

Perception of Health Professionals about the Importance of the Prone Position in the Neuropsychomotor Development of Newborns in Neonatal Intensive Care Units (NICU) of the Southern Region of Brazil

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Abstract

Background: The alternation of infant decubitus in NICU promotes neurobehavioral and neuromotor stability.

Objective To identify the perception of health professionals about the importance of the prone position regarding the NPMD of newborn in the Neonatal Intensive Care Unit (NICU) of the Southern Region of Brazil.

Design: Cross-sectional.

Population: Health professionals working in the NICU of Southern Brazil (Paraná, Santa Catarina, and Rio Grande do Sul).

Setting: The information was collected through a standardized questionnaire, from December 2015 to May 2018, applied to the head of the NICU and the following members of the multi-professional team: doctors, nurses, and physiotherapists. Descriptive analysis, Chi-square test, Student's t-test, Mann-Whitney test, and logistic regression were performed using the ENTER method. It was considered statistically significant when $p < 0.001$.

Main results: 51 NICU were included, totaling 438 respondents (180 nurses, 154 doctors and 104 physiotherapists); the mean age of the interviewed professionals was 37.5 years (SD: 9.23) and the mean experience time in the area was 11 years (SD: 8.6); regarding the professional qualification of the participants, 87.3% (N: 327) reported having undergraduate/specialization and 12.3% (N: 54), graduate. There was a positive correlation between the affirmative response of the professionals regarding the interference of the prone position in the NPMD and the indication of this posture in the NICU (OR: 2.455; $p < 0.001$), and the presence of a physiotherapist increases fivefold the likelihood of prone position indication ($p < 0.001$, 95% CI).

Conclusion: According to the perception of 438 health professionals interviewed, prone position indication in the NICU is associated with considering their interference in the NPMD of infants and the presence of a physiotherapist in the Unit.

Clinical Rehabilitation Impact: Prone position use is positively related to the presence of a protocol for this position.

Keywords: Infant; Newborn; Intensive Care Units; Neonatal; Postnatal Development; Prone position

Introduction

In the last decades, a significant increase of neurocognitive alterations and neuropsychomotor development (NPMD) associated with the increased survival of premature births has been observed [1-4]. As the incidence of mortality in the neonatal age decreased, hospital admissions have been prolonged and private, and were related to developmental changes during childhood [5,6]. The length of hospital stay in the Neonatal Intensive Care Unit (NICU) is determinant in this process, being associated with biological and environmental risks [5-7].

Gestational age and birth weight are among the main risk factors that lead to an evolution of deficient NPMD, as the need for specialized care increases with clinical complications [1, 2]. In addition, environment has a strong influence on NPMD, since inadequate stimuli and the same position or inadequate positioning in bed during most of the time are routinely observed [7,8]. As care strategies, regular posture variation and correct functional positioning may attenuate postural changes and asymmetries associated with prematurity and remain in the NICU [9-10].

Among the postures employed for newborns, lateral decubitus stimulates proprioception and kinesthetic tactile, which facilitates hand contact, hand in mouth, visual contact with hands and flexor posture [11]. The supine position is known as less favorable, with consequent repercussions on the motor development of the newborn, because it favors cervical hyperextension, hampering the active movement of the head and upper limbs and impairing sensorial stimuli [12]. The prone position contributes to the activation of the extensor muscles, promoting faster development of cervical and trunk control [13,14], making them more apt to develop motor and weight-bearing capacities against gravity [15-17], which favors the acquisition of other postures: in the supine position, sitting [15,16] or standing [17].

Considering the relationship between the prone position and the typical motor development [18-20], the attention of health professionals regarding the alternation of positioning from birth becomes essential [14,21] to promote the development of spontaneous and functional motor activity of the newborn [9,10,13,18]. Thus, a team oriented and informed regarding the appropriate positioning of the newborn can contribute to lower levels of physiological and motor stress [22,23]. Thus, this study mainly aimed to identify the perception of health professionals about the importance and indication of the prone position in the NPMD of newborns in NICU of the Southern Region of Brazil. It's expected that health professionals identify the importance and indicate the prone position at DNPM for newborn in NICU in Southern Brazil.

