

# Assistance for newborns in the delivery room during the COVID-19 pandemic

Assistência ao recém-nascido na sala de parto durante a pandemia de COVID-19

Atención al recién nacido en la sala de parto durante la pandemia de COVID-19

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## Descritores

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## Descriptores

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## Abstract

**Objective:** To map the main recommendations for newborn care according to the maternal clinical picture in the delivery room, considering the COVID-19 pandemic context.

**Methods:** This is a scoping review based on the JBI method. The guiding question was: What are the main recommendations for assistance to newborns in the delivery room during the current coronavirus pandemic? Study selection was carried out in national and international databases and reference lists. Two independent reviewers read full texts, extracted and analyzed their data, and synthesized the content.

**Results:** We included 9 studies that had their data synthesized in a map of recommendations for assistance to newborns, based on the maternal condition for the new coronavirus in the delivery room according to the axes of attention breastfeeding, skin-to-skin contact, umbilical cord clamping, and respiratory assistance.

**Conclusion:** For newborn care in the delivery room, precautions should be taken to reduce the risk of virus transmission, make skin-to-skin contact after the adoption of hygiene measures, maintain and encourage exclusive breastfeeding through hygienic care of parturient women and perform respiratory assistance in a negative pressure room by trained professionals.

## Resumo

**Objetivo:** Mapear as principais recomendações na assistência ao recém-nascido conforme o quadro clínico materno na sala de parto, tendo em vista o contexto da pandemia de COVID-19.

**Métodos:** Revisão de escopo baseada no método JBI. Foi utilizada a questão norteadora: “Quais as principais recomendações para a assistência ao recém-nascido na sala de parto durante a atual pandemia do coronavírus?”. A seleção dos estudos foi realizada em bases de dados nacionais, internacionais e listas de referências. Dois revisores independentes realizaram a leitura dos textos completos, extração e análise dos dados, e sintetização do conteúdo.

**Resultados:** Foram incluídos 9 estudos que tiveram os dados sintetizados em um mapa de recomendações para assistência ao recém-nascido baseado no quadro materno para o novo coronavírus na sala de parto de acordo com os eixos de atenção: amamentação, contato pele a pele, clampamento do cordão umbilical e assistência respiratória.

**Conclusão:** Na assistência ao recém-nascido na sala de parto deve-se adotar precauções para reduzir o risco de transmissão do vírus, realizar o contato pele a pele após a adoção de medidas de higiene, manter e estimular a amamentação exclusiva mediante cuidados de higiene da parturiente e realizar assistência respiratória em sala de pressão negativa por profissionais paramentados.

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Conflicts of interest: nothing to declare.

## Resumen

**Objetivo:** Mapear las principales recomendaciones para la atención al recién nacido según el cuadro clínico materno en la sala de parto, considerando el contexto de la pandemia de COVID-19.

**Métodos:** Revisión de alcance basada en el método JBI. Se utilizó la pregunta orientadora: “¿Cuáles son las principales recomendaciones para la atención al recién nacido en la sala de parto durante la pandemia de coronavirus?”. La selección de los estudios fue realizada en bases de datos nacionales e internacionales y en listas de referencias. Dos revisores independientes realizaron a lectura de los textos completos, la extracción y el análisis de los datos y la síntesis del contenido.

**Resultados:** Se incluyeron nueve estudios, cuyos datos fueron sintetizados en un mapa de recomendaciones para la atención al recién nacido según el cuadro materno del nuevo coronavirus en la sala de parto, de acuerdo con los ejes de atención: lactancia, contacto piel con piel, pinzamiento del cordón umbilical y asistencia respiratoria.

**Conclusión:** En la atención al recién nacido en la sala de parto deben adoptarse precauciones para reducir el riesgo de transmisión del virus, realizar el contacto piel con piel luego de la adopción de medidas de higiene, mantener y estimular la lactancia exclusiva mediante cuidados de higiene de la parturienta y realizar asistencia respiratoria en sala de presión negativa por profesionales con traje de protección.

