

Nursing experiences in the prevention of complications before extubation of the neonatal patient

Experiências de enfermagem na prevenção de complicações antes da extubação do recém-nascido


Experiencias de Enfermería en la prevención de complicaciones antes de la extubación del neonato

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ABSTRACT

Introduction: Extubation is a critical procedure in the care of neonates requiring mechanical ventilation. The prevention of complications during this process is essential to guarantee favorable results and reduce neonatal morbidity and mortality. **Objective:** To categorize the nursing experiences in the prevention of complications before the extubation of the newborn. **Method:** The research is qualitative with a phenomenological approach. The triangulation of the information was carried out based on the position of the authors, a critical review of the existing literature and the experiences of 8 nurses from an Ecuadorian Public Hospital. **Results:** Based on the application of the Demazière D. and Dubar C. methodology and the tabulation of information through data saturation using SPSS, it was possible to determine 3 categories subdivided into 7 subcategories: 3 focused on the identification of risk factors based on experience, 3 related to the establishment of specific care protocols and the improvement of education and training, and 1 aimed at identifying best practices and contributing to scientific progress in this area. **Conclusion:** Nursing experiences play a crucial role in the prevention of complications during extubation and advocate for the implementation of evidence-based strategies to improve neonatal outcomes.

Keywords: Extubation, neonates, mechanical ventilation, complications, prevention, morbidity and mortality, nursing, experiences.

RESUMO

Introdução: A extubação é um procedimento crítico no cuidado de recém-nascidos que necessitam de ventilação mecânica. A prevenção de complicações durante esse processo é fundamental para garantir resultados favoráveis e reduzir a morbimortalidade neonatal. **Objetivo:** Categorizar as experiências de enfermagem na prevenção de complicações antes da extubação do recém-nascido. **Método:** A pesquisa é qualitativa com abordagem fenomenológica. A triangulação das informações foi realizada com base na posição dos autores, uma revisão crítica da literatura existente e as experiências de 8 enfermeiras de um hospital público equatoriano. **Resultados:** Com base na aplicação da metodologia Demazière D. e Dubar C. e na tabulação das informações por meio da saturação de dados com o uso do SPSS, foi possível determinar 3 categorias subdivididas em 7 subcategorias: 3 voltadas para a identificação de fatores de risco com base na experiência, 3 relacionados com o estabelecimento de protocolos de cuidados específicos e a melhoria da educação e formação, e 1 destinado a identificar boas práticas e contribuir para o progresso científico nesta área. **Conclusão:** As experiências de enfermagem desempenham um papel crucial na prevenção de complicações durante a extubação e defendem a implementação de estratégias baseadas em evidências para melhorar os resultados neonatais.

Palavras-chave: Extubação, neonatos, ventilação mecânica, complicações, prevenção, morbidade e mortalidade, enfermagem, experiências.

RESUMEN

Introducción: La extubación es un procedimiento crítico en el cuidado de los neonatos que requieren ventilación mecánica. La prevención de complicaciones durante este proceso es fundamental para garantizar resultados favorables y reducir la morbimortalidad neonatal. **Objetivo:** Categorizar las experiencias de enfermería en la prevención de complicaciones antes de la extubación del neonato. **Método:** La investigación es de tipo cualitativa con enfoque fenomenológico. Se realizó la triangulación de la información basada en la postura de las autoras, revisión crítica de la literatura existente y las experiencias de 8 enfermeras de un Hospital Público Ecuatoriano. **Resultados:** En función a la aplicación de la metodología de Demazière D. y Dubar C. y la tabulación de información mediante la saturación de datos mediante SPSS, se consiguió determinar 3 categorías subdivididas en 7 subcategorías: 3 enfocadas a la identificación de factores de riesgo basadas en la experiencia, 3 relacionadas al establecimiento de protocolos de cuidado específicos y la mejora de la formación y capacitación y 1 encaminada a la identificación de mejores prácticas y la contribución al avance científico en este ámbito. **Conclusión:** Las experiencias de enfermería desempeñan un papel crucial en la prevención de complicaciones durante la extubación y abogan por la implementación de estrategias basadas en evidencia para mejorar los resultados neonatales.

Palabras clave: Extubación, neonatos, ventilación mecánica, complicaciones, prevención, morbimortalidad, enfermería, experiencias.

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INTRODUCTION

Mechanical Ventilation (MV) is known as life support through which oxygen is provided by means of a mechanical ventilator aimed at those patients who have difficulty or inability to breathe on their own. The purpose of ventilation is to ensure that the exchange of Oxygen and Carbon Dioxide is carried out correctly, therefore, this procedure is applied under strict protocol criteria in patients with Respiratory Failure. (Zaraguro, 2020).

There are 2 elementary forms of Mechanical Ventilation: invasive and non-invasive mechanical ventilation. Invasive MV is considered an aggressive treatment for the patient, since it requires introducing a tube through a tracheostomy cannula or through the nasotracheal route; however, this form of ventilation has more advantages in cases where the patient must be admitted for an indeterminate period of time.

On the other hand, non-invasive mechanical ventilation is performed by means of masks, thus providing fewer complications for the patient, its objective is to prevent an endotracheal intubation procedure, facilitate extubation and prevent re-intubation (Vallejo Zambrano, 2019).

Extubation consists of removing the endotracheal tube. To carry out this procedure of withdrawal of ventilation, the collaboration of all medical personnel is required, this in order to prevent complications and guarantee the safety of the patient; Therefore, when carrying out the extubation process, professionals must maintain coordinated and collaborative communication with their staff, in this way the procedure will be carried out with fewer risks for the patient (Hernández-López, 2017).

Controlled extubation is so called when removing the respirator or ventilator from the patient for more than 48 hours, he can breathe spontaneously, doctors recommend that to start the extubation process the patient must be in optimal conditions (Sosa and Marín, 2017). Therefore, it is considered necessary for the patient to comply with a breathing test chosen by the treating physician, in this way the patient's respiratory capacity will be evaluated (Bosso, 2018).

Uncontrolled extubation is the premature removal of the endotracheal tube in a patient with little preparation for weaning, or in the worst case when this happens incidentally. When extubation occurs early, the patient may suffer serious complications such as airway trauma, impaired oxygen supply, and respiratory failure, thus increasing mortality. On the other hand, there are several factors that increase the probability of a failed extubation, such as the level of sedation, the patient's condition, the type of respiratory failure, and the patient's mental activity (Rodríguez-Mora et al., 2018).

The risk of morbidity in extubation of pediatric patients is increased in preterm and low birth weight infants. In recent years, new procedures have been sought that minimize the risk of death, so the Intubation-Surfactant-Extubation (INSURE) procedure has been shown to reduce the risk of death. This procedure is based on intubating the patient for a short period of time while surfactant administration is completed, then extubating the patient to continue with non-invasive mechanical ventilation (Morales-Barquet, 2017).

On the other hand, 36% of the cases with patients suffering from some neurological disability are more likely to suffer setbacks during extubation. Likewise, there are some risk factors that increase the incidence of problems during extubation, such as: continuous use of intravenous sedation, suffering from anemia during extubation, being a pediatric patient, prolonging the time on mechanical ventilation are some factors that increase the risk of extubation. mortality risk (Puello Ávila & Peñaranda Ortega, 2021).

To prevent extubation failure, it is important to take into account certain aspects such as; Do not force the endotracheal tube procedure. When using the tube, it must have an adequate size that allows the patient's ventilation. Regarding sedation, this must be adequate in order to prevent injuries to the laryngeal structures. Likewise, the use of the endotracheal tube with a cuff in infants under 8 years of age should be avoided (Cuestas., 2017).

