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NASAL IRRIGATION IN THE CONTROL OF NASAL SYMPTOMS IN PEDIATRICS: SYSTEMATIC REVIEW OF THE LITERATURE

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Abstract: Background: Nasal irrigation is a non-pharmacological measure used to relieve nasal symptoms, but it is not fully accepted by caregivers who have doubts since some aspects of the procedure are not clear, and there is no consensus on a uniform protocol. **Objective:** To understand the effect of different nasal irrigation methods on the relief of nasal symptoms in children. **Methodology:** Systematic Literature Review aiming to answer the question "What is the effect of different methods of nasal irrigation in the relief of nasal symptoms in pediatrics?". The research was carried out in August 2021, using b-On and EBSCO database aggregators. Inclusion and exclusion criteria were applied, selecting 4 articles for analysis. **Results:** Scientific studies point to greater effectiveness of hypertonic saline solutions in nasal clearance, but isotonic saline solution proved to be more effective in increasing peripheral oxygen saturation. Positive pressure devices show greater effectiveness. There is no direct relationship between the contamination of the solution and the occurrence of infectious processes. **Conclusions:** Nasal irrigation is a safe and effective procedure for relieving nasal symptoms, reducing drug consumption and preventing complications, regardless of the technique and solution used. The use of a positive pressure device has been shown to be more effective. The use of saline and hypertonic saline solutions both proved to be advantageous, and it was not possible to determine the ideal solution. **Implications:** It is urgent to train health professionals and caregivers to perform the technique. Scientific studies are needed to support solutions that enhance the benefits of the technique. Reference documents in the area of Pediatrics would serve to standardize the provision of care, increase the effectiveness of the procedure and convey confidence to caregivers, enabling them to perform it.

Keywords: Nasal lavage, methods, children, saline solution.

INTRODUCTION

Gruber et al. (2008) in a prospective German study carried out with a total of 1314 children, followed for a period of 12 years, considered that the child experiences 4 to 11 episodes of respiratory disease per year up to 3 years of age, 8 episodes in children between 3 and 6 years and 4 respiratory infections per year in children between 6 and 12 years. However, there is no precise number or consensual definition.

Respiratory infections are, therefore, the main cause of pediatric disease (Vasconcelos et al., 2012) and represent the main cause of hospitalization of children under five years of age and the third cause of mortality, being the diagnosis of 40% of children. who seek health services (Chaves et al., 2016).

However, the vast majority of respiratory tract infections in immunized children are of viral origin (more than 60%), often benign (Vasconcelos et al., 2012) and self-limiting (Bruce, Hoare, Mukherjee, & Paul, 2017), presenting symptoms the average duration of 7 and 14 days. Among the typical symptoms, nasal symptoms such as rhinorrhea and nasal obstruction stand out (Cabaillot et al., 2020).

Since acute respiratory infections are mostly of viral origin, and there is no effective pharmacological treatment, since the use of antibiotics is not indicated, non-pharmacological measures are often recommended for the treatment of symptoms, which do not present significant side effects and can contribute to reduce medication use (Alexandrino, Santos, Melo, Bastos & Postiaux, 2017). An example of this is nasal irrigation with saline, often used as an adjunctive treatment for sinusitis and allergic rhinitis (Malizia et al., 2017; Satdhabudha, Utispan, Monthanapisut, & Poachannukoon,

2017; Cabaillot et al., 2020)

Nasal symptoms represent an important weight in the child's quality of life, especially in the first months of life, since breathing in this age group is mainly nasal and the inability to remove nasal secretions can lead to an increase in the work of breathing, leading to to sleep disorders, increased risk of obstructive apnea and difficulty in eating, justifying the search for an effective treatment (Alexandrino et al., 2019; Schreiber et al., 2016).

Nasal irrigation thus appears as a non-pharmacological measure used to relieve nasal symptoms (both in situations of acute respiratory infection, acute sinusitis and allergic rhinitis). However, it is not fully accepted by caregivers. Parents have doubts and insecurities regarding its performance, since some aspects of the procedure are not very clear, and there is no consensus on a uniform protocol, namely, in relation to the frequency with which it must be performed, the child's position, method used and volume. saline solution, which may reduce its benefit (Alexandrino et al., 2017a).

