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NURSING CARE FOR PREMATURE INFANTS WITH RESPIRATORY DISTRESS SYNDROME: AN INTEGRATIVE LITERATURE REVIEW

CUIDADOS DE ENFERMAGEM AO PREMATURO COM SÍNDROME DO DESCONFORTO RESPIRATÓRIO: UMA REVISÃO INTEGRATIVA DA LITERATURA

CUIDADOS DE ENFERMERÍA EN RECIÉN NACIDOS PREMATUROS CON SÍNDROME DE DIFICULTAD RESPIRATORIA: UNA REVISIÓN BIBLIOGRÁFICA INTEGRADORA

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ABSTRACT

Introduction: Respiratory distress syndrome (or hyaline membrane disease) is one of the most common pathologies among preterm newborns and is responsible for the highest neonatal mortality rate. This syndrome is characterized by a lack or insufficiency of surfactant in the lungs. Surfactant plays a crucial role in this clinical condition. This syndrome is the most frequent respiratory pathology in preterm newborns and is more common in preterm infants under 28 weeks gestation.

Objective: To analyze the health gains from nursing care provided to preterm newborns with respiratory distress syndrome after surfactant replacement therapy in the respiratory system.

Methodology: Integrative literature review that used the PICO mnemonic to compile the research question. Articles were searched on the EBSCOhost platform, selecting articles published between January 2012 and December 2022. Eleven articles were selected and the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses – PRISMA method were followed.

Results: Most of the selected articles suggest there is scientific evidence of health gains when administered surfactant therapy in premature newborns with Respiratory Distress Syndrome. With this study, it was observed that surfactant therapy is of paramount importance for the treatment of these newborns, because it improves lung function, reduces the need for high oxygen concentrations, and prevents complications in the premature infant.

Conclusions: Based on the scientific evidence obtained, the importance of nursing care in relieving the symptoms caused by respiratory distress syndrome in newborns during surfactant therapy was verified. The importance of nursing care systematization is emphasized as a tool to improve care before, during and after surfactant administration in preterm infants with respiratory distress syndrome.

Keywords: Nursing Care; Preterm Newborn; Respiratory Distress Syndrome.

RESUMO

Introdução: A Síndrome do Desconforto Respiratório ou doença da membrana hialina) é uma das patologias mais comuns, entre os recém-nascidos pré-termo e é responsável pelo maior índice de mortalidade neonatal. Esta síndrome caracteriza-se pela falta ou insuficiência de surfactante nos pulmões. O surfactante desempenha papel crucial nesta condição clínica. Esta síndrome é a patologia respiratória mais frequente no recém-nascido pré-termo, sendo mais comum nos prematuros com menos de 28 semanas de gestação.

Objetivo: Analisar os ganhos em saúde decorrentes dos cuidados de enfermagem aos recém-nascidos pré-termo com Síndrome do Desconforto Respiratório, após terapia de reposição de surfactante no sistema respiratório.

Metodologia: Revisão integrativa da literatura que utilizou a mnemónica PICO para compilar a pergunta de investigação. Procedeu-se à pesquisa de artigos na plataforma EBSCOhost, selecionando-se artigos publicados entre janeiro de 2012 e dezembro de 2022. Foram selecionados onze artigos e seguiram-se as recomendações do método *Preferred Reporting Items for Systematic Reviews and Meta-Analyses* – PRISMA.

Resultados: A maioria dos artigos selecionados sugerem existir evidência científica de ganhos em saúde quando administrada terapêutica de surfactante em recém-nascidos prematuros com Síndrome do Desconforto Respiratório. Com este estudo, observou-se que a terapia com surfactante é de suma importância para o tratamento destes recém-nascidos, pois melhora a função pulmonar, reduz a necessidade de altas concentrações de oxigénio e evita complicações no prematuro.

Conclusões: Com base na evidência científica obtida, verificou-se a importância que os cuidados de enfermagem assumem no alívio dos sintomas provocados Síndrome do Desconforto Respiratório no recém-nascido, aquando da terapia com surfactante. Salienta-se a importância da sistematização dos cuidados de enfermagem, como ferramenta para melhorar o cuidado antes, durante e após a administração de surfactante no prematuro com Síndrome do Desconforto Respiratório.