Methods

This is a cross-sectional analytical study carried out at public NICU in the Southern Region of Brazil (states of Paraná, Rio Grande do Sul and Santa Catarina) between December 2015 and May 2018.

"According to the State Health Secretariats and accreditation in the DataSUS, with periodic consultations, during the period of data collection, concerning changes in the number of units, 92 public NICUs of the Southern Region of Brazil were identified, of which 38 units were from the State of Paraná, 35 from the State of Rio Grande do Sul and 19 from the State of Santa Catarina. Totaling 438 respondents (180 nurses, 154 doctors and 104 physiotherapists) included, who worked in the Service routine in these units with one year or more of experience in the area and who agreed and signed the Informed Consent Term were included in this study. Health professionals who were in (medical or multi-professional) residency programs were excluded from this study."

Instruments

A questionnaire was elaborated by the researcher to doctors, nurses, and physiotherapists working in NICUs to identify the perception of health professionals about the importance of prone position for the NPMD, containing 10 multiple choice questions and a descriptive question related to the main difficulties in performing the prone position in the Service. A second questionnaire was developed with four questions directed to the unit coordinator to characterize the profile of the Units. Both questionnaires were answered in person to the same researcher. The information on the questionnaires developed are as follows:

A. Questionnaire addressed to health professionals about the relationship between the prone position and the NPMD in the NICU, with extension to the post-discharge period of the newborns, and included the perception about: indications, contraindications, importance, applicability of the same in the routine of service, presence of a bed change protocol, difficulties to perform the prone position concerning factors associated with the clinical condition of the newborn and ventilation support (invasive and non-invasive mechanical pulmonary ventilation). We also questioned the guidelines given to relatives at hospital discharge, including the stimulation of the prone posture and postnatal follow-up of the newborn.

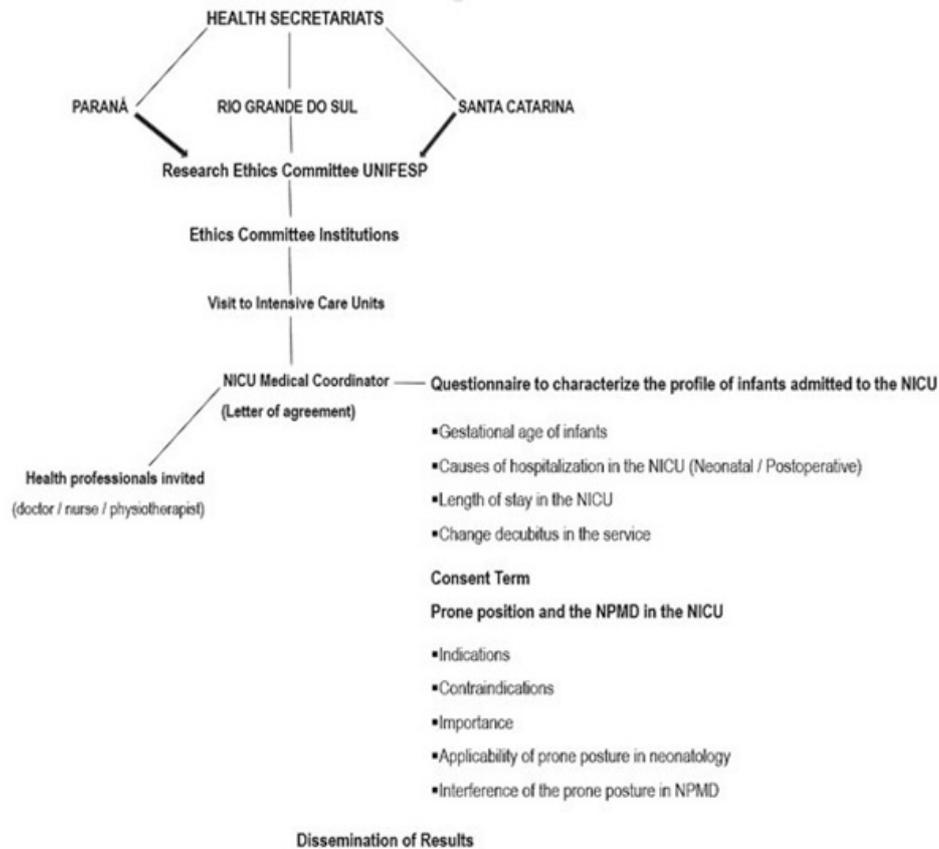
B. Questionnaire applied to the medical coordinator of each NICU to characterize the profile of patients admitted to the NICU and the use of functional positioning. The following were identified: gestational age of newborns, more frequent clinical diagnoses divided into neonatal (prematurity, low birth weight, perinatal asphyxia, perinatal infection, meconium/amniotic fluid aspiration syndrome, hyaline membrane/respiratory distress syndrome, pulmonary hypertension, sepsis) and postoperative (cardiac, abdominal, neurological) conditions, mean time of hospitalization in the NICU and whether the Service has a routine of mobilization and change of decubitus in the bed.