The implementation of health education interventions aimed at disseminating information, training and educating caregivers for the correct management of nasal symptoms can, however, minimize caregivers' concerns (Alexandrino et al., 2017a), and may contribute to the reduced demand for health services (Alexandrino et al., 2017a; Alexandrino, Santos, Melo & Bastos, 2017).

It is therefore important to clarify some aspects that relate to the procedure in question. The aim of this Systematic Review of the Literature is to understand the effect of different nasal irrigation methods on the relief of nasal symptoms in children. The search for this information aims to incorporate it into clinical practice, in order to respond adequately to situations of children with this diagnosis, providing adequate information to parents and training them to perform the technique.

The following research question was defined using the PICO method: "What is the effect of different methods of nasal irrigation in the relief of nasal symptoms in pediatrics?".

METHODOLOGY

The aim of the Systematic Literature Review was to understand the effect of different nasal irrigation methods on the relief of nasal symptoms in children. As such, and in order to initiate the methodology, a research question was defined using the PICO method: P- Problem/population/participants (children); I – Intervention (nasal irrigation); C- Comparison/context (nasal symptoms); O- "Outcomes", results (relief of nasal symptoms). Thus, the review question was defined: "What is the effect of different methods of nasal irrigation in the relief of nasal symptoms in pediatrics?" The population selected for the study were children with nasal symptoms. Considering that the nasal irrigation procedure is often recommended in the presence of nasal symptoms, in pediatrics, articles that reveal the benefits and contraindications of nasal irrigation were considered.

In order to answer the research question, an electronic search was carried out in two recognized database aggregators: EBSCO and B-On, using the Descriptors in Health Sciences [DeCS], 2019 edition. key ""nasal lavage", "methods", "children" and "saline solution", using the Boolean operator "AND" to combine the search terms. This was carried out by two researchers simultaneously, applying inclusion and exclusion criteria and was carried out during the month of August 2021.

As inclusion criteria, randomized controlled studies, articles with full text available and publication date from January 2016 to August 2021 were selected, in order to

maintain the scientific rigor and currentness of this Systematic Literature Review.

Articles whose theme was not relevant to the review in question, which did not refer to the previously defined population and articles without a defined scientific methodology were excluded.

With this research, between the two databases used, a total of 15 articles were obtained. Articles repeated in both databases were excluded and their relevance was analyzed by reading the title, abstract and, whenever necessary, reading the full text. The defined exclusion/inclusion criteria were applied and the research was carried out by two researchers, having been selected four studies for this Systematic Literature Review.

CRITICAL ASSESSMENT OF THE STUDIES

After selecting the studies, a critical evaluation was carried out through the application of evaluation grids of the level of evidence, reliability and relevance, which allowed classifying the studies found (Table 1).

To assess the level of evidence, the following assessment tools were chosen:*Joanna Briggs Institute* (JBI) (Institute TJB, 2014) and to assess the methodological quality of the studies, the norms of the *Effective Public Health Practice Project* (EPHPP), evidenced in table 2.

DATA EXTRACTION

(Table 3.)

DISCUSSION

The summary of the results of the selected articles is presented, for easier interpretation, in Table 3. In addition to the main results highlighted, some aspects that must be addressed are highlighted.

The studies included in this Systematic Literature Review took place between 2012 and 2016 and were published between 2016 and 2019, carefully presenting their objectives, the place where they took place, the methods used and the study participants. Regarding the place where the studies were carried out, two of them were carried out in Italy, one in Thailand and one in Portugal.

The participants involved in these studies are children, being this age group that we focus on.

Malizia et al. (2017), focused on children with seasonal allergic rhinitis, with the aim of comparing the effectiveness of using a hypertonic saline solution with the use of saline solution, for 21 days, in reducing nasal symptoms in children with this diagnosis. For this, the children were divided into two groups and, for 21 days, nasal irrigation was performed twice a day: with hypertonic saline solution for the first group; and with saline in the second group. The effectiveness of the interventions was evaluated through visits to the children at 4 different times, where a physical examination and assessment of nasal symptoms were performed. Quality of life and sleep quality were also assessed using questionnaires for this purpose.