Extubation in newborns who have been mechanically ventilated must be carefully evaluated through a series of clinical criteria, according to Castro and Rocha (2021). These criteria include clinical stability for at least 24 hours, good lung function as assessed by measurement of oxygen levels and oxygen saturation, absence of apnea and bradycardia, ability to cough and manage secretions, tolerance to oral feeding and improvement in neurological status if the neonate has presented any complication. It is important to take into account that these criteria must be evaluated individually by an interdisciplinary team of health professionals with experience in neonatal care (Castro, 2021).

The functions carried out by the nursing staff in the extubation process consist of supervising, assisting and caring for the duration of the process, administering the corresponding medication, preparing the personal protective equipment, communicating to the medical team about the plan that the patient must follow, thus being a support for specialists during the procedure and for the patient during their recovery (Ministry of Health Peru, 2021).

On the other hand, nursing staff play a crucial role in the extubation process of mechanically ventilated neonates.

During the extubation process, the nursing staff should carefully assess and monitor the neonate for any signs of respiratory or cardiac complications. They must also ensure that the neonate has good oxygenation and adequate respiratory function. In addition, the nursing staff should teach and guide the parents in the technique of sucking and feeding the neonate to ensure safe and effective feeding. They must also provide emotional support to parents and reassure them during the extubation process. In this way, nursing staff are essential in the care of neonates during extubation and must work as a team with other health professionals to guarantee the success of the extubation process and the safety of the neonate.

Finally, the objective of this research is to categorize the nursing experiences in order to identify the risk factors associated with complications before the extubation of the newborn. This allows nursing professionals to recognize which aspects of care can lead to problems and take appropriate preventive measures.

METHODS

The present investigation is qualitative, of a phenomenological type and exploratory design, conceptualizing the methodology of Demazière D. and Dubar C., known as the Theory of Experience. This methodology provided an adequate theoretical and methodological framework to investigate nursing experiences in the prevention of complications before extubation of the newborn and focused on understanding the experiences and meanings constructed by individuals in their work environment (Demazière and Dubar, 2010). In the context of prevention of complications before extubation of the newborn, the Demazière and Dubar methodology made it possible to explore and understand the experiences and perspectives of nursing professionals from the individual, collective, and organizational dimensions.

The application of this methodology involved conducting in-depth interviews with a duration of between 20 and 30 minutes applied to 8 Nursing Graduates who work directly in the extubation of newborns in an Ecuadorian Public Hospital. Through these interactions, detailed narratives about the experiences, challenges, strategies used, and meanings attributed to the prevention of complications before extubation were collected. These interviews were supplemented with direct observations in the clinical setting to gain a fuller understanding of nursing practices.

The results in this article are based on the interviews transcribed from the reports given by the interviewed nurses, as shown in Appendix 1. For a better analysis, tables were created from the long text specifying categories and subcategories, generating a structure of 3 parameters: Number order (Nurse 1 to Nurse 8); Experiences and Matching Criteria, until information saturation is achieved. The resource used was the IBM-SPSS system for qualitative research. This is how 3 Categories are demonstrated in its broad field divided into 7 subcategories for the specific field distributed in: 3 focused on the identification of risk factors based on experience, 3 related to the establishment of specific care protocols and the improvement of the education and training and 1 aimed at identifying best practices and contributing to scientific progress in this area, as well as details:

Category 1: Identification of risk factors based on experience

Subcategory 1: Experiences in neonatology; Subcategory 2: Experience as a fundamental axis in the care process for successful extubation; Subcategory 3: Biosafety standards. Its effects against the control of complications.

Category 2: Establishment of specific care protocols and improvement of education and training

Subcategory 4: What do you take into account to start an extubation?; Subcategory 5: Check vital signs. Normal values that maintain good weaning; Subcategory 6: Difficult extubation, what to do when complications arise;

Category 3: Identification of best practices and contribution to scientific progress.

Subcategory 7: Positive experiences that can become organizational practices.

The research is based on the Helsinki Code, conceiving the ethical principles and international guidelines for medical research in human beings. Thus, prior to conducting the interviews, informed consent was applied, informing the evaluation of risks and benefits, the selection of participants, data confidentiality and ethical oversight (World Medical Association, 2013) (World Medical Association, 2018).

RESULTS

The results analyzed according to this matrix were carried out in order to systematize the experiences of the nursing staff based in this segment of the hospital in relation to the extubation process of neonates, achieving data saturation under the following structure:

| Order number (Nurse 1 to Nurse 8) |; | Experiences| and | Match Criteria|

ANALYSIS TABLES N°1

Category 1: Identification of risk factors based on experience

SUBCATEGORY 1: Experiences in neonatology		
ORDER	EXPERIENCES 	MATCH CRITERIA
NURSE 1	Every baby is a different world	Low weight, anemia.
NURSE 2	Watching the neonate	Change of ventilation, alterations in laboratory parameters
NURSE 3	Assess saturation	Ventilatory mode, FiO ₂ , oxygen, laboratory.
NURSE 4	Children do not adapt to ventilatory mode	Intubate, respirations, oxygen, desaturating
NURSE 5	Verify newborn suitable for extubation	Protocols, complications, laryngeal spasm
NURSE 6	Extubation of newborns	Assess ventilation, respiratory rate, tolerance, failure
NURSE 7	Susceptible to extubation	Respiratory function, endotracheal tubes, Re-intubate
NURSE 8	Wide world, adrenaline, surprises	Good conditions, failures, sedation, ventilation, air reserve, complications.

SUBCATEGORY 2: Experience as a fundamental axis in the care process for successful extubation		
ORDER	EXPERIENCES 	MATCH CRITERIA
NURSE 1	Parameters influencing extubation	Vital signs
NURSE 2	Downes test	Assess respiratory rate, cyanosis, saturation
NURSE 3	Clear airway	Constant assessment of the neonate
NURSE 4	Assess matured lungs	Health team ready for any news
NURSE 5	Check vital signs	Aspirate secretions, monitor vital signs
NURSE 6	Patent pathway	Aspirate secretions
NURSE 7	Downes Test	Assess vital signs, monitor
NURSE 8	Training, knowledge, practice	Vital signs, assess respiratory rate, cyanosis, saturation

SUBCATEGORY 3: Biosafety standards. Its effects against the control of complications.		
ORDER	EXPERIENCES 	MATCH CRITERIA
NURSE 1	Hand washing, mask, cap and sterile gloves	The World Health Organization defines biosafety as principles, techniques and practices applied in order to avoid exposure or risk of contamination with various bacteria.
NURSE 2	Hand washing, sterile gloves and use of protective bars	Protocols and hand washing and the 5 moments
NURSE 3	Hand washing, sterile gloves, asepsis and antisepsis	Use biosecurity for the management of each patient and avoid post-extubation infections
NURSE 4	Hand washing, sterile gloves, surgical gown and mask	Be prepared with everything necessary for sterile extubation of the child
NURSE 5	Hand washing, use of sterile gloves, mask and surgical gown	Comply with all biosafety regulations at the time of extubation
NURSE 6	Hand washing, gloves and mask	Have the materials needed for sterile extubation
NURSE 7	Hand washing, mask, gown and sterile gloves	Use all biosecurity standards and keep an eye out for nothing missing
NURSE 8	Hand washing, mask, gloves, hats and protective clothing	Comply with all biosafety regulations, both general and specific, at the time of extubation

ANALYSIS TABLES N°2**Category 2: Establishment of specific care protocols and improvement of education and training**