Palavras-chave: Cuidados de Enfermagem; Recém-nascido Pré-termo; Síndrome de Desconforto Respiratório.

RESUMEN

Introducción: El síndrome de distrés respiratorio (o enfermedad de la membrana hialina) es una de las patologías más frecuentes entre los recién nacidos prematuros y es responsable de la mayor tasa de mortalidad neonatal. Este síndrome se caracteriza por la falta o insuficiencia de surfactante en los pulmones. El surfactante desempeña un papel crucial en esta condición clínica. Este síndrome es la patología respiratoria más frecuente en los recién nacidos prematuros, y es más frecuente en los prematuros de menos de 28 semanas de gestación.

Objetivo: Analizar las ganancias en salud derivadas de los cuidados de enfermería prestados a recién nacidos pretérmino con Síndrome de Distrés Respiratorio tras el tratamiento sustitutivo con surfactante en el sistema respiratorio.

Metodología: Revisión bibliográfica integradora que utilizó la mnemotecnia PICO para compilar la pregunta de investigación. Se realizaron búsquedas de artículos en la plataforma EBSCOhost, seleccionando artículos publicados entre enero de 2012 y diciembre de 2022. Se seleccionaron 11 artículos y se siguieron las recomendaciones del método *Preferred Reporting Items for Systematic Reviews and Meta-Analyses* – PRISMA.

Resultados: La mayoría de los artículos seleccionados sugieren que existe evidencia científica de beneficios para la salud cuando se administra terapia con surfactante en recién nacidos prematuros con Síndrome de Distrés Respiratorio. Con este estudio, se observó que la terapia con surfactante es de suma importancia para el tratamiento de estos recién nacidos, ya que mejora la función pulmonar, reduce la necesidad de altas concentraciones de oxígeno y previene complicaciones en el prematuro.

Conclusiones: Con base en la evidencia científica obtenida, se comprobó la importancia de los cuidados de enfermería en el alivio de los síntomas causados por el Síndrome de Distrés Respiratorio en recién nacidos durante la terapia con surfactante. Se destaca la importancia de la sistematización de los cuidados de enfermería como herramienta para mejorar la atención antes, durante y después de la administración de surfactante en recién nacidos prematuros con Síndrome de Distrés Respiratorio.

Descriptores: Cuidados de Enfermería; Recién Nacido Pretérmino; Síndrome de Distrés Respiratorio.

INTRODUCTION

In Portugal, the number of births per thousand inhabitants (crude birth rate) has been decreasing in recent years. In 2021, the crude birth rate corresponds to 7.7%, which represents a drop of -0.72% compared to 2019[1]. Also the neonatal mortality rate in Portugal has been decreasing compared to previous years. In 2021, this rate corresponded to 1.7%, while in 2019 there was a rate of 1.9%[1].

Every day, an average of 17 premature newborns (NB) are born in Portugal. Portugal has one of the highest rates of prematurity in Europe, with an annual 8% record of births before 37 weeks of gestation. The prevalence of preterm births is currently estimated at approximately 10% of births[1]. Taking into consideration the various respiratory pathologies found in NB, respiratory distress syndrome (RDS) is the one with the highest prevalence with 37.5% (related to lack of surfactant)[2].

The normal length of a pregnancy is 37 to 42 weeks. When babies are born before 37 weeks gestational age, we have a premature or preterm baby. The premature baby is born with immaturity in the organs and systems (breathing, temperature control, digestion, metabolism, etc.), which makes them more vulnerable to certain diseases and also more sensitive to certain external factors (such as light and noise).

Despite being a "small version" of a full-term baby, premature babies, especially those born before 35 weeks gestation, or who are very low birth weight, need special attention and extraordinary care to be able to mature biologically and survive outside the protective environment of the mother's womb.

