



## ORIGINALES

### Nursing interventions concerning the bonding of hospitalized newborns – scoping review

Intervenções de enfermagem promotoras da vinculação ao recém-nascido hospitalizado –revisão scoping

Intervenciones de enfermería promotoras de la vinculación con los recién nacidos hospitalizados – revisión scoping

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#### ABSTRACT:

**Introduction:** The bonding process consists of an emotional bond between the newborn and the parents or caregiver. The newborn's attachment to his caregiver is the basis of all subsequent relationships that he will develop throughout life.

**Objective:** To map nursing interventions that promote bonding in newborns in need of hospitalization.

**Method:** This scoping review was carried out according to the method of the Joanna Briggs Institute, the main sources of information being the databases: PubMed, MEDLINE, CINAHL via EBSCO, LILACS, Cochrane Library, Academic Search Complete, in portuguese and english, without time limit.

**Results:** 53 studies were included in this review. The nursing interventions identified in the literature are divided into two groups: in promoting interaction between parents and the newborn, namely physical proximity, the promotion of breastfeeding, the inclusion of parents in the care of the newborn, and in interaction between parents and the nursing team, through communication and emotional support.

**Conclusion:** Nurses play a fundamental role in reestablishing the binding process between the hospitalized newborn and the parents, so that they are able to move from a role in which they are mere spectators to become the main caregivers of the newborn, trained and linked.

**Keywords:** Bonding; Newborn; Parents; Hospitalization; Nurse.

#### RESUMO:

**Introdução:** O processo de vinculação consiste numa ligação emocional entre o recém-nascido e os pais ou o cuidador. A vinculação do recém-nascido ao seu cuidador é a base de todas as relações posteriores que este desenvolverá ao longo da vida e em particular em contexto de internamento hospitalar

**Objetivo:** Mapear na literatura as intervenções de enfermagem promotoras de vinculação em recém-nascidos em internamento hospitalar.

**Método:** Revisão de literaturascoping nas normas do *Joanna Briggs Institute*, sendo as principais fontes de informação as bases de dados: PubMed, MEDLINE, CINAHL via EBSCO, LILACS, Cochrane Library, *Academic Search Complete*, em português e inglês. A seleção dos estudos e extração dos dados foram realizados por dois revisores independentes.

**Resultados:** Foram incluídos 53 estudos. As intervenções de enfermagem identificadas na literatura como promotoras da vinculação organizam-se em dois grupos: na promoção da interação entre os pais e o recém-nascido, a proximidade física ou presença, a promoção da amamentação, a inclusão dos pais nos cuidados ao recém-nascido, e na interação entre os pais e a equipa de enfermagem (através da comunicação e o apoio emocional).

**Conclusão:** Os enfermeiros desempenham um papel fundamental para o restabelecimento do processo vincutivo entre o recém-nascido internado e os pais, seja na facilitação da relação pais-filho, seja enquanto interlocutores da relação. Esta scoping eleva intervenções de natureza relacional, que merecem ser testadas em relação à sua efetividade na vinculação.

**Palavras-chave:** Vinculação; Recém-nascido; Pais; Internamento; Enfermeiro.

## RESUMEN:

**Introducción:** El proceso de vinculación consiste en un vínculo emocional entre el recién nacido y los padres o cuidador. El apego del recién nacido a su cuidador es la base de todas las relaciones posteriores que desarrollará a lo largo de la vida.

**Objetivo:** Mapear las intervenciones de enfermería que promueven el vínculo afectivo en recién nacidos con necesidad de hospitalización.

**Método:** Esta revisión de alcance se realizó según el método del Instituto Joanna Briggs, siendo las principales fuentes de información las bases de datos: PubMed, MEDLINE, CINAHL vía EBSCO, LILACS, Cochrane Library, *Academic Search Complete*, en portugués e inglés, sin límite de tiempo.

**Resultados:** Se incluyeron 53 estudios en esta revisión. Las intervenciones de enfermería identificadas en la literatura se dividen en dos grupos: en la promoción de la interacción entre los padres y el recién nacido, es decir, la proximidad física, la promoción de la lactancia materna, la inclusión de los padres en el cuidado del recién nacido y en la interacción entre los padres y el equipo de enfermería, a través de la comunicación y el apoyo emocional.

**Conclusión:** El enfermero juega un papel fundamental en el restablecimiento del proceso de vinculación entre el recién nacido hospitalizado y los padres, para que sean capaces de pasar de un rol en el que son meros espectadores a convertirse en los principales cuidadores del recién nacido, formados y vinculados.

**Palabras clave:** Vinculación; Recién nacido; Padres; Internación; Enfermera;

## INTRODUCTION

Bonding consists in the formation of an affective relationship between the newborn and its bonding figure, in most situations, the mother and/or father. John Bowlby, English psychiatrist and psychoanalyst developed the Attachment Theory, having stated that bonding is a basic mechanism of human beings and that behaviors are biologically programmed, with the newborn's relationship with the parents being a relationship established by a set of innate signs <sup>(1)</sup>. Basing his theory on research by Lorenz Konrad and Harry Harlow, from the field of ethology, Bowlby argued that the connection between the baby and its mother, would go beyond the satisfaction of its basic needs such as hunger, thirst or pain, but also the promotion of comfort, affection and learning <sup>(2,3)</sup>.

