Cross-cultural adaptation of the sinus and nasal quality of life survey (SN-5) to Spanish

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Objective: There is a high prevalence for rhinitis with an increasing trend. However, there is a lack of specific quality of life pediatric questionnaires for sinonasal symptoms. The Sinus and Nasal Quality of Life Survey (SN-5) is the only validated instrument specifically designed with this objective. In this work we have translated and validated the Spanish version of the SN5 questionnaire.

Methods: The SN5 was translated according to the World Health Organization recommendation for the translation and adaptation of instruments. The final version of the Sp-SN5 was administered twice (day 0 and day 7) to 137 participants with and without sinonasal symptoms. Reliability was measured with Cronbach α, temporal stability was measured with intraclass correlation coefficient. External validity was assessed with a ROC curve comparing a cohort of cases (children going to turbinate radiofrequency ablation) and controls (asymptomatic children).

Results: A Spearman correlation between the total result of the Sp-SN-5 questionnaire and the QOL score showed a strong negative correlation in the general sample and all the age subgroups.

Internal consistency measured with Cronbach α was 0.87 for 5 items and was still over 0.83 after removing each item of the test. The intraclass correlation coefficient (ICC) for test-retest measurements was 0.94. The receiver operating characteristic (ROC) curve for all the included participants showed a very high area under the curve (0.998).

Conclusions: The Sp–SN–5 questionnaire was successfully translated and cross-culturally adapted into Spanish, and the translated version exhibited adequate properties. The survey was effective in assessing the quality of life of pediatric patients with sinonasal complaints and can be used for this purpose both in a clinical setting and in future research.

1. Introduction

Chronic nasal congestion is a common pediatric symptom that prompts visits to the otorhinolaryngologist. Rhinitis and chronic rhinosinusitis are habitual diagnosis in children. True sinusitis in young patients seen by primary pediatricians in the winter months comprises 4.2% of all visits and 17.3% of those displaying cold or cough symptoms [1].

The International Study of Asthma and Allergies in Childhood (ISAAC) revealed a high prevalence for rhinitis in Spanish children, it being 12.6–25% for children aged 6–7 years [3], and 31.2% for children aged 13–14 years [3], with an increasing trend in recent series [2,4]. These conditions pose important difficulties for patients, given that nasal obstruction and congestion may decrease quality of life (QOL), reduce concentration or attention span, affect dentofacial growth [5], compromise body posture [6], and even be a cause of obstructive sleep apnea [7]. In fact, the perception held by parents of the effect of sinonasal conditions on their children’s quality of life is similar to that of other diseases such as asthma, epilepsy, or rheumatoid arthritis [8].

The main instruments used in the assessment of QOL are questionnaires. These are intended to assess the various aspects and dimensions of a patient’s life, including physical, psychological, social performance and pain, in addition to disease specific symptoms [9]. Several
disease-specific questionnaires have been developed to characterize morbidity in patients with sinonasal disease, such as the widespread Sino-Nasal Outcome Test-20 and -22 (SNOT-20 and -22) [10,11]. However, these were not specifically designed and validated in children. This lack of child-specific data makes it difficult for clinicians to determine the effects on QOL nasal illness may have in pediatric patients.

The Sinus and Nasal Quality of Life Survey (SN-5) is the only validated instrument specifically designed to assess the quality of life related to sinonasal symptoms in the pediatric population. This survey evaluates 5 specific domains of symptoms (sinus infection, nasal obstruction, allergy, emotional distress, and activity limitations) and asks caregivers to rate their children’s symptoms on a 7-point Likert scale [12]. In addition to the symptomatic evaluation, caregivers evaluate the child’s overall QOL on a visual analog scale (VAS) from 0 to 10. Since its publication it has been widely popularized and has been used in research assessing pediatric turbinate surgery [13], adenoidectomy [14,15], balloon catheter sinusplasty [15–19], endoscopic sinus surgery [20,21], and medical treatment of chronic rhinosinusitis [18,22,23]. Recently, a systematic review assessing the SN-5 demonstrated a good internal and external validity of the test [24]. Furthermore, it has been translated and validated into Portuguese [25].

Spanish is the second most spoken language in the world with regard to the number of native speakers. To date there is no specific QOL instrument for pediatric sinonasal symptoms validated in Spanish. The aim of this study was to document the reliability and validity of our Spanish translation of the SN-5 (Sp–SN–5).

