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REVIEW

# Nursing care in pediatric tracheostomized patients: a knowledge challenge for these professionals. Literature review

# Cuidados de enfermería en pacientes pediátricos traqueostomizados: un reto del conocimiento para estos profesionales. Revisión de la literatura

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**ABSTRACT**

**Introduction:** one of the most applied surgical interventions in the critical care area is tracheostomy, which involves the incision and opening of the trachea to insert a plastic cannula between the 2nd and 3rd cartilage ring. This cannula is strategically placed to constantly maintain a free airway.
**Objective:** to conduct a review of the literature on nursing knowledge and care in pediatric tracheostomized patients.
**Method:** a bibliographic review was carried out according to the guidelines proposed by the PRISMA declaration. The articles were extracted from three renowned databases in the scientific field: Scopus, Web of Science and Google Scholar. "Tracheotomy", "nursing care", "postoperative complications" as well as their combinations were used as descriptors in English through the use of the Boolean operators "AND" and "OR". The terms were chosen as long as they were included in the Medical Subject Headings (MeSH) website. Before analyzing the documents in detail, inclusion and exclusion criteria were established, facilitating the focus on the most relevant works and discarding those that did not align with the research objectives and questions.
**Results:** in the finally selected articles, the close relationship that exists between the level of preparation of nursing staff and their performance in caring for pediatric tracheostomized patients can be seen.
**Conclusions:** the degree of knowledge of the nursing professional about the care of pediatric patients with tracheostomy directly influences the quality of health care that they are able to provide to the patient.

**Keywords:** Tracheotomy; Nursing Care; Postoperative Complications; Knowledge.

**RESUMEN**

**Introducción:** una de las intervenciones quirúrgicas más aplicadas en el área de cuidados críticos es la traqueostomía que implica la incisión y apertura de la tráquea para insertar una cánula de plástico entre el 2° y 3° anillo cartilaginoso. Esta cánula se coloca estratégicamente para mantener de manera constante la vía aérea libre.
**Objetivo:** realizar una revisión de la literatura sobre los conocimientos y cuidados de enfermería en pacientes pediátricos traqueostomizados.
**Método:** se realizó una revisión bibliográfica según las directrices propuestas por la declaración PRISMA. Los artículos fueron extraídos de tres bases de datos de renombre en el campo científico: Scopus, Web of Science y Google Académico. Se utilizaron como descriptores en inglés "tracheotomy", "nursing care", "postoperative complications" así como sus combinaciones mediante el uso de los operadores booleanos "AND" y "OR". Se escogieron los términos siempre que se incluyeran en la web del Medical Subject Headings (MeSH). Antes de analizar detalladamente los documentos, se establecieron criterios de inclusión y exclusión, facilitando el enfoque en los trabajos más pertinentes y descartando los que no se alineaban con los objetivos y cuestionamientos investigativos.
**Resultados:** en los artículos finalmente seleccionados se aprecia la estrecha relación que existe entre el nivel de preparación del personal de enfermería y su desempeño en la atención al paciente pediátrico traqueostomizado.
**Conclusiones:** el grado de conocimientos del profesional de enfermería sobre los cuidados en el paciente pediátrico portador traqueostomía, influye directamente en la calidad de la atención de salud que es capaz de brindarle al enfermo.

**Palabras clave:** Traqueostomía; Cuidados de Enfermería; Complicaciones Posoperatorias; Conocimiento.

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## INTRODUCTION

Tracheostomy is an ancient surgical procedure that can be performed for therapeutic or elective purposes. It aims to reestablish the airway, allowing for proper respiratory function. Currently, its use is widespread and necessary for many pathologies. However, the procedure is not without risks, so it is essential to be well informed about its indications and how and when to perform it. We must emphasize the importance of post-procedural care, as nursing management is directly related to its success.[1]

Pediatric patients with tracheostomy often have additional medical, social, and family problems that require comprehensive assessment during their hospitalization by a multidisciplinary team of pediatric specialists, including neurologists, physical therapists, otolaryngologists, nutritionists, intensivists, nurses, pulmonologists, rehabilitation specialists, speech therapists, cardiologists, and social workers. Communication and interaction between these professionals must be effective. Forming a team dedicated to tracheostomy care optimizes this process and minimizes complications. Hospital discharge should be a priority, as these patients often require tracheostomy for an extended period.