Collection Procedure

Initially, the research was submitted to the State Health Secretariats of Paraná, Rio Grande do Sul and Santa Catarina, which confirmed their awareness about the study, and later sent to the Research Ethics Committee of the Federal University of São Paulo - UNIFESP (CAAE 49068215.4.0000.5505). Following the approval of the Ethics Committee, the principal researcher contacted the public institutions with NICUs in at least five attempts to the institutional body responsible for conducting research.

After getting in touch with the corresponding sector, the documentation requested for the research was arranged, and the medical coordinator of each unit was contacted. Following clearance by coordinators through a letter of agreement, and subsequent

acceptance of the research by the Ethics Committees of the involved institutions, the health professionals were personally invited, in at least in two different moments, to participate in the study, and then collected the signing of the consent, followed by the application of the questionnaire. Concerning the unit's medical coordinator, a second questionnaire was applied to characterize the profile of infants admitted to the NICU. The professionals were identified by codes and identities were kept confidential; the preliminary and final results were made available to the medical coordinators of the participating institutions, and sent to the Health Secretariats of the three States (Flowchart 1).



Flowchart 1: Elaboration and stages of the researchfeeding

NICU = Neonatal Intensive Care Unit; NPMD = Neuropsychomotor Development

The neonatal variables collected were: gestational age in weeks, length of stay in the NICU in days, and causes of hospitalization in the NICU, which were divided into neonatal and postoperative periods. To characterize the health professionals the information collected were: time of experience (in years) and professional qualification, specialization or postgraduate (masters and doctorate).

Concerning the prone position in the NICU, the following variables were verified: presence of a protocol of change of decubitus, classified by its presence or absence in the Service; use of prone posture in the routine, applicability of prone position in neonatology, importance of prone position to NPMD in neonatology, difficulty in initiating prone position for newborn in the NICU, interference of the prone position in NPMD following discharge, and referral to physiotherapeutic care after hospital discharge, determined positively (yes) or negatively (no); which professional identifies when the prone position can be started in the NICU and which professional is responsible for orientation of the positioning of the newborn after discharge from the hospital (doctor, nurse and physiotherapist); indication of the beginning of the prone position in the NICU (clinical condition of newborn or ventilation support); factors related to the difficulties to initiate the prone position in the NICU (factors of the newborn and factors external to the newborn). It should be noted that each professional could respond to more than one possibility to indicate the difficulties to achieve this position.

Only 312(71.9%) mothers gave a specific reason for the choice. The highest proportion of women who wanted to stop breastfeeding at less than 12 months (41.2%) and at 12 months exactly (26.8%), gave returning to work/school as their reasons. While the highest proportion of those who wanted to go beyond 18 months had no specific reason (36.7%) or believed the child would have reached some form of maturity as reason for their choice (30.0%).

Statistical analysis

Qualitative variables were shown as absolute and percentage numbers, being compared using the Chi-square test. The quantitative variables were evaluated for their normality through the Shapiro-Wilk test, and those with parametric distribution were compared using the t-Student test; the non-parametric variables using the Mann-Whitney test.