The preterm infant can be classified, according to gestational age, into: (i) Threshold Preterm – Those who are born between 33 and 36 weeks of gestational age and have a birth weight between 1500 g and 2500 g; (ii) Moderate Premature – Those who are born between 28 and 32 weeks of gestational age and have a birth weight between 1000 g and 2500 g and; (iii) Extreme Premature – Those who are born before having completed 28 weeks of gestational age and weigh less than 1000 g. As a consequence of this greater immaturity, he/she is classified as Great Premature and presents more frequent and more severe problems. As far as their physical appearance is concerned, they stand out by their main characteristics: small size, low birth weight, thin, shiny and pink skin, visible veins under the skin, less fat layer under the skin, scarce hair, thin and soft ears, large and disproportionate head in relation to the rest of the body, weak muscle tone and hypotonia (they are less active babies who tend not to raise their upper and lower limbs), weak or non-existent sucking and swallowing reflexes and irregular breathing.

The premature baby is more prone to health problems due to the fact that the pregnancy is shorter and the organs have not developed sufficiently, and therefore they are more vulnerable compared to the newborn who reaches term pregnancy (from 37 completed weeks).

Respiratory distress syndrome (RDS), or hyaline membrane disease (HMD) is one of the most common pathologies among preterm infants and is responsible for the highest neonatal mortality rate[3]. This syndrome is characterized by a lack or insufficiency of surfactant in the lungs[4]. Surfactant in the intrauterine life of the preterm infant is essential for lung maturation. The respiratory distress syndrome is mainly characterized by signs and symptoms such as: dyspnea, expiratory moaning, cyanosis, nasal adhesion and apnea crises, appearing between the first hours of life until 48 hours of puerperium.

The traditional approach to the preterm NB with RDS consists of intubation, ventilation, and administration of surfactant[3]. The use of surfactant was one of the measures with the best positive impact on the morbidity and mortality of extreme preterm infants. Its administration is indicated as soon as possible, preferably in the first hours of life, should be performed carefully and, after this administration, it is recommended not to aspirate the NB for the next two hours. Up to 3 doses of surfactant can be administered in the first 72 hours of life, with an interval of 4 to 6 hours from the first dose[5].

Surfactant replacement therapy has numerous benefits in the treatment of preterm NB with RDS, but it is strongly associated with mortality, and nursing care is of utmost importance in the management of this delicate therapeutic process on which a human life depends. Systematization of nursing care is essential throughout this process and is an ideal methodological model for nurses to apply their technical and scientific knowledge in clinical practice, thus increasing the quality of care and health gains in NBs[6].

This literature review aims to gather scientific evidence on the influence of surfactant application in preterm NB with respiratory distress syndrome. The knowledge about this replacement therapy is essential to outline an effective therapeutic intervention and, consequently, reduce damage and sequelae in the newborn.

Considering the importance of safe and quality health care for preterm infants and their families, evidence-based care practices regarding surfactant replacement therapies are increasingly recognized as an emerging need in neonatal care units (NICUs). However, international studies confirm the inconsistency of these practices, thus the need to deepen and systematize the knowledge on this topic was felt.

Objective

To analyze the health gains from nursing care of preterm infants with RDS following surfactant replacement therapy in the respiratory system.

METHODOLOGY

Ethical aspects

We did not request the opinion of the Ethics Committee, since this was a secondary study. In formulating the problem, we were concerned about the respect for the principles of clarity, objectivity and accuracy, so that the results could be an added value for nurses' knowledge about surfactant replacement therapy in preterm NBs with RDS and, also, for the quality assurance of nursing care due to the possible complications that the NB is subject to. The analysis of data extracted from the selected studies was developed in line with the principle of respect for the results obtained in these investigations and by these researchers. The authors' referencing was performed in accordance with the standards of good academic and scientific practices.

Study type

Nurses' clinical practice is always performed based on the most current scientific evidence and it is this aspect that translates Nursing care into quality care. This evidence-based practice encompasses a whole process of collection, interpretation, assessment, and implementation of clinical data that are important for professionals' decision-making (Jensen 2018)[14].

