



Nursing assessment of neonates with Respiratory Distress Syndrome

Evaluación de Enfermería a neonatos con Síndrome de dificultad respiratoria

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Abstract

Respiratory distress syndrome (RDS) is recognized as a set of symptoms and signs that lead to increased respiratory work, significantly affecting both preterm and term newborns admitted to the NICU. The study is a quantitative, descriptive, retrospective cross-sectional study. An indirect observation matrix was applied through the collection of medical records for the registration of statistical data. There are 160 neonates with RDS attended annually in the NICU area. Equivalent to a sample of 113 neonates who will be selected by simple random sampling. The results showed that most of the neonates who took part in the study were male and were born during the 34th to 38th week, the main cause of RDS in neonates.

Keyword: Neonates, neonatal respiratory distress, Silverman test, NICU.

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Abstract

Espi Small and medium-sized companies in today's world require the support of technology to achieve their positioning in customer acquisition, loyalty and purchasing decisions, an aspect that involves overcoming new challenges such as facing a large, globalized and highly competitive market, as well as the incursion into a virtual environment influenced by social networks and digital channels that

Introduction

Neonatal Respiratory Distress Syndrome is a pathology of high relevance in hospital centers worldwide because it plays a very important role in neonatal mortality and morbidity indices (Ministry of Public Health, 2016, p. 10)..

It is a very frequent respiratory pathology in preterm newborns (RNP), the same that has its etiology by the deficit of pulmonary surfactant, a substance responsible for producing or providing distal alveolar stability especially when the lung experiences low levels of volumes. (Becker, 2018, para. 3)

It is characterized by abnormal breathing with alteration of gas exchange, oxygenation and elimination of carbon dioxide or, in other words, what is known as tachypnea (more than 60 breaths per minute), chest retractions, progressive cyanosis in the first 48 to 96 hours, which is confirmed by chest X-ray. In most cases, this clinical picture is caused by respiratory system disorders, due to the patient's age, although sometimes it is secondary to cardiac, nervous, metabolic or even muscular disorders. (Gaibor Layana & Tavares Palacios, 2020, p. 15).

Its incidence increases and is related to the gestational age, resulting in 60% of children born under 28 weeks being affected, in the case of those born between 32 and 36 weeks, in 15 to 20% and those older than 37 weeks, in 5%. According to the World Health Organization (WHO), the neonatal stage or the first 28 days of life represent the most vulnerable stage of survival for the human being, and within the main causes of death according to the specific basic condition, they mention that 19% and occupying the second place is respiratory insufficiency. (Becker, 2018, para. 14; Zurita Zaldumbide, 2015, p. 10)..

According to the World Health Organization (WHO), respiratory distress syndrome accounts for 47% of deaths in children under 5 years of age. Similarly figures given by The National Neonatal Perinatal Database Network, about 6% to 10% of neonates suffer from respiratory disease such as pneumonia, meconium aspiration syndrome, respiratory distress syndrome, and apnea (Kim et al., 2018, p. 16).

Globally RDS develops frequently and patients are hospitalized in the neonatal intensive care unit (NICU). Risk factors such as male sex, low birth weight and cesarean section

increase the risk of RDS in both preterm and term infants. During the first weeks of life, newborns experience a change in environment which drives a series of critical events such as changes in feeding behaviors and increased risk of infections. (Ramírez Álvarez et al., 2020; Zurita Zaldumbide, 2015)..

During 2016, 82,764 cases of births with anomalies were observed in Mexico, in a range of 797 different conditions. However, 51% of these cases are concentrated in ten causes alone, with newborn respiratory distress syndrome being the third most frequent cause in the country with 4996 cases (Rodríguez Molina et al., 2019, para. 6)..

In Ecuador, according to INEC (Instituto Nacional De Estadísticas y Censos), during 2016 the main cause of neonatal mortality was respiratory distress in newborns with a total of 484 cases, equivalent to 15.91%. It is a very frequent problem in newborns, as this is why it is of vital importance to achieve a decrease in the incidence of respiratory distress syndrome (Manzanares Rivera, 2019).

According to the National Institute of Statistics and Census (INEC), in Ecuador, Respiratory Distress Syndrome was recorded as the leading cause of infant death in both 2018 and 2019, with a total of 556 and 504 cases, representing 16.6% and 15% respectively of the national total something significantly relevant, while, in 2020 prenatal conditions represent the leading cause of infant death with 51.1%, i.e., a total of 1,304 deaths (Kim et al., 2018; Zurita Zaldumbide, 2015)..

