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## Research paper

# Nasal irrigation practice habits in infants: A Belgian survey

## Nasal irrigation practice habits in infants

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## ABSTRACT

**Background:** : Nasal irrigation is widely used in infants to relieve nasal obstruction. However, the nasal irrigation technique has not been standardized, and nasal irrigation practice habits (NIPH) in infants have not been investigated. Our objective was to provide an overview of NIPH in infants among parents, childcare workers, and healthcare professionals living in Belgium.

**Methods:** : Parents, childcare workers, physiotherapists, nurses, pharmacists, and physicians were invited to fill in an electronic survey questioning their NIPH in infants. The survey was disseminated through social networks, practitioners' associations, and creches.

**Results:** : The questionnaire was fully completed by 359 participants. A ready-made solution was used by 93% of participants, of whom 92% used physiological saline. The prophylactic use of nasal irrigation was considered appropriate or very appropriate by 65% of all participants. The irrigation frequency was particularly heterogeneous among participants. The optimal solution propulsion speed and solution volume to be used depended on the group of participants being interviewed. At least 37% of parents and 20% of physicians did not take a stand on the optimal irrigation volume to use in each age category. On average, 83% of participants described performing nasal irrigation by lying the infant on one side and delivering the solution through the top nostril. Finally, 74% of respondents declared that no risk was associated with this technique.

**Conclusion:** : Although some common NIPH viewpoints among the surveyed participants were identified, several disagreements were reported, reflecting the absence of a standardized method of nasal irrigation.

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## 1. Introduction

Between 0 and 3 years of life, children develop a median of 14 infections, and nine of them are upper respiratory tract infections [1]. Because these diseases are frequent and associated with sinonasal symptoms [2], it is not surprising to observe that infants experience nasal discharge for approximately 2 months during their first year of life [3]. Since infants are preferential nasal breathers [4], nasal obstruction will significantly impact their well-being by generating breathing discomfort, feeding difficulties, altered sleep quality, or even respiratory distress [5]. Therapeutic procedures aiming to relieve sinonasal symptoms and to maintain the patency of the upper airways are thus clinically relevant in infants. Nasal irrigation, which

consists of washing the nasal passage with an aqueous solution, appears to be an attractive therapeutic option.

Nasal irrigation is described as safe, inexpensive, and well tolerated among children, regardless of their age [6]. Furthermore, this technique is acknowledged to relieve symptoms not only in upper respiratory tract infections [7], but also in other conditions such as chronic rhinosinusitis [8] and allergic rhinitis [9], both with grade A evidence in children.

Despite its popularity, nasal irrigation still lacks evidence on its practical modalities [10–12]. Moreover, there are limited data on the nasal irrigation practice habits (NIPH) of people using this technique. A previous study investigated the prescribing practices of nasal irrigation among 330 physicians in Wisconsin (USA) and found that despite being used for a variety of upper respiratory tract conditions, no clear preference regarding parameters such as device, salinity, or irrigation frequency could be identified [13]. Similarly, a survey conducted among Italian pediatricians found that despite being used

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routinely in preschool children, many aspects of nasal irrigation were not clarified, thereby reducing parental compliance [14]. Finally, a recent study conducted among physicians and pharmacists in Finland found clear differences in the NIPH between these two groups, thus entailing heterogeneous therapeutic patient education [15].

To the best of our knowledge, practice patterns have neither been specifically surveyed in infants, nor have they been investigated among parents or other healthcare professionals than physicians or pharmacists. Therefore, the aim of this study was to provide an overview of NIPH in infants among a sample of parents, childcare workers, and healthcare professionals in Belgium.

## 2. Material and methods

### 2.1. Participants and survey distribution

Participants were eligible if they lived in Belgium and belonged to one of the following six groups: parents, childcare workers, nurses, pharmacists, physiotherapists, or physicians. They were invited to fill in a one-time electronic online survey about NIPH. The survey hyperlink was shared on social networks and sent to various practitioners' associations. Local authorities also shared the link to their creches. Participation was voluntary and the anonymous nature of the questionnaire was announced in the introduction to the survey. E-mail addresses, phone numbers, or names were not collected.

### 2.2. Questionnaire design

The survey was hosted on the LimeSurvey© platform (LimeSurvey GmbH, Hamburg, Germany) and was made available to participants between April 2020 and August 2020. The questionnaires were divided into four sections: "Introduction"; "Use of the technique"; "Realization of the technique"; and "Assessment of the technique." Some questions from the Introduction section were specific to the group to which the participants belonged, leading to two different versions of the questionnaire: one for the parents and one for the childcare workers and healthcare professionals. The three other sections featured the same questions regardless of the participant's group. Depending on answers to some questions, either additional questions or a free-text box appeared to allow participants to provide more details about their opinions. Therefore, the total number of questions included in the questionnaire ranged from 18 to 22.

