were aware of the benefits of breastfeeding, but in G2 it was found that 70% of the mothers had this knowledge, thus showing a risk slightly most with early weaning compared to G1. In addition, all newborns were discharged on exclusive breastfeeding; this data corroborated the literature, which states that because of the care provided to low-weight newborns and mother to the guidelines during the period of hospitalization favor of exclusive breastfeeding<sup>14</sup>. A study in 1997, conducted with 427 children between 3 and 6 years of age, showed that the mother who obtained knowledge about the importance of breastfeeding and breastfed their children exclusively for six months or close to this period<sup>15</sup>.

In the present study 40% (G1) of the interviewed mothers have not completed elementary school; and G2, 43% of them on grade level in elementary education. The level of education is one of the factors that can interfere with difficulty breastfeeding. The literature states that this variable maternal education is correlated with early weaning, so the bigger the mother's education time duration of breastfeeding, demonstrating that cultural aspects that start in the context of maternal and child relationship extend to family and the community<sup>16</sup>.

Escobar et al conducted a study in the emergency room of the Children's Institute in 1998 with a sample of 599 children and their parents, which found that 75,9% of mothers stopped breastfeeding without medical advice. 38,9% reported that milk was "weak" or "dried" or that the child "dropped" the chest. They

**Table 1.** Oral reflexes of premature and low-weight newborns. Maceio, 2014

Reflexes	Categorization	Control (G2)N(%)	Kangaroo (G1)N(%)	P value
<b>Gender</b>	Male	13(43,3%)	13(43,3%)	
	Female	17(56,7%)	17(43,3%)	
<b>Search Reflex</b>	Expected	26(86,6%)	28(93,3%)	0,3354
	Not Expected	4(13,3%)	2(6,6%)	
<b>Suction Reflex</b>	Expected	29(96,6%)	27(90%)	0,3060
	Not Expected	1(3,3%)	3(10%)	
<b>Bite Reflex</b>	Expected	25(83,3%)	29(96,6%)	0,0973
	Not Expected	5(16,6%)	1(3,3%)	
<b>Reflex of Gag</b>	Expected	25(83,3%)	23(76,6%)	0,7469*
	Not Expected	5(16,6%)	7(23,3%)	
<b>Reflex of Swallowing</b>	Expected	30(100%)	29(96,6%)	0,5000
	Not Expected	0(0%)	1(3,3%)	
<b>Suction Rhythm</b>	Expected	26(86,6%)	25(83,3%)	0,5000
	Not Expected	4(13,3%)	5(16,6%)	
<b>Lip Posture</b>	Expected	28(93,3%)	26(86,6%)	0,3354
	Not Expected	2(6,6%)	4(13,3%)	
<b>Tongue Posture</b>	Expected	22(73,3%)	22(73,3%)	0,6145
	Not Expected	8(26,6%)	8(26,6%)	
<b>Tongue Correction</b>	Expected	18(60%)	20(66,6%)	0,7888*
	Not Expected	12(40%)	10(33,3%)	
<b>Tongue Peristalsis</b>	Expected	25(83,3%)	26(86,6%)	0,5000
	Not Expected	5(16,6%)	4(13,3%)	
<b>Movements of Cheeks</b>	Expected	29(96,6%)	28(93,3%)	0,5000
	Not Expected	1(3,3%)	2(6,6%)	
<b>Mandibular Movements</b>	Expected	30(100%)	29(96,6%)	0,5000
	Not Expected	0(0%)	1(3,3%)	

Fisher exact was used in all tests except the marked (\*) used the Chi-square.

also observed that education was related to longer breastfeeding periods ( $p = 0,016$  and  $p = 0,011$  respectively)<sup>17</sup>.

In developed countries, mothers with higher levels of education tend to breastfeed longer. However, the working Giugliane *et al.*<sup>18</sup> in Porto Alegre, there was found that while inhabiting a developing country, mothers followed the model of developed countries, ie, those with higher educational level breastfed longer.

The income of the mothers of G1 (70%) was from a family income up to minimum wage, 30% 2-3 wages. While in G2, 65% of them had family income of up to one minimum wage; and 35% 2 to 3 wages. Thus, in general, the most economical level of the two groups was relatively low. Therefore, it can be said that the family income is presented as an important factor in relation to breastfeeding, as among mothers with lower income, who needed help with their work to support the family, breastfeeding may be hampered by a lack access to information on the damage of early weaning as shown in the study by Vasconcelos *et al.*<sup>19</sup>.

Of the 30 preterm and underweight participants of the Kangaroo Method, 24% had all oral reflexes as expected, supporting the literature which says that premature neonates who underwent skin contact, or who participated in the Kangaroo Method presented better mental development and better results in motor tests, in addition to decline in the standard of time crying<sup>20</sup>.