The formation of a strong affective bond with at least one caregiver is the key for the child to have an adequate physical, cognitive, emotional and psychological development, since this first relationship will affect the style of bonding relationships throughout its life <sup>(4)</sup>. Bowlby believed that the attachment relationship was monotropic, not excluding the possibility of other attachment relationships, but he admitted that

these would have less binding value for the child, declaring that the monotropic relationship was established between the newborn and the mother <sup>(5)</sup>.

Later, Mary Ainsworth contributed to develop the theory initiated by psychoanalyst Bowlby when investigating the relationship between mothers and children in Uganda, and mainly by developing an experimental procedure to assess the quality of the relationship between the infant and his primary caregiver. This experimental procedure, which she called the *Experimental Method of the Strange Situation*, allowed us to observe and classify which pattern of bond was established between the infant and his or her attachment figure. The attachment pattern could be classified as secure or insecure, according to the behavior demonstrated by the infant in the absence of their attachment figure <sup>(6)</sup>.

In his theory, Ainsworth concluded that all human beings are born endowed with a bonding system that allows them to seek proximity to a reference figure that offers them protection and security, so that they can have the curiosity and willingness to explore the world that surrounds <sup>(6)</sup>.

The bonding of parents to the child begins in the prenatal period with the desire for pregnancy and idealization of the imaginary child, with the planning, acceptance and awareness of the fetus, its movements and the perception of the fetus as an individual person <sup>(7)</sup>. Experiencing the various stages of the pregnancy process allows future parents the beginning of the emotional bond with the child they idealize and through labor and birth, there is the personification of the couple as mother and father, and their responsibility towards the child, as a being in need of care, protection and security. It is after birth and with the possibility of seeing the newborn, touching and caring for it that the acceptance of the child as an individual belonging to that family is promoted and the bond of the mother-father-newborn triad is established <sup>(8)</sup>.

In the period right after the birth of the newborn, there are several hormonal and physiological mechanisms that interfere in the bonding process, these mechanisms being triggered by the physical proximity between the triad. This physical proximity in the early postnatal period allows the establishment of a strong affective bond due to the experiences required by the new role of caregivers and the possibility that they manifest parental behaviors, such as the affectionate touch to the newborn, contemplation and the expression of affection by the new family member <sup>(9)</sup>.

When the child is born prematurely, or has a pathology that necessarily implies hospitalization in a neonatal unit, there is a disruption in the bonding process, which inevitably jeopardizes the establishment of the triad bond in the early postnatal period. The hospitalization of a child, especially when it is preterm, is a situation that generates stress and has consequences in the transition to parenthood, germinating feelings in parents such as impotence, guilt and incapacity <sup>(10)</sup>. Whenever there is a need for the newborn to be hospitalized, even with an adequate early postnatal course, there is a change in the transition and adaptation to this new phase. The establishment of a bond can be hampered by the newborn's health-disease situation and further aggravated by the physical barriers that exist in hospital units, preventing parents from contacting their child and performing their parental role as they desired<sup>(10)</sup>.

Parents, in these cases, need to maintain a balance between two opposing feelings: anguish and attachment to the newborn. In order to be able to deal with these feelings in a balanced way, parents need to acquire knowledge about the physiological needs of the newborn and recognize subtle signs that lead to the development of skills that allow them to know what specific care they should provide to the child and cumulatively re-establish the relationship that was interrupted <sup>(11)</sup>.

Given the importance of a good quality and safe bond for the child's development, the nurse's intervention in promoting the bond of the triad is extremely important, further emphasizing the impact of said intervention when the triad suffers a physical withdrawal due to the child's hospitalization <sup>(12)</sup>.

The motivation for carrying out this scoping review is linked to the need to map the existing knowledge in the literature to determine which nursing interventions promote the formation of a bond between parents and the child when the child is hospitalized and the triad is disrupted in its affective process.

After conducting an exploratory search in the databases PubMed, Medical Literature Analysis and Retrieval System (MEDLINE), Cumulative Index to Nursing and Allied Health Literature (CINAHL) via EBSCO, it was possible to conclude that there is no scoping review or systematic review of the literature that systematizes the topic of interest proposed by this protocol.

In conclusion, and given the importance of the theme for the healthy emotional development of newborns and their families, this scoping review was carried out with the aim of mapping knowledge about nursing interventions that promote the attachment of newborns in need of admission to their parents, or caregivers.

## METHOD

This literature review complied with the standards stipulated by the Joanna Briggs Institute (JBI) Reviewer's Manual method. Initially, a scoping review protocol was developed, predefining the review objectives and methods, as well as the review question "*Which nursing interventions promote attachment in newborns with need for hospitalization?*".

### Search Strategy

Thus, the inclusion criteria were established according to the components of the research question for the population, concept and context (PCC).

Population - All studies that include newborns up to twenty-eight days of life, whether term or preterm newborns, regardless of their pathology, and their family, with a focus on the mother and/or or father.

Concept – All studies related to the promotion of bonding between newborns and parents were included and analyzed.

Context – All studies that include nursing interventions to the family in the context of hospitalization of the newborn were included and evaluated.

The studies included were quantitative and qualitative, published in international and Portuguese databases. There was no limitation on the date of publication. Studies in English and/or Portuguese were included.

As for the exclusion criteria, all studies that did not comply with the PCC methodology described above were excluded.