2. Subjects and methods

2.1. SN-5 translation

The original Sinus and Nasal Quality of Life Survey (SN-5) evaluates 5 clusters of symptoms (sinus infection, nasal obstruction, allergy, emotional distress, and activity limitations). Each cluster has a series of symptoms selected to help parents to understand the nature of what is being assessed. Each cluster of symptoms is rated on a 7-point Likert scale, from 0 (never) to 6 (all the time). In addition to the symptomatic evaluation, caregivers evaluate the child’s overall QOL on a visual analog scale (VAS) from 0 (worst possible) to 10 (best possible).

We followed the recommendations of the WHO for the translation and adaptation of instruments: 1) A first translation (v1) was developed by a multidisciplinary team which included two pediatric otolaryngologists, two general otolaryngologists, 2 rhinologists, and an orthodontist, all native Spanish speakers except for a native bilingual English-Spanish speaker. 2) v1 was sent to a panel of seven experts in pediatric otolaryngology throughout Spain (different from the initial team). Three versions of the translated test (v2, v3 and v4) were developed until a general consensus was reached. 3) The fourth version (v4) was sent to a native English-Spanish speaker for back-translation. No changes were made. 4) Afterwards, a pre-test cognitive interview was carried out in 50 patients to check for comprehensibility in the translated questionnaire. There were no changes after this phase.

2.2. Participants

Regarding the inclusion criteria, a first cohort of pediatric participants ranging from 4 to 12 years of age from the pediatric otolaryngology outpatient clinic of a tertiary-level referral center in Spain were consecutively offered to participate regardless of their sinonasal symptoms. One hundred participants were recruited from November 2019 to May 2020.

A second cohort of sixty additional participants were also included from a cohort of children with uncontrolled allergic rhinitis and excessive vertical facial growth going to inferior turbinate radiofrequency ablation in order to assess the external validity of the test. All of them had been diagnosed using clinical examinations and rhinomanometry with normalization of nasal resistance after nasal decongestant.

A third cohort of asymptomatic children, siblings of current patients, were also recruited so as to obtain answers covering the full spectrum of possibilities. This cohort of controls did not present any rhinologic complaint, and their physical examination was normal.

The sample size was previously calculated for a correlation analysis, assuming an alfa risk of 0.05, a beta risk of 0.20, and a minimal correlation of 0.25.

Exclusion criteria were the negative of the parents to participate in the study or patients, children who had started treatment before the second test. Patients whose caregivers did not have sufficient cognitive skills, assessed by interview, to complete the questionnaires or those who were unable to read and understand Spanish were also excluded.

2.3. Sp–SN–5

All the included participants’ caregivers filled in a first version of the Sp–SN–5 in the pediatric otolaryngology outpatient clinic instructed by senior authors (GMC, AFG). Different interviewers (BVB, BBC), blinded to the first answer, telephoned participant’s parents on the 7th day after having completed the first questionnaire. If the participants did not answer, they were contacted again on the 8th day. If there still was no answer, they were considered a lost to follow-up.

This repeated measurement was made after a 7-day interval to prevent memory bias and, at the same time, ensure comparability between both tests. Regarding the former, both participants and interviewer did not have access to the first questionnaire and regarding the latter; patients were asked not to follow any treatment before the second tests were performed to guarantee full comparability between both results.

2.4. Statistical methods and psychometric evaluation of the instruments

2.4.1. Internal methods and psychometric evaluation of the instruments

Internal validity or reliability refers to the accuracy of a measurement without random error. That means that repeated measurements offer constant and similar results. Reliability can be evaluated by ascertaining consistency, temporal stability and inter-observer concordance.

Temporal stability: also known as test-retest reliability. It refers to the concordance between the scores of repeated measurements from the same participant. It can be assessed by the intraclass correlation coefficient. A correlation value over 0.80 is considered high. Using a mixed model containing random effects (participants), and fixed effects (questionnaire items), we employed the intraclass correlation coefficient and an absolute agreement model.

Consistency: it refers to the extent to which each question of the scale relates to the rest. Cronbach α is the most widely used method to measure it. Values over 0.80 suggest a strong construct validity, which increases the closer it is to 1. Cronbach α was measured using the first questionnaire to prevent memory bias.

2.4.2. External validity

External validity refers to the extent to which results from a study can be generalized and applied to other situations, groups or events. It means, in other words, that the test measures what it is supposed to measure.