The Hospital del Niño Dr. Francisco de Icaza Bustamante for 2018 had a neonatal mortality rate of 7.5; within the main causes of death are perinatal asphyxia and congenital anomalies. Therefore, the purpose of this research work is to determine the clinical characterization of Respiratory Distress Syndrome in neonates in the NICU area of the hospital institution in question.

It is considered that more than half of the newborns with extremely low birth weight and even more if prematurity is added, may eventually present some type of respiratory disorder. In this population mentioned above, RDS is considered the most frequent diagnosis according to studies with a (51%), followed by transient tachypnea of the newborn (TTN; 4%) and pneumonia/sepsis (2%) (Gleason & Juul, 2019).

Linked to this during respiration (whether spontaneous or assisted) forces are produced in the alveoli and terminal bronchioles due to repetitive reopening of collapsed alveoli and hyperdistension of open alveoli. These forces can rapidly damage the fragile lung structure to produce leakage of proteinaceous debris into the airways (i.e., hyaline membranes). These debris can diminish the function of the scarce surfactant present, thereby inducing a repetitive cycle that, if uninterrupted, can lead to respiratory failure and death.

Thus if supportive treatment works, during the second postnatal day the repair phase is normally initiated with the appearance of macrophages and polymorphonuclear cells. With uncomplicated RDS, the newborn's condition improves by the end of the first postnatal week. However, newborns with a birth weight of less than 1,250 g and larger infants who require high concentrations of oxygen and positive pressure ventilation for

severe RDS may develop inflammation and inappropriate repair of the growing lung, resulting in emphysema and fibrosis. (Gleason & Juul, 2019).

Among the biologic features of RDS is by far in early and moderate preterm (23 to 33 weeks of pregnancy), late preterm (34 to 36 weeks of pregnancy) and term (>37 weeks of pregnancy). On the other hand, maternal problems for the development of RDS are also highlighted, such as perinatal asphyxia, maternal diabetes, absence of delivery, absence of prenatal steroid administration to the mother, male sex and white race. The central feature of RDS is surfactant deficiency due to lung immaturity, often as a consequence of premature delivery or late lung maturation associated with maternal diabetes or male sex. Surfactant dysfunction may also be due to genetic abnormalities of surfactant-associated proteins, perinatal asphyxia, pulmonary infection, or excessive fluid in the fetal lungs due to a non-delivery delivery. (Ali et al., 2019; Condò et al., 2017)..

Materials and methods

The level of study is descriptive in scope because the information is obtained in such a way that the environment is not changed or manipulated in any way. It is cross-sectional because the information was collected only once; the focus of this research is quantitative, since data collection and tabulation will be carried out.

The study population consisted of 113 neonates, among the Inclusion criteria we have neonates < 28 days of life and neonates with RDS; Exclusion criteria: neonates > 28 days of life. Neonates without RDS. The information was collected by the investigators of the present study. The SPSS version 21 statistical software was used to analyze the information, where the reliability statistics measured by Cronbach's alpha were calculated. The technique used was indirect observation/survey whose instruments are the indirect observation matrix through the review of medical records and the questionnaire of polytomous questions according to the Clinical Practice Guideline (CPG) of the Newborn with difficulty in breathing of the MOH and nursing diagnoses definition and classification NANDA 2021-2023. (Kim et al., 2018).

Results

The information was collected from the observation of the values recorded in the neonatal medical records of a sample of 113 patients. The data obtained were tabulated and subsequently correlations of the variables were made. The correlation of the values corresponding to the neonatal characteristics, the causes of neonatal RDS, the Silverman test, and the nursing diagnosis in neonatal RDS were considered, as shown below:

The data obtained through the review of the clinical histories allow us to identify that there is a higher percentage of male neonatal patients, since 58% of the 113 neonates, equivalent to 66 neonates, are male. In contrast to the female sex, which has an equivalent of 42%, that is to say that in our study only 47 female neonates were present. We identified that the male sex is more prone to suffer from RDS, this was proven by the review of previous clinical histories. The reason is because androgen (male sex

hormone) delays the production of surfactant in male embryos from the period of pregnancy. Unlike the female sex, in which there is an increase of estrogens which produces a better alveolar development and efficient production of surfactant.