The introduction section aimed to collect demographic data, and for the professionals, work experience and the type of practice. For parents, the questionnaire asked to identify the educator of the nasal irrigation technique and where it was learned. If several education sources were identified, participants could define how similar were the techniques learned. The "Use of the technique" section surveyed the adequacy and frequency of nasal irrigation in specific situations and included a self-assessment of the respondent's proficiency in performing the technique through a Likert scale ranging from 1 (absolutely not proficient) to 5 (perfectly proficient). The "Realization of the technique" section surveyed the positioning of the infant, the device used (multiple choice question), the liquid propulsion speed through a Likert scale ranging from 1 (I propel the liquid very slowly) to 5 (I propel the liquid very quickly), and the characteristics of the solution (volume, temperature, type of solution, and whether the liquid was previously boiled or not). The "Assessment of the technique" section asked participants to indicate whether they considered that nasal irrigation presented a risk and, if so, asked to specify its severity through a Likert scale ranging from 1 (very low) to 5 (extremely high). The nature of the risk was then asked to be detailed via a free-text box.

English (Appendix A), Dutch (Appendix B), and French (Appendix C) versions of the NIPH survey<sup>1</sup> were used for the purpose of this study.

### 2.3. Data analysis

In order to identify trends, the minimal number of participants per group in the NIPH survey was arbitrarily set to 30. The shape of the curve of normally distributed data sets generally stabilizes at  $n = 30$  [16]. Only fully completed questionnaires were included in the analysis. Descriptive statistics are presented as numbers (with percentages), means, and standard deviations (SD).

## 3. Results

A total of 560 individuals answered the NIPH survey but only 359 questionnaires were fully completed and thus analyzed (Table 1). The following results are displayed according to the four sections of the questionnaire.

### 3.1. Introduction section

Demographics and work experience are displayed in Table 1. Regarding the practice setting, physiotherapists ( $n = 121$ ) and physicians ( $n = 35$ ) mostly reported working in a private practice (88% and 83%, respectively), whereas nurses ( $n = 48$ ) mostly reported working in a hospital (46%).

Parents ( $n = 73$ ) learned the nasal irrigation technique from different sources. The most frequent education sources were the physicians (53%) followed by the Internet (47%), nurses (29%), relatives (29%), and physiotherapists (26%). The parents declared that physiotherapists and nurses were more inclined to use both explanation and demonstration (68% and 43% of them, respectively) while physicians were more likely to teach nasal irrigation through explanations only (64%).

Among the 53 parents who declared having learned the nasal irrigation technique from several sources, 74% considered these techniques to be similar (from nearly the same to exactly the same). Among healthcare professionals and childcare workers ( $n = 286$ ), 84% declared that they learned the technique from several sources, and 63% of them considered the techniques as similar.

### 3.2. Use of the technique

The appropriateness of nasal irrigation in different contexts among each category of participant is detailed in Table 2. For the whole cohort of respondents ( $n = 359$ ), 65% considered the preventive use of nasal irrigation as appropriate or very appropriate. Pharmacists and physiotherapists were the most likely to consider preventive use to be very appropriate. From this subset of participants ( $n = 232$ ), 37% reported using nasal irrigation for prevention at a frequency of once a day in infants and 19% reported using it twice a day. Among the parents who considered this use as appropriate or very appropriate ( $n = 41$ ), 29% reported not using it.

In the case of nasal obstruction, 95% of all participants considered the use of nasal irrigation as appropriate to very appropriate. Fig. 1 details the answers of participants regarding the optimal frequency of nasal irrigation in this context.

Regarding the self-assessment of the level of proficiency in the nasal irrigation technique, parents mostly rated their own proficiency level as 3 out of 5 whereas physiotherapists, physicians, nurses, and pharmacists mostly selected "4". Childcare workers mostly selected "5".

<sup>1</sup> [www.shorturl.at/hzIY4](http://www.shorturl.at/hzIY4)

**Table 1**

Demographics of nasal irrigation practice habits survey participants.

| Group             | Number of respondents | Mean age (SD) | Mean number of years of work experience (SD) | Flemish Region (n) | Walloon Region (n) | Brussels Capital Region (n) |
|-------------------|-----------------------|---------------|----------------------------------------------|--------------------|--------------------|-----------------------------|
| Physiotherapists  | 121                   | 32.8 (7.1)    | 9.8 (9.2)                                    | 59                 | 50                 | 12                          |
| Physicians        | 35                    | 39.7 (12.6)   | 13.8 (12.7)                                  | 6                  | 24                 | 5                           |
| Nurses            | 48                    | 36.6 (10.5)   | 12.8 (10.6)                                  | 9                  | 31                 | 8                           |
| Parents           | 73                    | 35.2 (6.3)    | /                                            | 9                  | 23                 | 41                          |
| Pharmacists       | 41                    | 39.9 (11.7)   | 15.8 (11.7)                                  | 10                 | 19                 | 12                          |
| Childcare workers | 41                    | 34.5 (10)     | 12 (9.6)                                     | 11                 | 23                 | 7                           |
| Total             | 359                   | 35.5 (9.5)    | 12 (10.6)                                    | 104                | 170                | 85                          |

SD: standard deviation.