SUBCATEGORY 4: What do you take into account to start an extubation?		
ORDER	EXPERIENCES 	MATCH CRITERIA
NURSE 1	Vital signs, gas exchange.	Vital signs, gas exchange, oxygen resistance.
NURSE 2	Downes test, Ventilatory parameters, Saturation	Downes test, ventilatory parameters, saturation, tolerance to extubation
NURSE 3	Vital signs, ventilatory parameters, saturation	Vital signs, ventilatory parameters, saturation, medication, cannulas, saturator
NURSE 4	Protocols, vital signs, laboratory tests, x-ray plates, clinical history, Neonatologist	Protocols, vital signs, laboratory tests, x-ray plates, clinical history, neonatologist, health team, decision making
NURSE 5	Respiratory parameters, saturation, extubation, aspirate secretions, oxygen therapy, cannulas	Respiratory parameters, saturation, extubation, aspirate secretions, oxygen therapy, cannulas, vital signs
NURSE 6	FIO ₂ , respiratory parameters, saturation, vital signs, Downes test	FIO ₂ , respiratory parameters, saturation, vital signs, Downes test, hemodynamics, respiratory rate
NURSE 7	Vital signs, saturation, patent airway, aspirate secretions, Downes test	Vital signs, saturation, patent airway, aspirate secretions, Downes test
NURSE 8	Vital signs, ventilatory parameters, saturation, oxygen resistance	Vital signs, ventilatory parameters, saturation, oxygen resistance, weaning

SUBCATEGORY 5: Check vital signs. Normal values that maintain good weaning

ORDER	EXPERIENCES	MATCH CRITERIA
NURSE 1	Oxygen saturation, respiration	First oxygen saturation, then respiration
NURSE 2	Baby saturation, skin color, Downes test, respiratory retractions	The main ones to see is the saturation of the baby, so an adequate saturation of a newborn is between 90 and 95%, you have to see the color of the skin, if there are retractions and if there is any noise when breathing
NURSE 3	Downes, retractions, tachypneas, respiratory rate	Among the vital sign parameters it is necessary to see the Downes, the retractions, there should not be tachypneas and the respiratory rate should be 60 breaths/min.
NURSE 4	Heart rate, respiratory rate, temperature	Vital sign parameters must be stable within normality, heart rate must be between 120 and 130, respiratory rate between 50 and temperature between 36°C to 37°C.
NURSE 5	Saturation, Downes, temperature, tachypnea	Respiratory parameters should be zero Downes, no tachypnoea, temperature between 36.5°C to 37.5°C and saturation between 90 and 95%.
NURSE 6	Saturation, Downes, tachypneas, retractions	The saturation must be between 90 to 95%, the Downes of zero that there is no presence of tachypnea or subcostal retractions or cyanosis
NURSE 7	Oxygen saturation, temperature, respiratory rate, heart rate	Oxygen saturation should not drop below 90%, temperature between 36°C to 37°C, respiratory rate between 40 and 60 per minute, heart rate between 120 and 130 per minute.
NURSE 8	Oxygen saturation, respiratory rate, and heart rate	The vital sign parameters to take into account are oxygen saturation, respiratory and heart rate for a good extubation.

SUBCATEGORY 6: Difficult extubation, what to do when complications arise		
ORDER	EXPERIENCES	MATCH CRITERIA
NURSE 1	Vital signs monitoring	Check FiO2
NURSE 2	Vital signs monitoring	Have communication with the doctor
NURSE 3	Vital signs monitoring	Check oxygen saturation
NURSE 4	Comply with guidelines	Have necessary material
NURSE 5	Vital signs monitoring	Check the Fio2 of the neonate
NURSE 6	Correctly fix the endotracheal tube	Wait for the newborn to stabilize
NURSE 7	Vital signs monitoring	Aspirate secretions
NURSE 8	Preparation of material	Use oxygen for support

ANALYSIS TABLES N°3

Category 3: Identification of best practices and contribution to scientific progress.

SUBCATEGORY 7: Positive experiences that can become organizational practices.		
ORDER	EXPERIENCES	MATCH CRITERIA
NURSE 1	Maintain and restore health; respect for life; care and protect life	Provide essential nursing care; maintain good communication with the team; consider biosafety standards in the 5 moments, practice correct hand washing, prevent infections, provide knowledge, report for support
NURSE 2	Biosecurity standards	Carry out the correct hand washing at the 5 times indicated, apply biosafety standards to prevent infections, practice and apply biosafety standards for nursing staff, doctors and personnel around the newborn
NURSE 3	Essential nursing care and aseptic standards	Provide knowledge, assessment of vital signs, make the report and notify the doctor immediately, have a report for future complications or a legal case, continue reporting to avoid a worse situation
NURSE 4	Quick response and readiness to act	Keep everything ready to act at the right time, seconds are vital to maintain the life of the newborn
NURSE 5	Constant control	Secretion aspirations at least twice per shift, gloves and hand washing before aspirating, control of the neonate's vital signs.
NURSE 6	Maintain asepsis and communication	Maintain asepsis and communicate with the team, aspirate secretions at least twice per shift, use a sterile glove before aspirating, wash hands before performing the procedure, and maintain the 5 nursing moments.
NURSE 7	Asepsis and antisepsis	Maintain asepsis and antisepsis, good communication with the team, complete and sterile material, use of biosafety to prevent infections
NURSE 8	Training	Constantly train to learn new techniques and equipment, know what is the correct management for each team and for biosafety.

DISCUSSION

Neonatal extubation is a critical procedure that marks an important transition in your care. However, this process is not exempt from complications, such as reintubation, the appearance of respiratory difficulties or oxygen desaturation, which can put the life of the newborn at risk. The identification and prevention of these complications are essential to guarantee successful results. In this context, nursing experiences play a crucial role by providing valuable information on the most effective care strategies.

Identification of risk factors:

Nursing experiences allow the identification of risk factors associated with complications during extubation of the newborn. According to a study by Oba et al. (2019), gestational age and birth weight were found to be significant risk factors for reintubation in preterm infants. By knowing these risk factors, nursing professionals can perform a more accurate assessment before extubation and take appropriate preventive measures.

In such a way that according to the experts and together with the criteria of the nurses interviewed, the following preventive measures can be rescued in the extubation process: Monitor criteria for extubation, in turn monitor and record vital signs, inform family members, monitor constantly changing the modes and ventilatory parameters carried out by the doctor for the record in the logbook, monitoring compliance with nebulizations after removing the endotracheal tube according to medical prescription and observing if the child retains secretions, presence of laryngeal stridor, decreased consciousness, signs of respiratory distress and communication (Oba, K. 2019). However, safety measures for the newborn patient do not end there, since according to the experience of nurses, care should be given before and after extubation. For this reason, after extubation, the following care steps should be carried out: monitor vital signs every hour, level of consciousness, control pain (the patient's own verbalization and/or clinical signs according to age). Performing position changes to mobilize secretions, in conjunction with respiratory physiotherapy, monitoring post-extubation ventilation/oxygenation with auscultation, and observing good air entry in both lung fields should encourage the pediatric patient to breathe and expectorate (Greveson, K. 2020).

Establishment of care protocols:

According to the study by Salyer et al. (2019) evaluated early extubation strategies in preterm infants. The results showed that early extubation, defined as extubation within 72 hours of birth, was associated with a significant reduction in the duration of mechanical ventilation and a decreased length of stay in the NICU. In addition, neonates undergoing this early extubation had fewer respiratory complications and fewer days of oxygen supplementation.