Nurses who care for multiple patients daily must be equipped to provide care efficiently. This is particularly relevant for patients with respiratory disorders, such as those who have required a tracheostomy. These patients must receive immediate attention in the event of cessation of free and direct air passage through the airway, as the window of opportunity for effective intervention in such situations is extremely limited.

This is why nursing staff must have the interpersonal skills and the practical and theoretical knowledge to perform tracheostomy care smoothly and safely.

Nursing staff fulfill a crucial role, such as ensuring airway patency and facilitating proper oxygenation. In particular, the pediatric tracheostomy population is at constant risk of developing complications associated with this procedure, such as airway perforation with air entering the pleural space, cessation of voluntary breathing, inadequate technique when performing the procedure, infections of the ostomy site or surrounding skin, reflex bronchospasm, bleeding, and airway obstruction, among others.[5]

Properly managing the pediatric tracheostomy population is challenging for nurses, since inadequate care can lead to nosocomial infections, especially during the incision and insertion of the endotracheal tube. It is vitally important that the care of this procedure be under the responsibility of nursing staff and that they be prepared to anticipate any complications that may arise. Furthermore, although tracheotomy remains a much less standard procedure in pediatrics than in adult services, there are increasing reports of an increase in the number of tracheotomies performed in children because the pediatric population with chronic conditions has a higher survival rate. These aspects motivated the present study to review the literature on nursing knowledge and care in pediatric tracheostomy patients.

## METHOD

Using a scope review protocol and following clear guidelines, such as PRISMA,[6,7] can improve the quality and impact of the information presented. In addition, this facilitates understanding of the topic to be addressed and allows other researchers to replicate the review, promoting transparency and rigor in scientific research.[8] That is why this algorithm was chosen for the development of this research.

To this end, documents were extracted from three renowned databases in the scientific field: Scopus, Web of Science, and Google Scholar. The English descriptors “tracheotomy,” “nursing care,” and “postoperative complications” were used, as well as combinations of these using the Boolean operators “AND” and “OR.” The terms were chosen whenever they were included in the Medical Subject Headings (MeSH) website. To ensure rigor in the process, the guidelines proposed by the PRISMA statement, an international protocol for systematic and scoping reviews, were adapted. Before analyzing the documents in detail, inclusion and exclusion criteria were established, facilitating a focus on the most relevant studies and discarding those that did not align with the objectives and research questions.

The following criteria were established for the selection of studies: research in English, published since 2017, with a sample or population, and addressing nursing care issues in tracheostomized patients.

Figure 1 summarizes the selection process for the articles included in this research. The final nine articles were reviewed again by the researchers to confirm that the selection was appropriate. It should be noted that 98 records were obtained from Scopus, 56 from Web of Science, and 84 from Google Scholar.

## RESULTS

In a study conducted in Cuba, Durán et al.[9] mention that 13,5 % of nurses regarding knowledge and care mention a high percentage of ignorance in care, leading to an increase in hospital-acquired infections due to inadequate secretion aspiration techniques and neglecting the importance of personal protective equipment for their handling.

Rovira et al.[10] conducted a study in the United Kingdom to determine tracheotomy and decannulation care during the COVID-19 pandemic. It was a systematic review study using a PubMed search, with 120 study subjects among all the articles evaluated in the review. A total of 409 articles were found in PubMed, with 73 % related to basic tracheostomy care and 25 % to tracheostomy management simulation. The study concluded that healthcare professionals have attempted to update their knowledge on the care of these patients, despite the constant stress of their work schedule and additional activities added to their duties during the pandemic.

Dokoohaki et al.[11] conducted a project in Iran to investigate nursing knowledge and care in hospitalized patients with tracheostomy admitted to ICUs. Their methodology was observational, quantitative, and cross-sectional. They determined that of the 151 nurses who responded to their two questionnaires, 60,7 % had acceptable knowledge of caring for patients with tracheostomy. They concluded that adequate management of the endotracheal tube was identified in terms of knowledge and practice. However, the understanding of the associated complications was poor.

