

Clinical applicability of Nursing Outcomes related to breastfeeding establishment in the Neonatal Intensive Care Unit*

Aplicabilidade clínica dos Resultados de Enfermagem relacionados ao estabelecimento da amamentação na Unidade de Terapia Intensiva Neonatal

How to cite this article:

Emidio SCD, Oliveira HC, Moorhead S, Oliveira-Kumakura ARS, Carmona EV. Clinical applicability of Nursing Outcomes related to breastfeeding establishment in the Neonatal Intensive Care Unit. Rev Rene. 2022;23:e80535. DOI: <https://doi.org/10.15253/2175-6783.20222380535>

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*Extracted from the dissertation “Validação dos resultados de enfermagem da Nursing Outcomes Classification relacionados ao estabelecimento da amamentação”, Universidade Estadual de Campinas, 2019.

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Conflict of interest: the authors have declared that there is no conflict of interest.

EDITOR IN CHIEF: Viviane Martins da Silva

ASSOCIATE EDITOR: Renan Alves Silva

ABSTRACT

Objective: to analyze clinical changes in the breastfeeding process in the Neonatal Intensive Unit Care using the Nursing Outcomes Classification. **Methods:** this longitudinal and prospective study was conducted in a public hospital at Neonatal Intensive Unit Care in Brazil. The sample consisted of 61 mother-infant dyads evaluated three times during breastfeeding by trained nurses who applied the Nursing Outcomes Classification scales. Statistical analysis was performed using Generalized Estimating Equation Models. **Results:** most indicators of the two Nursing Outcomes studied presented a similar frequency of scores of 4 and 5. It was observed that in most indicators, there were clinical changes throughout the evaluations over time; however, the indicators related to the mother presented a higher risk of scoring 4 and 5 on the Likert scale. **Conclusion:** the Nursing Outcomes Classification outcomes and indicators included successfully evaluated the clinical evolution of mother-infant dyads and proved to be applicable for use in Neonatal Intensive Unit Care. **Contributions to practice:** nurses can use the indicators to assess the quality of the proposed interventions.

Descriptors: Breast Feeding; Nursing Process; Nursing Assessment; Validation Study.

RESUMO

Objetivo: analisar as alterações clínicas no processo de amamentação em uma Unidade de Terapia Intensiva Neonatal por meio da Classificação dos Resultados de Enfermagem. **Métodos:** estudo longitudinal e prospectivo realizado na Unidade de Terapia Intensiva Neonatal de um hospital público no Brasil. A amostra foi composta por 61 binômios mãe-bebê avaliados três vezes durante a amamentação por enfermeiras treinadas que aplicaram as escalas da Classificação dos Resultados de Enfermagem. A análise estatística foi realizada utilizando Modelos de Equações de Estimativa Generalizada. **Resultados:** a maioria dos indicadores dos dois Resultados de Enfermagem estudados apresentou frequência semelhante de escores 4 e 5. Observou-se que, na maioria dos indicadores, houve alterações clínicas ao longo das avaliações e ao longo do tempo, porém, os indicadores relacionados à mãe apresentaram maior risco de pontuar 4 e 5 na escala Likert. **Conclusão:** os resultados e indicadores da Classificação dos Resultados de Enfermagem incluídos foram capazes de avaliar com sucesso a evolução clínica dos binômios mãe-bebê e mostraram-se aplicáveis para uso em Unidades de Terapia Intensiva Neonatal. **Contribuições para a prática:** os enfermeiros poderão utilizar os indicadores para avaliar a qualidade das intervenções propostas.

Descritores: Aleitamento Materno; Processo de Enfermagem; Avaliação em Enfermagem; Estudo de Validação.

Introduction

Despite its benefits to mothers, infants, and society, breastfeeding can pose a challenge to the mother-child dyad, especially when the infant is admitted to a Neonatal Intensive Care Unit (NICU)⁽¹⁾. In the NICU, the establishment of breastfeeding can be compromised by the length of hospitalization, maternal stress, lack of a daily routine that stimulates lactation, and the infant’s clinical condition itself⁽²⁻³⁾. In this context, nurses play an essential role in supporting breastfeeding by identifying difficulties and planning and applying measures to stimulate breastfeeding.

