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Maternal perception on neurobehavioral signs of preterm infants hospitalized in the pediatric Ward

A percepção materna sobre os sinais neurocomportamentais de bebês pré-termo internados na enfermaria pediátrica

Percepción materna acerca de los señales neurocomportamentales del bebés pretérmino hospitalizados en sala de pediatría

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The aim of the study was to map the neurobehavioral signs presented by preterm infants from the perspective of mothers. This is a descriptive and exploratory qualitative study with 20 mothers of preterm infants carried out through the application of the APIB questionnaire and *checklist*, from October 2011 to January 2012, in a pediatric ward of a Clinical Hospital in the Triângulo Mineiro region, MG, Brazil. To analyze the data, a simple description of absolute and relative frequencies was performed and the thematic content analysis method was used to describe the qualitative data. In the analysis of the signs presented by the babies, the mothers were able to recognize the signs of approximation more than those of retraction. All mothers reported watching their babies and mentioned the importance of the mother-child bond. This fact helped both in the observational process and in the strengthening of the mother-infant bond, helping to create strategies to deal with hospitalization.
Descriptors: Infant premature; Neurobehavioral manifestations; Humanization of care; Mothers.

O estudo teve como objetivo realizar o mapeamento dos sinais neurocomportamentais apresentados por bebês pré-termo a partir do olhar materno. Esta é uma pesquisa descritiva e exploratória, de abordagem qualitativa realizada com 20 mães de bebês pré-termo, através de questionário e *checklist* do instrumento APIB, no período de outubro de 2011 a janeiro de 2012, em uma enfermaria pediátrica de um Hospital de Clínicas da região do Triângulo Mineiro. Para análise dos dados coletados realizou-se uma descrição simples das frequências absoluta e relativa e utilizou-se o método de análise de conteúdo temática para descrição dos dados qualitativos. Na análise dos sinais apresentados pelos bebês, as mães souberam reconhecer mais os sinais de aproximação do que os de retraimento. Todas as mães disseram observar os seus bebês e relataram a importância do vínculo mãe-filho. Esse fato auxiliou tanto no processo observacional, quanto no fortalecimento do vínculo mãe-bebê, ajudando na criação de estratégias para lidar com a hospitalização.
Descritores: Recém-Nascido Prematuro; Manifestações neurocomportamentais; Humanização da assistência; Mães.

El estudio tuvo como objetivo realizar el mapeo de las señales neurológicas de comportamiento presentadas por bebés prematuros a través de la mirada materna. Esta es una investigación descriptiva y exploratoria, de abordaje cualitativa realizada con 20 madres de bebés prematuros, a través de cuestionario y check-list del instrumento APIB, en el periodo octubre de 2011 a enero de 2012, en una enfermería pediátrica de un Hospital de Clínicas de la región del Triángulo Minero, Uberaba, MG, Brasil. Para análisis de los datos recolectados se realizó una descripción simple de las frecuencias absoluta y relativa y se utilizó el método de análisis de contenido temático para descripción de los datos cualitativos. En el análisis de las señales presentadas por los bebés, las madres pudieron reconocer más las señales de aproximación que las de retraimiento. Todas las madres dijeron observar a sus bebés y relataron la importancia del vínculo madre-hijo. Ese hecho auxilió tanto en el proceso observacional, como en el fortalecimiento del vínculo madre-bebé, ayudando en la creación de estrategias para lidiar con la hospitalización.
Descriptores: Recién nascido prematuro; Manifestaciones neuroconductuales; Humanización de la atención; Madres.

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INTRODUCTION

Prematurity is seen as a biological risk factor for child development, increasing the possibility of motor, sensory, cognitive and emotional problems and also vulnerability factors, which requires double care, representing an exceptional situation for the child and the parents[1,2]. A preterm newborn (PTNB) is an infant born at less of 37 weeks or 259 days of gestational age[3].

When PTNB are hospitalized, they are exposed to environments to which they are not adapted and which are often not compatible with their neurological maturity and with the readiness to issue adaptive responses to the stimuli coming from the environment[4,5].

Repetitive and painful interventions trigger a global response to stress, changes in the cardiovascular, respiratory, immune, hormonal and behavioral systems, and interfere with the homeostatic balance, promoting increased energy expenditure and nutritional needs. There is excessive stress on the still immature central nervous system of the PTNB[4,5].

Excessive stimuli may generate neurological processes that are inconsistent with the developmental level of a PTNB. However, when stimulation is appropriately offered, it can contribute to the neurobiological maturity, health, and development of the baby[6].