With this objective we included both asymptomatic controls and confirmed patients. Patients were children between 4 and 12 years of age suffering from uncontrolled allergic rhinitis going to turbinate radiofrequency ablation. The surgery was indicated in children with turbinate hypertrophy (Camacho III or IV) [26], who normalized their nasal resistance in rhinomanometry with nasal decongestant. Controls were children showing no rhinological complaints and anodyne examinations.
2. IRB approval

The study was performed in accordance with the ethical standards laid down in the Declaration of Helsinki. The study protocol was approved by the Research and Ethics Committee of the Hospital Complex of Santiago de Compostela, register code 2019/419.

2.6. Statistical analysis

Statistical analysis was conducted with STATA for Macintosh v. 15.1 (StataCorp®). Normality of all the quantitative variables was assessed with Doornik-Hansen test.

Internal consistency was measured with Cronbach α and temporal stability using the intraclass correlation coefficient (P < 0.05). External validity was assessed with the U-Mann Whitney test, and the cutoff value was assessed with a receiver operating characteristic (ROC) curve.

3. Results

3.1. Participants

A total of 154 participants completed the initial surveys, 80 were female and 74 male. Of these, 137 presented both baseline and follow-up data, which constitutes a 11.04% of lost to follow-up. No participants were excluded for following treatment before the second tests were performed. Mean age of included participants was 7.86 and median age 7.59 (range 4.02–11.98).

The age did not show a normal distribution under the Doornik-Hansen test (p = 0.002).

3.2. SN-5 distribution

Regarding the SN-5 distribution, there was a skewness of 0.60, which can be read as a positive asymmetry. The distribution of results by interval can be seen in Fig. 1.

The average results per item and age subgroups are summarized in Table 1. The data were presented as mean ± standard deviation (SD). The mean value was 8.42, 12.72 for cases and 2.36 for controls. Differences between groups were statistically significant for all age subgroups and test items.

3.3. Correlation between Sp–SN–5 total and QOL score

A Spearman correlation between the total result of the Sp–SN–5 questionnaire and the QOL score show a strong negative correlation in the general sample (rho = –0.77; p =< 0.01); and all the age subgroups; 4–6 years (rho = –0.83; p =< 0.01); 6–8 years (rho = –0.70; p =< 0.01); 8–10 years (rho = –0.76; p =< 0.01); 10–12 years (rho = –0.75; p =< 0.01). A graphic representation is shown in Fig. 2.

3.4. Internal validity

3.4.1. Internal consistency

Internal consistency of the Sp–SN–5 measured with Cronbach α was 0.87 for 5 items. Internal consistency was still over 0.83 after removing each item of the test (Table 2).

Consistency was measured in a subgroup analysis according to age. Patients were divided into four groups, 4–6 years of age; 6–8; 8–10 and 10–12. The value for Cronbach α was high for all the age subgroups, 0.86, 0.84, 0.86 and 0.89, respectively. After removing item 5 (activity limitations) consistency improved in all age groups (Table 2).

3.4.2. Test-retest

The intraclass correlation coefficient (ICC) for test-retest measurements was 0.94 (CI 95%: 0.92–0.96).

With regard to age, the ICC among 4-6 year-olds was 0.89 (CI 95%: 0.76; 0.95). In the 6-8 year-old group it was 0.96 (CI 95%: 0.93; 0.98); in the 8–10 group it was 0.94 (CI 95%: 0.88; 0.97); and in the 10–12 group, 0.94 (CI 95%: 0.88; 0.97).

The maximum result is 1, therefore, these results categorize this test as having a very high test-retest reliability.

With regard to severity, being 0 the minimum and 30 the maximum, the ICC for 0–10 was 0.81 (CI 95%: 0.71; 0.88). For 11–20 it was 0.85 (CI 95%: 0.71; 0.92); and for 21–30 it was 0.61 (CI 95%: -1.27; 0.93).

3.5. External validity

The comparison between means in cases and controls is shown in Table 1. The difference was statistically significant in all the age subgroups and all the items of the test.

Fig. 1. SN5 total score distribution.
Table 1
SNS score. VAS (visual analogue scale). Bold and asterisk if the difference between mean score for cases and controls were statistically significant.