### 3.3. Realization of the technique

Fig. 2 shows that sterile single dose was the most selected device in each group, particularly among childcare workers and physicians, where this device was chosen by, respectively, 88% and 83% of participants. The optimal solution volume to be used for nasal irrigation in infants is detailed in Table 3. Regarding infants aged 0–6 months, the participants taking a stand ( $n = 289$ ) mostly considered 1–5 mL per nostril to be the most appropriate volume of solution to use in infants aged 0–6 months (61%). More discrepancies arose for infants aged 6–24 months, where a volume of 5–10 mL was preferred among participants. Within the different age categories, physiotherapists and, to a lesser extent, pharmacists, were most likely to use higher irrigation solution volumes in infants compared to other groups of respondents. At least 37% of parents and 20% of physicians did not take a stand on the optimal irrigation volume to use in each age category. A ready-made solution was used by 93% of all respondents, of whom 92% reported using physiological saline solution. Among users of a homemade solution ( $n = 26$ ), 62% did not boil their solution beforehand. Moreover, 73% of homemade solution users reported that their solution was made of tap water and roughly half of them added salt to obtain an isotonic solution of sodium chloride.

Table 4 shows the optimal temperature of the solution used to perform nasal irrigation in infants. Among the participants who commented on the solution temperature ( $n = 339$ ), 68% declared that a room temperature was the optimal temperature.

Regarding the position of the infant when performing nasal irrigation, the side-lying position associated with the delivery of solution through the top nostril was identified as being the optimal technique by most of the respondents (83%).

The solution propulsion speed to be used was heterogeneous among the different groups.

Fig. 3 details the distribution of response per group of participants.

### 3.4. Estimated risks of the technique

Only 26% of the whole cohort of respondents considered that a risk was associated with nasal irrigation in infants. A majority of physiotherapists and physicians rated this potential risk as very low (1 out of 5), 40% and 50%, respectively, whereas 39% of nurses and 50% of pharmacists rated this risk as a 3 out of 5. Among the participants who mentioned a risk ( $n = 78$ ), the most reported types of risk

**Table 2**

Appropriateness of nasal irrigation in infants in different contexts, according to the different groups of participants.

| Context                                                                                                | Group (n)              | Very inappropriate | Inappropriate | Appropriate | Very appropriate |
|--------------------------------------------------------------------------------------------------------|------------------------|--------------------|---------------|-------------|------------------|
| As prevention (prophylaxis)                                                                            | Physiotherapists (121) | 5%                 | 26%           | 45%         | 24%              |
|                                                                                                        | Physicians (35)        | 11%                | 26%           | 51%         | 11%              |
|                                                                                                        | Nurses (48)            | 6%                 | 31%           | 52%         | 10%              |
|                                                                                                        | Parents (73)           | 8%                 | 36%           | 45%         | 11%              |
|                                                                                                        | Pharmacists (41)       | 2%                 | 15%           | 51%         | 32%              |
|                                                                                                        | Childcare workers (41) | 5%                 | 44%           | 44%         | 7%               |
|                                                                                                        | Total (359)            | 6%                 | 29%           | 47%         | 17%              |
| In case of nasal obstruction                                                                           | Physiotherapists (121) | 3%                 | 2%            | 19%         | 75%              |
|                                                                                                        | Physicians (35)        | 3%                 | 0%            | 26%         | 71%              |
|                                                                                                        | Nurses (48)            | 4%                 | 4%            | 23%         | 69%              |
|                                                                                                        | Parents (73)           | 3%                 | 3%            | 30%         | 64%              |
|                                                                                                        | Pharmacists (41)       | 0%                 | 2%            | 24%         | 73%              |
|                                                                                                        | Childcare workers (41) | 0%                 | 2%            | 34%         | 63%              |
|                                                                                                        | Total (359)            | 3%                 | 3%            | 25%         | 70%              |
| In perioperative period (before and/or after), for respiratory, neurological or cardiologic operations | Physiotherapists (121) | 0%                 | 21%           | 60%         | 20%              |
|                                                                                                        | Physicians (35)        | 9%                 | 23%           | 57%         | 11%              |
|                                                                                                        | Nurses (48)            | 6%                 | 21%           | 60%         | 13%              |
|                                                                                                        | Parents (73)           | 1%                 | 26%           | 63%         | 10%              |
|                                                                                                        | Pharmacists (41)       | 5%                 | 7%            | 68%         | 20%              |
|                                                                                                        | Childcare workers (41) | 5%                 | 17%           | 59%         | 20%              |
|                                                                                                        | Total (359)            | 3%                 | 20%           | 61%         | 16%              |
| When the child has difficulties in feeding                                                             | Physiotherapists (121) | 0%                 | 22%           | 54%         | 24%              |
|                                                                                                        | Physicians (35)        | 6%                 | 6%            | 63%         | 26%              |
|                                                                                                        | Nurses (48)            | 6%                 | 21%           | 42%         | 31%              |
|                                                                                                        | Parents (73)           | 8%                 | 30%           | 48%         | 14%              |
|                                                                                                        | Pharmacists (41)       | 7%                 | 29%           | 44%         | 20%              |
|                                                                                                        | Childcare workers (41) | 5%                 | 10%           | 49%         | 37%              |
|                                                                                                        | Total (359)            | 4%                 | 21%           | 50%         | 24%              |