## Introduction

Since the beginning of February 2020, the World Health Organization (WHO) has officially named the disease caused by the SARS-CoV-2 virus as COVID-19. Currently, this disease constitutes a Public Health Emergency of International Concern (PHEIC), whose progress has challenged health systems and society around the world.<sup>(1,2)</sup>

Pregnant and postpartum women were considered to be the groups with the greatest clinical vulnerability for COVID-19, as they present changes in the immunity mechanism and greater sensitivity to hypoxia.<sup>(3-5)</sup> This situation is associated with a greater number of negative outcomes, such as hospitalizations and deaths, representing an increased risk of transmission of infection to newborns (NB).<sup>(6,7)</sup>

In Brazil, assistance to pregnant women and puerperal women with the coronavirus faces barriers, considering the difficulties present in obstetric care, such as obstacles to access to health services during the pandemic. This is associated with low availability of respirators and intensive care for obstetric patients with COVID-19, which results in high numbers of maternal deaths and poor prognosis for NBs.<sup>(8)</sup>

Postnatal or horizontal transmission of the virus for NBs is more frequent and worsens when mothers are symptomatic for COVID-19, due to a greater probability of contact with droplets or contaminated biological material. In this situation, care needs to be adapted to reduce the risk of infection in the delivery room.<sup>(6,9-12)</sup>

Because of this, the importance of humanized assistance to NBs at the time of delivery and the

advances achieved, so that the birth has fewer unnecessary interventions for parturient women and NBs, stand out. However, in the pandemic context, maternal and child life and well-being maintenance should be prioritized over the performance of actions that can increase the risk of contamination of NBs by SARS-CoV-2.<sup>(12-14)</sup>

Thus, understanding the recent emergence of COVID-19 in the world, this review is justified by the need to understand the main recommendations for assisting NBs after birth and by the reduced national and international production of studies on the current pandemic context, especially when it comes to NB care.

Also, there is evidence that discusses maternal mortality due to COVID-19 in Brazil, which is 3.5 times greater than the sum of the number of maternal deaths reported in other countries until July this year.<sup>(8)</sup> This data is important, as it can significantly interfere with NBs' health.

In a preliminary search in scientific literature, a knowledge production gap was identified about recommendations directed to neonatal management in the delivery room, although there are studies that assess the virus transmissibility by different routes. Thus, this study aimed to map the main recommendations in assisting NBs according to the maternal clinical picture in the delivery room, considering the COVID-19 pandemic context.

## Methods

This is a scoping review, defined as a way of mapping the existing literature in a given field in terms

of nature, characteristics and volume, to identify the main concepts that support a given area of knowledge.<sup>(15,16)</sup> The choice for this method resulted from the fact that until now we have worked with the production of knowledge with a low level of scientific evidence, making it more appropriate to gather the available information through a far-reaching exploratory review.

The proposed scoping review was conducted by the JBI methodology for scoping analysis. For the study preparation, the following steps were used: guiding or research question identification; search and selection of relevant studies; study selection; information mapping; grouping; summary and reporting of results.<sup>(16,17)</sup>

In this regard, the question constructed using PCC strategy was: What are the main recommendations for assistance to NBs in the delivery room during the current COVID-19 pandemic? The choice for PCC strategy is a suitable recommendation for scoping reviews, in which P (population) means NBs (“infant, newborn”), C (concept), delivery room assistance, C (context), COVID-19 pandemic (“coronavirus infections”).

Data search was carried out in June and July 2020 and followed three steps to access the maximum content of published and unpublished references: a) Initial search of high sensitivity in databases, to identify the main theme keywords and descriptors: Medical Literature Analysis and Retrieval System Online (MEDLINE) via PubMed and Cumulative Index to Nursing and Allied Health Literature (CINAHL); b) Development of a specific search strategy based on keywords and indexed terms specific to the collections: Web of Science via Main Collection (Thomson Reuters Scientific); SCOPUS and Latin American and Caribbean Literature in Health Sciences (LILACS), consulted by the Virtual Health Library (VHL), accessed through the CAPES Portal; c) The reference lists of all potentially eligible articles were accessed to identify additional studies.

The search strategy occurred through the keywords “infant, newborn”, “coronavirus infections”, “postnatal care”, “delivery rooms”, “birth setting” and “childbirth”, identified in the

Medical Subject Headings (MeSH), CINAHL and Health Sciences Descriptors (DeCS). These terms were combined using the Boolean operators “AND” and “OR” to the uncontrolled descriptors: “newborn”, “neonate”, “neonates”, “coronavirus infection”, “covid19”, “2019 novel coronavirus disease” and “birth”.