The relation between the indication of the prone position and the following factors were evaluated: gestational age of the newborns; time of experience in the field of neonatology; professional qualification; presence of a protocol of change of decubitus and use of prone position in the Service; affirmation of the positive relationship between the prone position and the subsequent NPMD of the newborn; and presence of the professional physiotherapist in the unit. The multivariate analysis was performed using the ENTER method logistic regression once an association of the variables mentioned above with the indication of the prone position in the NICU was found. The variables were entered and consolidated into an Excel worksheet (Microsoft Office). The Statistical Package for Social Science (SPSS®) program, version 25.0 was used for the analyses. A statistically significant level was set at $p < 0.005$. The significance level adopted was 5%.

Results

A total of 51 NICUs from the southern region of Brazil were included (Figure 1) (Table 1), with authorization from the coordinators of the Unit and the ethics committees involved, and in the other units, no authorization was obtained for the study.

NEONATE INTENSIVE THERAPY UNITS OF THE SOUTHERN BRAZIL

TOTAL: 92 Units



PARANÁ

RIO GRANDE DO SUL

SANTA CATARINA

INCLUDED = 12 Units = 31.6%

INCLUDED = 21 Units = 60%

INCLUDED = 18 Units = 95%

(77 interviewed professionals - 17.5%)

(195 interviewed professionals - 44.3)

(168 interviewed professionals - 38.2%)

Figure 1: Representation the number of Neonatal Intensive Care Unit (NICU) and interviewed professionals included in the present study

	Paraná N/%	Rio Grande do Sul N/%	Santa Catarina N/%	Total N/%
Units	12 / 31,6	21 / 60%	18 / 95%	51 / 55,4
Interviewed Professionals	77 / 17,5	195 / 44,3	168 / 38,2	440

N = Number of interviewed

Table 1: Representation the number of Neonatal Intensive Care Unit (NICU) and interviewed professionals included in the present study

According to the demographic characteristics of newborns admitted to the NICU evaluated in this study, the mean gestational age was 29 weeks, with mean of 24 hospitalized days, mainly due to neonatal factors (76.8%), followed by postnatal factors (20.5%) (Table 2). A total of 438 interviews were conducted with health professionals, with 180 nurses (41.1%), 154 doctors (35.2%) and 104 physiotherapists (23.7%); the mean age of the professionals was 37.5 years (± 9.2 years). A mean the time of experience in the area of neonatology of 11.1 years was observed, and 87.3% reported having a specialization course (Table 3).

	N	Mean \pm SD	%
GA (weeks)	404	29 \pm 8,85	-
Time of hospitalization in the NICU (days)	428	24,3 \pm 16,14	-
Causes of Hospitalization in NICU			
Neonatal	338	-	76,8
Postoperative	90	-	20,5

GA = Gestational Age; N = Number of interviewed; NICU = Neonatal Intensive Care Unit; SD = Standard Deviation

Table 2: Demographic characteristics of infants according to gestational age, mean of hospitalized days in NICU and causes of hospitalization in NICU (N = 438)

	Nurses N / %	Physiotherapists N / %	Doctors N / %	N Total / %
Experience time (years)	173 / 100.0	104 / 100.0	150 / 100.0	427 / 100.0
< 10 years	119 / 48.2	78 / 31.6	50 / 20.2	247 / 57.8
> 10 years	54 / 30.0	26 / 14.4	100 / 55.6	180 / 42.2
Professional qualification	171 / 100.0	104 / 100.0	150 / 100.0	425 / 100.0
Specialization	155 / 41.8	90 / 24.2	126 / 34.0	371 / 87.3
Postgraduate	16 / 29.6	14 / 26.0	24 / 44.4	54 / 12.7

Table 3: Characteristics of Neonatal Intensive Care Unit (NICU) health professionals (doctors, nurses and physiotherapists) regarding the time of experience and professional qualification (N = 425)

Regarding the change of decubitus, the coordinators of all the Units included informed that this practice is part of the routine of the service, and most respondents (67.7%) reported the existence of a protocol in the Unit for positioning alternation in the newborn layer. Regarding the prone position, most of the interviewees included in this study (76.9%) reported that the prone position is not indicated.