Saatdhabudha et al. (2017), in turn, undertook to assess the effectiveness of positive pressure nasal irrigation devices in children with acute rhinosinusitis and to assess bacterial colonization of the irrigation device. Both groups were instructed to use a 1.25% hypertonic solution twice daily (until secretions were removed) for two weeks. One group did this using a squeezable bottle, the other group did it using a 20cc syringe. In both groups, amoxicillin + clavulanic acid was added. The technique to be used was demonstrated and trained by a nurse and children and caregivers were asked to report any adverse symptoms after each use,

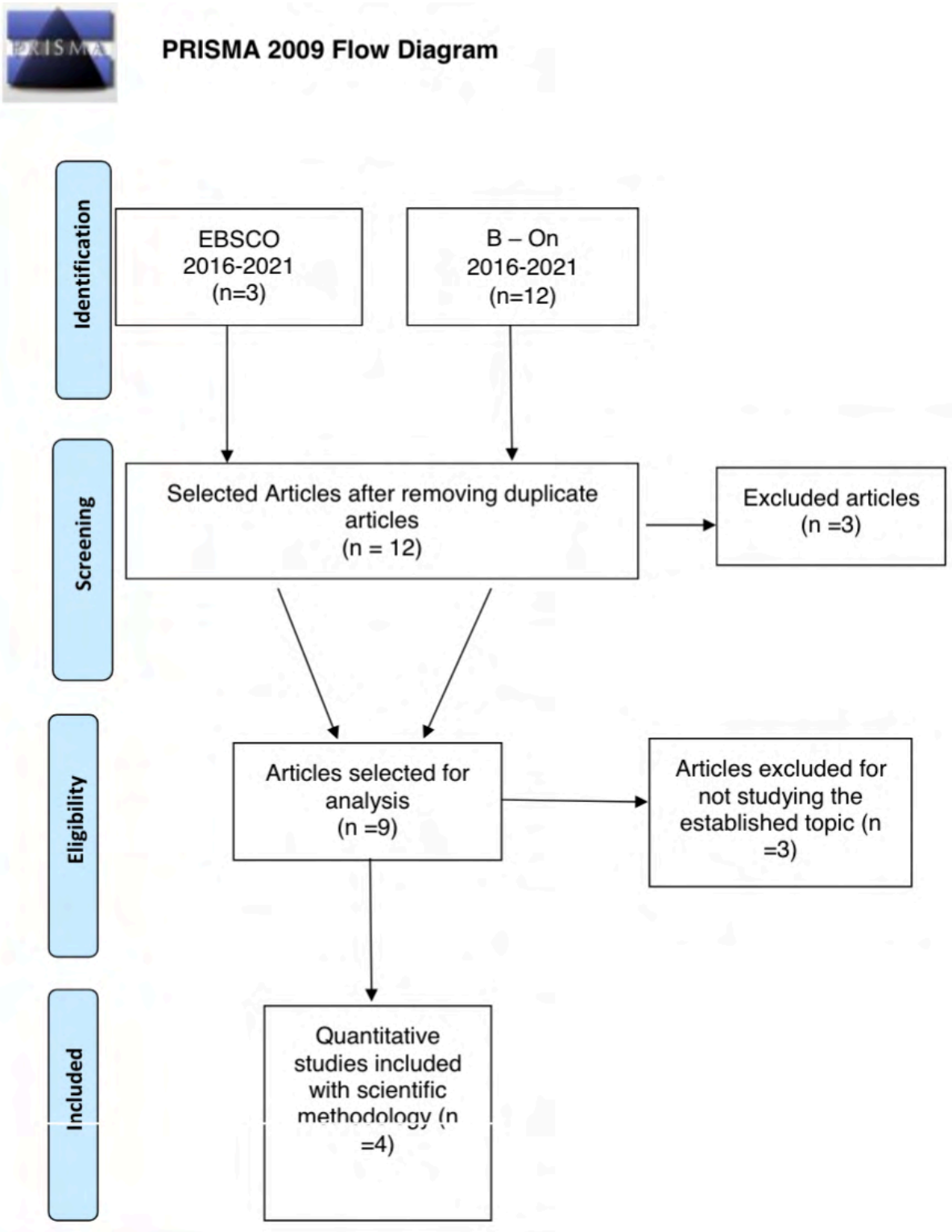

Figure 1 - Article selection flowchart

From: Moher &Liberat & Tetzlaff & Altman (2009)

Article	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Result
Article 1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	100%
Article 2	✓	✓	✓	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	92%
Article 3	✓	✓	✓	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	92%
Article 4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	100%