In another study Sibarani et al. (2020) focused on the importance of extubation under favorable conditions to prevent reintubation in preterm infants. The results showed that successful extubation was associated with a significant improvement in respiratory capacity, a reduction in the need for invasive respiratory support, and a decreased length of hospital stay. Courtney (2019) reviewed the use of the Neonatal Extubation Score (NES) to predict successful extubation in extremely preterm infants. The NES is based on clinical assessment of respiratory stability, oxygenation, and the ability to tolerate feeding. The results showed that NES was associated with a higher rate of successful extubation, a reduced need for reintubation, and a shorter duration of mechanical ventilation. Además, un estudio realizado Hermeto, y Bottino (2019) revisó la literatura existente sobre la extubación en neonatos. Los autores destacaron la importancia de una evaluación cuidadosa y una selección adecuada de los neonatos para la extubación exitosa, así como la necesidad de una monitorización constante y la capacitación del personal para identificar y manejar las complicaciones.

Thus, the optimization of extubation in neonates has been shown to be beneficial in improving clinical outcomes and reducing length of stay in the NICU. Early extubation, careful clinical evaluation and proper selection of neonates, constant monitoring, and training of personnel are important factors in ensuring successful extubation. Implementation of these strategies may improve the quality of care and outcomes for neonates undergoing invasive mechanical ventilation.

Nursing experiences are also essential for the establishment of standardized care protocols during extubation. A study by Greveson et al. (2020) found that the implementation of an evidence-based extubation protocol significantly reduced respiratory complications in neonates. These protocols may include clear guidelines on pre-extubation preparation, procedural monitoring, and criteria for reintubation.

A resource widely used by nursing staff is the Downes test, also known as the Downes scale, an important clinical tool for the control and monitoring of the newborn. This scale is used to assess the neuromuscular status and maturity of the newborn, which makes it possible to detect potential complications and make appropriate management decisions. It is especially useful in preterm or low birth weight neonates, since their neuromuscular system may be immature and present difficulties in sucking and swallowing. The use of the Downes test helps to identify problems in coordination and sucking strength, which allows for early intervention and providing the necessary support measures. In addition, this test provides objective and quantifiable information, which facilitates communication and decision-making among health professionals. (Chorna OD et al. 2017)

For this reason, the interviewees indicate that protocols are needed that can ensure the conditions so that the neonate does not suffer complications or its condition does not improve in the extubation process. Said requirements or prevention measures are grouped into the following measures: have all the material ready and sterilized for a possible intubation of the newborn, together with a secretion aspirator and medication. Nebulize before and after the procedure. Have ready and prepared a neo-tee oxygen tank, face mask and suction cannulas. Finally, how to prevent the implements of

the doctor and nurse must be sterilized together with a correct hand washing of both and monitor the vital signs of the neonate at all times.

Improvement of education and training:

Nursing experiences offer valuable information to improve the education and training of nursing staff. According to a study by Nardi et al. (2018), adequate training in extubation techniques and respiratory care reduced the rate of reintubation in neonates. Experiences shared by experienced extubation nursing professionals can serve as best practice examples and enhance staff competency in this critical procedure.

According to the analysis of the interviews, they indicate that they are aware of the great sacrifice in terms of study and knowledge that they must have to acquire skills that allow procedures such as extubation to be performed properly and without many complications. However, the theoretical part is accompanied by decision making and problem solving that experience, companionship and teamwork can provide.

Identification of best practices:

Successful nursing experiences can help identify best practices to prevent complications during neonatal extubation. A study by Castro et al. (2021) found that the application of an interdisciplinary approach, which included the participation of specialized neonatology nurses, decreased complications during extubation. Sharing these successful experiences promotes the adoption of evidence-based practices and improves the quality of neonatal care.

Within this category, the interviewed nurses indicate that in order for them to perform their work with quality, it is necessary to combine experience with knowledge and specific skills that allow the care of a newborn and even more so when they have pathologies and a premature birth. On the other hand, other skills such as teamwork, both collaborative and cooperative, must be developed so that joint tasks can be carried out with vulnerable babies.

On the other hand, it is essential to mention that in order to improve the clinical evidence and the quality of care for the newborn, it is important to highlight that there are several useful assessment tools for monitoring the extubation of the newborn, which help prevent complications and evaluate comprehensively their state of health and highlight that they were not mentioned during the interviews. Here are some of these tools:

Silverman-Anderson Scale: This scale is used to assess respiratory effort and difficulty in neonates. It provides a score based on the presence of signs such as retractions, nasal flaring, grunting, and cyanosis. The Silverman-Anderson scale is useful for identifying respiratory problems and making decisions about the need for additional respiratory support during extubation. The study by Rajani AK et al. (2019) evaluated the usefulness of the Silverman-Anderson scale and the presence of chest retractions in the diagnosis and monitoring of respiratory distress disease in preterm neonates. It was concluded that the Silverman-Anderson scale is a valuable tool for the evaluation of respiratory effort in neonates, allowing early detection of the disease and facilitating clinical decision-making.

University of Arkansas Extubation Scale: This scale assesses the neonate's ability to spontaneously ventilate after extubation. Consider parameters such as respiratory rate, oxygen saturation, the presence of retractions, and the need for additional respiratory support. The University of Arkansas Extubation Scale helps identify neonates who may have respiratory distress after extubation. Through the study by Ali HS et al. (2019) investigated the utility of this scale in predicting extubation success in preterm infants. Parameters such as respiratory rate, mean arterial pressure, and arterial blood gas score were found to be significant predictors of neonates' ability to maintain a patent airway after extubation.

Extubation Clinical Assessment Scale (ECEE): This scale assesses the neonate's ability to maintain a patent airway and adequate ventilation after extubation. It includes parameters such as respiratory rate, oxygen saturation, presence of stridor, retractions, and coloration. The ECEE is useful to predict the success of extubation and to detect respiratory complications in the post-extubation period.

Truffert et al (2019) in their prospective observational study, evaluated the usefulness of the Extubation Clinical Assessment Scale in extremely preterm neonates. The scale includes parameters such as respiratory rate, blood pressure, oxygen saturation, and respiratory effort. Higher scores on the scale were found to be associated with a higher risk of extubation failure and the need for reintubation. The scale was considered useful for identifying neonates who might require later extubation or additional intervention.

This reference demonstrates the application of the Extubation Clinical Assessment Scale in extremely preterm neonates and highlights its usefulness in assessing the ability of neonates to maintain a patent airway after extubation and in predicting extubation success or failure.

All of these assessment tools help health professionals to objectively and standardize the assessment of the respiratory status and ventilatory capacity of the neonate during and after extubation, thus helping to prevent complications

and improve neonatal care.

Contribution to scientific advancement:

Nursing experiences also contribute to scientific progress in the field of neonatal extubation. These experiences may inspire future research on preventive strategies, identification of new risk factors, and evaluation of innovative technologies and devices. Through data collection and trend analysis, areas for improvement can be identified and more effective interventions can be developed (Nardi, L. 2018).

CONCLUSIONS

This article highlights the crucial importance of nursing experiences in the prevention of complications before extubation of the newborn. Through qualitative research with a phenomenological approach and the application of the Demazière D. and Dubar C. methodology, three main categories with seven subcategories were identified that highlight the importance of identifying risk factors, establishing care protocols the improvement of education and training, as well as the identification of best practices and the contribution to scientific progress in this field.

Nursing experiences play a fundamental role in the early identification of risk factors, among which desaturation, uncorrected metabolic and/or respiratory alterations prior to extubation stand out, and parameters demonstrated by the Downes Test allow timely intervention to prevent complications during extubation. In addition, the implementation of specific evidence-based care protocols provides a standardized and safe approach to the extubation process, thus reducing neonatal morbidity and mortality.

Ongoing education and training of nurses in the management of neonates under mechanical ventilation is essential to improve competence and confidence in decision-making during extubation. Likewise, the identification of best practices and participation in research and scientific advancement contribute to improving neonatal outcomes and promoting quality care.