Nursing Outcomes from the Nursing Outcomes Classification (NOC) can be a useful tool for this purpose by aiding professionals in systematically assessing breastfeeding status during the whole process, starting before the implementation of interventions. However, the clinical applicability of Nursing Outcomes, i.e., their ability to continuously measure the alterations in patients’ status, should be investigated in different demographic and regional contexts, aiming at expanding knowledge, applicability, and sensibility of this classification.

Two Nursing Outcomes from NOC are related to the establishment of breastfeeding: Breastfeeding Establishment: infant (1000) and Breastfeeding Establishment: maternal (1001). Breastfeeding Establishment: infant is defined as “infant attachment to and sucking from the mother’s breast for nourishment

during the first 3 weeks of breastfeeding”, and Breastfeeding Establishment: maternal (1001) is defined as “maternal establishment of proper attachment of an infant to, and sucking from, the breast for nourishment during 3 weeks of breastfeeding”^(4:234). To the best of our knowledge, there are no studies investigating the applicability of these Nursing Outcomes. The objective of this study was to analyze clinical changes in the breastfeeding process in the Neonatal Intensive Unit Care using the Nursing Outcomes Classification.

Methods

A longitudinal prospective study was conducted in the NICU of a public teaching hospital in Brazil. The convenience sample⁽⁵⁾ consisted of 61 mother-infant dyads. The study included infants in the process of establishing breastfeeding, with at least 24 hours of nutritive sucking on the maternal breast, whether or not through a nasogastric tube for oral feeding, and their mothers.

Mothers were invited to participate in the research and signed the consent forms. The NOC indicators of Breastfeeding Establishment: infant and Breastfeeding Establishment: maternal were evaluated from the infants’ medical records through video recording and interviews with the mothers. Other indicators that had been clinically validated by the researchers in a previous study⁽⁶⁾ were also evaluated (Figure 1).

Method of indicator evaluation	Nursing Outcomes Classification Indicator
Video recording	Comfort of position during nursing (100101) Supports breast using” C” hold (cupping) (100102) Adequate removal of newborn or infant from breast when necessary (100107)* Proper alignment related to breast (100001)* Proper latch on (100002)* Correct tongue placement (100013) Suck reflex (100014) Noticeable or audible swallow (100005)* Nursing a minimum of 5-10 minutes (100006) Newborn or infant contentment after feeding (100011)*

(the Figure 1 continue in the next page...)

Method of indicator evaluation	Nursing Outcomes Classification Indicator
Interviews with mothers	Proper areolar compression (100003)* Presence of colostrum/milk in the breast before breastfeeding (100103)* Milk ejection reflex (100104)* Recognition of infant swallowing (100106) Techniques to prevent nipple tenderness (100121) Recognition of early hunger cues (100113) Maternal fluid intake (100120) Pumping of breast (100123) Safe storage of breastmilk (100115) Use of family support (100124) Use of community, social medias and, healthcare services (100125)* Satisfaction with breastfeeding process (100118)
Medical records of the infant	Minimum of 8 feedings per day (100007) Urinations per day appropriate for age (100008)* Stools per day appropriate for age (100009)* Weight gain appropriate for age (100010)

*Additional indicators evaluated. These indicators had been validated in a previous study⁽⁶⁾

Figure 1 – Nursing Outcomes Classification indicators evaluated through video recording, interviews, and medical records. Campinas, SP, Brazil, 2019

The principal investigator collected sociodemographic and clinical data from the mother’s and infant’s medical records. Furthermore, mothers and infants were filmed during breastfeeding using Canon Rebel T3i® video recording digital camera on a tripod in three moments: first feeding, soon after being included in the study (0h); 24 hours after the first evaluation (24h) and 48 hours after that (48h). Mothers were also interviewed. Throughout the breastfeeding process, mother-child dyads received routine interventions from the nursing staff, according to the institutional protocols, without any interference from the investigators. According to empirical observation during bedside practice, the breastfeeding process is improved over time. Therefore, it was assumed that NOC indicators, if clinically applicable, would be able to capture this improvement, i.e., they would be increasingly scored 4 or 5 during the follow-up period. Table 1 shows the evaluation method for each indicator studied.