Percentages may not total 100% due to rounding.

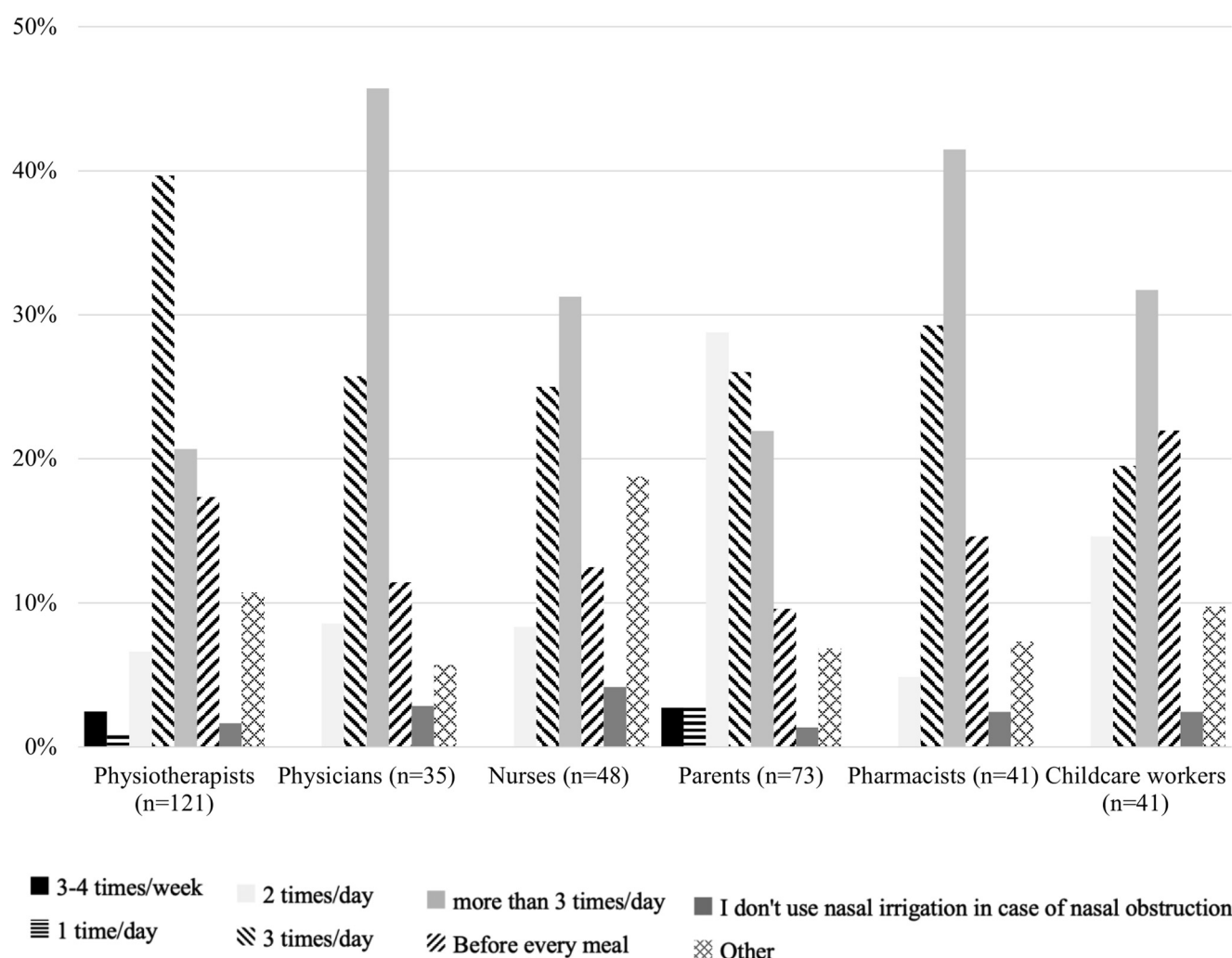


Fig. 1. Frequencies of nasal irrigation in infants for nasal obstruction according to the different groups of participants.

were aspiration (57%), nostril injury (43%), and psychological trauma (10%).