For inclusion of publications in the review, the following criteria were selected: full articles, case reports, editorials, guidelines, technical notes and recommendations in English, Spanish, or Brazilian Portuguese. Records were included that present important information for conducting assistance regardless of NBs’ birth route in the first hours after delivery. Articles that did not adapt or did not have adequate information to meet the proposed theme were excluded.

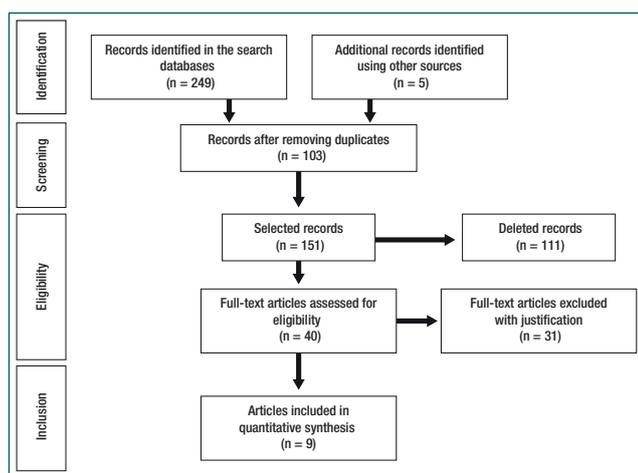
After the search, all potentially eligible citations were grouped and imported into the EndNote Web software, which is important for organizing references and removing duplicates. Selection through the reading of titles and abstracts, followed by access of selected texts in full, was carried out by two independent reviewers. The entire process was detailed and illustrated using a specific flowchart for the chosen methodology, the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR).<sup>(18)</sup>

In the process of extracting data from the selected publications, an adaptation of the JBI data extraction form was used, in which specific items were added for the theme addressed, based on the year, authors and country of publication, objective, study design, study population, context analyzed, route of birth, main results or contributions about NB care.<sup>(17)</sup>

For the identified knowledge production to respond directly to the research question, data synthesis occurred through a map of recommendations for NB care, according to maternal clinical picture (symptomatic or asymptomatic, but confirmed for COVID-19) in the delivery room. The other information extracted was discussed in the form of a narrative, to describe the state of the art in the available literature.

## Results

In the initial search, 249 references were obtained from database searches and 5 by reading reference lists of potential articles. Of that amount, 103 studies were excluded after removing duplicates. After that, the title and abstract of 151 articles were read, with subsequent eligibility for 40 studies. Of these, 9 articles were excluded due to lack of availability of full text and 22 articles due to disagreement with the guiding question. Thus, 9 studies were included for full-text analysis (Figure 1).



**Figure 1.** Flowchart of the review study selection process

A total of 9 studies were included in the review. The data of these publications are described in Table 1, in which some characteristics are identified, such as the title of the study, journal, and country of origin. All were published in 2020, in Brazil (n=3), Italy (n=2), India (n=1), Croatia (n=1), United States (n=1), Vietnam (n=1). Regarding type of publication and design, the following were included: recommendations (n=3), guidelines (n=1), protocols (n=1), original article (n=1), editorial (n=1), and technical notes (n=2).

Assistance to NBs in the delivery room was adjusted based on the maternal clinical picture, when there is confirmation of infection with the new coronavirus. Care is differentiated for mothers with no signs of infection and suspected or confirmed mothers for COVID-19, especially in the areas of attention to clamping the umbilical cord, skin-to-skin contact, breastfeeding and respiratory assistance.

**Table 1.** Studies included in the scoping review, according to title, periodical, and country of origin

Study	Study title	Journal title	Country of origin
1	Management of newborns exposed to mothers with confirmed or suspected COVID-19. <sup>(19)</sup>	J Perinatology	United States
2	Breastfeeding and coronavirus disease-2019: Ad interim indications of the Italian Society of Neonatology endorsed by the Union of European Neonatal & Perinatal Societies. <sup>(20)</sup>	Matern Child Nutr.	Italy
3	<i>Nota Técnica no10/2020-COCAM/CGCIV/DAPE/SAPS/MS. Atenção à saúde do recém-nascido no contexto da infecção (SARS-CoV-2).</i> <sup>(1)</sup>	-	Brazil
4	Perinatal-Neonatal Management of COVID-19 Infection — Guidelines of the Federation of Obstetric and Gynaecological Societies of India (FOGSI), National Neonatology Forum of India (NNF), and Indian Academy of Pediatrics (IAP) <sup>(21)</sup>	Indian Pediatr	India
5	Management of mother-infant with suspected or confirmed SARS-CoV-2 infection in a highly epidemic context. <sup>(22)</sup>	J Neonatal Perinatal Med	Italy
6	<i>Normas de biossegurança para prevenção da infecção pelo SARS-CoV2 a serem adotadas nos serviços de obstetria para atendimento ao parto e recém-nascido.</i> <sup>(23)</sup>	-	Brazil
7	Are Covid-19-positive mothers dangerous for their term and well newborn babies? Is there an answer? <sup>(24)</sup>	J Neonatal Perinatal Med	Croatia
8	Appropriate care for neonates born to mothers with COVID-19 disease. <sup>(25)</sup>	Acta Paediatric	Vietnam
9	Neonatal COVID-19: little evidence and the need for more information. <sup>(26)</sup>	J Pediatr (Rio J).	Brazil