Prolonged intensive and stressful care implies the need to host PTNBs and their parents, who experience feelings of anxiety and fear regarding the hospitalization of their children. In this way, humanization is fundamental in the hospital, a receptive and embracing place to both[6,7].

Humanization in the hospital space is focused on respect for individuality, promotion of safety of the newborn, and embracement of babies and their parents, through the bond that the family seeks with the health team. In order to improve the quality of life of PTNBs and their parents and provide a more humanized assistance, public policies and theoretical models have been created and adopted[8].

The Synchronous-Active Approach to Development (*synactive*) created by Heidelise Als advocates the humanization of care[9]. Such an approach focuses on the fact that the brain of PTNBs is an acting organ on all aspects of its development, and emphasizes that the baby's cerebral functioning can be observed in its behavior. The baby's limits towards the stress, self-regulation and the functioning of some subsystems, which are interconnected and promote balance, can be therefore demonstrated[10,11].

This approach raises the need for professionals working with infants and parents to develop abilities to identify and interpret the behaviors of PTNBs. These can be named neurobehavioral signs of approximation and retraction[12].

These signs serve to indicate the level of overall organization and disorganization of the baby's body and its subsystems, and whether it needs any specific help. Neurobehavioral signs of approximation indicate that the body is ready to receive adequate stimulation, giving evidence of homeostatic balance. In turn, retraction signs indicate that the baby is stressed and is not in homeostasis. The recognition of these signs is important to the development of PTNBs[11,12].

Since birth, PTNBs are involved in interactions with adults and with the environment in which they live. Therefore, it is essential to receive support from these adults to control their social, interactive and/or exploitative capacities[13].

In this way, it is essential that the health team have knowledge about these behaviors, correctly stimulates the child based on the expressed neurobehavioral signs in order to teach and guide parents about these signs[7,14].

When the health team and parents work together in this intervention process, recognizing and respecting these signs and consequently the neurophysiological maturity and stability of the PTNB, humanized care can become effective.

In this sense, the objective of the present study is to map the neurobehavioral signals presented by preterm infants from the perspective of mothers.

METHOD

This is a descriptive, exploratory study with qualitative approach carried out from October 2011 to January 2012 in a pediatric ward of a Clinical Hospital of the Triângulo Mineiro region. Twenty mothers of preterm newborns hospitalized in the exclusively infant ward participated in the study. The research was approved by the Research Ethics Committee of the Federal University of Triângulo Mineiro under the protocol number 1947-11.

The inclusion criteria were: mothers who accepted to participate in the study, signed the Informed Consent Form, and who had preterm babies with chronological age of up to 3 months and hospitalized in the pediatric ward for a minimum time of seven days. The ages of the babies and the length of hospitalization were stipulated respecting the age suggested by the research instrument, and also based on the fact that seven days is a desirable period of time because at this point mothers have already established contact with their babies and have a better perception of the behavioral responses of their babies.

Data were collected through an individual checklist that contained the following items: sociodemographic characteristics of the participants, aspects related to gestation and delivery, gestational age and sex of the child. Part of the *Assessment of Preterm Infant Behavior* (APIB) was also included in this checklist.

The APIB is a neurobehavioral evaluation of self-regulation behaviors expressed by preterm and full term infants and those at risk of developmental delays[9,15].

In addition to this checklist, a semi-structured script was developed containing questions related to the difficulties encountered by the mothers to identify the neurobehavioral signs; their knowledge of the signs and the importance given to them; the valorization of observation and bonding between mother and infant, and one question where they were invited to add any extra information they deemed necessary.

For the analysis of the collected data, a simple numerical description was performed, where the absolute and relative frequency of occurrence of the responses were presented; and for a qualitative description, thematic content analysis was used[16].

The analysis of thematic content consists of discovering the nuclei of meaning that make up a communication, whose presence or frequency means something to the analytic target object[16].

Data were read and reread twice by each researcher separately and once in a group, and a checkup and agreement among both researchers on the similarities between the created categories were performed.

RESULTS

Table 1 shows the socio-demographic profile of the mothers. They lived in cities of the Minas Gerais Triangle. Half (50%) were aged between 19 and 30, 35% had completed high school, 55% were common-law married, and 80% did not work outside the home. The majority (70%) was primiparous and the others said they had already had preterm children.

Regarding the type of delivery, 55% had vaginal delivery and 45% cesarean delivery. Regarding "complications in childbirth", the majority (60%) had no complications; however, of the 8 mothers (40%) who reported having had some type of complication, 7 mentioned pre-eclampsia. Prenatal care was performed by 90% of the mothers.