The following indicators were not evaluated because they would not represent the mothers’ decisions in the NICU where data were collected: Avoidance of artificial nipple with newborn or infant (100109), Avoidance of giving water or other liquids to newborn or infant (100110), Supplemental feeding, when indicated (100122).

The videos were separately and independently watched by two pairs of nurses with professional experience in breastfeeding. The nurses had been previously trained to use NOC and had not participated in any project steps to avoid bias. The first pair of nurses evaluated Breastfeeding Establishment: infant and Breastfeeding Establishment: maternal using their respective 5-point Likert-type scales with the aid of a form containing validated conceptual and operational definitions for each indicator⁽⁷⁾. The second pair of nurses also evaluated the NOC outcomes using their respective Likert-type scales with the aid of a form containing the indicators without any definitions.

When the nurses found an indicator that did not apply to a mother-infant dyad, they could check the option not applicable (NA).

For the study (to identify the clinical applicability of NOC indicators to identify changes in the breastfeeding process in the NICU), only the results of the pair of nurses who evaluated the mother-infant dyads without the aid of conceptual and operational definitions were considered. The results of the evaluations by nurses who used the definitions are described in a previous paper⁽⁷⁾.

The data was analyzed using SPSS version 23 and the Statistical Analysis System, version 9.4. Continuous and categorical variables were analyzed by descriptive statistics. The average score for each nursing outcome was calculated based on the average scores for the indicators throughout the assessment period. The statistical significance level was set at 5% ($p \leq 0.05$).

A modified Poisson regression model with robust variance using generalized Generalized Estimating Equation (GEE) was used to compare the scores of the NOC indicators identified in the patients being followed up. The GEE models are an extension of the generalized linear models (GLM) and can be applied to continuous or categorical dependent variables and correlated data, which is the case in this study because the data analyzed was measured over time. One model was adjusted for each NOC indicator (dependent variables). Regarding the NOC and its application, scoring ranged from "1", the lowest score, standing for the worst condition when it comes to the specific indicator of a given Nursing Outcomes being evaluated, to "5", the highest score, standing for the best condition.

For the best performance of statistical tests, this study adopted scores 4 and 5 of the NOC's Likert scale to estimate the relative risk, i.e., over time, grouped those dyads who received scores 4 and 5 rather than 1, 2, and 3. Relative risk, in this case, is the probability

of the indicator presenting a "4" or "5" result on the Likert scale.

Thus, the nurses' evaluations of the Likert scale were categorized into two categories: the first category, with scores 1, 2, and 3; and the second category, with scores 4 and 5. It means that the response rate for scores 4 and 5 overtime on assessments that took place at 0h, 24h, and 48h were considered, aiming at assessing changes on the scores of the indicators that might have taken place during the process.

The study was approved by the Committee on Ethics in Research of the University of Campinas according to report nº 2,458,608/2017.

Results

Sixty-one mother-child dyads were evaluated daily for three days, comprising 183 evaluations. A total of 85.2% of the infants had been admitted to the NICU due to prematurity; 50.9% were male infants; their mean birth weight was 1,859g (standard deviation (SD) =654.3), and their mean gestational age was 34.1 weeks (SD=2.7) per Capurro Method. When nutritive sucking was established, the infants were 14.1 days old on average (SD=13.7), and their mean weight was 2072 g (SD= 488.1).

The mothers' mean age was 28.4 years old (SD=6.9). The majority were living with a partner (52; 85.2%) and had previously experienced at least one pregnancy (60; 99.2%). The most common birthing method was cesarean section (59.1%). Considering the whole sample, 55 had been previously pregnant, 19 (31.2%) breastfed their infants exclusively, 31 (50.8%) breastfed infants while also offering infant formula, and nine (14.7%) did not breastfeed.

Table 1 shows the prevalence of indicators that scored 4 and 5 throughout the evaluations (0, 24, and 48 hours).