<table>
<thead>
<tr>
<th></th>
<th>4-6 year (n – 37)</th>
<th>6-8 year (n – 49)</th>
<th>8-10 year (n – 33)</th>
<th>10-12 year (n – 35)</th>
<th>Total (n – 154)</th>
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</thead>
<tbody>
<tr>
<td><strong>SNS Total</strong></td>
<td></td>
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<tr>
<td>Total:</td>
<td>6.93 ± 0.33</td>
<td>7.14 ± 0.30</td>
<td>8.88 ± 0.30</td>
<td>10.85 ± 0.30</td>
<td>8.42 ± 0.30</td>
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<tr>
<td><em>0.33</em></td>
<td>0.85* ± 0.10</td>
<td>1.04* ± 0.10</td>
<td>1.10* ± 0.10</td>
<td>1.30* ± 0.10</td>
<td>0.50* ± 0.10</td>
</tr>
<tr>
<td>Case 1 ± 1</td>
<td>4.15</td>
<td>5.15</td>
<td>7.15</td>
<td>9.15</td>
<td>5.55 ± 0.25</td>
</tr>
<tr>
<td>Control:</td>
<td>1.36</td>
<td>1.12</td>
<td>1.14</td>
<td>1.07</td>
<td>1.07 ± 0.07</td>
</tr>
<tr>
<td><strong>SNS_1 (sinus infection)</strong></td>
<td></td>
<td></td>
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<tr>
<td>Total:</td>
<td>1.54 ± 0.24</td>
<td>1.93 ± 0.30</td>
<td>1.97 ± 0.30</td>
<td>2.5 ± 0.14</td>
<td>1.76 ± 0.30</td>
</tr>
<tr>
<td><em>0.24</em></td>
<td>0.27* ± 0.08</td>
<td>0.28* ± 0.08</td>
<td>0.29* ± 0.08</td>
<td>0.30* ± 0.16</td>
<td>0.16* ± 0.08</td>
</tr>
<tr>
<td>Case 1:</td>
<td>3.71</td>
<td>2.59</td>
<td>3.14</td>
<td>3.14</td>
<td>1.60 ± 0.07</td>
</tr>
<tr>
<td>Control:</td>
<td>0.64</td>
<td>0.53</td>
<td>0.32</td>
<td>0.36</td>
<td>0.64 ± 0.07</td>
</tr>
<tr>
<td><strong>SNS_2 (nasal obstruction)</strong></td>
<td></td>
<td></td>
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<tr>
<td>Total:</td>
<td>2.07 ± 0.28</td>
<td>2.5 ± 0.36</td>
<td>3.36 ± 0.36</td>
<td>3.53 ± 0.38</td>
<td>2.87 ± 0.38</td>
</tr>
<tr>
<td><em>0.28</em></td>
<td>0.30* ± 0.34</td>
<td>0.30* ± 0.34</td>
<td>0.30* ± 0.34</td>
<td>0.30* ± 0.34</td>
<td>0.16* ± 0.09</td>
</tr>
<tr>
<td>Case 1 ± 1</td>
<td>4.93</td>
<td>4.36</td>
<td>5.14</td>
<td>4.55</td>
<td>5.14 ± 0.09</td>
</tr>
<tr>
<td>Control:</td>
<td>0.32</td>
<td>0.28</td>
<td>0.28</td>
<td>0.16</td>
<td>0.28 ± 0.08</td>
</tr>
<tr>
<td><strong>SNS_3 (allergy symptoms)</strong></td>
<td></td>
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<tr>
<td>Total:</td>
<td>1.18 ± 0.27</td>
<td>1.60 ± 0.30</td>
<td>1.76 ± 0.30</td>
<td>2.29 ± 0.32</td>
<td>1.72 ± 0.32</td>
</tr>
<tr>
<td><em>0.27</em></td>
<td>0.23* ± 0.09</td>
<td>0.29* ± 0.09</td>
<td>0.30* ± 0.14</td>
<td>0.30* ± 0.14</td>
<td>0.14* ± 0.09</td>
</tr>
<tr>
<td>Case 1 ± 1</td>
<td>2.71</td>
<td>2.18</td>
<td>2.71 ± 0.18</td>
<td>2.86 ± 0.18</td>
<td>2.02 ± 0.10</td>
</tr>
<tr>
<td>Control:</td>
<td>0.46</td>
<td>0.37</td>
<td>0.34</td>
<td>0.34</td>
<td>0.24 ± 0.08</td>
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<tr>
<td><strong>SNS_4 (emotional distress)</strong></td>
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<tr>
<td>Total:</td>
<td>1.39 ± 0.25</td>
<td>1.75 ± 0.30</td>
<td>1.24 ± 0.30</td>
<td>1.82 ± 0.36</td>
<td>1.26 ± 0.36</td>
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<tr>
<td><em>0.25</em></td>
<td>0.19</td>
<td>0.28* ± 0.11</td>
<td>0.28* ± 0.11</td>