tance. The care recommendations map presents a comparative summary of NB care based on the maternal clinical picture in the delivery room, as shown in Table 2.

## Discussion

This scoping review made it possible to map the main recommendations to NBs of mothers infected with COVID-19, according to the clinical picture in the delivery room. To this end, it was decided to present data discussion through the axes of attention related to assistance, such as umbilical cord clamping, skin-to-skin contact, breastfeeding, and respiratory assistance.

### Delaying umbilical cord clamping

Delaying umbilical cord clamping (performed 1 to 3 minutes after birth) is one of the essential precautions for NBs, and, under normal conditions, is recommended by the WHO as it allows continued

**Table 2.** Map of recommendations for newborn care based on the maternal clinical picture for COVID-19 in the delivery room

Attention Axes	Mothers without signs of COVID-19	Suspected or confirmed mothers for COVID-19
Breastfeeding	Breastfeeding as soon as possible, preferably in the first hour of life, still in the delivery room, in addition to exclusive breastfeeding. <sup>(27)</sup>	Breastfeeding through the expression of milk following biosafety precautions, to avoid contagion. <sup>(19,20)</sup> Direct breastfeeding should be allowed after the adoption of precautionary measures, such as the mother's hygiene and the use of a surgical mask. <sup>(1,21-26)</sup>
Skin-to-skin contact	It should be performed in maternal and child binomials with stable and asymptomatic clinical conditions, right after birth, in order to reduce the risk of hypothermia and favor breastfeeding. <sup>(28)</sup>	Immediate skin-to-skin contact should be avoided when suspected of COVID-19, and mother-infant separation is recommended to perform first care; <sup>(19,22)</sup> early skin-to-skin contact is recommended after mothers' body hygiene and personal protection equipment (PPE) exchange. <sup>(21,25,26)</sup>
Umbilical cord clamping	It can be performed late, if NBs is born in healthy conditions, from 1 to 3 minutes after birth. <sup>(28,29)</sup>	At gestational age $\geq 34$ weeks with good muscle tone and adequate breathing at birth, clamping can be performed in a timely manner. In NBs with gestational age $<34$ weeks, it is indicated to wait 30-60 seconds before clamping the umbilical cord. <sup>(30,31)</sup>
Breathing procedures	The recommendations suggest that they should be carried out by a trained multidisciplinary team, duly attired with the PPE available. They can be performed in the delivery room. <sup>(32)</sup>	In case of suspicion, the need for complete vesting for respiratory care of NBs is reinforced. <sup>(23)</sup> Assessment should be started quickly in the delivery room and continued in a negative pressure room. <sup>(19)</sup>

passage of blood from the placenta to infants for a longer time and increases iron reserves by up to 50% at 6 months of age in children born at term.<sup>(29)</sup>

However, the time recommended for the delaying umbilical cord clamping may present some changes according to the consulted literature, considering the fear that the vertical transmission of COVID-19 may occur, and the urgency, in some cases, for separation of NBs and suspected or confirmed mother for the virus.<sup>(24)</sup>

As a result, the selected studies differed in terms of time for delaying umbilical cord clamping. Some studies have recommended doing this immediately after birth to reduce the risk of secondary transmission of NBs by the SARS-CoV-2 virus.<sup>(21,24)</sup> Contradictorily, there is a suggestion that the delaying umbilical cord clamping remains considering the benefits to NBs and the uncertainty regarding the available information.<sup>(1,23,33)</sup>