Table 1 – Prevalence of indicators of the Nursing Outcomes “Breastfeeding establishment: maternal” and “Breastfeeding establishment: infant” from the Nursing Outcomes Classification that scored 4 or 5 when the dyads were filmed. Campinas, SP, Brazil, 2019

Nursing Outcomes indicators	A time when the dyads were filmed		
	0h n (%)	24h n (%)	48h n (%)
Likert			
Breastfeeding establishment: maternal			
Comfort of position during breastfeeding (100101)	50 (86.2)	48 (82.7)	53 (91.3)
Supports breast using “C” hold (cupping) (100102)	36 (63.1)	24 (42.1)	26 (45.6)
Presence of colostrum/milk in the breast before breastfeeding (100103)	2 (7.4)	4 (14.8)	2 (7.4)
Milk ejection reflex (10104)	43 (71.6)	44 (73.3)	44 (73.3)
Recognition of infant swallowing (100106)	37 (61.6)	40 (66.6)	43 (71.6)
Adequate removal of newborn or infant from breast when necessary (100107)	30 (50.0)	37 (61.6)	44 (73.3)
Techniques to prevent nipple tenderness (100121)	4 (6.7)	24 (40.6)	32 (54.2)
Recognition of early hunger cues (100113)	37 (61.6)	44 (73.3)	49 (81.6)
Maternal fluid intake (100120)	20 (33.3)	29 (48.3)	30 (50)
Pumping of breast (100123)	29 (48.3)	34 (56.6)	38 (63.3)
Safe storage of breastmilk (100115)	28 (46.6)	38 (63.3)	38 (63.3)
Use of family support (100124)	43 (71.6)	50 (83.3)	41 (68.3)
Use of community, social media and healthcare services (100125)	2 (3.3)	3 (5.0)	5 (8.3)
Satisfaction with the breastfeeding process (100118)	51 (86.4)	52 (88.1)	53 (89.8)
Breastfeeding establishment: infant			
Proper alignment related to breast (100001)	52 (85.2)	49 (80.3)	52 (85.2)
Proper latch on (100002)	38 (65.5)	42 (72.4)	46 (79.3)
Proper areolar compression (100003)	3 (100.0)	1 (33.3)	2 (66.6)
Correct tongue placement (100013)	23 (38.3)	30 (50.0)	39 (65.0)
Suck reflex (100014)	15 (30.0)	22 (44.0)	32 (64.0)
Noticeable or audible swallow (100005)	2 (100.0)	2 (100.0)	1 (50.0)
Nursing for a minimum of 5-10 minutes (100006)	15 (27.2)	24 (43.6)	34 (61.8)
Minimum of 8 feedings per day (100007)	28 (45.9)	33 (54.1)	37 (60.6)
Urinations per day appropriate for age (100008)	4 (6.5)	10 (16.3)	13 (21.3)
Stools per day appropriate for age (100009)	9 (14.7)	34 (55.7)	29 (47.5)
Weight gain appropriate for age (100010)	58 (95.0)	60 (98.3)	59 (96.7)
Newborn or infant contentment after feeding (100011)	25 (41.6)	33 (55.0)	35 (58.3)

The indicators with the highest mean prevalence of scores 4 and 5 overtime were: Satisfaction with the breastfeeding process (88.1%), Comfort of position during breastfeeding (86.7%), Noticeable or audible swallow (83.3%), Use of family support (74.4%), Milk ejection reflex (72.7%), Proper latch on (72.4%), and Recognition of early hunger cues (72.2%).

The indicators with the lowest mean prevalence of scores 4 and 5 overtime were: Presence of colos-

trum/milk in the breast before breastfeeding (7.4%), Use of community, social media, and healthcare services (3.3%), and Urinations per day appropriate for age (6.5%).

The following tables show the results of the Poisson models for indicators of the two studied Nursing Outcomes: data related to “Breastfeeding establishment: maternal (1001)” are presented in Table 2, while data of “Breastfeeding establishment: infant (1000)” are in Table 3.