With respect to the results obtained for the sub-variables corresponding to the characteristics of the neonates, the data corresponding to the sex and weeks of birth of the patient; weight and head circumference, thoracic perimeter, abdominal perimeter; and height were correlated with the values obtained for head circumference, thoracic perimeter, abdominal perimeter.

In relation to sex and weeks of birth: It was identified that the highest percentage of patients are male, with respect to weeks of birth, a higher rate of neonates were born during the 34th to 38th week. In this sense, through data processing, it was identified that there is no correlation between both variables. However, the results suggest that there is a higher prevalence of this syndrome in male patients, mainly in the case of those who were born prematurely.

Regarding the correlation between the variables of weight and head, thoracic and abdominal perimeter of the neonates, it was identified that there is a very low correlation according to the value of $r= 0.280$ in the case of the relationship between weight and $r= 0.255$ with respect to thoracic perimeter. However, a level of correlation was observed with respect to the values obtained for the patient's perimeter and thoracic perimeter.

The data obtained with respect to the lengths of the neonatal patients correlated with the values corresponding to head, thoracic and abdominal perimeter; in this case, a moderate correlation was observed between length and thoracic perimeter, with an $r= 0.437$.

In the data obtained in relation to the causes of neonatal RDS, we can identify the following; this graph details the causes of YES / NO, which occurred in neonates with the following percentages; 62% presented respiratory distress, 15% is divided between transient tachypnea of the newborn and meconium aspiration syndrome and finally with 8% is hyaline membrane disease. The reason is because respiratory distress is one of the first signs observed in the neonate, this may be due to the fact that at the time of delivery the baby passes to extrauterine life and may not have a good adaptability to the environment if we add to this a neonate with RDS with all the characteristics mentioned above is more prone to present this cause of respiratory distress.

On the other hand, a correlation was made with respect to the possible causes that have generated neonatal RDS in the sample of patients evaluated. In particular, the prevalence of hyaline membrane disease, transient tachypnea of the newborn, respiratory distress, and meconium aspiration syndrome was analyzed, in which case the following results were obtained: The results obtained show a higher prevalence of respiratory distress in neonatal patients, which suggests that this pathology is one of the main causes of neonatal RDS in the patients studied.

With respect to the results obtained for the sub-variables corresponding to the Silverman test, the corresponding data are detailed; nasal flaring, respiratory whine, intercostal pull, xiphoid retraction, thoracoabdominal dissociation; with the following values obtained:

In the data obtained in relation to the Silverman test we can identify the following in nasal flaring; of the 113 neonates, 51% equivalent to 58 neonates, presented a minimum score, being the most frequent, followed by 36% equivalent to 41 neonates, who presented a marked score. Finally, 13%, equivalent to 14 neonates, presented an absent score. The reason for this is that when there is a respiratory difficulty in the first stay, this leads to distress and therefore causes fatigue to the accessory muscles, making visible the presence of nasal flaring at the time of the Silverman test.

The results obtained from the analysis of the variables corresponding to the Silverman test identified that in most of the neonates there is minimal nasal flaring. It was identified that there is a weak intercostal pull and a little visible xiphoid retraction. Regarding the data obtained from the evaluation of thoracoabdominal dissociation, it was identified that in most of the cases studied in the clinical histories, the neonates show delay in inspiration.

According to the interpretation criteria defined to establish the Pearson correlation, it was identified that there is a low correlation between intercostal stretch and xiphoid retraction presented by the patients, since in both cases the number of neonates that showed these signs is minimal; in addition, the correlation between the two will depend on other factors, among which is the severity of neonatal RDS.

With respect to the results obtained for the sub-variables corresponding to the nursing diagnoses in the neonatal RDS, the data corresponding to Ineffective respiratory pattern, Fatigue, Decreased cardiac output, Impaired spontaneous ventilation, Risk of alteration of the maternal-fetal dyad, Risk of aspiration, Risk of thermoregulation are detailed; with the following values obtained.

According to the reference research of Riga et al. From the assessment made it is determined that the neonates registered in this study were mostly male neonates who were born prematurely are more likely to develop RDS, and the most significant similarity is that this study also registered mostly male neonates who had a higher prevalence of suffering from RDS because of an elective cesarean section to which their mothers were exposed during the birth process (Stylianou-Riga et al., 2021).