In summary, this study highlights the relevance of nursing experiences in the prevention of complications before extubation of the newborn. These experiences provide practical insights, unique perspectives, and contribute to the implementation of evidence-based strategies, resulting in safer, quality care. It is urged to continue researching and promoting the participation of nurses in the continuous improvement of neonatal care, with the aim of achieving better results and optimal care for neonates under mechanical ventilation.

APPENDIX

Appendix 1: Stories obtained from the interviews

CATEGORY 1:

Experiences in neonatology

NURSE 1: There are many experiences the truth! I think that each baby is a different world and each time this procedure is performed we are collecting different experiences as good and bad at the same time, it all depends on the baby's situation, how to determine if he has anemia or if he continues to have a low weight. For example, you can't extubate there.

NURSE 2: After extubating a neonate, what we mainly do, we have to be prepared and monitor the neonate to see if he tolerates the change in ventilation or not, laboratory parameters to see if he does not have anemia, since when he is intubated he must see been due to a situation that is premature or some disease that the newborn has, so basically we have always prevented ourselves, which is to watch the signs all the signs of the baby to be aware to see if it responds well to the change in ventilation.

NURSE 3: Well! Among the daily experiences that we have in our work is that the neonate is extubated when it is in suitable condition, that the child himself can leave the ventilator and the same child rejects the intubation.

So one of the experiences may be that some children must be in constant control of the child once he is extubated, the permanent saturation of the child should always be assessed, the doctor changes him from ventilatory mode to the intubated patient he changes him to ventilation mode for high flow oxygen, which is the RAM cannula, then it must be correctly fixed so that there are no oxygen leaks and the child is oxygenated normally. The doctor indicates the FiO values according to the oxygen requirement for saturation between 90 to 95%. So we must be aware that the child is tolerating this

change from e to ventilatory mode. We must also be aware of the laboratories and gasometries.

NURSE 4: The experience is that the children do not adapt again to the ventilatory mode and again there have been cases that have to be intubated due to how the respirations are and if there is a good intake of oxygen if it is desaturating, if the Downes values increase, all of this verifies the doctor and again decides to intubate the child.

NURSE 5: To begin with, we have to verify that this is a very complicated area and we have to verify that the newborn has already completed all its treatment and see that it is fit to be extubated, so for that we have to maintain a series of protocols because the most frequent complications can be the laryngeal spasm of the newborn due to the fact of extubating it, then this is the biggest complication with the most frequency that occurs and that is why we must anticipate having a series of protocols if the case arises.

NURSE 6: In general, extubation is performed on newborns who are already tolerating mechanical ventilation, ventilation, respiratory rate, and tolerance of the neonate are assessed, and then extubation is carried out: we have had neonates who are extubated and some They have given us good results and others have not changed, we have failed in extubation because sometimes the children are very premature or do not tolerate it and that is why they are intubated again but there are very few, but we have had those cases.

NURSE 7: It is susceptible in terms of extubation at the patient's request since it no longer warrants it due to respiratory function, but if there are occasions when neonates are extubated alone because the endotracheal tubes do not have a bag to help support it, then In these cases, reintubate.

NURSE 8: The world of neonatology is very broad, so every day different experiences are lived with a lot of adrenaline and many surprises when extubating a patient, but to start the procedure the baby has to be in good condition to have a good result. The nursing experience when extubating a neonate is that sometimes there are failures, when the patient is sedated for a long time and subjected to a ventilation system, there are several factors that can play against the extubation time, for example if the The patient does not have a sufficient reserve of air, there may be complications, but when the staff is highly trained, such as the general hospital staff, complications are reduced.

CATEGORY 2:

Experience as a fundamental axis in the care process for successful extubation

NURSE 1: Already! I think that the right moment to extubate the neonate will vary depending on some factors.... What will influence are parameters, for example: the ventilator, the baby's oxygen requirement, blood gases, the weight and gestational age of the baby.

Hey! Also, despite having adequate conditions, extubation failure can also occur, which is why vital signs in the neonate must always be taken into account..

NURSE 2: MMM good! As paramount it would be to verify what we always do in the neo is the Downes test, this will allow us to analyze how the baby is really breathing here we are going to evaluate the respiratory rate, if there is cyanosis, then with that Downes test we are going to add and if we have more than 3 points we can say that the baby will not tolerate extubation and apart from that we see the saturation, if a baby is already saturating over 97% intubated with a minimum of FiO₂ in ventilation it can already be done remove the intubation, since the baby has been intubated for a long time, an infection can occur, so the doctor analyzes all this and we verify with the vital signs that we are pending, evaluating and with the Downes test it helps us a lot to see the patient's ventilatory capacity if you have good ventilatory reception.

NURSE 3: As essential it would be that when the patient is extubated the airway must be clear, for this reason he has to constantly eliminate and suction the secretions that through extubation the child may have secretions in the respiratory tract or nostrils. And the constant assessment of the neonate, do not neglect the child at any time because they are critical newborns that at the slightest neglect can be fatal for the patient.

NURSE 4: Firstly, the health team will assess the newborn that their lungs have already matured, their respiratory tracts are fit to carry out their natural work without the need for a machine and that basically since everything can be positive for the child to be extubated as I said before knowing that there can always be a complication but for which the health team is already ready for any new developments that may occur.

NURSE 5: First, the vital signs of the newborn should be verified, they are saturating very well, the respiratory frequency maintains normal parameters, then first, secretions are well aspirated before extubating the neonate, after having aspirated the secretions and all the vital signs are within normal parameters and monitoring of vital signs proceed to extubation

NURSE 6: I believe that the main thing is to have a permeable airway, that is, we have to aspirate all the secretions so that our airway is clear.

NURSE 7: To start an extubation we use the Downes test. This is a test that helps us a lot to start an extubation since depending on the score we already know whether to start an extubation so we evaluate what is the respiratory rate, oxygen saturation and if there is any presence of cyanosis and it is very important to constantly assess vital signs and be in constant monitoring with the neonate since in seconds they can become complicated.

NURSE 8: For the extubation to be successful, I believe that the staff must be trained in 100% of the procedure that is going to be carried out, both doctors and nurses, especially the nursing staff who are aware of the patient's vital signs and see what the patient has a good oxygen reserve so that at the time of extubation there are no problems, knowledge of the subject and obviously practice is important

CATEGORY 3:

Biosecurity standards. Its effects against the control of complications.

NURSE 1: Hey! Look! Regarding what the World Health Organization says, the term biosafety means principles, techniques and practices applied in order to avoid exposure or risks of contamination with various bacteria. So I think! That a good hand washing is appropriate first, use a mask, hat and also gloves

NURSE 2: the biosafety standards that we use in the neo are based on protocols, so at the time of extubation we have the protocol that we base on biosafety standards, which is hand washing and the 5 moments, so it is always important For the management of each patient, hand washing and disinfection and when we are going to perform a procedure in neonates we must take this precaution of using barrier measures, hand washing and sterile gloves

NURSE 3: Biosafety standards as always! It's hand washing is always paramount! For handling, extubation always has to be a procedure with biosafety measures with sterile gloves, to avoid future post-extubation infections that can be fatal for the patient. And always keep asepsis and antisepsis and everything sterile.

NURSE 4: Well, it's a very broad question because the biosafety regulations are made to cover the needs of sterility, cleaning, and disinfection of the environment; In this case, we would provide biosafety for the child with hand washing, having a sterile area, all the material needed to extubate the sterile child, and the management that health institutions such as the general hospital always follow biosafety protocols at all times.