The strategy for conducting the research was comprehensive and took place in three distinct phases. In the first phase, which took place in April 2020, and which corresponded to an initial search in the PubMed, CINAHL databases via EBSCO and MEDLINE. This initial research resulted in an analysis of the indexed keywords and terms, and the Boolean descriptors and operators were selected to be included in the next research phase.

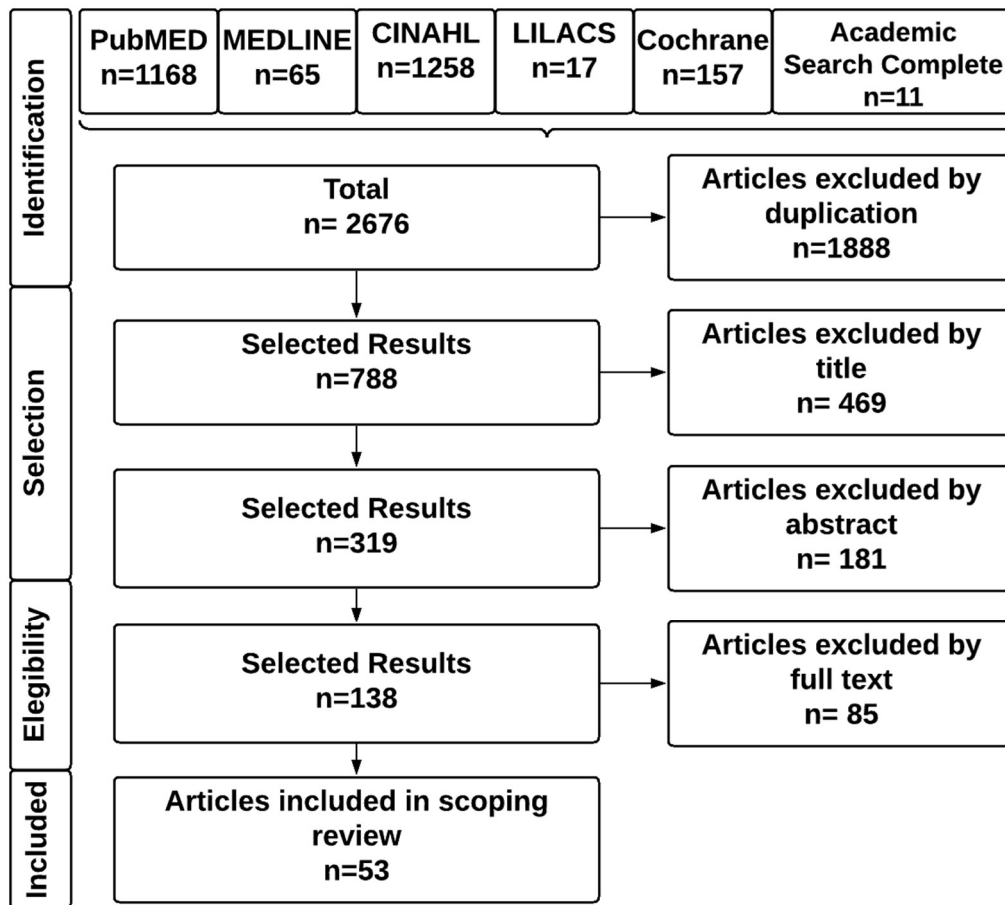
The second phase of the research was carried out in the PubMed, Medical Literature Analysis and Retrieval System (MEDLINE), Cumulative Index to Nursing and Allied Health Literature (CINAHL) databases via EBSCO, LILACS, Cochrane Library, including the Cochrane Database of Systematic Reviews (CDSR) and Cochrane Central Register of Controlled Trials (CENTRAL) and Academic Search Complete, in the period between May and June 2020. The last phase of research included the search for additional studies through bibliographic references of the studies selected in the previous phases. The selection of studies included in the review was performed by two independent reviewers.

The search descriptors and related words were used for the research with the articulation of the respective Boolean operators, as presented through the search equation: *(Newborn OR neonatal OR infant) AND (Bonding OR attachment OR closeness) AND (Neonatal intensive care unit OR hospitalization OR hospital stay) AND (Nursing care OR nursing interventions OR nursing role).*

### **Data extraction**

After the search, all duplicated studies were removed. The resulting studies were evaluated and selected respecting the inclusion criteria, initially through the information provided by their title and abstract. Afterwards, the selected articles were subject to a full reading. The results of the research and selection of the studies in question are presented through the flowchart of *Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA-ScR)*, shown in Figure 1.

**Figure 1** – Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) flowchart adapted for scoping review by Joanna Briggs Institute (JBI) Reviewer's Manual



## RESULTS AND DISCUSSION

Fifty-three studies were included, and are shown in Table 1, according to the title, study design and purpose of each study.