The study in question is an Integrative Literature Review, based on the need to implement quality care, according to the most current scientific evidence. It comprises the following steps: i) identification of the research question; ii) definition of criteria for inclusion and exclusion of studies; iii) selection of studies according to the defined criteria; iv) analysis of the selected articles; v) presentation and discussion of results; and vi) synthesis of the acquired knowledge.

Methodological procedures

As a methodological approach, the following steps were used to conduct this Integrative Literature Review: definition of the study's research question, definition of exclusion and inclusion criteria, introduction of descriptors into the databases, identification of studies in the databases, selection of studies after reading the title and abstract of the studies, tho-

rough evaluation of the articles selected for this study, and finally, the analysis of the collected data.

Based on the previously outlined objective, which served as a common thread for the Integrative Literature Review, a research question was formulated using the mnemonic PI[C]O, where (P) the target population, (I) the type of intervention, (C) the comparisons, (O) the outcomes. Based on this framework, the following guiding question was formulated: How does surfactant replacement therapy (Intervention) influence respiratory distress syndrome (Outcomes) in preterm infants (Population)?

With the PICO question elaborated, a data collection on the topic under study was carried out during October 2022 through the EBSCOhost platform, selecting the MEDLINE complete and CINAHL complete databases. The descriptors used for the search were: "Respiratory distress syndrome"; "Preterm newborns" combined with the Boolean operator "AND" and "OR" in the following arrangement and order: "Nursing care" AND "Newborn" AND "Premature" OR "Preterm" AND "Respiratory distress" OR "Hyaline membrane disease" OR "Respiratory distress syndrome".

In order to limit the search, the following inclusion criteria were used: (i) full text; (ii) time period between 2012 and 2022; (iii) languages such as Portuguese and English; and (iv) publications in peer-reviewed academic journals. Studies that addressed theoretical and/or practical aspects of nursing care for preterm NBs with respiratory syndrome were considered relevant. Studies involving any aspect of nursing and respiratory distress in newborns were also selected for the secondary discussion. The exclusion criteria included all duplicate articles and those that were not in line with the objective of this study.

After this search, a total of 222 articles were obtained. However, 21 of these articles were repeated and, as such, were excluded, resulting in 201 articles. Subsequently, we proceeded to the respective selection, which was performed in two stages. First by reading the titles, abstracts, and keywords, and then by reading them in full. At the end of the first stage, 24 articles resulted, and at the end of the second stage, 11 articles met all the weighted criteria for data collection and analysis. These research stages are shown in Figure 1↗.

RESULTS

Preliminarily, the results of the literature review will be analyzed, with the purpose of comparing the selected studies and, subsequently, a discussion will be held, based on the thematic analyses of the content. The characteristics and main results obtained are summarized in Table 1↗, in ascending chronological order of publication.

DISCUSSION

This Integrative Literature Review summarizes the contributions of surfactant administration therapy in the premature infant in preventing and reducing the symptoms of RDS.

Through the identification of the main results obtained in the eleven articles included in this literature review, it was possible to understand that all the results of the studies converge, regarding the fact that there was a general agreement among authors on how surfactant acts in the respiratory system, contributing to a better respiratory adaptation of the premature infant with this syndrome.

According to the studies conducted by Junior *et al* (2014)[20]; Storino *et al* (2020)[10]; Martins *et al* (2020)[19]; López *et al* (2019)[15]; Teles *et al* (2019)[18] and Rebello *et al* (2014)[17], the administration of surfactant is necessary due to the immaturity of the pulmonary alveoli in the premature infant and their low production of endogenous surfactant, and is therefore an intervention that reduces the suffering of the newborn. Therefore, the use of exogenous surfactant caused a significant drop in the number of deaths consequent to respiratory distress in premature newborns. These studies have shown that early administration of surfactant has benefits in reducing acute lung injury, reducing neonatal mortality and Chronic Lung Disease, and consequently a decrease in the rate of deaths from RDS, even though it is still one of the most common problems. According to Martins *et al* (2020)[19], the increased survival of premature newborns with RDS can be attributed to the association of corticoid therapy in the gestational period, postnatal exogenous surfactant and mainly due to advances in ventilatory support in neonatal intensive care units.