The use of some type of respiratory support and use of orogastric or nasogastric tube was necessary in 24% of cases, due to its hazardous condition due to their anatomical and physiological immaturity. According to a study conducted in 2007, prolonged use of probe in addition to causing a long hospital stay harms the development of speech organs. Furthermore, it may lead to a delay in coordinating the suction movements and swallowing, occurring oral hypersensitivity due to little or no experience of food in the mouth during the first months of life and therefore power rejection orally by interfering with oral motor development the

**Table 2.** Socio-demographic data of the mothers of preterm newborns. Maceió, 2014.

Variable	Categorization	Kangaroo (G1) N(%)	Control (G2) N(%)
Type of Parturition	Normal	17 (56,6%)	8 (26,6%)
	Cesarean	13 (43,3%)	22 (73,3%)
Prenatal	Yes	28 (93,3)	29 (96,6%)
	No	2 (6,66%)	1 (3,33%)
House	Capital	13 (43,3%)	13 (43,3%)
	Countryside	17 (56,6%)	17 (56,6%)
Maternal Age (in years)	Up to 15	2 (6,66%)	2 (6,66%)
	16 - 25	14 (46,6%)	17 (56,6%)
	26 - 35	13 (43,3%)	9 (30%)
	Over 36	1 (3,33%)	2 (6,66%)
Marital Status	Single	9 (30%)	14 (46,6%)
	Married	21 (70%)	16 (53,3%)
Variable	Categorização	G1(N)%	G2(N)%
Maternal Education	Incomplete Elementary School	12 (40%)	13 (43,3%)
	Complete Elementary School	2 (6,66%)	5 (16,6%)
	Incomplete High School	5 (16,6%)	3 (10%)
	Complete High School	9 (30%)	6 (20,%)
	Incomplete Higher Education	0 (0%)	2 (6,66%)
	Complete Higher Education	1 (3,33%)	1 (3,33%)
Family Income	Up to 1 minimum wage	21 (70%)	19 (63,3%)
	2 – 3 minimum wages	9 (30%)	10 (33,3%)
	4 – 5 minimum wages	0 (0%)	1 (3,33%)
Prior Experience with Breastfeeding	Yes	15 (50%)	16 (53,3%)
	No	13 (43,3%)	14 (46,6%)
Previous Successful Breastfeeding	Yes	11 (36,6%)	10 (33,3%)
	No	4 (13,3%)	1 (3,33%)

newborn; which can bring as consequences, changes in speech organs<sup>21</sup>.

These changes can occur in preterm neonates and low birth weight causing this group of infants are more vulnerable compared to the group that comes forward<sup>22</sup>, as oral reflexes of this group of babies have been preset during intrauterine life. What often does not happen in the group of preterm infants<sup>23</sup>. However, it is important to note that the work of the multidisciplinary team who attended premature low birth weight, her mother and family, housing kangaroo (G1), guiding them and providing them the necessary support to overcome the difficulties encountered are essential to minimize the risk of future changes. What usually does not occur in the housing assembly (G2), since even in low efficiency in the reflection and sucking rhythm, the neonate has left hospital<sup>24</sup>.

The missing oral reflexes found in both the G1 and G2 have few indicators that show signs of risk in the evaluation index of Oral Sensory Motor System, which leads to suggest that speech therapy performed in this group of newborns promoted the adequacy of

structures and stomatognathic functions of preterms, confirming with the literature that states that the speech therapy favors ownership and coordination of functions involved in the feeding process, favoring the initiation of breastfeeding in the mother's chest and consequent discharge<sup>20</sup>.

The suction of the premature neonate with speech therapy, when the two groups were compared, it was observed that the G1 got better as to behavior, stress signs, coordination and suction rhythm; while the G2 obtained improvement over the coordination of the swallowing reflex and sucking. This result was not found in other studies, therefore, both groups benefited, possibly with speech therapy<sup>23</sup>.

Regarding eating habits all newborns at discharge were in Exclusive Breastfeeding (AME) and 19 mothers of the G1 neonates, reported having knowledge about the benefits of exclusive breastfeeding; however, during the clinical assessment of the 32 neonates G1, 2 breast milk was offered by the womb more glass and 2 diet was offered by nasogastric tube. Early initiation of breastfeeding brings benefits to newborns,

physiological, affective and improvement in their quality of life<sup>21</sup>.

In the study carried out by Sanches<sup>22</sup>, is concerned that exclusive breastfeeding of infants of low birth weight and premature babies is quite complex and involves numerous factors that influence their practice, though prior knowledge of the factors associated with the interruption of this practice can facilitate the actions of the interdisciplinary team in the promotion and support of breastfeeding. As a result, it is expected that these difficulties can be overcome by health staff actions of the hospital, the family, society, beyond the articulation of health services<sup>25</sup>.

According to Dorothy<sup>26</sup>, preventing the changes of oral functions is to take care of establishing proper structures, hard and soft that allow proper tone all the muscles of the stomatognathic system, correct posture of the tongue and lips in perfect lip seal, as well as breathing with nasal standard.

## CONCLUSION

The study revealed that all preterm and low weight at hospital discharge were in exclusive breastfeeding, possibly due to guidance and speech therapy interventions that were carried out during the hospital admission period. This can be one of the factors contributing to the emergence of low early weaning rates after hospital discharge in this population.

Newborns who visited the Kangaroo method did not achieve a statistically significant difference from the food profile and the oral motor sensorial system, when compared to infants who have not gone through this method, but the scientific evidence on the benefits of Kangaroo Care are numerous, improves mother-child bond and promotes exclusive breastfeeding making knowledge about the benefits of breastfeeding something concrete and practical, also decreasing the risk for early weaning.

## ACKNOWLEDGEMENTS

We would like to thank the whole team of motherhood, as well as the mothers of infants who participated in this research and the FAPEAL (Support Foundation to Research of the State of Alagoas) for the opportunity and incentive to scientific initiation.

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