#### 4. Discussion

This is the first study to assess the NIPH of parents, childcare workers, and healthcare professionals in infants. The main findings were the following. First, most participants considered nasal irrigation to be appropriate or very appropriate in the case of nasal obstruction and in prevention. Second, most participants reported performing the technique with a sterile single dose containing a physiological saline solution, positioning the infant in a side-lying position, and delivering the solution through the top nostril. Third, discrepancies regarding other aspects of the realization of the technique were reported, especially regarding the optimal irrigation frequency and the ideal solution volume to use in infants.

Even though the benefit of using nasal irrigation in prevention was outlined by most respondents, its prophylactic use was not actually carried out in practice by 29% of parents. However, the use of nasal irrigation in that context was shown to prevent the recurrence of upper respiratory tract infections in children aged 6–10 years [17]. There may be an interest in a technique that reduces the number of upper respiratory infections in infants. However, there is currently no evidence supporting the preventive use of nasal irrigation in infants. Therefore, we suggest that the lack of preventive nasal irrigation practice originates from the lack of such studies focusing on

infants. Additionally, participants mostly considered that nasal irrigation was safe in infants, which is in accordance with a systematic review and meta-analysis by Cabaillet et al. (2020). Pharmacists reported a higher risk in performing this technique. We hypothesize that differences in professional training [15] and lack of hands-on experience may result in this technique being perceived as more harmful than it is. Moreover, it has been shown that the nasal epithelium's innate natural defenses are potentially compromised in the post-irrigation period in adults [18]. No study has been conducted on the long-term impact of prophylactic nasal irrigation on the sinonasal microbiota, emphasizing the need for multidisciplinary investigations in that regard.

Regarding the realization of the technique, a sterile single dose was the most widely selected irrigation device. Consistent with this, ready-made isotonic solutions were the most broadly used. Interestingly, a previous meta-analysis concluded that hypertonic saline showed greater benefits than isotonic saline in treating sinonasal diseases, especially in patients under the age of 18, although it caused more nasal discomfort and side effects [19]. Therefore, the greater propensity to use isotonic solution might be explained by the fear of causing any discomfort to the infant who is unable to verbalize his or her emotions and is susceptible to experiencing such a situation as a psychological trauma, as mentioned by some participants. Among participants using a tap water-based homemade solution, only a minority boiled this solution prior to irrigation. This goes against the suggested preventive measures of a previous study reporting several