For Hameed *et al* (2018)[8], newborns at significant risk of RDS need to be first stabilized and then receive surfactant so that the risk of RDS decreases. Thus, this study is shown to be in favor of administering surfactant to newborns due to the risk of them developing RDS.

In the study by Macêdo *et al* (2019)[9], it was found that there is no scientific evidence showing an association between RDS and mortality rate, however, after conducting a subsequent study, they found that surfactant administration when correlated with RDS, showed a statistically significant relationship, so they inferred that surfactant therapy reduces mortality in preterm newborns.

Regarding the time at which surfactant replacement therapy should be started, according to Segur *et al* (2019)[3], it should be started soon after birth in children at risk of developing RDS, as soon as symptoms are established and the diagnosis is confirmed, so that it may result in an improvement of symptoms and decrease the risk of mortality. The studies such as the one by Storino *et al* (2020)[10], reveal that early administration of pulmonary surfactant, in the first minutes of life up to 2 hours, results in fewer acute lung injuries, and a significant reduction in the prevalence of Interstitial Pulmonary Emphysema, Pneumothorax, Bronchopulmonary Dysplasia as well as decreasing the risk of death in up to 53% of newborns (Flores *et al* 2017)[11].

According to Rotta *et al* (2015)[12], to children of all age groups, including full-term newborns, can develop Respiratory Distress Syndrome, with its prevalence increasing with advancing age. However, no significant gender differences were observed. Thus, it was possible to verify the increase in health gains resulting from surfactant administration therapy in preterm NB with RDS. The selected articles were in line with what is recommended in the literature, and there is strong scientific evidence that the application of surfactant in newborns reduces the effects of RDS. Additionally, there was a significant decrease in both mortality and pulmonary morbidity.

Study limitations

The limitations of this Integrative Literature Review are related to the fact that only articles in Portuguese and English were considered, which may have resulted in the loss of important international studies in other languages. Another limitation of this study refers to the sample of articles used, since only articles available online and free of charge were included, which may have led to the non-inclusion of some relevant studies related to the theme. During this research, we also observed a great difficulty in finding published articles on the topic, and we highlight the importance of future studies that allow systematizing the knowledge about the nursing care provided to preterm infants with RDS.

Contributions to Nursing

This Integrative Literature Review will allow reflection on the importance of active health surveillance not only during pregnancy but also after it, reinforcing the important role that nurses play in transmitting information, thus being able to make important contributions to the provision of care in this specific context[2].

It is important to raise awareness, reinforcing the scientific evidence, in order to bring benefits to lung maturation in care practice and consequently decrease health care costs and improve newborn care.

This scientific evidence is important for the nurse to be able to recognize the physiological adaptations and abnormalities that the newborn may suffer, resulting from adaptation to the extra-uterine environment.

FINAL CONSIDERATIONS

RDS is a major factor in neonatal morbidity and mortality. The cause of RDS is related to the existence of pulmonary surfactant deficiency. Based on this fact, studies have shown that there is scientific evidence for the importance of nursing care in the administration of surfactant, which is the most commonly used treatment to alleviate the symptoms of this syndrome. From the above, it can be inferred that this replacement therapy leads to a reduction in complications and brings health gains to the NB and increases their quality of life.

We must take into account that providing individualized nursing care to the NB with RDS may result in shorter hospital stay, higher survival rate, better quality of life and decreased neonatal mortality. In this sense, this study aims to build new knowledge and discussion about the nursing care provided to the newborn and, at the same time, to raise awareness about the importance of promoting an integral and humanized care.

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AJ: Study design, data analysis, review and discussion of results.
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CB: Study design, data analysis, review and discussion of results.
MP: Study design, data analysis, review and discussion of results.
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AC: Review and discussion of results.
AD: Review and discussion of results.
LL: Review and discussion of results.
All authors read and agreed with the published version of the manuscript.