Table 2 – Poisson models to indicators of Nursing Outcome “Breastfeeding establishment: maternal (1001)”, comparing the assessments over time. Campinas, SP, Brazil, 2019

Nursing Outcomes indicators	Comparison	RR*	95% CI		p-value [†]
			LL	HL	
Comfort of position during breastfeeding (100101)	24h / 0h	0.96	0.83	1.12	0.593
	48h / 0h	1.06	0.95	1.19	0.317
	48h / 24h	1.10	0.98	1.24	0.095
Supports breast using “C” hold (cupping) (100102)	24h / 0h	0.67	0.48	0.92	0.015
	48h / 0h	0.72	0.52	1.00	0.050
	48h / 24h	1.08	0.79	1.48	0.617
Presence of colostrum/milk in the breast before breastfeeding (100103)	24h / 0h	2.00	0.50	8.00	0.327
	48h / 0h	1.00	0.14	7.10	1.000
	48h / 24h	0.50	0.13	2.00	0.327
Milk ejection reflex (100104)	24h / 0h	1.02	0.91	1.15	0.705
	48h / 0h	1.02	0.89	1.17	0.738
	48h / 24h	1.00	0.88	1.13	1.000
Recognition of infant swallowing (100106)	24h / 0h	1.08	0.88	1.33	0.467
	48h / 0h	1.16	0.92	1.46	0.201
	48h / 24h	1.08	0.92	1.26	0.365
Adequate removal of newborn or infant from breast when necessary (100107)	24h / 0h	1.23	0.97	1.57	0.090
	48h / 0h	1.47	1.14	1.89	0.003
	48h / 24h	1.19	0.96	1.47	0.108
Techniques to prevent nipple tenderness (100121)	24h / 0h	6.00	2.45	14.68	< 0.0001
	48h / 0h	8.00	3.10	20.66	< 0.0001
	48h / 24h	1.33	1.02	1.74	0.033
Recognition of early hunger cues (100113)	24h / 0h	1.19	1.00	1.42	0.052
	48h / 0h	1.32	1.10	1.59	0.002
	48h / 24h	1.11	0.96	1.30	0.165
Maternal fluid intake (100120)	24h / 0h	1.45	1.04	2.03	0.030
	48h / 0h	1.50	1.09	2.07	0.013
	48h / 24h	1.03	0.83	1.29	0.763
Pumping of breast (100123)	24h / 0h	1.17	0.97	1.41	0.095
	48h / 0h	1.31	1.01	1.69	0.039
	48h / 24h	1.12	0.90	1.39	0.317
Safe storage of breastmilk (100115)	24h / 0h	1.36	1.05	1.75	0.018
	48h / 0h	1.36	1.00	1.84	0.050
	48h / 24h	1.00	0.78	1.29	1.000
Use of family support (100124)	24h / 0h	1.16	1.04	1.30	0.008
	48h / 0h	0.95	0.82	1.11	0.527
	48h / 24h	0.82	0.71	0.95	0.006
Use of community, social media and healthcare services (100125)	24h / 0h	1.50	0.67	3.34	0.320
	48h / 0h	2.50	0.85	7.31	0.094
	48h / 24h	1.67	0.61	4.59	0.322
Satisfaction with the breastfeeding process (100118)	24h / 0h	1.02	0.90	1.16	0.763
	48h / 0h	1.04	0.96	1.12	0.317
	48h / 24h	1.02	0.90	1.15	0.763

*Estimated the risk of scoring 4 or 5; [†]p-value<.05; RR: Relative Risk; LL: lower limit; HL: higher limit; CI: confidence interval

The Nursing Outcome “Breastfeeding establishment: maternal (1001)” indicators 100121, 100120, 100115, and 100124 presented a higher risk for scores 4 and 5 on the Likert scale at 24h in comparison with 0h. Moreover, the indicators 100107, 100121, and 100123 presented a higher risk for scores 4 and 5 on the Likert scale at 48h compared to 0h.