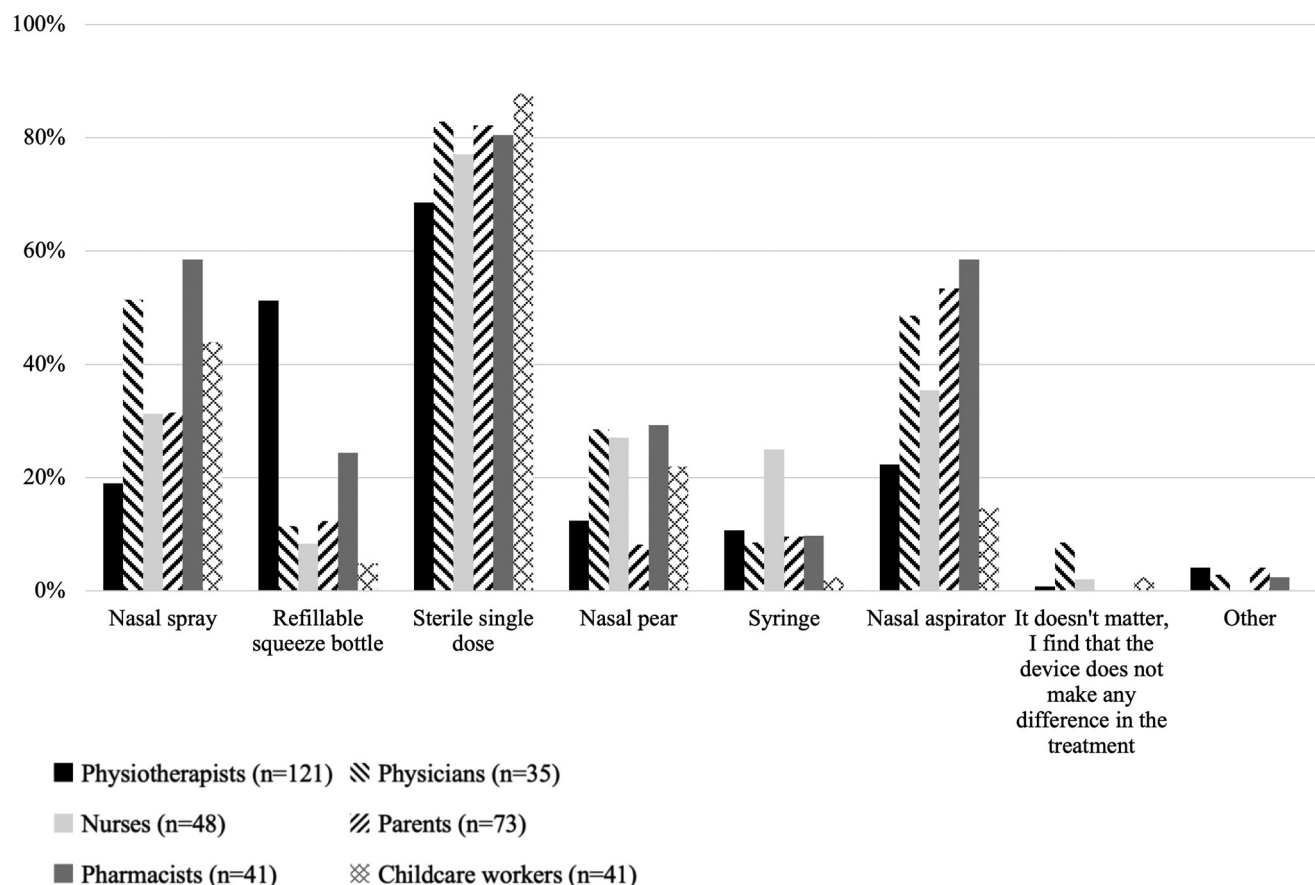


Fig. 2. Devices used for nasal irrigation in infants according to the different groups of participants.

cases of death due to *Naegleria fowleri* contamination following nasal irrigation with contaminated tap water [20]. More recently, the use of distilled or bottled water has even been recommended due to the increased risk of bacterial contamination with a boiled solution [21].

At least 37% of parents and 20% of physicians did not comment on which volume would be the best to use regarding each age category,

reflecting the current gap in the literature on this topic [12]. Pediatric studies mentioned volumes ranging from a few drops [22] to 20 mL in children around 5 years or age [23]. A study attempting to describe a method of pediatric nasal irrigation suggested the empirical use of a volume of 6 mL per nostril, estimating that the appropriate volume to irrigate the nasal cavity must be equal to at least three times its

Table 3

Solution volumes for nasal irrigation in infants according to the different groups of participants.

|                             | Group (n) / Volume (mL) per nostril | 1–5 | 5–10 | 10–20 | 20–50 | >50 | It doesn't matter, I think that the volume doesn't make any difference in the treatment | I don't know |
|-----------------------------|-------------------------------------|-----|------|-------|-------|-----|-----------------------------------------------------------------------------------------|--------------|
| From 0 to 6 months of age   | Physiotherapists (121)              | 29% | 18%  | 16%   | 11%   | 2%  | 7%                                                                                      | 18%          |
|                             | Physicians (35)                     | 57% | 11%  | 3%    | 0%    | 0%  | 9%                                                                                      | 20%          |
|                             | Nurses (48)                         | 69% | 13%  | 4%    | 4%    | 0%  | 0%                                                                                      | 10%          |
|                             | Parents (73)                        | 47% | 10%  | 1%    | 3%    | 0%  | 3%                                                                                      | 37%          |
|                             | Pharmacists (41)                    | 66% | 20%  | 2%    | 2%    | 0%  | 2%                                                                                      | 7%           |
|                             | Childcare workers (41)              | 68% | 10%  | 2%    | 0%    | 0%  | 5%                                                                                      | 15%          |
|                             | Total (359)                         | 49% | 14%  | 7%    | 5%    | 1%  | 4%                                                                                      | 19%          |
| From 6 to 12 months of age  | Physiotherapists (121)              | 12% | 24%  | 16%   | 18%   | 6%  | 7%                                                                                      | 18%          |
|                             | Physicians (35)                     | 40% | 26%  | 3%    | 3%    | 0%  | 9%                                                                                      | 20%          |
|                             | Nurses (48)                         | 35% | 38%  | 8%    | 6%    | 0%  | 0%                                                                                      | 13%          |
|                             | Parents (73)                        | 22% | 25%  | 5%    | 3%    | 0%  | 3%                                                                                      | 42%          |
|                             | Pharmacists (41)                    | 34% | 41%  | 10%   | 0%    | 2%  | 2%                                                                                      | 10%          |
|                             | Childcare workers (41)              | 39% | 37%  | 7%    | 2%    | 0%  | 5%                                                                                      | 10%          |
|                             | Total (359)                         | 25% | 30%  | 10%   | 8%    | 2%  | 4%                                                                                      | 21%          |
| From 12 to 24 months of age | Physiotherapists (121)              | 6%  | 19%  | 15%   | 21%   | 11% | 7%                                                                                      | 21%          |
|                             | Physicians (35)                     | 17% | 31%  | 14%   | 0%    | 3%  | 11%                                                                                     | 23%          |
|                             | Nurses (48)                         | 25% | 35%  | 19%   | 4%    | 4%  | 0%                                                                                      | 13%          |
|                             | Parents (73)                        | 8%  | 27%  | 12%   | 4%    | 0%  | 4%                                                                                      | 44%          |
|                             | Pharmacists (41)                    | 32% | 29%  | 22%   | 2%    | 2%  | 2%                                                                                      | 10%          |
|                             | Childcare workers (41)              | 32% | 39%  | 7%    | 5%    | 0%  | 7%                                                                                      | 10%          |
|                             | Total (359)                         | 16% | 28%  | 15%   | 9%    | 5%  | 6%                                                                                      | 22%          |