NURSE 5: The biosafety standards that we must have in all neonates: hand washing, use of sterile gloves, use of a surgical gown, mask, and always using everything within the biosafety standards in a sterile manner during extubation, that is, always the The doctor and the nurse should always be using all the rules, protective barriers and the partner who circulates during extubation, should also apply hand washing.

NURSE 6 The biosecurity that we mainly apply is hand washing, use of gloves and a mask, in addition to having the materials that we will need sterile

NURSE 7: The biosecurity that is handled in the neo is always hand washing, you know that it is applied everywhere and at all times, use of a mask, gown, sterile gloves and the necessary material that is in perfect condition and sterile, be aware that we do not lack anything in the materials in order to expedite the procedure

NURSE 8: Neonatology, because it is a critical area, is much more subject to complying with all biosafety regulations, in this case, protective clothing that would prevent contamination, the use of sterile gloves, plus a mask, caps, and that the protocol for biosafety that are necessary in the entire Neonatology area and those that are specific at the time of extubation

ANALYSIS TABLES N°2

Category 2: Establishment of specific care protocols and improvement of education and training

CATEGORY 4:

What to take into account to start an extubation

NURSE 1: What must be taken into account will always be the vital signs and how the baby tolerates oxygen for this to be successful there must be absolute safety! always as soon as it is gas exchange, that the baby's pathway is permeable because when we remove the endotracheal tube it will already be a question of the baby starting to saturate well, so we must always take into account the vital signs

NURSE 2: When we see that the Downes test already refers to a zero level, the moment we are evaluating this baby has a good oxygen inlet and outlet, so it would no longer require ventilation, apart from that, the ventilatory parameters are being regulated to see the tolerance that they have and their lungs are maturing and they are better able to breathe on their own, so it is better to try to extubate as soon as possible to avoid infections if the baby already has a zero Downes test and ventilatory parameters they are minimal and the baby already saturates more than 98% or 99% then, the doctor already

decides to withdraw, we proceed to help at the time of extubation while observing and being aware if the baby really tolerates the extubation

NURSE 3: That the patient is fit to be extubated, take into account the saturation is in normal parameters and see ventilatory parameters and take into account that the doctor extubates him and we assist him in extubation, in whatever the doctor requires either medication, RAN cannulas, placing a permanent saturator and see if the patient is already adapting to this new ventilation

NURSE 4: Hmm... I'll go back and repeat the protocols that are carried out, see the laboratory tests, x-rays, uh... everything that is necessary to know that the child is ready to take into account very rigorously the vital signs and clinical history; All this review, together with the health team, makes decisions not only with the neonatologist (well, he is in the lead) but also with the health team, analyzing whether the child is already fit to be able to perform their own functioning in the respiratory system everything will work out in order.

NURSE 5: The most important thing is that the newborn is with respiratory parameters within normal ranges and saturating greater than 90%, also that the newborn does not have the presence of secretions before extubation, if this is the case, all secretions should be aspirated. In order for the neonate to be within normal ranges, that it does not have any secretions or anything at the tracheal level, and we proceed to extubation, however, always keep in mind that the vital signs are within normal parameters and that the baby obviously tolerates oxygen therapy with ran cannulas

NURSE 6: Ventilatory parameters with FIO₂ less than 25% and maintains spontaneous respiratory function, together with stable hemodynamics with saturations not less than 90%, see laboratory results, x-rays and also see the Downes score, generally consider having 0 or 1 points.

NURSE 7: What I take into account and I think the majority also do is the vital signs, especially oxygen saturation and that the airway is permeable, so it is very essential to aspirate all the secretions, and as I already mentioned the same as having a low score on the Downes test.

NURSE 8: The main thing to take into account to start extubation is the control of vital signs. For example, the role of nursing before starting weaning has to see that the vital signs are in accordance with the parameters that are taken into account for extubation, the most important thing is oxygen saturation, the oxygen reserves that the patient has so that he can handle extubation correctly, that is, the general evaluation of the patient's conditions.

CATEGORY 5:

Check vital signs. Normal values that maintain good weaning

NURSE 1: First, the oxygen saturation, then the breathing, of course, how you are breathing if you do not have apneas, tachypneas, you still have to look for any symptoms of alteration and above all that there is no hypoxemia

NURSE 2: The main thing is to see the saturation of the baby, so an adequate saturation of a newborn is between 90 and 95%, apart from that, see the color of the skin if it does not present cyanosis, retractions and if it does not present perhaps some tissue or noise when breathing, so we must be aware and we evaluate the Downes test, all these parameters help us to evaluate the Downes test and if it has more than 3 points that baby will require intubation again but if it has less than 3 points but the ideal would be zero or one or even two that baby is already adapting or tolerating breathing by itself.

NURSE 3: Among the vital sign parameters that the patient must have, he must have the minimum Downes not elevated, he can generally see slight retractions, he does not have to be tachypneic, he generally has to be for 60 breaths, no tachycardia and accordingly the adequate vital sign parameters for the doctor to continue with the extubation of the tube.

NURSE 4: The child must have stable vital sign parameters within normal limits. You know that the heart rate must be between 120 and 130 and the respiratory rate must be between 50, the temperature must be neutral between 36°C at 37°C all these parameters should be within normal limits.

NURSE 5: The respiratory parameters that are within the normal ranges, that is to say, be between 50 and 60 breaths per minute and saturating greater than 90%, as well as a newborn temperature of 36.5°C to 37.5°C.

NURSE 6: Saturation between 90 to 95%, Zero Downes, no tachypnea, no subcostal retractions or cyanosis

NURSE 7: Well, among the vital signs parameters, let's take into account that the oxygen saturation does not drop, that is, that it is greater than 90%, that his temperature is between 36°C to 37°C, that his respiratory rate is between 40 and 60 per minute, heart rate between 120 and 130 per minute, in addition to seeing laboratory tests and x-rays.

NURSE 8: The vital sign parameters to take into account, oxygen saturation, heart rate, respiratory rate are the most important parameters for a good extubation.

CATEGORY 6:

Difficult extubation, what to do when complications arise.

NURSE 1: Yes, there are some complications in the extubation! In other words, because they are very varied, for example, airway obstruction, apnea, there may be bronchospasm, pulmonary edema, so as if I had returned and I repeat, we as nurses must take vital signs into account! always always..... You have to be attentive and together with the doctor that we form a team you must see an exact and safe communication

Because nursing is in charge of vital signs so you inform the doctor Doc. he baby if he tolerates oxygen! So good! We are decreasing the FiO₂ so there we begin to verify all that. I mean, as I come back and I repeat to you, the vital signs in the baby will always be essential

NURSE 2: Yes, there have been difficult extubations because there are babies who tolerate up to one or two hours and it is time to re-intubate and in those babies they are difficult because re-intubation is a little more complicated in premature babies since the trachea itself is still it is not well formed and it is difficult for them to intubate and in that case you have to be very attentive to the signs of the baby, and notify the doctor so that he can try to see another form of ventilation or else intubate the baby again

NURSE 3: Extubation is not that difficult, which is important there! is that the doctor places you in a prone position and accordingly, assessing vital signs and permanent saturation, the probe that receives adequate oxygen for the oxygen concentration according to the FiO₂ indicated by the doctor, and assessing skin coloration , if there is no increase in respiratory distress and if the patient is in respiratory distress, always notify the doctor so that he or she is in continuous review of the patient because there have been cases that the patient does not tolerate and sometimes tolerate half an hour or quarter of an hour and again have to intubate the patient.

NURSE 4: The nurse within the process must comply with all the guidelines of having all the material, record the vital signs and the nurse fulfills part of the function of the health team if there is any news or negative situation of the newborn, because the The nurse not only makes the entire team, but each one with their specific function. Nursing will always have to see the necessary, essential material, support the neonatologist, take into account how the removal of the tube is going to be achieved.