For the item "presence of any disease during pregnancy", 9 mothers (45%) said they had hypertension or problems of urine infection.

Regarding the item "use of any medication during gestation", all mothers said "yes", referring to vitamins. About the profile of the 20 infants, 60% were male and 40% female. Three infants (15%) were born before 25 weeks, 10 (50%) between 25 and 30 weeks and 7 (35%) between 31 and 36 weeks.

The table 2 presents the results related to the neurobehavioral signs (approximation/retraction) of the infants as indicated by the mothers and the respective percentages of responses.

It was observed that among the 17 signs of approximation, 9 (hand on the face, snuggling, body movements, gripping

movements, search reflex, sucking, biting, holding the examiner's hand, and visual and auditory fixation) were indicated by more than 70% of the mothers, of which 4 (body movements, search reflex, sucking, holding the examiner's hands) were reported by more than 90%. In this sample, the least marked approximation sign was "crossing fingers", pointed by only 25% of the mothers.

Table 1. Socio-demographic profile of mothers of preterm infants hospitalized in a pediatric ward from October 2011 to January 2012. Uberaba, 2012.

Profiles	Number of mothers	Answers (%)
Age (in years)		
14 to 18	5	25
19 to 30	10	50
31 to 40	5	25
Schooling		
Incomplete primary education	5	25
Complete primary education	5	25
Incomplete secondary education	1	5
Complete secondary education	7	35
Incomplete higher education	2	10
Marital status		
Single	4	20
Married	4	20
Common-law married	11	55
Divorced	1	5
Working out of home		
Yes	4	20
No	16	80
Children		
1	14	70
2	3	15
3	3	15
Type of delivery		
Normal	11	55
Cesarean	9	45
Complications at childbirth		
Yes	8	40
No	12	60
Prenatal care		
Yes	18	90
No	2	10
Presence of any disease during pregnancy		
Yes	9	45
No	11	55
Use of any medication during pregnancy		
Yes	20	100
No	0	0

Among the retraction signs, 6 (sobbing, bending the body, airplane winging, sneezing, yawning, and frowning) were reported by more than 70% of the mothers and of these, 2 (sobbing and yawning) were reported by more than 90% of the mothers, and the "yawning" was the sign listed by all of them. The least mentioned retraction sign was "nausea", reported by 5% of the mothers.

The analysis of the approximation /retraction signs revealed that the mothers recognized more often the approximation signs than those of retraction.

Regarding the semi-structured questionnaire, in the question 1 - "Do you find it difficult to identify these signs in your preterm baby?", 2 mothers (10%) reported having difficulties and 18 (90%) said they had not. Regarding the question 2 - "Were you aware of these signs?", 6 mothers (30%) said yes, 3 of whom said they only knew the signs; 1 mother reported knowing the signs because she observed her baby very often; another

mother said she knew only the signs of approximation; and the last mother said she had heard of these signs in a talk; another 14 mothers (70%) said never having heard about the matter.

In the question 3 - "Do you think it is important to know these signs? Why?", all the mothers answered yes.

Table 2. Approximation/retraction signs mentioned by mothers of preterm infants hospitalized in a pediatric ward from October 2011 to January 2012. Uberaba, 2012.

Retraction signs	**%**	**Approximation signs**	**%**
Regurgitating	20	Tongue extension	55
Nausea	5	Hand on the face	80
Sobbing	90	Emission of sounds	50
Peristaltic movements	20	Hands together touching each other	55
Grimaces, tongue retraction	65	Feet together touching each other	50
Bending the body	85	Crossing fingers	25
Stretching fingers	50	Snuggling	70
Airplane winging (abduction of extended arms)	70	Body movements	95
Greeting (extension of one or both arms)	60	Hand on mouth	65
Sitting in the air	60	Gripping movements	85
Sneezing	85	Search for support for feet or legs	65
Yawning	100	Search reflex	90
Sighing	45	Sucking	90
Coughing	35	Holding the examiner's hand	90
Dodging	55	Do 'OHH' with the mouth (round lips)	65
Frowning	80	Visually or auditory fixation	80
		Biting: opening and closing movements of the mouth	70

Table 3 presents the mothers' report on "why they think it is important to recognize the retraction and approximation signs ". In question 4 - "Do you often observe your baby?" And 5 - "Do you think it is important to have a bond with your child? Why?", all the mothers answered yes. Table 3 also presents the mothers' report on the importance of bonding.