Most of the professionals interviewed believed that the prone position was considered significant (90.2%) for NPMD; almost all professionals reported knowledge about the applicability of this posture in neonatology (97.5%). It was observed that it is the professional physiotherapists who most frequently identify when to begin the prone position in the NICU (57.5%), followed by doctors (48.9%) and by nurses (36.8%) (Table 4).

Concerning the indication of the beginning of the prone position in NICU, the factors related to the clinical condition of the newborn were frequently mentioned, followed by the need for ventilation support: cardiorespiratory stability of the infant was the most frequently cited (58%); ventilation and extubation weaning (28.6%); after 72 hours of life, with continuous monitoring (minimum handling) (24.5%); after suspended sedation (11.1%); after suspended vasoactive medications (8.4%); newborn in condition of discharge from the NICU (1.8%).

In 81% of the interviewed professionals, difficulties were reported to initiate a prone position in the NICU in which they operate, and the main difficulties mentioned are newborn-related factors (69.3%). Among the main difficulties mentioned in the inclusion of the prone position in the NICU are factors related to prematurity and associated changes (59%) and factors external to the newborn (38%), which refer to the management of the Service, especially reduced (50.3%) and lack of knowledge and training in the management of the newborn in the change of decubitus (40.1%).

About half (45.2%) of the interviewed professionals affirmed the possible interference of the prone position during hospitalization on NPMD. The respondents affirm that, after hospital discharge, doctors (58.6%), nurses (46.6%) and physiotherapists (28.4%) conduct the guidelines for parents or caregivers regarding the bed positioning of newborns; however, most of the time (63.2%), there is no indication of the prone position in the Services (Table 5), regardless of their interference with NPMD (Table 4).

	Nurses N / %	Physiotherapists N / %	Doctors N / %	Total N / %
Decubitus Protocol	115 / 38.7	71 / 23.9	111 / 37.4	297 / 67.8
Lack of indication of prone posture	81 / 24.3%	102 / 30.5	151 / 45.2	334 / 76.2
Knowledge about the applicability of prone posture in neonatology	167 / 42.4	101 / 25.6	126 / 32.0	394 / 90.0
Importance of the prone stance on DNPM in Neonatology	175 / 41.2	103 / 24.2	147 / 34.6	425 / 97.0
Nurse identifies when to start prone posture in NICU	52 / 68.4	7 / 9.2	17 / 22.4	76 / 17.3
Physiotherapist identifies when to start prone posture in NICU	33 / 27.5	42 / 35.0	45 / 37.5	120 / 27.4

Table 4: Presence of protocol for the exchange of decubitus and indication of the prone position in the Services and clinical situations related to Neonatal Intensive Care Unit (NICU) in the Southern Region of Brazil (N: 438)

Prone position	Interferes NPMD N %	No Interferes NPMD N %	Total N %
Indicates	58 / 33.3	34 / 16.9	92 / 24.5
No indicates	116 / 66.7	167 / 83.1	283 / 75.5
Total	174 / 46.4	201 / 53.6	375 / 100.0

Significance level of the chi-square test ($p < 0.001$); OR = 2.455 (95% CI 1.51; 3.98)

N = Number Of Interviewed; NPMD = Neuropsychomotor Development

Table 5: Indication and interference of the prone position in the neuropsychomotor development (NPMD) of the newborns in the Neonatal Intensive Care Unit (NICU) of the Southern Region of Brazil (N: 375)

The possible association between the indication of prone position and the following factors was evaluated: gestational age of the newborns; time of experience in the field of neonatology; professional qualification; presence of change of positioning protocol and presence of prone posture in the routine of Service; affirmation of the positive relationship between the prone position and the subsequent NPMD of the newborn after discharge from the hospital; and presence of the professional physiotherapist in the Unit. After multivariate analysis, the aspects above remained associated with the indication of the prone position: the use of prone posture in the Service routine and the presence of the physiotherapist in the NICU, as well as the affirmation of the interference of the prone position in the NPMD (Table 6). It is emphasized that the presence of physiotherapist increases fivefold the likelihood of prone position indication.