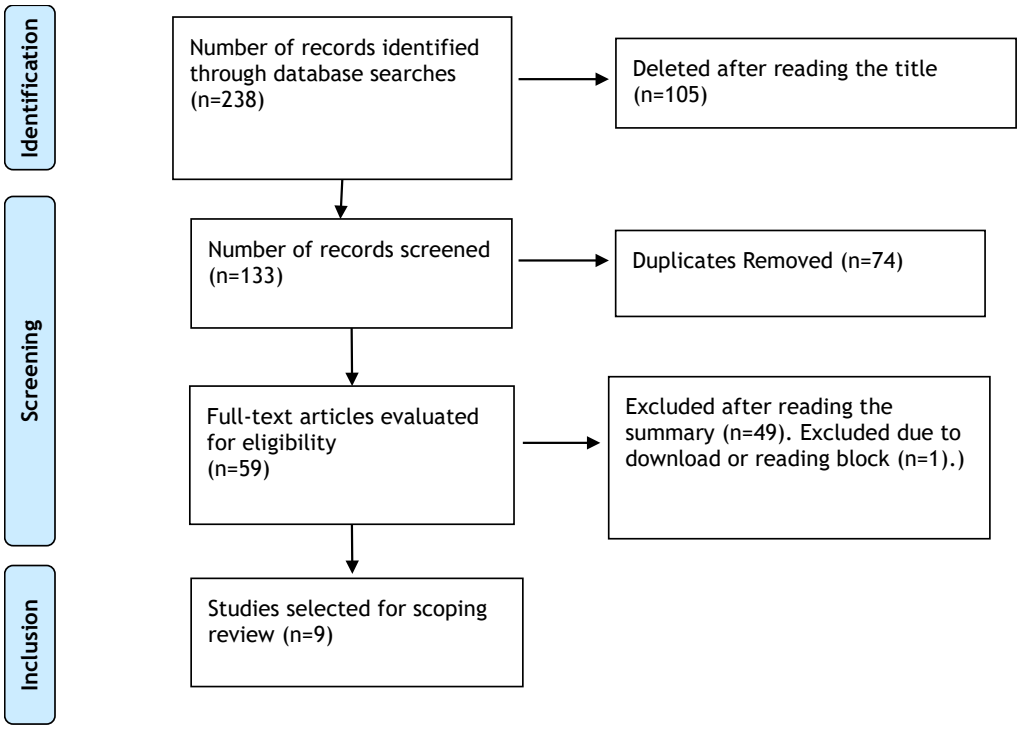


**Figure 1.** PRISMA flow chart

Gaterega et al.[12] researched Africa to identify an association between knowledge and care among nursing staff caring for tracheostomy patients in a health institution in Rwanda. This was an observational, correlational, and quantitative project. The sample consisted of 80 nurses who responded to two questionnaires. It was found that 71 % of nurses had moderate knowledge, 26,5 % had low knowledge, and only 2,5 % had high knowledge. About practice, 97,5 % were at a low level and 2,5 % were at a high level. It was concluded that the amount of knowledge and practice was low, so it is recommended that the regularity of training be increased.

Altamirano[13] conducted research in the capital of Bolivia to identify the cognitive competence of nurses caring for tracheostomized patients in the Adult Critical Care Unit. This was an observational, cross-sectional, non-analytical study. It included 18 registered nurses. The results showed that 44 % knew when tracheostomy is indicated and the function of the cannula, 100 % knew the aspiration systems, but only 33 % knew the complications. It was concluded that, according to the Likert scale, 53 % had a medium amount of knowledge and 47 % had a low amount. The practical indicators revealed the need to improve various aspects, suggesting the implementation of a guide for the proper management of tracheostomized patients.

Quiroga[14] conducted a study in Cuzco that sought to analyze the knowledge and nursing care of the pediatric population with tracheostomy in the ICU in a hospital setting. The methodology described the project's observational, non-analytical, and cross-sectional nature. The sample consisted of 59 nurses. The results showed that 55,2 % of nurses had high knowledge of tracheostomy care, 32,3 % had average knowledge, and 12,5 % had low knowledge. In addition, 54,4 % of nursing care in the tracheostomy population was adequate, and 45,6 % was inadequate. In summary, it was determined that nurses have a high level of knowledge about tracheostomy care and that the care they provide to patients is predominantly appropriate.