The last question in the script was answered by no one of the mothers. All mothers answered the questions 3 and 5 of the script, and in question 5 only 2 mothers (10%) did not know how to respond.

Regarding the mothers' speeches, three categories were evidenced:

a) Recognizing the signs presented by my baby;

b) My child and his/her development; and,

c) The importance of the communication process between mother and child.

DISCUSSION

Assistance to PTNBs and their parents has become more humanized. Parents who interact with their hospitalized babies feel fulfilled for being able to help and share in the recovery of the child[17].

The infirmary, they are likely to gain weight, have fewer breathing pauses, and better complexity of brain function[18].

This issue could be observed in the speech of one of the mothers, who used communication as a humanized strategy to aid in the development of her baby:

It's nice to talking to her; it seems she understands what I say. (Mother 20).

Table 3. Importance of bonding according to the mothers of preterm infants hospitalized in a pediatric ward. Uberaba, 2012.

Mother	Age	Why do you think it is important to recognize the signs expressed by the baby?	Why do you think it is important to have a bond with your baby?
1	38	To be aware and learn more about	No answer
2	23	To know if the child is well	To speed up the development, especially when you know the mother
3	29	To know the child well	It is essential because staying together with him makes all the difference to his recovery
4	25	To see if the child is developing well	She did not know how to explain
5	40	To know the baby	Because you know the baby better and start to discover a lot of things
6	16	Because the mother is always close to her child	Because it promotes a strong love
7	37	To pay attention and learn to deal with the child	Because he is my son
8	25	To have a sense of understanding, because the baby does not speak	To give attention, love, affection, to understand him; because he does not speak, then he gives signs for me to understand
9	24	Because information helps in everything	Because it is essential to have this link
10	16	Because it is good, to avoid problems, diseases. The more you know, the better	I like to observe her because sometimes she smiles to us even with her eyes closed
11	36	To follow up the baby all the time correctly	To observe what is going on, if everything is okay
12	22	It is a way of understanding them, and they understand us	In breastfeeding especially, because being together is a way of communicating
13	14	To know when he likes and what we should do with him	Because in the future we will be very attached to each other
14	17	To know when she likes it or not, so she can do what she likes	It's important to be attentive because they grow and you do not even see it
15	22	Because with knowledge, it is easier to deal with things	He is young; at the time of feeding, it is a bond that words cannot explain
16	14	To know when they want something	For the baby to be close to his mother and be pacified
17	28	I wasn't aware of the signs of retraction. It is important to know because it is a sign that something is not well, then as he does not speak, he will show it	It is essential because in this world now, in his life, he only knows me, I am his mother
18	20	Because we learn	Because you feel closer to your daughter, baby. She depends on it.
19	32	Because sometimes the child needs some extra care and you do not know how to identify that	Because she was premature, the mother had no contact with her and after those 15 days the baby is very much better and less stressed
20	24	To know, right?	It's nice talking to her; it seems she understands what I say.

In the humanization of care, mothers began to be considered allies and to play a fundamental role in the care of the children[19,20]. Maternal stay during hospitalization has become fundamental in this new form of care and for the process of affective bonding between mother and premature baby.

The speeches of the participating mothers demonstrated such experiences lived and advocated by current public policies: *It is essential because staying together with him makes all the difference to his recovery* (mother 3).
It is essential because in this world now, in his life, he only knows me, I am his mother. (mother 17)

Having the opportunity to stay with her child in the hospital and spend time playing the maternal role will positively have an effect on the process of knowing the child, the behavioral signs presented by him, and especially in the development of the child.

In the category "Recognizing the signs presented by my baby", in relation to the question "Why do you think it is important to recognize the signs presented by the baby?", most mothers reported having no difficulty observing the signs presented by their children and that they thought it was important to be aware of them.

This favored the questioning of whether the fact that they spent most of their time with

their infants in the infirmary had caused them to adopt this care attitude or if the team advised them on the appropriate form of care for the babies, or still if it had been the concern with prematurity and need for differentiated care.

In a report, one of the mothers pointed out that after more contact with her baby, she could see her progress, and that made her think that this contact was really essential for her development:

Because she was premature, the mother had no contact with her and after those 15 days the baby is very much better and less stressed (mother 19)

It is important to be attentive to the gestures made by the PTNB in order to offer health care that takes the baby as a subject into account[20]. And this is what was observed in the following reports of the mothers:

Because it is good, to avoid problems, diseases. The more you know, the better. (mother 10)

To know when he likes and what we should do with him. (mother 13)

To know when they want something. (mother 16)

Because sometimes the child needs some extra care and you do not know how to identify that. (mother 19)

The fact that mothers become worried and attentive to their babies is in line with the theory of primary maternal concern, which consists of a state of great sensitivity, where the mothers have a concern for their babies and seek to meet their needs[21]. In this study, mothers showed concern and curiosity towards the signs presented by the babies, and this sensitized them to a greater acceptance of the children.