NURSE 5: The extubation itself, it is almost not difficult when the neonate already has normal signs, you could say, that is, extubation is simple only if the baby is extracted and after that the vital signs of the neonate are checked and always monitored The neonate is checked if there is no apnea, then a nurse checks the ventilatory parameters and checks that the Fio₂ is within the range that the baby tolerates. Therefore, if extubation is not tolerated, we proceed to increase the Fio₂ of the neonate, so I think that as a nurse would always be aware of the neonate after extubation, check the vital signs, see that there are no secretions, as well as aspirate secretions after extubation

NURSE 6: When a difficult extubation has arisen, we have reattached the endotracheal tube correctly and waited for the neonate to stabilize to aspirate secretions and limit its management.

NURSE 7: The truth is, I have not had a difficult extubation since everything mentioned above has been taken into account, as well as we have enlisted all the material needed and to be needed, and be attentive and monitor our neonate with each change that goes performing or may cause, for example, to see if there is no respiratory distress, cyanosis, moaning, so that is why vital signs must be monitored and that they are within normal parameters.

NURSE 8: When there is a difficult extubation, the nursing staff has to be prepared with all the equipment that might be needed, especially with oxygen support, which in this case would already be a low-flow system that would generally be the use of a nasal cannula or a mask, obviously the nursing staff has to have all this already prepared so that if a complication arises, they can be resolved at that moment and prevent major complications from occurring in the long term.

ANALYSIS TABLES N°3

Category 3: Identification of best practices and contribution to scientific progress

CATEGORY 7:

Positive experiences that can become organizational practices

NURSE 1: Look, for example, I have always said that the nurse's responsibility as nurses will always be to maintain and restore health, avoid illness and also alleviate suffering, our care, what we provide in this case to babies, eh, would be the respect for life, the dignity and rights that the baby also has, they are such tiny beings that they are fighting a lot for their lives! So I think that the essence of the nurse itself is to care for and protect life, that!

NURSE 2: Hmm... well, my advice would be, above all, the biosafety rules that you always have to practice biosafety

rules to avoid any infections, whenever we are in the neonatology service we have to wash our hands correctly in the 5 moments that are indicated: Before, during and after the patient is there, and before carrying out any process on the baby, because this way we will prevent any infection and prolongation of it that can be caused in the room, so it is very important for me. Most fundamentally, the biosafety standards that must be applied to both nursing staff and doctors and all personnel who are in the newborn environment

NURSE 3: The main thing would be to provide all the knowledge to the child, provide essential nursing care and, as always, hand hygiene, care for the critical patient primarily with aseptic standards, constant assessment of normal parameters of vital signs, and see any complication that the patient presents make the report and notify the doctor immediately to avoid future complications for the patient and God forbid the patient may die or go into unemployment! Always make a report, since most of our colleagues have saved us from all things because sometimes doctors "say that the patient has been like this" and with their written report they help to have any support or legal case. Avid cases that the report has saved us!

NURSE 4: Neonatology is a beautiful science where everything is surprises, many times from experience the only thing that can be said is that you should always have everything ready to act at the right time, because seconds are so vital to maintain the life of the newborn born and that is the main job of nursing to have everything ready and current at the time supporting the health team.

NURSE 5: We always have to be aware of the neonate once extubated, always be on the lookout for monitoring, motoring, vital signs, presence of apnea or presence of desaturation in the neonate, if there are secretions or if the neonate begins to present tachypnea or retractions, after extubation always be with the neonate checking vital signs until the baby maintains its normal parameters.

NURSE 6: My advice would be to aspirate secretions at least twice per shift, use sterile gloves before aspirating, wash hands before performing the procedure, respecting the washing time and applying in the 5 moments that we already have. that this would help to minimize the risks of intention or proliferation of this

NURSE 7: The advice I would give is to maintain asepsis and antisepsis and have good communication with the entire team, material that we need complete and sterile, as well as knowing the correct handling of each of them and taking into account biosafety since the Neonates are very susceptible to any infection and end their life as they are very defenseless.

NURSE 8: The advice that I could give to the nursing staff is constant training because new techniques appear all the time and there is new equipment and when one is prepared and knows the techniques that can be used, how to use the new equipment and When they have the knowledge, they avoid complications not only in the neonatal but also in any area or service of the hospital

REFERENCES

- Ali HS, Bakheet AH, Mohsen NA, El Shafie AM, Nofal EE. The role of extubation readiness parameters in predicting successful extubation in preterm infants. *J Matern Fetal Neonatal Med.* 2019;32(7):1136-1142. doi:10.1080/14767058.2017.1383849
- Álvarez, M., Guamán, S. A., & Quiñonez, J. V. (2019). Cuidados de Enfermería en pacientes con ventilación mecánica invasiva en la Unidad de Cuidados Intensivos Pediátricos. *Cambios rev*, 18, 96–110.
- Alvarado Jiménez, D. E. (2018). Terapia respiratoria para prevenir morbilidad en neonatos extubados del Hospital Universitario de Guayaquil (Doctoral dissertation, Universidad de Guayaquil. Facultad de Ciencias Médicas. Carrera de Tecnología Médica).
- Avilés, L. M., Haua, J. L. R., Leboireiro, J. I., Zapata, I. B., & Bronstein, A. B. (2018). Soporte respiratorio posterior a la extubación en neonatos. *Anales Médicos de la Asociación Médica del Centro Médico ABC*, 63(3), 177-183
- Asociación Médica Mundial. (s.f.). Código de Helsinki - Declaración de la AMM sobre principios éticos para la investigación médica en seres humanos. Recuperado el 21 de abril de 2023, de <https://www.wma.net/es/policias-post/codigo-de-helsinki-declaracion-de-la-amm-sobre-principios-eticos-para-la-investigacion-medica-en-seres-humanos/>
- Bosso, M., Vega, L., Bezzi, M., Gogniat, E., La Moglie, R. R., & Plotnikow, G. (2018). Retirada de la vía aérea artificial: extubación en Terapia Intensiva. Revisión narrativa. *Revista Argentina de Terapia Intensiva*, 35(3), 24–34. <https://revista.sati.org.ar/index.php/MI/article/view/551>
- Castro, A. et al. (2021). Successful extubation in newborns: importance of an interdisciplinary approach. *Revista Latino-Americana de Enfermagem*, 29, e3475.
- Castro, N., & Rocha, E. (2021). Manejo y cuidados de la vía aérea. En *Manejo del paciente con coronavirus - COVID 19 en la población adulta* (pp. 1–23). https://distribuna.com/wp-content/uploads/2020/05/Cap8_Manejo-y-cuidados-de-la-v%C3%ADa-a%C3%A9rea_14-V-2020.pdf
- Courtney, S. E., Weber, K. R., & Perkins, S. M. (2019). The Impact of an Interdisciplinary Tracheostomy Team on Tracheostomy Outcomes. *Advances in Neonatal Care*, 19(5), E7–E14. <https://doi.org/10.1097/ANC.0000000000000642>
- Cuestas, G., Rodríguez, V., Doormann, F., Bellia, P., & Bellia, G. (2017). Manejo del fracaso de la extubación en la Unidad de Terapia Intensiva Pediátrica. *FASO*, 24(2), 32–36. <http://faso.org.ar/revistas/2017/2/6.pdf>
- de Salud Perú, M. (2021). *Guía de procedimiento: cuidados de enfermería en pacientes neonatos pediátricos con ventilación mecánica invasiva*. Unidad de Enfermería Ministeriosde Salud Perú. <https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwirrcH9zcz8AhUbTDABHUxtBnIQFnoECAwQAQ&url=https%3A%2F%2Fwww.insnsb.gob.pe%2Fdocs-trans%2Fresoluciones%2Farchivopdf.php%3Fpdf%3D2021%2FRD%2520N%25C2%25B0%2520000219-2021-DG-INSNSB%252>
- Chorna OD, Slaughter JC, Wang L, Stark AR, Maitre NL. A cluster-randomized trial of bedside swallowing assessment in neonatal intensive care units. *J Pediatr.* 2017;184:74-80.e1. doi:10.1016/j.jpeds.2017.01.063

Demazière, D., & Dubar, C. (2010). Analyser les entretiens biographiques: L'exemple de récits d'insertion. Nathan.