Table 1 – Results of the critical evaluation of the included studies according to the JBI Critical Evaluation Checklist

Article	**Evidence level: JBI** (Institute TJB, 2014)	**Methodological Recommendation (EPHPP)**
Alexandrino *et al.* (2019)	1.c	Strong
Malizia *et al.* (2017)	1.c	Strong
Satdhabudha *et al.* (2017)	1.c	Strong
Schreiber *et al.* (2016)	1.c	Strong

Table 2 - Level of evidence and recommendation of selected articles

Study Identification	**Study Purpose**	**Total of participants**	**Results**	**Duration of Intervention**
Alexandrino, A.S.; Santos, R.; Melo, C.; Tomé, D.; Bastos, J.M.; Postiaux, G. (2019)	To analyze the effect of a nasopharyngeal lavage intervention protocol on nasal obstruction and acute otitis media in children under 3 years of age with acute respiratory infection	44 children up to 3 years of age diagnosed with acute respiratory infection	Comparison between groups revealed more frequently the auscultation of a clear nasal sound in children submitted to the nasopharyngeal lavage intervention protocol. When the intra-group analysis was performed, it was found that nasopharyngeal lavage immediately improved middle ear pressure bilaterally.	January to March 2016
Malizia, V.; Fasola, S.; Ferrante, G.; Cilluffo, G.; Montalbano, L.; Landi, M.; Marchese, D.; Passalacqua, G.; Grutta, S. (2017)	To compare the effectiveness of the use of hypertonic saline solution, for 21 days, with the use of saline solution, in the reduction of nasal symptoms in children with seasonal allergic rhinitis	30 children between 6 and 13 years old with seasonal allergic rhinitis	The use of hypertonic solution proved to be more beneficial compared to the use of saline solution, also contributing to the improvement of the inflammation of the nasal mucosa. The use of the first solution also resulted in an improvement in quality of life, regardless of the solution used, there was an improvement in sleep quality, which can be attributed to the nasal cleaning effect, regardless of pH and tonicity.	Sample selection carried out between October 2015 - February 2016 21 days (May 2016)

Satdhabudha, A.; Utispan, K.; Monthanapisut, P.; Poachannukoon, O. (2017)	To assess the effectiveness of positive pressure nasal irrigation devices in children with acute rhinosinusitis and to assess bacterial colonization of the irrigation device.	80 children between 3 and 15 years old diagnosed with acute rhinosinusitis	There was an improvement in sinusitis symptoms, in the score of 5 symptoms, in the group that performed nasal irrigation with a syringe and in the group that used a compressible bottle, being significantly greater in the last group, especially in relation to nasal congestion and rhinorrhea. In both groups there was a reduction in the use of antihistamines. In both groups no significant side effects were reported, similar in both groups. In both devices, there was bacterial contamination, although it did not translate into bacterial infection for the child.	2 week period Selection carried out between March 2013 – May 2014
Schreiber, S.; Ronfani, L.; Ghirardo, S.; Minen, F.; Taddio, A. Jaber, M.; Rizzello, E.; Barbi, E. (2016)	To compare nasal irrigation with sodium chloride (isotonic or hypertonic) with basic care measures in children with bronchiolitis	133 children up to one year of age, admitted to two emergency departments, with bronchiolitis and SpO2 88-94%	After 5 minutes of the intervention, the average SpO2 of the group submitted to nasal irrigation with isotonic saline was higher than in the group submitted to nasal irrigation with hypertonic saline and than in the group submitted only to standard treatment. Differences between the isotonic group and the standard treatment group were statistically significant at all time points. The group submitted to irrigation with hypertonic saline only achieved significantly higher SpO2 values 50 minutes after the intervention, when compared to the standard treatment. No adverse effects of the interventions were reported.	October 2012 to May 2014

Table 3 – Data extraction

describe the symptoms daily and fill in a satisfaction score for nasal irrigation using a Likert scale. After two weeks, the children were reassessed. The effectiveness of the technique in controlling nasal symptoms was also evaluated by comparing the use of antihistamines and decongestants. Parents were also instructed to wash the devices with soap after each use and the device was sent for microbiological analysis, after two weeks, for bacterial identification.