As for the Nursing Outcome “Breastfeeding

establishment: infant (1000)” indicators 100013, 100014, 100006, 100008, 100009, and 100011 presented a higher risk of scoring 4 or 5 at 48h in comparison with 0h. The indicators 100013, 100014, and 100006 presented a higher risk of scoring 4 or 5 at 48h compared to 24h. Finally, the indicator 100009 presented a higher risk of scoring 4 or 5 at 24h compared to 0h (Table 3).

Table 3 – Poisson models to indicators Nursing Outcome “Breastfeeding establishment: infant (1000)” from Nursing Outcomes Classification, comparing the assessments over time. Campinas, SP, Brazil, 2019

Nursing Outcomes indicators	Comparison	RR*	95% CI		p-value [†]
			LL	HL	
Proper alignment related to breast (100001)	24h / 0h	0.94	0.80	1.11	0.466
	48h / 0h	1.00	0.86	1.16	1.000
	48h / 24h	1.06	0.96	1.18	0.256
Proper latch on (100002)	24h / 0h	1.11	0.90	1.36	0.346
	48h / 0h	1.21	0.97	1.51	0.088
	48h / 24h	1.10	0.93	1.29	0.285
Proper areolar compression (100003) [‡]	24h / 0h	-	-	-	-
	48h / 0h	-	-	-	-
	48h / 24h	-	-	-	-
Correct tongue placement (100013)	24h / 0h	1.30	0.94	1.81	0.109
	48h / 0h	1.70	1.21	2.37	0.001
	48h / 24h	1.30	1.01	1.67	0.039
Suck reflex (100014)	24h / 0h	1.47	0.97	2.23	0.072
	48h / 0h	2.13	1.39	3.28	< 0.0001
	48h / 24h	1.45	1.10	1.92	0.007
Noticeable or audible swallow (100005) [‡]	24h / 0h	-	-	-	-
	48h / 0h	-	-	-	-
	48h / 24h	-	-	-	-
Nursing for a minimum of 5-10 minutes (100006)	24h / 0h	1.60	1.02	2.51	0.040
	48h / 0h	2.27	1.44	3.56	< 0.0001
	48h / 24h	1.42	1.12	1.80	0.004
Minimum of 8 feedings per day (100007)	24h / 0h	1.18	0.87	1.61	0.297
	48h / 0h	1.32	0.99	1.77	0.061
	48h / 24h	1.12	0.90	1.40	0.317
Urinations per day appropriate for age (100008)	24h / 0h	2.50	1.04	6.01	0.040
	48h / 0h	3.25	1.44	7.35	0.004
	48h / 24h	1.30	0.82	2.05	0.258
Stools per day appropriate for age (100009)	24h / 0h	3.78	2.11	6.76	< 0.0001
	48h / 0h	3.22	1.74	5.98	< 0.0001
	48h / 24h	0.85	0.74	0.98	0.025
Weight gain appropriate for age (100010) [‡]	24h / 0h	-	-	-	-
	48h / 0h	-	-	-	-
	48h / 24h	-	-	-	-
Newborn or infant contentment after feeding (100011)	24h / 0h	1.32	0.97	1.79	0.074
	48h / 0h	1.40	1.03	1.91	0.033
	48h / 24h	1.06	0.80	1.41	0.683

*Estimated the risk of scoring 4 or 5; [†]p-value<.05; [‡]insufficient data to compare; RR: Relative Risk; LL: lower limit; HL: higher limit; CI: confidence interval

The indicators of “Breastfeeding Establishment: infant” with improved scoring over time were: Correct tongue placement, Suck reflex, Nursing a minimum of 5-10 minutes, Urinations per day appropriate for age, Stools per day appropriate for age, and Newborn or infant contentment after feeding. Nevertheless, from 24h to 48h, the indicator Stools per day appropriate for age was worsened.

Discussion

As for the evaluation of the scores over time, some stood out due to the low frequency of scores 4 and 5, mainly the indicator related to community support, social media, and healthcare services. The literature states that the establishment of breastfeeding may be a challenge for women, especially mothers

of hospitalized infants and preterms. Thus, these support networks may help diminish early weaning, providing support to the women and families in this context⁽⁸⁻¹⁰⁾. This finding shows the demand for bigger efforts towards higher efficiency regarding this kind of support for mothers.