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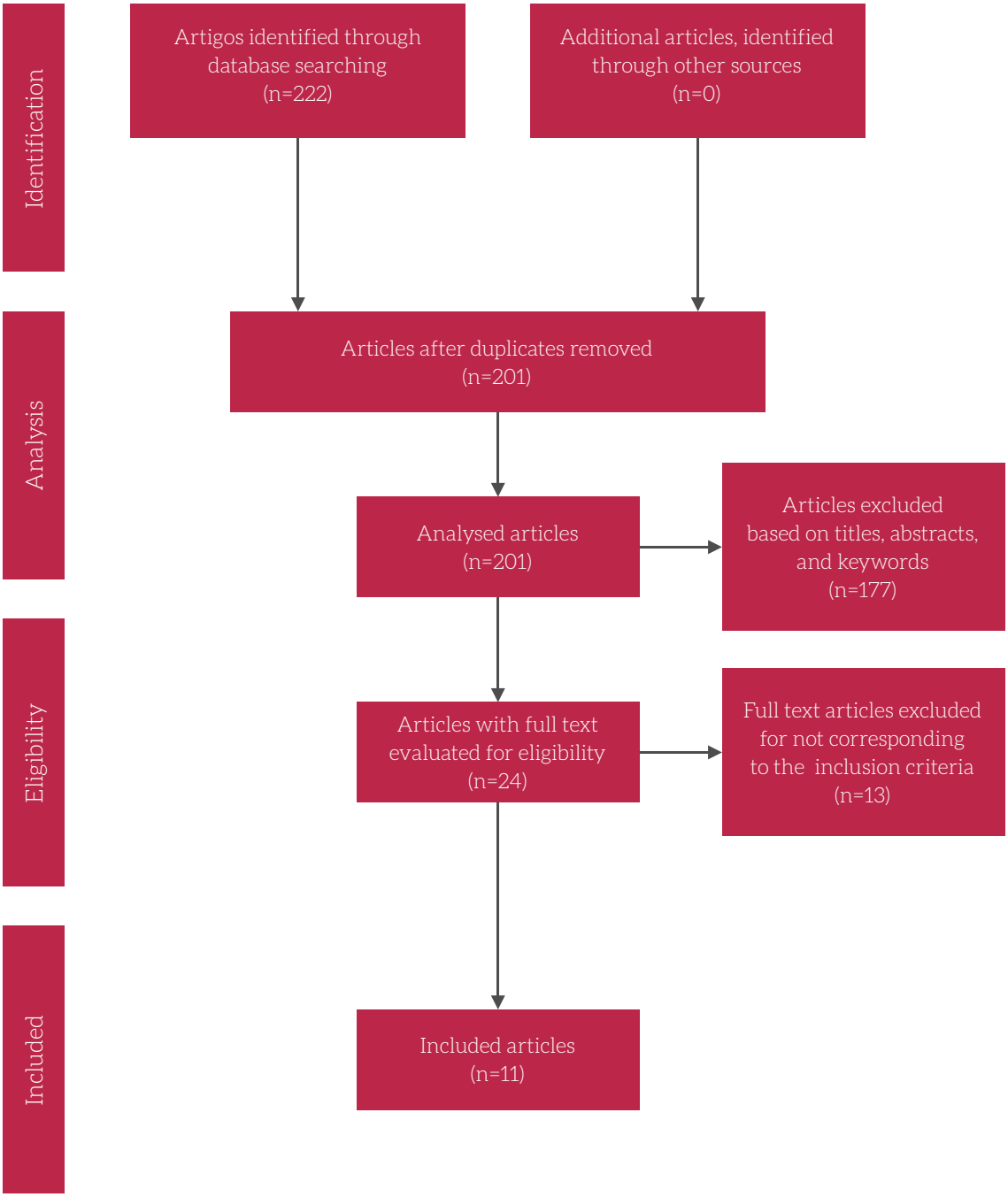

Figure 1 – 2020 PRISMA diagram for the presentation of the research methodology.

Chart 1 – Identification of the studies and main results.