In turn, Alexandrino et al. (2019) focused their study on children under 3 years of age with acute respiratory infection and analyzed the effect of applying a nasopharyngeal lavage intervention protocol on nasal obstruction and acute otitis media. In the intervention group, nasal auscultation and tympanometry were performed before the beginning and at the end of the intervention; in the control group, auscultation and tympanometry were performed after 30 minutes of normal activity. The intervention consisted of nasal irrigation with saline solution – no more than 50 ml – with a low pressure device (syringe or single-dose type) followed by a forced inspiration.

The study by Schreiber et al. (2016) defined the objective to compare the effect of nasal irrigation with isotonic sodium chloride, nasal irrigation with hypertonic sodium chloride and treatment with basic care measures in children with bronchiolitis. The children were divided into three groups: Group A (nasal irrigation with 1 ml of isotonic saline solution in each nostril, in addition to the standard treatment – nose cleaning, positioning, diaper change and feeding), Group B (nasal irrigation with 1 ml of 3% hypertonic saline in each nostril, in addition to standard treatment) and group C (only standard treatment performed). Variations in peripheral oxygen saturation (SpO2), respiratory noises, oxygenation and use of accessory muscles and respiratory difficulty at zero, 5, 15, 20 and 30 minutes were evaluated.

Although the different studies analyzed were carried out in children using different methodologies and with children with different pathologies, the benefit of nasal irrigation was unquestionable for all authors, especially in the improvement of nasal symptoms such as nasal congestion and rhinorrhea, which goes to the meeting the existing literature.

According to scientific evidence, nasal irrigation can reduce or eliminate secretions from the upper airways and liquefy secretions, contributing to the improvement of mucociliary efficiency, restoration of breathing and prevention of dissemination (Alexandrino et al., 2019; Schreiber, 2019; Schreiber, 2019). 2016; Satdhabudha, Utispan, Monthanapisut, & Poachannukoon, 2017).

The mechanical effect contributes to eliminating germs, allergens and pollutants from the nasopharynx, also contributing to the protection of the airways (Alexandrino et al., 2019; Satdhabudha et al., 2017). Evidence also suggests that, in addition to the mechanical benefit of nasal irrigation, the procedure interferes with inflammatory mediators, helping to reduce edema and contributing to the healing of the nasopharyngeal mucosa (Alexandrino et al., 2017a; Satdhabudha et al., 2017).

Nasal irrigation may thus contribute to accelerating the resolution of nasal symptoms during episodes of acute illness (Alexandrino et al., 2019). A study by Alexandrino et al. (2017a), even revealed a reduction in the rate of acute respiratory infections in the group submitted to a nasopharyngeal cleaning protocol.

Corroborating these premises, Satdhabudha et al. (2017) registered a reduction in the use of antihistamines with the application of the technique, also mentioned in a study by Torretta et al. (2019), such as reducing the use of antibiotics.

On the other hand, Alexandrino et al. (2019), based on the literature, report that acute respiratory infections, by causing inflammation of the nasopharynx, often lead to obstruction of the Eustachian tube, creating negative pressure within the middle ear, which results in effusion and aspiration of nasopharyngeal secretions, predisposing the occurrence of Acute Otitis Media. Since there is an important relationship between nasal clearance and higher middle ear pressures, described in the literature, the removal of nasopharyngeal secretions may restore middle ear pressure, according to Alexandrino et al. (2019), normalizing Eustachian tube function.

Corroborating what was previously described, Alexandrino et al. (2019) verified more frequently, the auscultation of a clear nasal sound in the children submitted to the nasal irrigation intervention protocol and improvement of the middle ear pressure immediately after the application of the intervention protocol. The technique can thus, according to the article, contribute to the reduction or elimination of nasal secretions, restoring nasal breathing and promoting ventilation and drainage of the middle ear (Alexandrino et al., 2019).

The results are in line with previous studies that demonstrate that acute upper respiratory infections are an important predisposing factor for the emergence of acute otitis media. Alexandrino et al. (2017a) even suggest that parental health education may contribute to a lower frequency of the disease. According to the article, since the symptoms of acute upper respiratory infections appear before the onset of the otitis in question, an adequate approach to the former can contribute to the prevention of acute otitis media in young children. (Alexandrino et al., 2017a).