	Authors/year	Title	Draw	Aim
E1	Medina, I., Fernández-Sola, C., Hernández-Padilla, J., Ávila, M., & Rodríguez, M. 2018	Bonding in neonatal intensive care units: experiences of extremely preterm infants' mothers.	Qualitative interpretive study	Describe and understand the experiences of mothers who have extreme premature infants hospitalized in a neonatal intensive care unit in the bonding process
E2	Fleck, P. 2016	Connecting Mothers and Infants in the Neonatal Intensive Care Unit.	Literature revision	Explore how the nursing team can empower parents through the relationship.
E3	Spinelli, M., Frigerio, A., Montali, L., Fasolo, M., Spada, M., & Mangili, G. 2016	'I still have difficulties feeling like a mother' The transition to motherhood of preterm infants mothers	Qualitative study with semi-structured interviews	To analyze the experience of the transition to motherhood of mothers of premature babies, framing it in Stern's transition.
E4	Hagen, H., Iversen, V., & Svindseth, M. 2016	Differences and similarities between mothers and fathers of premature children a qualitative study of parents' coping experiences in a neonatal intensive care unit	Qualitative study with semi-structured interviews	Explore and describe the coping experiences of parents and children in a neonatal intensive care unit.
E5	Maastrup, R., Weis, J.,	'Now she has become my	Qualitative study	Explore the immediate experiences

	Engsig, A., Johannsen, K., & Zoffmann, V. 2018	daughter' parents' early experiences of skin-to-skin contact with extremely preterm infants		of parents in skin-to-skin contact with extreme premature newborns.
E6	Ncube, R., Barlow, H., & Mayers, P. 2016	A life uncertain – My baby's vulnerability: Mothers' lived experience of connection with their preterm infants in a Botswana neonatal intensive care unit.	Qualitative, exploratory and phenomenological descriptive study	Explore and describe the experiences lived by mothers regarding the care of their premature newborns in a neonatal unit in a public hospital in Botswana.
E7	Moreira, R., Lavor, V., Siqueira, A., Barros, L., Frota, N., & Luna, I. 2013	Affective Participation of Parents in Child Support in Intensive Care Unit	Qualitative study with semi-structured interviews	Understand the importance of the participation of parents in affective care for their child in an intensive care unit.
E8	Francis, K., & Pugsley, L. 2018	Care Through the Newborn's Eyes	Literature revision	Explore the benefits of non-separation of the newborn from the mother in attachment, physiological regulation, immune response, sleep and communication.
E9	Lindberg, B., Axelsson, K., & Öhrling, K. 2008	Adjusting to being a father to an infant born prematurely: experiences from Swedish fathers	Qualitative study	Describe the experiences of parenting a child born prematurely.
E10	Kurt, F., Kucukoglu, S., Ozdemir, A., & Ozcan, Z. 2020	The Effect of Kangaroo Care on Maternal Attachment in Preterm Infants	Quasi-experimental study	To determine the effect of the Kangaroo Method on the attachment of Turkish mothers to preterm newborns.
E11	Mäkelä, H., Axelin, A., Feeley, N., & Niela-Vilén, H. 2018	Clinging to closeness: The parental view on developing a close bond with their infants in a NICU	Descriptive Qualitative Study	Identify and understand how parents develop a bond with their children admitted to a neonatal intensive care unit.
E12	Özdemir, F., & Alemdar, D. 2017	Supporting of the Fathers to Visit Their Infants in Neonatal Intensive Care Unit Decreases Their Stress Level A Pretest-Posttest Quasi-Experimental Study.	Quasi-experimental study	To determine the effects of visiting the newborn in a neonatal intensive care unit on the father's stress levels.
E13	Skelton, H., Dahlen, H., Psaila, K., & Schmied, V. 2019	Facilitating closeness between babies with congenital abnormalities and their parents in the NICU A qualitative study of neonatal nurses' experiences	Qualitative, descriptive, interpretive study	Explore the experiences of neonatal nurses by facilitating closeness between parents and babies with congenital anomalies in a neonatal intensive care unit.
E14	Sponsler, W., Weatherspoon, C., Weatherspoon, D., & Campbell, D. 2015	Fear of Fatherhood.	Literature review	Promote increased education for would-be parents and discuss interventions to promote or improve the essential parent-child bond.
E15	Fegran, L. H., & Fagermoen, M. 2007	A comparison of mothers' and fathers' experiences of the attachment process in a neonatal intensive care unit	Qualitative descriptive study	Compare opinions and experiences of mothers and fathers about the bonding process in a neonatal intensive care unit one week after preterm birth.
E16	Williamson, S., & McGrath, J. 2019	What Are the Effects of the Maternal Voice on Preterm Infants in the NICU	Systematic Literature Review	Explore the connection between mother and child, specifically the effects of the maternal voice on hemodynamic stability, weight gain and behavioral states.
E17	Jones, H., & Santamaria, N. 2017	Physiological benefits to parents from undertaking skin-to-skin contact with their neonate, in a neonatal intensive special care unit	Observational cohort study	Investigate the effect of skin-to-skin contact between the parents and the newborn on the parents' heart rate and blood pressure.
E18	Pados, B., & McGlothen-Bell, K. 2019	Benefits of Infant Massage for Infants and Parents in the NICU	Literature review	Describe infant massage and the current literature on the massage unit in the neonatal intensive care unit.
E19	Valizadeh, L., Ajoodaniyan, N., Namnabati, M., Zamanzadeh, V., & Layegh, V. 2013	Nurses' viewpoint about the impact of Kangaroo Mother Care on the mother-infant attachment.	Descriptive Qualitative Study	To determine the nurses' point of view on the impact of the Kangaroo Mother Method on the bond between mothers and newborns.
E20	Zhang, Y., Deng, Q., Zhu, B., Li, Q., Wang, F., Wang, H., Xinfen, X.,	Neonatal intensive care nurses' knowledge and beliefs regarding kangaroo care in	Descriptive quantitative study	To investigate current knowledge, beliefs and practices related to the Kangaroo Care among nurses in a