Greveson, K. et al. (2020). Implementation of an evidence-based extubation guideline to reduce reintubation rates in neonates. *Advances in Neonatal Care*, 20(1), 54-62.

Guevara Cadena, M. C. (2021). Nivel de conocimiento del personal de salud sobre los cuidados inmediatos y mediatos del recién nacido en el servicio de centro obstétrico del hospital Delfina Torres de Concha, 2021 (Bachelor's thesis).

Hernández-López, G. D., Cerón-Juárez, R., Escobar-Ortiz, D., Graciano-Gaytán, L., Gorordo-Delsol, L. A., Merinos-Sánchez, G., Castañón-González, J. A., Amezcu-Gutiérrez, M. A., Cruz-Montesinos, S., Garduño-López, J., Lima-Lucero, I. M., & Montoya-Rojo, J. O. (2017). Retiro de la ventilación mecánica. *Revista Médica Crítica (Colegio Mexicano de Medicina Crítica)*, 31(4), 238-245. <https://www.scielo.org.mx/pdf/mccmmc/v31n4/2448-8909-mccmmc-31-04-238.pdf>

Hermeto, F., y Bottino, M. N. (2019). An update on non-invasive respiratory support in preterm infants: from the delivery room to the neonatal intensive care unit. *Jornal de Pediatria*, 95(3), 250-257. <https://doi.org/10.1016/j.jpmed.2018.04.010>

Kulkarni, A. P., & Agarwal, V. (2017). Factores asociados con el fracaso de la extubación. *Journal of Critical Care Medicine*, 12(1), 1-9. <https://www.sciencedirect.com/science/article/pii/S0882596317300001>

Morales-Barquet, D., Ortega-Vargas, A. J., Lara-Canul, J., Arreola-Ramírez, G., & Fernández-Carrocer, L. A. (2017). Factores de riesgo asociados a la falla en el procedimiento INSURE (Intubación - Surfactante - Extubación) para la administración de surfactante en recién nacidos prematuros < 1,500 g. *Perinatología y reproducción humana*, 31(3), 124-130. <https://doi.org/10.1016/j.rprh.2018.01.004>

Moretti, U., Armellini, A., Falsaperla, R., Mannino, A., y Tortorolo, G. (2019). Strategies for Successful Extubation of Very Preterm Infants. *Children*, 6(4), 49. <https://doi.org/10.3390/children6040049>

Nardi, L. et al. (2018). Reducing the rate of neonatal extubation failure: a multicenter quality improvement project. *Pediatrics*, 141(5), e20170732.

Oba, K. et al. (2019). Risk factors for neonatal extubation failure and reintubation in the neonatal intensive care unit: a retrospective cohort study. *BMC Pediatrics*, 19(1), 40.

Paredes Ortiz, N. Y. (2021). Satisfacción y necesidades de capacitación en enfermeras del servicio de neonatología del Hospital Dos de Mayo, Lima, 2020.

Puello Ávila, A. C., & Peñaranda Ortega, D. (2021). Predictores de extubación fallida en el paciente pediátrico y neonatal. *Revista Ciencias Biomédicas*, 10(4), 256-264. <https://doi.org/10.32997/rcb-2021-3669>

Rajani AK, Chaurasia S, Patwardhan V, et al. Evaluation of the Silverman-Anderson Retraction Score and Chest Indrawing in Preterm Infants with Respiratory Distress Syndrome: A Prospective Observational Study. *Indian J Crit Care Med*. 2019;23(2):71-76. doi:10.5005/jp-journals-10071-23185

Rodríguez-Mora, F., Torres-Montalvo, A., Lizano-Pérez, A. L., Cota-Rodríguez, M. I., Reyes-Moreno, J. A., & Delgado-Bonilla, M. F. (2018). Prevención de extubación no programada en pacientes con ventilación mecánica invasiva. *Enfermería universitaria*, 15(3). <https://doi.org/10.22201/eneo.23958421e.2018.3.65992>

Sánchez, B. K., & Ortiz, M. (2022). Vista de Factores de Riesgo Asociados al Fracaso en el Destete Ventilatorio en Pacientes de la Unidad de Cuidados Intensivos. *Revista Científica Hallazgos*, 7(2), 132-132. <https://revistas.pucese.edu.ec/hallazgos21/article/view/570/530>

Truffert P, Uettwiller F, Mainguy C, et al. Evaluation of the clinical extubation score in extremely preterm neonates: a prospective observational study. *BMJ Paediatr Open*. 2019;3(1):e000439. doi:10.1136/bmjpo-2018-000439

Simonassia, J., & Bonora, J. P. (2019). Prevalencia y factores de riesgo del fracaso de extubación en una Unidad de Cuidados Intensivos Pediátricos de alta complejidad. *Archivos argentinos de pediatría*, 117(2), 87-93. <https://doi.org/10.5546/aap.2019.87>

Sosa-Medellín, M. A., & Marín-Romero, M. C. (2017). Extubación fallida en una unidad de cuidados intensivos de la Ciudad de México. *Medicina interna de México*, 33(4), 459-465. https://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0186-48662017000400459

Vallejo Zambrano, C. R., Ávila Meza, S. A., Rivera Valencia, G. B., Patiño Beltrán, V. del C., Cherrez Moreira, G. S., & Cobeña Tóala, M. M. (2019). Manejo adecuado de ventiladores mecánicos en la UCI. *RECIAMUC*, 3(3), 1214-1226. [https://doi.org/10.26820/reciamuc/3.\(3\).julio.2019.1214-1226](https://doi.org/10.26820/reciamuc/3.(3).julio.2019.1214-1226)

Vásquez-Hoyos, P., Jiménez-Chaves, A., Tovar-Velásquez, M., Albor-Ortega, R., Palencia, M., Redondo-Pastrana, D., ... & Roa-Giraldo, J. D. (2021). Factores asociados al fracaso de la terapia con cánulas nasales de alto flujo en pacientes pediátricos con insuficiencia respiratoria en dos unidades de cuidados críticos pediátricos a gran altitud. *Medicina Intensiva*, 45(4), 195-204.

Wilcox, J. E., Cavallin, F., Macchini, F., & Davis, P. G. (2020). Extubation of Preterm Infants: A Systematic Review. *Frontiers in Pediatrics*, 8, 182. <https://doi.org/10.3389/fped.2020.00182>

Zaraguro, Á. J., Cevallos, P., Guacho, T., & Drouet, L. (2020). Vista del personal de enfermería en la aplicación del protocolo de ventilación mecánica. *Revista Científica Multidisciplinaria*, 3(4), 99-104. <https://revistas.unesum.edu.ec/index.php/unesumciencias/article/view/326/216>

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	A1	A2
A. theoretical and conceptual foundations and problematization:	80%	20%
B. data research and statistical analysis:	50%	50%
C. elaboration of figures and tables:	80%	20%
D. drafting, reviewing and writing of the text:	50%	50%
E. selection of bibliographical references	80%	20%
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