Several authors mention benefits of nasal irrigation that go beyond those already described and that justify the search for an effective treatment for nasal obstruction. Malizia et al. (2017) showed the positive effect of nasal irrigation on the child's sleep quality, regardless of the tonicity and pH of the solution used, which can be attributed to the nasal cleaning effect. The authors also evaluated the effect on children's quality of life, which must be taken into account. Schreiber et al. (2016) show, on the other hand, the effects of nasal obstruction in increasing the work of breathing in children, and consequently, the beneficial effect of nasal irrigation.

The result of the different studies analyzed was also consistent in verifying the absence of significant side effects and that did not require the suspension of the intervention, regardless of the solution and technique used. The risk/benefit of nasal irrigation thus offers a strong argument for its recommendation (Cabaillot et al., 2020).

With the benefits of the nasal irrigation technique being explicit, the main difference in the objective of the different scientific articles consisted in the comparison between the methods used and the type of saline solution.

The optimal salinity and pH of nasal irrigation solutions are not well defined (Malizia et al., 2017), and the procedure is often performed with isotonic saline. However, previous studies suggest that a hypertonic saline solution may be more effective in reducing nasal symptoms (Satdhabudha et al., 2017; Schreiber et al., 2016), namely 3% hypertonic saline solution which may be more effective in reducing nasal symptoms. reduced airway edema, increased mucus clearance, and liquefaction of secretions (Schreiber et al., 2016). Hypertonicity can thus reduce edema thanks to induced osmotic pressure, with water transport across the epithelial membrane and consequent improvement in mucociliary clearance (Malizia et al., 2017).

Corroborating this principle, in the

study carried out by Malizia et al. (2017), the authors found that the use of hypertonic solution proved to be more beneficial than the use of saline, in improving nasal symptoms in children with seasonal allergic rhinitis such as rhinorrhea, sneezing, nasal and ocular itching. The improvement in symptoms was also associated with a reduction in eosinophils and neutrophils (assessed on nasal cytology), an improvement that was only seen in the group that used the hypertonic solution, denouncing its effect on the inflammation of the nasal mucosa.

Comparing the two solutions (hypertonic and isotonic) for a period of 21 days, the authors also concluded, after 21 days of treatment, that the improvement in the quality of life of children with allergic rhinitis was only observed in the group submitted to nasal irrigation with hypertonic.

On the contrary, the results of Schreiber et al. (2016), denounce isotonic saline as the solution capable of increasing SpO2 faster. The authors, when evaluating the effect of nasal irrigation on SpO2 in children with bronchiolitis, found that, in fact, it improved rapidly and significantly with the intervention (regardless of the solution used), an improvement that was maintained over the next 50 minutes. The percentage of children with SpO2>94% in these children was almost double that of children who did not receive nasal irrigation. After 5 minutes of the intervention, the mean SpO2 of the group submitted to nasal irrigation with isotonic saline was higher than in the group submitted to nasal irrigation with hypertonic saline and than in the group submitted to standard treatment only. The differences between the isotonic group and the standard treatment group were, in fact, statistically significant at all times. The group submitted to irrigation with hypertonic saline only achieved significantly higher SpO2 values 50 minutes after the intervention, when compared to the standard treatment. The study in question thus extols a greater effectiveness of isotonic saline compared to hypertonic.

As the same variables were not evaluated in the two previous studies and they were not performed under the same conditions, it is not possible to draw any conclusion regarding the ideal solution to be used in nasal irrigation.

Regarding the tonicity of the saline solution used, it is also important to mention that, despite the existing concerns regarding the concentration of nasal irrigation solutions, in vivo studies have shown that the use of hypertonic saline solutions below 6% does not cause damage to the epithelium, in addition to alkaline pH proves to be more beneficial for eyelash function (Malizia et al., 2017).

There is also a wide variety of systems for nasal irrigation available, from nebulizers, nasal sprays and positive pressure devices with syringe or squeezable bottle. Previous studies have shown that positive pressure systems are more effective than nebulizations or nasal sprays (Satdhabudha et al., 2017).

Compared to the use of a syringe to perform the nasal irrigation procedure, Satdhabudha et al. (2017) concluded that the use of a squeezable bottle had more advantages in improving nasal symptoms, which can be explained by the fact that the volume of the solution is more effectively delivered through the squeezable bottle into the nasal cavity and by the fact that the tip of the bottle adapts accordingly. more effectively in the nostril. In this way, the waste of the irrigated solution is reduced, which more effectively cleans the nasal mucus and allows a more effective drainage of secretions (Satdhabudha et al., 2017).