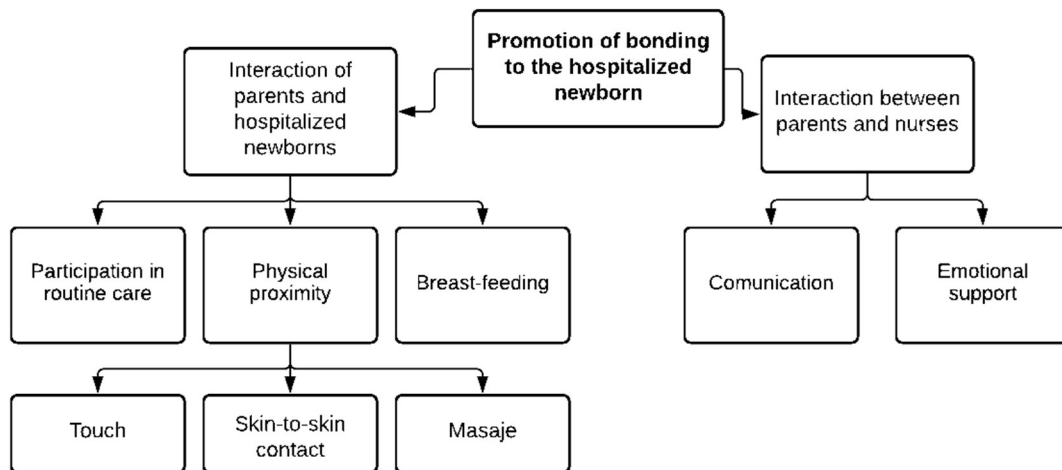
	Johnston, L. 2018	China: a national survey		neonatal intensive care unit in China.
E21	Martel, M., Milete, I., Bell, L., Tribble, D., & Payot, A. 2016	Establishment of the Relationship Between Fathers and Premature Infants in Neonatal Units	Qualitative study	Describe the establishment of the father-premature newborn relationship in a neonatal intensive care unit.
E22	Bialoskurski, M., Cox, C., & Hayes, J. 1999	The Nature of Attachment in a Neonatal Intensive Care Unit	Qualitative ethnographic study	Study the phenomenon of attachment in a neonatal intensive care unit.
E23	Tandberg, B., Frosli, K., Flacking, R., Grundt, H., Lehtonen, L., & Moen, A. 2018	Parents and nurses balancing parent-infant closeness and separation a qualitative study of NICU nurses' perceptions	Qualitative study	Explore, from the perspective of nurses, what parents and nurses do to promote parent-infant proximity or cause separation.
E24	Feldman, R. 2004	Mother-infant skin-to-skin contact (Kangaroo Care) theoretical, clinical, and empirical aspects	Literature revision	To analyze the benefits of the Kangaroo Care intervention on the newborn's physiological stability, increased lactation and improving mother-newborn bonding.
E25	Moore, E., Anderson, G., & Bergman, N. 2007	Early skin-to-skin contact for mothers and their healthy newborn infants (Review)	Systematic Literature Review	To evaluate the effects of early skin-to-skin contact on breastfeeding, behavior and physiological adaptation in mother-newborn dyads.
E26	Potgieter, K., & Adams, F. 2019	The influence of mother-infant skin-to-skin contact on bonding and touch	Quantitative correlational study	To investigate the influence of early skin-to-skin contact on the mother-infant bond and touch with a low-risk population.
E27	Tiloksulchai, F., Phatthanasiriwethin, S., Vichitsukon, K., & Serisathien, Y. 2002	Attachment Behaviors in Mothers of Premature Infants: A Descriptive Study in Thai Mothers	Descriptive Qualitative Study	Describe the attachment behaviors of mothers of premature newborns during their first contact with them in a neonatal unit.
E28	Kim, A., Kim, S., & Cho, H. 2016	Effects of tactile stimulation by fathers on physiological responses and paternal attachment in infants in the NICU A pilot study	Quasi-experimental study	To test the effectiveness of tactile stimulation by the parents on the physiological responses of the newborn and the attachment of the parents to the newborn in the neonatal intensive care unit.
E29	Cho, E., Kim, S., Kwon, M., Cho, H., Kim, E., Jun, E., & Lee, S. 2016	The Effects of Kangaroo Care in the Neonatal Intensive Care Unit on the Physiological Functions of Preterm Infants, Maternal-Infant Attachment, and Maternal Stress	Quasi-experimental study	Identify the effects of the kangaroo method on the physiological functions of premature newborns, mother-newborn bonding and maternal stress.
E30	Gooding, J., Cooper, L., Blaine, A., Franck, L., Howse, J., & Berns, S. 2011	Family support and family-centered care in the neonatal intensive care unit: origins, advances, impact	Literature review	Examine available evidence that supports family-centered care in a neonatal intensive care unit and identify recommendations.
E31	Hall, R., Hoffenkamp, H., Tooten, A., Braeken, J., Vingerhoets, A., & Van Bakel, H. 2015	Child-Rearing History and Emotional Bonding in Parents of Preterm and Full-Term Infants.	Qualitative study	Evaluate the impact of the quality of parent-newborn bonding on its development, the risk factors that facilitate and prevent it.
E32	Kristoffersen, L., Stoen, R., Rygh, H., Sognaes, M., Follestad, T., Mohn, H., Nissen, I., Bergseng, H. 2016	Early skin-to-skin contact or incubator for very preterm infants study protocol for a randomized controlled trial	Randomized Clinical Trial	Investigate whether skin-to-skin contact after childbirth is safe and what the consequences are by comparing term newborn care with extreme preterm infants.
E33	Goulet, C., Bell, L., Tribble, D., Paul, D., & Lang, A. 1998	A concept analysis of parent-infant attachment.	Literature review	Clarify the concept of attachment, the antecedents, attributes and consequences of parent-newborn attachment.
E34	Amaliya, S., Rustina, Y., & Agustini, N. 2017	Comparison of Various Kangaroo Mother Care Carriers on Maternal Comfort: A Pilot Study	Cross Study	Compare the level of maternal comfort when performing the Kangaroo Mother Care in three different ways.
E35	Chen, E., Gau, M., Lui, C., & Lee, T. 2017	Effects of Father-Neonate Skin-to-Skin Contact on Attachment: A Randomized Controlled Trial	Randomized Clinical Trial	Examine how skin-to-skin contact between father and newborn affects the bonding relationship.
E36	Lelis, B., Sousa, M., Mello, D., Wernet, M., Velozo, A., & Leite, A. 2018	Maternal Reception in the Context of Prematurity	Qualitative, exploratory and descriptive study	To analyze the reception of mothers of preterm newborns hospitalized in the care environments of a child-friendly hospital.
E37	Norén, J., Nyqvist, K., &	Becoming a mother - Mothers'	Descriptive	Describe the experiences of Swedish