The indicator Presence of colostrum/milk in the breast before breastfeeding (100103) also presented lower scores on the Likert scale when the mother's perception was investigated. The literature corroborates this finding since it is more difficult for mothers with infants admitted to the NICU to keep milk production due to the lack of breast stimulation⁽¹¹⁾. Even though using maternal perception was a methodological decision, this indicator demands investigative complementation in the clinical practice since the woman's perception may not be precise. Thus, the nurse must be ready to examine breasts, collect data and promote adequate interventions so that the stimulus takes place even when there is no effective breastfeeding⁽¹²⁾.

The indicator Proper areolar compression (100003), evaluated through the interview with the mother, presented low frequency for scores 4 and 5. This can be related to the mother's difficulty to describe the areolar compression at the establishment of breastfeeding, especially in cases of preterm infants⁽¹³⁻¹⁴⁾. Another possibility would be difficulty comprehending the magnitudes to measure the Likert scale.

Noticeable or audible swallow (100005) also presented low occurrence for 4 or 5-point responses, suggesting a certain degree of subjectivity in evaluating this indicator. The perception of the swallow during breastfeeding requires careful examination to notice the infant's mouth moving around the nipple-areola complex and to observe the swallowing during the sucking process⁽¹⁵⁻¹⁶⁾.

Both the indicators Techniques to prevent nipple tenderness (100121) and Supports breast using "C" hold (cupping) (100102) demonstrated probability for higher scores at the first evaluation, which may

have occurred due to the initial orientation given to the mothers by the time of the first breastfeeding. One of the most important strategies for preventing nipple tenderness is the proper latch. The latch must be guided at every feeding session until the woman feels comfortable and safe enough to position herself, correct the infant's position on the breast, and avoid holding the breast with "scissors-shaped" fingers⁽¹⁷⁻¹⁹⁾.

The indicator If necessary, remove newborn or infant from breast properly (100107) presents a higher probability of higher scores at the last evaluation. When needed, due to a painful latch, removing the infant from the breast in a proper way is one of the strategies that reduce nipple tenderness. It can be done by inserting the index or the little finger into the infant's mouth through the labial commissure⁽²⁰⁾.

The indicators Pumping of the breast (100123) and Safe storage of breastmilk (100115) also presented a higher probability of scoring 4 or 5 at 48h. These indicators are important to the continuity of milk production, even when the breasts are not being stimulated by the infant, what happens in the NICU context. The women should be instructed to manually extract the milk at predefined times or use a breast pump to keep the milk production. Safe storage is also an important technique for mothers of NICU-admitted infants who need to return to work⁽²¹⁾. Thus, the instructions received after the first breastfeeding and the need to return home and repeat the procedures may have influenced these outcomes.

Techniques to prevent nipple tenderness (100121) and Recognition of early hunger cues (100113) presented higher risks of scoring 4 or 5 at the first and the last evaluations. The strategies to prevent nipple tenderness, as previously mentioned, must be reinforced at every breastfeeding since nipple trauma is one of the most frequent causes of early weaning⁽²¹⁾. With regards to the early hunger cues, the nurse is meant to instruct the mother about the importance of observing not only the infant's cry but also other characteristics, such as alert state, sucking on his fist, rooting reflex, sticking the tongue out of the

mouth, restlessness, fussiness, and irritability⁽¹¹⁾.

Nursing a minimum of 5-10 minutes (100006) and Newborn or infant contentment after feeding (100011) presented a higher probability of scoring 4 and 5. These indicators describe the infant's readiness to keep himself on the breast and extract enough milk for his metabolic demand. Further, it is challenging to evaluate the ideal length of the infant's stay on the breast and the signals of satisfaction. Preterm infants are drowsier and may present difficulties related to coordination, sucking, swallowing, and breathing, being necessary longer breaks and, initially, a rather irregular breastfeeding rhythm⁽²²⁾. Furthermore, there is no consensus in the literature on the length of the infant's stay on the breast that reliably assesses the efficiency of breastfeeding.