	OR	Confidence Interval 95%	P value
Use of prone posture in the NICU	2.242	1.263 a 3.980	0.006
Professional	5.362	3.070 a 9.366	< 0.001*
NPMD interferes	1.951	1.142 a 3.333	0.014

Significance: * $p < 0.001$

NICU- Neonatal Intensive Care Unit; NPMD- neuropsychomotor development

Table 6: Multivariate analysis of factors associated with indication of the prone position in the Neonatal Intensive Care Unit (NICU) of the Southern Region of Brazil

Discussion

This study aimed to identify the perception of health professionals about the importance of prone position regarding NPMD in NICU in the Southern Region of Brazil. We found that most of the professionals interviewed affirmed that the change of decubitus is part of the Service routine, and professionals follow the protocol for the functional positioning of the newborn. However, when specifying the prone position, most professionals affirmed that they did not include posture/bed positioning during the Service routine, although it was considered important concerning the NPMD of the newborn and with applicability in neonatology. The main indication of the prone position in the unit refers to the presence of the physiotherapist in the NICU.

Among the main factors described for NICU hospitalizations are those of a neonatal nature, which may be associated with the risk of severe conditions related to prematurity and low birth weight [24,25]. Among the clinical alterations of the newborns are the pulmonary or central nervous system (CNS) lesions [26,27], losses associated with the facilitation and induction of neural maturation and sensory development [12,28], and reduced volume of a cortical area [29]. These aspects influence postural adjustment because of low muscle tone and inability to self-organize, hindering movements in flexion [12, 30, 31]. Correct postural alignment of the newborn is essential in the maintenance of neuromuscular and osteomyoarticular function, as well as in the development of spontaneous and functional motor activity [32,33]. Strategies that facilitate the reorganization of the newborn, such as nesting, skin-to-skin contact (kangaroo mother or father) and facilitated restraint are suggested to promote better neurobehavioral development [4,22,23,25,34].

The coordinators of the Units participating in the study report that the mean length of stay in the NICU was higher than 20 days. Due to the direct relationship between neonatal care interference and future changes in the newborn [1,31], the importance of comprehensive neonatal care is emphasized [35,36] in order to minimize the negative impact of hospitalization on them [23].

Regarding the indication of the prone position in the NICU between the different professional categories, it was observed that the presence of the physiotherapist favors the indication and performance positioning of the newborn in the prone position in these Services. It was found that, for all professional categories, the decisive aspects for the indication of the prone position in the NICU are related mainly to the clinical condition of the newborn. The importance of the careful use of the prone position, based on the clinical analysis of the newborn, is a way of prevention to be adopted by the NICU multiprofessional team [37,38].

Staying in the prone position interferes with the sequence and mechanism of appearance of the motor frames by facilitating flexion [39-41]. On the other hand, the permanence in inadequate postures is related to anatomical and structural alterations, which can result in functional deficits [23,31,42]. In this study, we found that the professionals who affirmed that there was a relationship between prone position and NPMD after discharge from the newborns and the presence of a protocol at the Unit were determinants of the prone position as a positioning strategy in the NICU. However, it has been shown that the prone position has often not been indicated, as well as guidelines and encouragement for parents or caregivers to change positioning from birth. The lack of guidelines for other placements may help parents to keep the newborn most of the time in the supine position after discharge from the hospital [20,43].

Although the importance of the relationship between the NPMD and the prone position in the NICU in newborn is not recognized, there is no standardized positioning to be followed during hospitalization, as well as the positioning orientation [44-46]. Moments of newborns awake and under supervision in the prone position are suggested from the first days of life, and a qualified team in the area is required [22] in order to improve the neonatal outcomes, aiming at a better quality of the NPMD for infants and their relatives [13,18,19].

Limitations of this study are the cross-sectional design, failure to obtain the total number of professionals working in each Service and the number of NICU not assessed, because of non-institutional authorization or non-compliance by professionals.

Conclusion

According to the perception of 438 health professionals in the southern region of Brazil, the indication of the prone position in the NICU is associated with considering their interference in the NPMD of newborn; use of this prone position in the routine of Service and presence of the professional physiotherapist. Also, prone position is relevant, although it is poorly introduced in the NICU and frequently not indicated after hospital discharge, even under supervision, which may limit newborn manipulation, depriving it of experiences to be lived in its environment.

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