	Rubertsson, C. 2018	Experience of Kangaroo Mother Care	Qualitative Study	mothers in the kangaroo mother method.
E38	Joshi, A., Chyow, P., Tirmizi, Z., & Gross, J. 2016	Web Camera Use in the Neonatal Intensive Care Unit: Impact on Nursing Workflow	Prospective study based on questionnaires	Explore the perception of nurses and their workload and identify factors that facilitate or impede the use of cameras in the service.
E39	Gibson, R., & Lilcullen, M. 2020	The impact of web-cameras on parent-infant attachment in the neonatal intensive care unit	Systematic Literature Review	To investigate the impact of web cams on parents of newborns admitted to a neonatal unit for inclusion.
E40	Maree, C., & Downes, F. 2016	Trends in Family-Centered Care in Neonatal Intensive Care.	Literature review	Assess the impact of family-centered care on family education and involvement.
E41	Flacking, R., Thomson, G., & Axelin, A. 2016	Pathways to emotional closeness in neonatal units - a cross-national qualitative study	Qualitative study	Explore how, when and why parents have emotional bonding experiences with their newborn in a neonatal unit.
E42	Grassley, J., Tivis, R., Finney, J., Chapman, S., & Bennett, S. 2018	Evaluation of a Designated Family Bonding Time to Decrease Interruptions and Increase Exclusive Breastfeeding	Experimental Study	Plan and implement a daily family bonding time and assess its effect on mothers' perception of interruption and rate of exclusive breastfeeding.
E43	Spratt, E., Marsh, C., Wahlquist, A., Papa, C., Nietert, P., Brady, K., Herbert, T.L., Wagner, C. 2013	Biological effects of stress and bonding in mother-infant pairs.	Qualitative study	Explore the relationship between maternal and infant cortisol levels, gender differences in infants in response to cortisol, and association of dyad cortisol levels and maternal oxytocin levels.
E44	Matos, N., Oliveira, N., Coelho, M., Dodt, R., & Moura, D. 2015	Perception and Support Given by Father in Maintenance of Breastfeeding.	Cross-sectional descriptive qualitative study	Analyze the father's participation during the breastfeeding period, as well as the importance of support at this stage
E45	Ahlqvist-Björkroth, S., Boukydis, Z., Axelin, A., & Lehtonen, L. 2016	Close Collaboration with Parents TM intervention to improve parents' psychological well-being and child development: Description of the intervention and study protocol	Intervention study	Assess the effectiveness of the collaborative parent intervention.
E46	Kearvell, H., & Grant, J. 2016	Getting connected: How nurses can support mother/infant attachment in the neonatal intensive care unit	Literature review	Explore how nurses can support the newborn mother within the neonatal intensive care unit.
E47	Fegran, L., & Helseth, S. 2009	The parent–nurse relationship in the neonatal intensive care unit context – closeness and emotional involvement	Qualitative ethnographic study	Explore the experiences of parents and nurses about the relationship between them when their premature child is hospitalized.
E48	Jabrailli, M., Rasouli, A., Qojazadeh, M., & Abadi, S. 2018	The impact of support programs on attachment of mothers of infants The impact of support programs on attachment of mothers of infants	Randomized Clinical Trial	To determine the effect of the support program on the attachment of mothers of newborns with gastrointestinal disorders.
E49	Ghadery-Sefat, A., Abdeyazdan, Z., Badiie, Z., & Zargham-Boroujeni, A. 2017	Relationship between parent-infant attachment and parental satisfaction with supportive nursing care	Descriptive correlational study	To investigate the bonding relationship between mother-newborn and mothers' satisfaction with nursing care in a neonatal intensive care unit.
E50	Gallagher, K., Shaw, C., Aladangady, N., & Marlow, N. 2017	Parental experience of interaction with healthcare professionals during their infant's stay in the neonatal intensive care unit.	Qualitative study with semi-structured interviews	Explore the experiences of parents of newborns admitted to a neonatal intensive care unit for interaction with health professionals during care.
E51	Cox, C., & Bialoskurski, M. 2011	Neonatal intensive care: communication and attachment.	Qualitative and quantitative study of the phenomenological type	Describe aspects that facilitate and prevent family attachment during periods of subsequent separation from prematurity or the newborn in a neonatal intensive care unit.
E52	Franck, L., & Spencer, C. 2003	Parent Visiting and Participation in Infant Caregiving Activities in a Neonatal Unit.	Qualitative study	Describe the frequency and duration of parental visits and participation in care and identify factors associated with parental participation.
E53	Schrauwen, L., Kommers, D., & Oetomo, S. 2017	Viewpoints of Parents and Nurses on How to Design Products to Enhance Parent-Infant Bonding at Neonatal	Qualitative study	Investigate how product design can be used to improve the parent-infant bond in a neonatal intensive care unit.