Authors/Year/Method	Objectives	Results
Nascimento Júnior *et al* 2014[5]. Systematic literature review.	Analysis of the pathophysiology of Respiratory Distress Syndrome and the challenges of care.	Due to the low production of endogenous surfactant, the immaturity of the accessory muscles and airway, the newborn has serious difficulties breathing in the extra-uterine environment, and it is often necessary to adopt mechanical ventilation (MV) associated with the administration of surfactant to reduce suffering and prevent other complications from occurring. This study determined that the aforementioned method contributes to the improvement in pulmonary function and positive evolution of this same condition. The use of exogenous surfactant caused a significant decrease of approximately 50% in the number of deaths resulting from respiratory distress in preterm newborns.
Rebello *et al* 2014[17]. A multicenter, double-blind, randomized clinical trial.	To compare the efficacy and safety of a new pulmonary surfactant of porcine origin in the diagnosis of respiratory distress syndrome.	In this study, the administration of exogenous surfactant therapy (surfactant of porcine origin) allowed us to identify a reduction in the neonatal mortality rate among extreme preterm infants with respiratory distress syndrome.
Rotta *et al* 2015[12]. Review article.	Conceptually define the acute respiratory distress syndrome in pediatrics specifying predisposing factors, etiology and pathophysiology; Make recommendations on treatment; and identify research priorities.	According to this study, children of all age groups can be affected and develop Respiratory Distress Syndrome, including preterm newborns, but its prevalence increases with advancing age. Regarding the variable gender, little difference was observed. The new definition of pediatric acute respiratory distress syndrome creates a common language to generate studies and exchange information among intensivists worldwide. Several centers are already trying to validate this new definition and the correlation of its severity indices with outcome. The next few years should bring progress in the understanding of pediatric acute respiratory distress syndrome, as well as answers to several areas where consensus is still lacking in the management of this syndrome.
Flores *et al* 2017[11]. Literature review, descriptive study.	To analyze the nursing care provided to newborns with RDS based on the literature.	Respiratory Distress Syndrome affects about 1% of all live births, especially premature infants. The prophylactic use of surfactant in the delivery room, in the first minutes of life, and the therapy with exogenous surfactant within 2 hours decreases the risk of death by up to 53%. The main function of pulmonary surfactant is to decrease the surface tension of the alveoli and the need for high pressures to keep the alveoli open, especially during expiration, maintaining lung stability, decreasing respiratory effort, and increasing lung compliance.

Chart 1 – Identification of the studies and main results.[↔↖]

Authors/Year/Method	Objectives	Results
Hameed & Talab 2018[8]. Analytical cross-sectional study.	To study morbidity and mortality in premature infants with ARDS treated with different methods of administering surfactant replacement therapy.	This study states that infants at significant risk for Respiratory Distress Syndrome (RDS) need to be first stabilized and then given surfactant, so that the risk of RDS decreases. Thus, this study advocates the administration of surfactant in preterm infants because of their risk of developing RDS.
De Macêdo *et al* 2018[9]. Quantitative study with cross-sectional design.	To evaluate the epidemiological profile of premature babies with RDS and compare it with the mortality rate in the intensive care unit in a hospital in the city of Natal/ RN in Brazil.	It was verified that there is no local evidence that demonstrates the association between RDS and mortality rate, in premature babies, in the intensive care units of a hospital in the city of Natal – RN. In the present sample, 14 infants made use of surfactant, which, when correlated with RDS, showed a statistically significant relationship. It was concluded that surfactant therapy reduces mortality in preterm infants.
Segur *et al* 2019[3]. Literature review; Exploratory study.	To describe the nursing care provided to newborns with respiratory distress syndrome, involving the prescription of care and humanized assistance, to the parents of the newborn.	Surfactant replacement therapy (SRT) should be initiated soon after birth in infants at risk for developing RDS, as soon as symptoms are established and the diagnosis is confirmed. Administration of surfactant into the trachea by endotracheal intubation is the only method that has been shown to be effective for its uniform distribution in the lungs of newborns with RDS. After installation of exogenous surfactant, an acute improvement in oxygenation occurs in the first few hours. Regarding the complications observed in RDS, exogenous surfactant supplementation therapy significantly reduces the incidence of pneumothorax, interstitial emphysema, but does not change the incidence of pulmonary hemorrhage, bronchopulmonary dysplasia (BPD), sepsis, and peri-intraventricular hemorrhage (PIVH). The use of exogenous surfactant increases survival of the newborn with RDS. Surfactant treatment decreases the need for ventilatory support to maintain adequate gas exchange, thereby reducing the risk of volutrauma and oxygen toxicity.