Percentages may not total 100% due to rounding.

**Table 4**

Solution temperatures for nasal irrigation in infants according to the different groups of participants.

| Group (n)                  | "Cold" temperature<br>(liquid from the<br>refrigerator) | Room<br>temperature<br>(+/- 20 °C) | Body temperature<br>(+/- 37 °C) | "Hot" temperature<br>(liquid heated<br>before use) | Irrelevant, I find that the<br>temperature does not make any<br>difference in the treatment | I don't know | Other |
|----------------------------|---------------------------------------------------------|------------------------------------|---------------------------------|----------------------------------------------------|---------------------------------------------------------------------------------------------|--------------|-------|
| Physiotherapists (n = 121) | 0%                                                      | 51%                                | 43%                             | 1%                                                 | 1%                                                                                          | 3%           | 2%    |
| Physicians (n = 35)        | 0%                                                      | 60%                                | 20%                             | 0%                                                 | 6%                                                                                          | 11%          | 3%    |
| Nurses (n = 48)            | 0%                                                      | 81%                                | 19%                             | 0%                                                 | 0%                                                                                          | 0%           | 0%    |
| Parents (n = 73)           | 0%                                                      | 75%                                | 14%                             | 0%                                                 | 1%                                                                                          | 8%           | 1%    |
| Pharmacists (n = 41)       | 0%                                                      | 51%                                | 29%                             | 0%                                                 | 5%                                                                                          | 10%          | 5%    |
| Childcare workers (n = 41) | 0%                                                      | 76%                                | 12%                             | 0%                                                 | 2%                                                                                          | 7%           | 2%    |
| Total (359)                | 0%                                                      | 64%                                | 26%                             | 0%                                                 | 2%                                                                                          | 6%           | 2%    |

Percentages may not total 100% due to rounding.

volume [24]. There are currently no data allowing us to conclude on the superiority of high- or low-volume irrigations in infants. Future studies should attempt to determine the recommended volume of solution to use.