The main nursing interventions that promote bonding in newborns when they are hospitalized are divided into two groups: in promoting the interaction of parents and the newborn and in the interaction between parents and the nursing team, as shown in Figure 2. In this sense, the analysis of the articles included in this scoping review is structured by chapters.

**Figure 2.** Nursing interventions that promote attachment to the hospitalized newborn



### Interaction between parents and the hospitalized newborn

With the hospitalization of the newborn, parents experience negative feelings such as emotional shock, fear, anxiety, depression, post-traumatic stress (E1, E2), with the feeling of failure and helplessness being more evident in mothers, feeling disconnected and not involved in newborn care (E3, E4).

The first interactions with the child occur in an atypical, unknown and intimidating environment, which prevents easy contact with the child (E1, E3-E6). Regardless of the reason for hospitalization, the disruption of the relationship during hospitalization, together with the absence of touch and interaction with the newborn, can negatively affect the newborn's attachment and representations (E7).

Nurses have a crucial role in reestablishing proximity and early bonding, and it is important that this is established in the first hours of life (E2, E8-E14). Attachment is beneficial, regardless of the newborn's survival (E5).

The quality of parents creating a physical and emotional bond with the child cannot be replaced and nurses, by promoting the bonding process, are able to consolidate parental skills, social and psychological development, as well as establish the bond (E5, E15).

## Physical proximity

The normal bonding process is initiated through proximity, contact, touch, heat, odor, skin and voice <sup>(E5, E16)</sup>. Physical proximity has several benefits for the newborn's development, such as hemodynamic stability, weight gain, temperature stabilization, reduced hospital stay, neurodevelopment and pain <sup>(E5, E13, E14, E17-E20)</sup>. For parents, there is a decrease in anguish <sup>(E21)</sup> and the encouragement of physical contact has positive emotional effects <sup>(E22)</sup> being significantly more present in the unit <sup>(E23)</sup>, improving performance in breastfeeding and parental training <sup>(E24, E25)</sup>.

Touch has a sequential progression, starting at the extremities and evolving to the rest of the body and plays a key role in the parents' experiences <sup>(E6, E13, E19, E26, E27)</sup> increasing parental self-confidence and parent-newborn bonding was effective <sup>(E28)</sup>.

Skin-to-skin contact, or the *Kangaroo Mother Care*, is considered the key to breaking down barriers between the triad and linking parents to the newborn <sup>(E5, E10, E13, E19, E29-E32)</sup>. Parents feel less worried and less anxious, increasing their commitment to the child <sup>(E33)</sup>, assuming more control over the situation. They describe the moment of skin-to-skin contact as moving and emotional and promotes that newborn's feeling of belonging <sup>(E1, E10, E14, E24, E29, E34-E37)</sup>.

Massage is also considered an intervention that facilitates bonding, especially between the father and the child, resulting in a reduction in paternal stress <sup>(E14, E28)</sup>.

The use of web cameras is considered a good strategy to promote bonding <sup>(E38)</sup>, however it does not replace the physical presence of parents <sup>(E39)</sup>. This is a strategy that allows parents to feel closer to the newborn when they cannot be present at the hospital, increasing the feeling of closeness, reducing stress and anxiety <sup>(E39)</sup>.

## Breast-feeding

With regard to breastfeeding, it contributes to the reestablishment of the bond, increases the interaction between the mother and the newborn, making it possible to the mother to experience the role of caregiver <sup>(E40)</sup>, feeling emotionally connected to the child <sup>(E41)</sup>.

Mothers should be encouraged to touch and hold the newborn <sup>(E7)</sup>, as the bonding time between mother and newborn increases the breastfeeding rate <sup>(E42)</sup> and consequently, these mothers have levels of lower cortisol <sup>(E43)</sup>.

With the hospitalization of the newborn, most of the times breastfeeding does not normally take place essentially due to the health condition of the newborn. In these situations, the extraction of breast milk is the strategy used, but it does not correspond to what the mothers imagined, becoming a difficult and tiring challenge <sup>(E37)</sup>. Encouraging mothers to express milk with the newborn promotes the development of a greater connection between them, consequently increasing the amount of milk extracted <sup>(E11)</sup>. The father's support in promoting breastfeeding allows for the promotion of the newborn's health and consequently increases the interaction of the triad <sup>(E44)</sup>.