The indicators Urinations per day appropriate for age (100008) and Stools per day appropriate for age (100009) also presented higher scores at the first and the last evaluation. These indicators are rather objective and were collected from the patients' medical records. There are still controversies on the urine and feces excretion pattern for newborns; being more common for the health institutions to consider normal at least 6 daily episodes of urinary elimination and the presence of feces within 24 hours or up to 5 to 7 days without abdominal distension⁽²³⁾.

The indicator Minimum of 8 feedings per day (100007) establishes that the infant must be breastfed at least every 3 hours, making 8 daily feedings. Even though the World Health Organization encourages spontaneous breastfeeding, preterm infants need to be fed at fixed times to help their growth and development due to higher metabolic needs compared to term infants⁽²⁴⁻²⁶⁾. The access to definition may have offered increased security for the nurses to set scores of 4 and 5.

Most of the indicators of the two studied Nursing Outcomes presented similar frequency of scores 4 and 5. This finding may denote the indicators applied to measuring the phenomenon of the establishment of breastfeeding since it was possible to obtain

similar answers for the majority of the indicators over time, regardless of the usage of conceptual or operational definitions.

Despite the training in which the nurses took part, some indicators may have generated doubts during the clinical application. The authors of the NOC recommend the nurses to have their lists of results, which are closer to the specificities of the service that is concerned, and specific training for the usage of the Nursing Outcomes. This way, nurses can properly measure the effects of the interventions through these outcomes⁽⁴⁾.

The analysis of the relative risk for an over-time analysis model was chosen to verify the scoring behavior of the Likert scale⁽¹⁷⁾. From this analysis, the NOC was demonstrated to be an important tool for measuring the clinical change over time in diverse scenarios and its capacity to adapt according to the performed nursing interventions⁽²⁷⁻³⁰⁾.

Study limitations

Evaluation of Nursing Outcomes Classification outcomes and the use of generalized estimating equation as a statistical method limited the comparison with other studies. The use of videos for data collection may also have omitted some characteristics of the evaluated dyads. Furthermore, most women in this study had previously experienced breastfeeding, which may have affected the experience of conducting breastfeeding.

Contributions to practice

The use of Nursing Classifications, in this case, the Nursing Outcomes Classification, demonstrates the importance of the accuracy of these instruments for the successful implementation of the Nursing Process. In addition, the NOC outcomes proved to be easy to use and accurately measure the nursing interventions performed. In order to improve communication, recording, and patient care, nursing classifications are

fundamental in the clinical practice of nurses, helping in the development of clinical reasoning and advanced practices.

Conclusion

This was the first study within a clinical environment to verify the clinical applicability of the Nursing Outcomes related to breastfeeding establishment in patients admitted to Neonatal Intensive Care Units and their mothers.

Breastfeeding Establishment: infant and Breastfeeding Establishment: maternal, demonstrated clinical changes during the evaluation of the mother-child dyad. The indicators Techniques to prevent nipple tenderness (100121), Maternal fluid intake (100120), Safe storage of breastmilk (100115), Adequate removal of newborn or infant from breast when necessary (100107), and Pumping of breast (100123) related to the mother and the indicators Correct tongue placement (100013), Suck reflex (100014), Nursing for a minimum of 5-10 minutes (100006), Urinations per day appropriate for age (100008) and Newborn or infant contentment after feeding (100011) related to the infant showed clinical evolution being evaluated with 4 and 5 on the Likert scale in 48 hours. That is, these indicators showed clinical change over time.

The indicators Satisfaction with the breastfeeding process (100118), Comfort of position during breastfeeding (100101), Noticeable or audible swallow (100005), Use of family support (100124), Milk ejection reflex (100104), Proper latch on (100002), and Recognition of early hunger cues (100113) received scored 4 or 5 since the first evaluation.

Acknowledgments

To the Coordination for the Improvement of Higher Education Personnel (*Coordenação de Aperfeiçoamento de Pessoal de Nível Superior*) for the Scholarship destined to Suellen Cristina Dias Emídio (Process number: 15206122) during her Ph.D. Program Course.

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