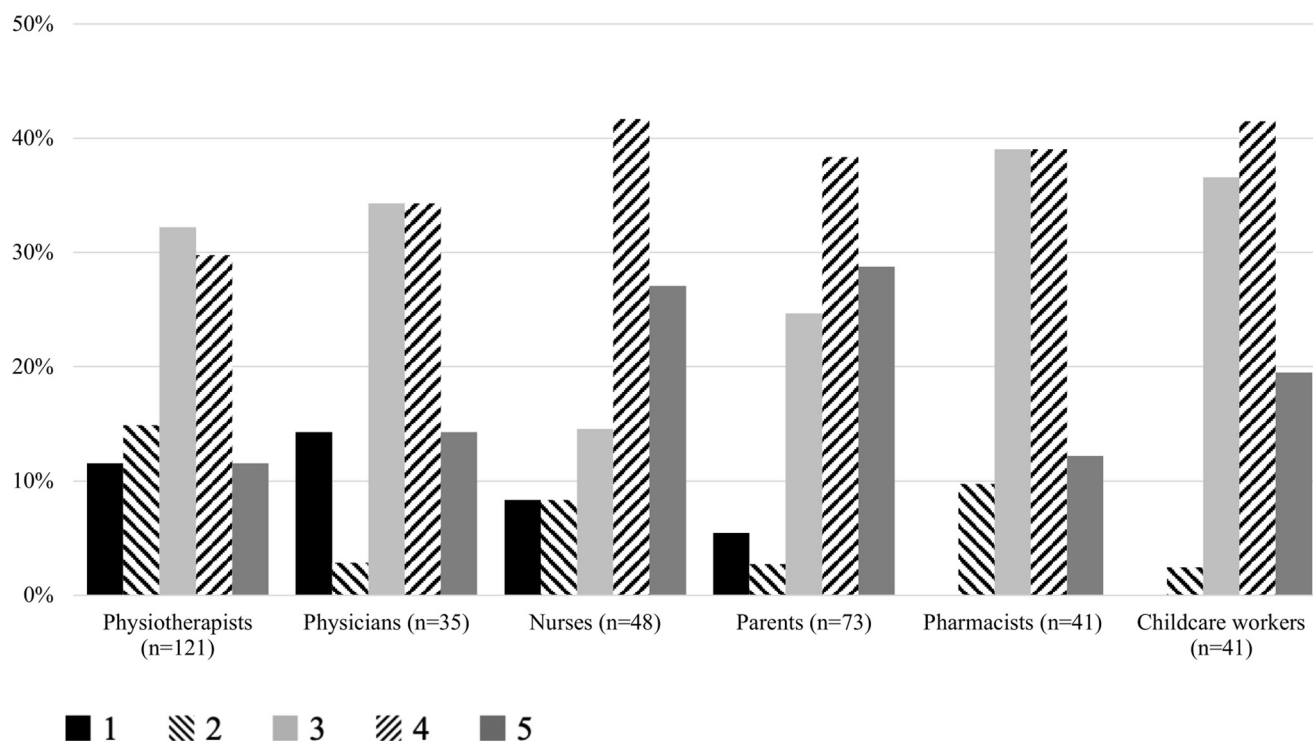
No studies investigating the solution propulsion speed in infants could be found. Trials on nasal irrigation in adults regularly refer to high- or low-pressure administration and devices. A high-volume low-pressure douching system appeared to be superior to a spray in reducing adhesions and crusts following functional endoscopic sinus surgery [25]. Nasal douching systems also seem to enhance the solution distribution within the nasal cavity and sinuses when compared to a metered spray bottle or a nebulizer [26]. However, one should be cautious about applying these findings from adult to infants, since their sinonasal anatomy differs significantly. In addition to the narrow anatomical conditions, the nose of the toddler will, for instance, contain more mucosa, and the only sinuses present at birth will be the maxillary sinus and the ethmoid sinuses [27].

The side-lying position was recommended by a majority of Italian pediatricians for nasal irrigation in infants, which concurs with our findings [14]. Although previous studies investigated the influence of head positioning on sinus irrigation, most of them were based on

adult anatomical models, which does not fully capture elements of in vivo anatomy or clinical situations such as mucosal congestion under symptomatic conditions [28]. No studies investigating the influence of the infant's positioning on the efficiency of irrigation could be found, thus highlighting the need for future research.

Parents showed a potential lack of self-confidence in performing this technique. This highlights the need to increase parents' confidence in performing nasal irrigation in their offspring. Healthcare professionals' explanation ideally accompanied by a demonstration of the technique might fulfill this need. Indeed, it has been shown that verbal teaching should not be used alone but in addition to another teaching strategy [29]. A recent study concluded on the high heterogeneity of current therapeutic patient education on nasal irrigation [15]. The same study also reported clear interprofessional differences in practices, reflecting the absence of standardization of this technique. Once standardized, the nasal irrigation technique in infants can be promoted in a homogeneous way by healthcare professionals to parents.

Several limitations must be considered when interpreting our results. Firstly, a minimal number of 30 participants per group was arbitrarily set. This threshold was sometimes considered to be a rule



**Fig. 3.** Solution propulsion speed during nasal irrigation in infants according to the different groups of participants  
1= "I propel the liquid very slowly", 5= "I propel the liquid very quickly".

of thumb [30] and may not be sufficient to accurately reflect the opinion of Belgian practitioners of the technique. Nonetheless, no statistical inference was made based on the NIPH survey. Secondly, a selection bias is likely. The survey was disseminated through social networks, practitioners' associations, and creches. Therefore, participants who were already aware and educated on the subject might have been more inclined to answer the survey, whereas practitioners who were less familiar with the topic might have been reluctant to answer the questions. Finally, the use of nasal irrigation in infants with comorbidities was not addressed in the present study and could potentially lead to different findings.

## 5. Conclusion

This study identified several common NIPH in infants between Belgian parents, childcare workers, and healthcare professionals. This was, for instance, the case for the nasal irrigation device, the salinity of the solution, and the positioning of the infant. Conflicting opinions were also reported, specifically in regard to the optimal solution volume and the ideal nasal irrigation frequency. This reflects the absence of a standardized method of irrigation. Further studies are required to clarify the optimal methodology of nasal irrigation in infants and to provide guidance for parents and healthcare professionals alike. Once this step is complete, education will play a crucial role to ensure the implementation of good practice among practitioners of this technique.

## Sources of support

None.

## Declaration of Interest

None

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