Chart 1 – Identification of the studies and main results.[↔↖]

Authors/Year/Method	Objectives	Results
López *et al* 2019[15]. Observational, descriptive and prospective study.	To characterize the newborns admitted to the neonatal intensive care unit of the General Teaching Hospital "Dr. Agostinho Neto" for hyaline membrane disease during the years 2016 to 2018.	It is concluded that up to 53% of infant mortality occurs before 28 days. About 77% is caused by respiratory distress, of which 50% is due to RDS, a disease in newborns caused by lack of lung maturation and insufficient production of pulmonary surfactant. The presence of this pathology occurs in about 50% of newborns at 26-28 weeks gestational age, and decreases to 25% in those at 30-31 weeks gestational age. This study, which took place at the "Dr. Agostinho Neto" hospital, found that the administration of surfactant in newborns with hyaline membrane disease contributes to lower mortality, when compared with similar results from other studies by other researchers.
Teles *et al* 2019[18]. Bibliographic review.	A literature review to identify the respiratory therapeutic strategies used by the physiotherapist in the care of premature newborns with Respiratory Distress Syndrome.	The increased survival of PIs with RDS can be attributed to the association of corticosteroid therapy during pregnancy, postnatal exogenous surfactant, and especially to advances in ventilatory support in neonatal intensive care units. Among the physiological effects of CPAP (continuous positive airway pressure) are endogenous surfactant conservation, improved lung compliance, prevention of alveolar collapse, increased transpulmonary pressure, airway stabilization, improved functional residual capacity (FRC), and improved regularity of respiratory rhythm. The administration of surfactant has been of great effectiveness for RNs, harmoniously reducing the mortality of PIs by 30% to 40%. The role of surfactant is to stabilize the alveoli, preventing collapse at the end of expiration, decreasing the work of breathing, increasing lung compliance, decreasing pulmonary edema, and immediately improving PaCO2 and cardiac output.

Chart 1 – Identification of the studies and main results.

Authors/Year/Method	Objectives	Results
Storino *et al* 2020[10]. Systematic literature review.	Review on the use of prophylactic surfactant in newborns with respiratory distress syndrome and the impact on morbidity and mortality of premature newborns.	This study has shown that early administration of surfactant, has benefits in reducing acute lung injury, reducing neonatal mortality and chronic lung disease. The administration of pulmonary surfactant has led to a decrease in the rate of deaths from Respiratory Distress Syndrome, however, this disease still remains as one of the main respiratory complications in premature newborns. With the application of exogenous pulmonary surfactant as a treatment for RDS, a significant decrease in the prevalence of interstitial pulmonary emphysema, pneumothorax, bronchopulmonary dysplasia (BPD), mortality in preterm infants, and respiratory distress syndrome has been observed.
Martins *et al* 2020 Cross-sectional study.	To evaluate the occurrence of RDS in neonates and the prevalence of infants with the disease who were born prematurely in the years 2016 and 2017 attended at the Neonatal Intensive Care Unit (NICU) of the Hospital Hélio Anjos Ortiz (HHAO) in the city of Curitibanos.	Records of 524 neonates were analyzed, and 266 developed RDS. Of these, 60.15% were male and 39.85% were female. Of which, 92.48% were born prematurely. And of the total number of babies with RDS, 11.65% resulted in death. The relationship between RDS and prematurity was notorious, since it represented more than 90% of the neonates with the disease. Thus, although it is not possible to analyze this data in isolation, the relationship found is consistent with the literature.