Zavala[15] conducted a study in Lima to identify the association between knowledge levels and nursing care in a tracheostomy population in an ICU at a state hospital. The methodology was observational, cross-sectional, and descriptive. Of the 58 nurses who responded to the two questionnaires, the results showed that 62,5 % provided adequate tracheostomy care, 60,4 % offered adequate stoma care, 58,9 % adequately cleaned the internal cannula, and 63,8 % offered proper care of the cuffed tracheostomy tube. In summary, they affirm a relationship between the two variables.

Cuizano[16] conducted a study in Lima to identify the level of knowledge about airway and endotracheal tube care among ICU nurses at a private institution. The survey methodology highlights its observational, cross-sectional, and non-analytical nature. Thirty nurses participated, of whom 60 % were found to have average knowledge, less than 35 % had high knowledge, and less than 10 % had low knowledge. In the care practice variable, more than 50 % was deficient and less than 50 % was adequate. A relationship between the two study variables was ultimately confirmed.

Obando et al.[17] conducted a study in Trujillo to identify the association between the level of knowledge and nursing care in a population with tracheostomy in a hospital institution. The methodology highlighted the study's observational, cross-sectional, and correlational nature. Seventeen nurses were surveyed, finding that 35 % had adequate knowledge and more than 50 % had an acceptable level. Regarding the application of care, 47 % did so adequately and 53 % inadequately. Ñuñuvera et al.[18] conducted a study in Trujillo to identify the level of knowledge and care of the airway provided by nursing staff to patients with tracheostomies.

The methodology highlighted the study's observational, cross-sectional, and non-analytical nature. It worked with a population

of 37 nurses. It was found that 10,8 % of nurses had high knowledge, more than 50 % had regular knowledge, and less than 36 % had low knowledge. Regarding airway care, more than 30 % was adequate, and 67,6 % was inadequate.

## DISCUSSION

Although tracheotomy remains much less common in pediatrics than in adult services, they believe that the number of tracheostomies performed in children has increased recently because the pediatric population with chronic conditions has a higher survival rate.[19]

Most tracheotomies performed in children under 1 year of age through an invasive medical procedure involve a 1,5 cm incision in the front of the neck, followed by the insertion of a catheter through the incision into the trachea until it reaches the bronchi, so that the air entering the trachea has direct access to the lungs. This ensures ventilation in patients who are in critical hypoxia. Since the tube enters the trachea directly rather than through the oropharynx, protecting the upper airway and reducing the risk of aspiration pneumonia, this procedure may be helpful in certain patients who require prolonged mechanical ventilation while intubated.[20]

Children with tracheostomies are complex patients who often have multiple chronic conditions, with 43 % having two or more conditions. They usually depend on other types of home technology support, such as enteral feeding devices and home ventilators.

In Peru, there are more than 50 000 hospital-acquired infections, which is above international standards. Peru has the highest increase in hospital-acquired infections in the care of tracheostomized patients connected to a mechanical ventilator. The report also states that nursing professionals must be aware of the theory and correct management of secretion aspiration. However, there is a significant deficiency in practice and care.[21]

Nursing care provided to tracheostomized children is vitally important in critical care settings and must be performed by professionals with adequate biosafety techniques.[22]

## CONCLUSIONS

The level of knowledge that nursing professionals have about caring for pediatric patients with tracheostomies directly influences the quality of healthcare they can provide. The greater the cognitive abilities of nursing professionals, the lower the rate of complications in patients with tracheostomies in their overall care. Furthermore, if complications arise, a properly trained nurse can identify them more quickly and take the necessary measures to correct them. For this reason, nursing staff working primarily in intensive care units need ongoing training to provide quality care to tracheostomy patients.

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## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

## AUTHORSHIP CONTRIBUTION

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*Methodology:* Seudy Rodríguez Pinedo, Celeste Mauricio Esteban.
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*Writing – original draft:* Seudy Rodríguez Pinedo, Celeste Mauricio Esteban.
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