The early contact between the newborn and the mother increases the effectiveness of breastfeeding, stimulating the secretion of hormones, namely oxytocin, which promotes bonding, and prolactin, which promotes lactation <sup>(E25)</sup>.

### **Participation in routine care**

Parents who experience separation from their newborn feel consequently excluded from care, which undermines the bond <sup>(E25)</sup>.

The bond between parents and the newborn is facilitated by the development of parental skills and involvement in care <sup>(E2, E9, E11, E46)</sup> thus allowing the establishment of a connection between them through interaction <sup>(E7, E11, E47)</sup>.

Parents who are motivated by the team to stay longer and take care of the newborn feel more involved and connected to the child <sup>(E7, E9, E47)</sup>, making them more sensitive to the newborns' development and its progress during hospitalization <sup>(E9)</sup> and leads to awareness of the child's care needs <sup>(E48)</sup>.

Planning the care together with the parents makes them feel included, facilitates the feelings of participation, they feel actively listened to <sup>(E40, E45)</sup> and proud to provide "normal" care (changing, dressing, bathing) to the newborn <sup>(E41)</sup>.

Promoting the involvement of parents with the newborn from birth, allowing them to be monitored and observed, influencing the growing commitment and bond with the newborn <sup>(E21, E41, E48, E49)</sup>. Thus, they assume the role of the main caregivers <sup>(E40)</sup>.

### **Interaction between parents and the nursing team**

Admission to an intensive care unit is traumatic for parents <sup>(E50)</sup>. The professional who presents for the first time the unit where the newborn is hospitalized, as well as showing the newborn, greatly influences the reestablishment of the bonding process because it presents a newborn who already belonged to that family, which is deprived of this due to the newborn's health condition <sup>(E3)</sup>.

Encouragement from health professionals positively influences parents' feelings, making them more confident in the interaction with the newborn <sup>(E5, E33)</sup>. This is a process facilitated by giving information to parents, however it often has a slightly forced beginning, so that parents are able to overcome conflicts and feelings and realize that their care is safe for the newborn <sup>(E5)</sup>.

Teaching and support is often directed at mothers, however it is essential to include the father at all times, from pregnancy and in the involvement after birth <sup>(E14)</sup>.

### **Communication**

The relationships between parents and professionals must be based on positive interactions, capable of creating a partnership and facilitated communication between them <sup>(E6, E47, E50, E51)</sup>.

Communication allows parents to become partners in care and decision-making, while nurses enable them to fulfill their parental role, increasing parents' self-confidence, generating a sense of control and a feeling of bond with the newborn (E6, E49, E51).

It is important that all information related to the newborn is provided, in the different stages of hospitalization (E7, E12, E41). Information, support and guidance promotes the parents' trust in the team, being the key to supporting worries and anxiety, enforcing the feeling that the newborn is safe and well cared for (E1, E2, E11, E12, E36, E41, E45, E52, E48, E50).

Improving communication and collaboration skills to increase the presence of parents in care is essential to improve the bond with the newborn and the parents' psychological well-being (E45, E49, E50).

### **Emotional Support**

Regarding emotional support, it is essential that the nursing team support the family, not restricting themselves to the questions asked, as parents often do not know what to ask, as they are unaware of the seriousness of the situation, the existing equipment and the duration hospitalization (E2, E7).

Parents must be accompanied on the first visit to the newborn and receive as much information as possible, as the first visit is impactful and influences the family bonding process (E7).

Creating opportunities to listen to parents' needs can reduce anxiety caused by uncertainty (E2, E46). Parents who receive emotional support from nurses tend to improve the bond with the newborn, considering they are emotional support, informed and more confident (E49).

Good communication, listening skills, not making judgments, defending the newborn-parents relationship, empathy for the situation, good nursing skills, providing information proved to be important for the emotional support of parents (E46) and including the family's religious beliefs allows them to express their feelings (E7).

The relationship that parents create with the nursing team increases the commitment and responsibility on the part of parents (E47, E53).

### **CONCLUSION**

With this scoping review, it was possible to map the scientific evidence regarding interventions that promote attachment to the newborn in need of hospitalization. Due to the complexity of the health-disease situation that motivates the hospitalization of the newborn, the bonding process is corrupted and the reestablishment of the bond is more effective the earlier it is encouraged after separation from the family.

Nurses play a fundamental role in reestablishing the bonding process between the hospitalized newborn and the parents, promoting an effective bond. Consequently, during hospitalization they should take every opportunity to encourage, educate and enable parents to be involved with the newborn. The nursing interventions identified in

the literature through the scoping review, namely physical proximity, breastfeeding promotion, inclusion of parents in newborn care, communication and emotional support are essential for parents to reestablish the bond with the child and are able to transition from a role in which they are mere spectators to becoming the newborn's primary caregivers, empowered and connected.

The increase in nurses' knowledge about the newborn's attachment to the parents, the impact that the disruption of this bond has on the triad's life course, as well as the interventions that promote an effective early attachment, result in an improvement in the performance of the nurses that will have an impact on the family's bonding path during and after hospitalization.

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