The mothers' reports on the importance of identifying neurobehavioral signs and the question "Why do you think it is important to have a bond with your baby?" led to the creation of the thematic category, "My child and his/her development", where the following accounts stood out:

To know the child well (mother 3)

To see if the child is developing well. (mother 4)

Because you know the baby better and start to discover a lot of things. (mother 5)

To pay attention and learn to deal with the child. (mother 7)

To observe what is going on, if everything is ok. (mother 11)

Often, the baby may have long-term suffering and this will lead to developmental risks, and possibly influence the interaction with the parents and be harmful to the psychic development. Thus, it is essential that the mother of the newborn understand the capabilities and weaknesses of the child, thus helping to intervene in the moment of organization of the physiological systems[11].

The experience with PTNBs can be considered important because through early contact, it is possible to observe when the baby began to recover and when he used a better communication[20]. Thus, the time spent by the mother with her infant influenced the recognition of the signs presented by the child and the process of attachment.

In the category "The importance of the communication process between mother and child", most of the speeches brought the essence of this relationship as a unique and enriching moment of the bonding between both:

To give attention, love, affection, to understand him; because he does not speak, then he gives signs for me to understand (mother 8)

The affective bond consists of an approximation and interaction as early as possible between mother and child, constantly growing and playing the role of bringing protection and survival to the infant, promoting communication with parents, and thus the onset of a normal development[20,22].

The Bond Theory advocated by Henrique Pichon-Riviére proposes that every family system, considered a group of social relations, is characterized by roles and functions where each member complements each other, thus promoting the feeling of belonging that influences the functioning of the group[27].

The bond is part of people's lives; it promotes family ties and quality relationships established in the first years of life. It is therefore a determining factor in the process of cognitive and emotional development.

Maintaining the bond during hospitalization is important also for caregivers of the infants as it helps them in providing opportunities and support for baby care and to enhance their recovery process. This attachment between mother-child has a meaning for the development and well-being of both[23,24].

When the mother and baby interact, a series of sensorial, hormonal, physiological, immunological and behavioral events begins, positively contributing to the bond and that working in line with the synchronous-active approach[7,11].

Communication between mother and baby, even if silent, is sensitive to signs of both sides, and has the potential to protect the baby from automatic reactions to intrusive factors in the environment. To do so, it is important that mothers have subtle perceptions of their babies' behaviors. This will also help mothers in the perception of to which extent exactly they should manipulate the baby or make pacify them. It can become a coping mechanism to deal with the stress experienced in the hospitalization process[25].

A support network for parents provided by the health team during the hospitalization process is also important. This network can help and guarantee a healthy and embracing environment for mothers and their families[20,26]. This was not pointed out in the mothers' statements, which raises doubts on whether they were aware of the importance of the team's intervention, to aid in the global development of the PTNB, and to facilitate their experience in the hospital.

The recognition of neurobehavioral signs is crucial to identifying what the baby is feeling, when the baby is well or is experiencing stress. It is important that parents be engaged in the hospitalization process because it is at that time that they are susceptible to strong emotions, conflicts, and feelings involving family, baby, and staff.

To this end, a training of all who enter this hospital context, whether health professionals or families, should take place. Furthermore, the best care to babies and their mothers should be prioritized, and the maternal role should be valued in the care of the babies.

CONCLUSION

We observed in this study that mothers of preterm infants were able to visualize more often the neurobehavioral signs of approximation than those of retraction presented by the babies.

The fact that the mothers had a process of affective attachment with their babies during the hospitalization process helped in the observation of signs and in the creation of strategies to deal with the hospitalization.

It became clear that more than observing babies, it is important that active listening and a training process for these mothers and for the whole team take place.

Due to a few references on the theme, it is hoped that this research contributes to the promotion of a more humanized health care and generates new hypotheses for future research also addressing this issue, and also helps in the guarantee of the neurodevelopmental needs of infants, to include parents actively in the process of comprehensive care.

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CONTRIBUTIONS
Maria Regina Pontes Luz Riccioppo worked in the design and writing of the article, analysis and interpretation of the data. **Lucieny Almohalha** participated in the design and writing of the article; delineation, analysis and interpretation of data and critical review.

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