On the other hand, the use of a bottle can easily be carried out with just one hand, leaving the other free to hold the child in a favorable position. Older children can still

perform the technique autonomously through this method, adjusting the volume of the irrigated solution and controlling the pressure (Satdhabudha et al., 2017).

The authors therefore support the regular use of a positive pressure nasal irrigation device, such as the squeezable bottle, as an adjunctive treatment in pediatric sinusitis, admitting that both positive pressure techniques were well tolerated. Torretta et al. (2019) point out, however, that the procedure carried out using a bottle of saline solution and syringe is probably the easiest and cheapest method, a fact that may influence the decision of parents/caregivers when they have to decide on the methodology. used.

The study by Satdhabudha et al. (2017) also looked at bacterial contamination of the devices used, which evidence had previously proven to exist (Satdhabudha et al., 2017; Torretta et al., 2019).

Satdhabudha et al. (2017) verified the existence of bacterial contamination in both devices (86% of the total of compressible bottles and 76% of the syringes), with S. aureus being the most frequently identified microorganism, findings that are in line with the existing literature. which evidences the contamination of nasal irrigation devices (Torretta et al., 2019).

A study by Torretta et al. (2019) even concluded that this contamination occurs earlier when the procedure is performed by health professionals, results that force us to reflect on the adoption of strict hygiene and infection control measures, namely before nasal irrigation (Torretta et al, 2019).

Satdhabudha et al. (2017) concluded, however, that bacterial contamination of the devices used did not translate into bacterial infection for the child, as no bacteria involved in upper respiratory infections were isolated, and only microorganisms usually located on the skin or surfaces, such as S. aureus. and Neisseria spp. (Satdhabudha et al., 2017; Torretta et al., 2019). These results thus suggest the inexistence of a direct relationship between the contamination of the saline solution and the occurrence of any infectious process, confirming the safety of the procedure (Torretta et al., 2019). Despite this, both authors stress the importance of frequent washing of irrigation systems in order to reduce bacterial contamination, as well as the adoption of strict hygiene and infection control measures.

CONCLUSION AND IMPLICATIONS

The high prevalence of respiratory pathologies in pediatrics and the impact of nasal symptoms on the quality of life, sleep, health and well-being of the child/family, evident in the literature, justify the importance of clarifying the nasal irrigation procedure. The analysis of selected articles showed their effectiveness in resolving nasal symptoms in children, restoring breathing, reducing drug consumption and preventing complications.

Although the Standard of the Directorate-General for Health "Diagnosis and Treatment of Acute Bronchiolitis in Pediatric Age" recommends nasal clearance through the use of nasal saline solution, scientific studies point to a greater effectiveness of hypertonic saline solutions in nasal clearance, which have minor side effects, especially those with less than 6% tonicity. Isotonic saline solution, however, proved to be more effective in increasing peripheral oxygen saturation, and it was therefore not possible for us to draw any conclusions regarding the ideal solution to be used in nasal irrigation.

As for the irrigation method used, positive pressure devices are shown to be more effective, namely the use of a compressible bottle, which has an additional advantage. The use of saline solution and syringe represents, however, the

most practical and cheapest method.

Although there is bacterial contamination of the nasal irrigation devices used, there is no direct relationship between the contamination of the saline solution and the occurrence of any infectious process, confirming the safety of the procedure. In the absence of considerable side effects, the risk/benefit of nasal irrigation therefore offers a strong argument for its recommendation.

When analyzing the results, however, it must be taken into account that the different studies do not use the same criteria for evaluating the effectiveness of the procedure and the time interval and conditions in which they were performed were also not the same, heterogeneity that makes interpretation difficult. of the results and determination of definitive conclusions. Despite not calling into question the relevance and precision of the question asked, this premise reveals the need to carry out more studies with more homogeneity and precision.

Once the benefits of the technique have been proven, it is urgent to train health professionals and parents/caregivers to carry it out. Thus, it is necessary to carry out more scientific studies to support the type of irrigation solutions that enhance the benefits of nasal irrigation. Reference documents in the area of Pediatrics about the procedure would serve to standardize the provision of care, increase the effectiveness of the procedure and convey confidence to parents/caregivers, enabling them to perform it.

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