A review study looked at the perinatal outcomes of 71 neonates born to mothers who developed the infection in the third trimester. Of the reported cases, a total of 4 NBs were diagnosed by the RT-PCR exam performed with umbilical cord samples, within the first 48 hours. The presence of IgG in the sample may denote the presence of maternal antibodies transferred to NBs, whereas the detection of IgM would indicate a fetal immune response. In this sense, choosing the opportune time for clamping can bring risks and benefits to NBs. It is worth mentioning that RT-PCR is a more specific than a sensitive test, which allows for greater cases of false diagnoses.<sup>(34)</sup>

Based on these findings, the WHO and the Brazilian Federation of Gynecology and Obstetrics Associations (FEBRASGO - *Federação Brasileira das*

*Associações de Ginecologia e Obstetrícia*) recommend more assertive recommendations regarding timely clamping, suggest that it should be individualized and analyzed because of NBs' gestational age and health condition. At gestational age  $\geq 34$  weeks with good muscle tone and adequate breathing at birth, clamping can be delayed in a timely manner. In NBs with gestational age  $<34$  weeks, it is indicated to wait 30-60 seconds before umbilical cord clamping.<sup>(30,31)</sup>

Considering the data analyzed, the need for attention to the risks, benefits and individual contexts that are important for decision-making is reinforced. Therefore, an individual analysis of maternal and neonatal clinical conditions is necessary for having safety in care.

### Skin-to-skin contact

Skin-to-skin contact (SSC) occurs when NBs are placed naked in direct contact with the mothers' breast skin. "Immediate" SSC means that NBs were placed in contact with mothers' skin in the first 10 minutes after birth, and in "early" SSC, contact occurred between 10 minutes and 24 hours after birth. This contact with mothers' skin is indicated by literature as a way of adapting infants to extra-uterine life and reducing the risk of hypothermia.<sup>(35)</sup>

This topic of assistance commonly performed in the delivery room is in some situations contraindicated due to the presence of symptoms of the new coronavirus presented by parturient women, considering the possibility of infection of NBs. Thus, studies have indicated that SSC is avoided and that mother and infant management should be carried out according to their clinical conditions and the results of screening for coronavirus infection.<sup>(1,21,22)</sup>

For another author, in addition to the recommendation to avoid SSC, he reinforced the need for the admission of symptomatic mothers for COVID-19 and NBs in different hospital units. Thus, after the procedures performed in the delivery room, mothers must remain in a differentiated unit, to fulfill the isolation of both parties.<sup>(19)</sup> Thus, according to this study, both immediate and early SSC should be discouraged and possibly some losses may occur for the dyad, such as greater difficulty in performing breastfeeding directly at mothers' breast.

This data can be understood as a precautionary measure adopted to prevent NBs from being infected by the virus, but also as a reflection of the different policies to promote the bond and contact of the dyad in the postpartum period in different countries, which can influence the ways of coping with the pandemic. depending on the context.

On the other hand, other studies have highlighted that SSC of NBs with their mothers can be carried out when mothers are asymptomatic, as it constitutes a protective action against the negative consequences of harmful procedures, including early umbilical cord clamping and aspiration routinely, actions that increase contact with various health professionals who may be infected.<sup>(20,25,26)</sup> However, it is important to note that SSC can only occur when all measures to prevent NBs' contamination are adopted, such as puerperal bath, change of masks, caps, nightgowns, and sheets.<sup>(2)</sup>

Thus, it is possible to conclude SSC should be discouraged in the first 10 minutes after birth, considering that in the period considered, women in labor are still with secretions arising from childbirth and that may increase the risk of transmission of SARS-CoV-2 for NBs.<sup>(25)</sup>

## Breastfeeding

Breastfeeding, still in the delivery room, allows NBs to better adapt to extrauterine life and helps with thermal, glycemic and cardiorespiratory regulation. Early suckling, especially for mothers, stimulates the pituitary gland to produce oxytocin and prolactin, increasing milk production by the body. Moreover, breastfeeding in the first hour of life is associated with more successful cases of exclusive breastfeeding.<sup>(36)</sup>

In the pandemic context caused by the new coronavirus, some recommendations suggested that breastfeeding should be maintained directly in the breast, if NBs and their mothers are clinically stable. Therefore, mothers must wear a surgical mask while infants are breastfeeding and clean their hands before and after touching NBs.<sup>(21,23)</sup>