In turn of the patients evaluated the possible causal diseases of SRD reflected that respiratory distress (characterized the accumulation of fluid in the air sacs of the lungs that does not allow oxygen to reach the organs) is significant compared to other pathologies, this results in turn was contrasted with the reference research of Pizarro (Pizarro & Angeli Sonia, 2019). In which of 80 neonates, transient tachypnea (a respiratory disorder in which low oxygen levels are perceived due to delayed reabsorption of pulmonary fluid) is the main cause of RDS, mostly of male gender, in this case, although it is possible to determine that both respiratory distress and

tachypnea are different conditions, they are diseases directly linked to the respiratory system.

Regarding the correlation according to the Silverman test used to assess the levels of respiratory distress in a range in which five criteria are considered, it was possible to determine that in this study nasal flaring, in other words, it is evident that in neonates there is a widening of the nostrils when breathing, being the first indicator in a visual way through which it is possible to determine this situation. From this result in contrast to the research where the main sign of the analyzed neonates was the subcostal retraction (greater effort made by the neonate to be able to breathe normally) and nasal flaring in second place, being determined as the main symptoms both visual and medical rooted to RDS (Molina Duque & Morales Jaramillo, 2019)..

Regarding the correction determined on the nursing diagnosis in neonatal RDS, in this research different variables were considered such as ineffective respiratory pattern, fatigue, decreased cardiac output, impaired spontaneous ventilation, alterations in the maternal-fetal bond, and that, According to the correlation carried out, it was determined according to the two most related variables (fatigue - decrease in cardiac output), determining that although fatigue is a key symptom in neonates to determine that they have RDS because it increases the respiratory work in which the diaphragm and intercostal muscles increase their activity, this is not preponderant for a higher than normal cardiac output to be generated. (Rodríguez Molina et al., 2019)..

Complementing the information in this section, it is possible to determine that the nursing profession in neonatology areas, it is essential to have highly trained personnel in order to contribute satisfactorily to the assessment process in this type of syndromes, taking into consideration that from experience and practice it is even possible to save the lives of neonates before chaotic scenarios resulting from a series of causes related to RDS.

Although in this research the results were much more linked to identify correlations of RDS through the neonatal characteristics, causal of TDS, which implies the Silverman Test, it is possible that they are complemented with other variables of analysis such as the incidence of the type of delivery to which the mothers underwent, taking into consideration that cesarean deliveries are also determinants that usually trigger this type of ailments, as well as there may be other prevailing factors. (Gaibor Layana & Tavares Palacios, 2020; Stylianou-Riga et al., 2021)..

Similarly, according to other of the reference works considered, some were identified with results directed to the constant preparation of nurses, especially in terms of support for physicians who face scenarios with neonates with these characteristics, they state that it is necessary that in health care facilities it is complemented with interventions in which much more technical knowledge is strengthened, only in this way it is possible to ensure that the care for mothers and especially in neonates with this and other types of

conditions are managed, ensuring above all the welfare and health of these. (Molina Duque & Morales Jaramillo, 2019)..

From Ramirez Tito's studies, it is suggested to continue with research linked to nursing assessment in neonatal patients with RDS, with which the most common causes are determined with a greater range of data among a number of variables, which would expand the reference data and thus in the near future help to mitigate the effects of this condition (2018, p. 41).

Conclusions

Based on the previously established research objectives, the following conclusions were obtained:

In relation to the biological characteristics observed in the clinical histories of the patients with neonatal RDS, in which case it was identified that there is a greater prevalence of this syndrome in male patients born during the 34th to 38th week. Regarding the weight observed, most neonates are in the range of 1500 - 2500g, and an average height of 46 - 52 cm.

Regarding the causes of neonatal RDS, a higher prevalence of respiratory distress was identified in neonatal patients; few cases were recorded in which, in addition to this pathology, patients presented hyaline membrane disease and transient tachypnea of the newborn.

When the Silverman test was used to determine neonatal respiratory distress, an audible respiratory whine and delayed inspiration were observed in most neonates as one of the most visible signs with respect to the assessment of thoracoabdominal dissociation.

The nursing diagnoses associated to the newborn with respiratory distress syndrome, we have impaired spontaneous ventilation and a higher risk of alteration of the maternal-fetal dyad as the most prevalent variables according to the observation made.

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