A retrospective cross-sectional study carried out in the United States meets this information by guiding continuity of breastfeeding of NBs of an infected mother after delivery and in the rooming-in. This recommendation is analyzed as a critical educational opportunity by providing mothers with COVID-19 to learn about isolation precautions, use of PPE and safe distance.<sup>(37)</sup>

In the delivery room, in cases of suspicion or confirmation of mothers for COVID-19, some studies have recommended that breastfeeding should be postponed until the time when hygiene care and measures to prevent NB contamination were carried out, such as cleaning parturient women by bathing in the bed, changing the shirt, sheets, mask, and cap.<sup>(1,22,27)</sup> Thus, breastfeeding is not discouraged from the perspective of COVID-19 infection, considering the possibility of passing maternal SARS-CoV-2 antibodies into breast milk, conferring immunity against the virus or reducing the severity of the infection.<sup>(25)</sup>

However, other authors did not recommend breastfeeding directly at mothers' breast, given that NBs are separated from their mothers and admitted to a different hospital unit. In these cases, the expression of breast milk is suggested with the adoption of strict hygiene measures to avoid possible transmission of infection by droplets or contact with respiratory secretions, milk can also be offered by a healthy caregiver.<sup>(19,20)</sup>

In this regard, there was consensus among the authors to maintain exclusive breastfeeding as a way of feeding NBs. This data converges with that recommended by the Ministry of Health (MoH), in which breast milk is considered the gold standard in NB nutrition.<sup>(27)</sup> Thus, it is believed that the results found in this review were based on the benefits arising from the act of breastfeeding, which are, therefore, greater than the risks of transmission of SARS-CoV-2 through breast milk.

## Respiratory assistance

Respiratory procedures performed in NBs can increase the risk of airborne transmission, especially for healthcare professionals who are providing care, considering that SARS-CoV-2 can remain in the air for more than 3 hours and travel for a distance greater than 2 meters.<sup>(38,39)</sup>

Still in the delivery room, it is suggested that the NB who does not require resuscitation or extensive breathing procedures be assessed by a professional trained in neonatal care immediately after birth to assess aspects such as color, tone and respiratory effort. If breathing is spontaneous and the NB has good tone, they should be wrapped with warm covers and placed in a heated incubator for transportation.<sup>(19)</sup>

In line with this information, a technical note reinforced that health professionals who perform respiratory procedures and resuscitation maneuvers must wear long-sleeved sterile aprons, waterproof aprons, hats and N95 masks to perform aerosol-generating procedures, such as ventilation with manual positive pressure, airway aspiration, intubation and CPAP.<sup>(23)</sup> In need of respiratory assistance to the suspected NBs for COVID-19, there is the recommendation of the initial assessment in the delivery room and continuity of care in a negative pressure room.<sup>(19)</sup>

Additionally, it is reinforced that in situations of respiratory assistance, the number of professionals in the room must be minimized and using auxiliary ventilation, a negative pressure suction tube can be placed containing an outlet end of the ventilator connected with a filter and then connected to a negative pressure suction device so that there is a reduction in the dispersion of particles contaminated with COVID-19.<sup>(4)</sup>

## Conclusion

Despite the few reports of identification of fetal antibodies in umbilical cord samples, the definition of timely clamping should be performed through individualized analysis, based on obstetric and neonatal conditions. Immediate SSC is

contraindicated, whereas early SSC can be encouraged, as long as the risks of contamination of NBs through mothers' body secretions and respiratory droplets are avoided, after the puerperal bath and PPE exchange. Regarding breastfeeding, it was recommended to continue exclusive breastfeeding; however, the adoption of hygiene measures to perform the act, such as hand washing and wearing a mask, was emphasized. For NBs who need respiratory assistance, care must be carried out by properly trained professionals to avoid contamination by aerosols, in a negative pressure room. The high number of studies published in Chinese are considered as limitations observed in the development of this scoping review, which made it impossible to access these publications due to the language. Also, there was difficulty in analyzing the studies due to authors' divergencies about the recommendations for NB care in the delivery room, which hindered the possibility of making a synthesis of more assertive care. Given the above, mapping the main recommendations for the assistance of NBs present in this review serves as a guide for professionals' performance in assisting mother-child in the current pandemic context. Furthermore, the results presented here presented gaps for the production of new studies about the time of umbilical cord clamping and NB management in other scenarios, such as in rooming-in and at discharge and post-discharge.

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