<td>0.28* ± 0.11</td>
<td>0.13* ± 0.08</td>
</tr>
<tr>
<td>Case 1 ± 1</td>
<td>4.93</td>
<td>4.36</td>
<td>5.14</td>
<td>4.55</td>
<td>5.14 ± 0.09</td>
</tr>
<tr>
<td>Control:</td>
<td>0.16</td>
<td>0.11</td>
<td>0.14</td>
<td>0.14</td>
<td>0.14 ± 0.07</td>
</tr>
<tr>
<td><strong>SNS_5 (activity limitation)</strong></td>
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</tr>
<tr>
<td>Total:</td>
<td>0.75 ± 0.15</td>
<td>0.36 ± 0.11</td>
<td>0.55 ± 0.11</td>
<td>0.71 ± 0.16</td>
<td>0.57 ± 0.16</td>
</tr>
<tr>
<td><em>0.15</em></td>
<td>0.11* ± 0.07</td>
<td>0.13* ± 0.07</td>
<td>0.16* ± 0.07</td>
<td>0.16* ± 0.07</td>
<td>0.07* ± 0.07</td>
</tr>
<tr>
<td>Case 1 ± 1</td>
<td>0.64</td>
<td>0.55</td>
<td>0.91</td>
<td>0.68</td>
<td>0.68 ± 0.12</td>
</tr>
<tr>
<td>Control:</td>
<td>0.31</td>
<td>0.16</td>
<td>0.23</td>
<td>0.12</td>
<td>0.12 ± 0.07</td>
</tr>
<tr>
<td><strong>SNS VAS (overall quality of life)</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Total:</td>
<td>7.32 ± 0.33</td>
<td>7.11 ± 0.30</td>
<td>6.58 ± 0.30</td>
<td>7.01 ± 0.30</td>
<td>6.78 ± 0.30</td>
</tr>
<tr>
<td><em>0.33</em></td>
<td>0.34* ± 0.18</td>
<td>0.38* ± 0.18</td>
<td>0.16* ± 0.16</td>
<td>0.16* ± 0.16</td>
<td>0.18* ± 0.18</td>
</tr>
<tr>
<td>Case 1 ± 1</td>
<td>5.55</td>
<td>5.55</td>
<td>5.55</td>
<td>5.55</td>
<td>5.55 ± 0.25</td>
</tr>
<tr>
<td>Control:</td>
<td>0.68</td>
<td>0.57 ± 0.32</td>
<td>5.32</td>
<td>5.32</td>
<td>5.32 ± 0.27</td>
</tr>
<tr>
<td><strong>4. Discussion</strong></td>
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</table>

This is the first validated version of a Spanish translation of the SN-5 questionnaire. It has shown an excellent internal validity by means of test retest and internal consistency, and good external validity discriminating between ill participants and controls.

The examination of QOL in pediatric patients is difficult, as parent’s answers might be biased by their own experiences or interpretations. In fact, children’s self-assessment of their psychosocial health has shown to differ from that of their parents. For example, Cunningham et al. found that self-reported psychosocial issues in the CHQ-CF87 were normal, while they were considerably lower when reported by parents [8]. However, even if they do not perfectly correlate with their children’s judgment, they remain valid in their own right as part of the total health-related QOL picture [27]. Consequently, questionnaires directed at children should also be objectively validated by assessing their external validity, in order to ensure that they actually have the ability to discriminate between ill and healthy children, even if the answers are given by their caregivers.

Several questionnaires for the assessment of overall quality of life in pediatric patients have been developed. These include, among others, the Autoquestionario de Calidad de Vida Enfant Imagé (AUQED) [28], the TNO AZL Child Quality Of Life (TACQOL) questionnaire [29], the Child Health and Illness Profile [30], the Dartmouth Primary Care Cooperative Information Project [31], the Functional Status II(R) [32], the RAND Health Insurance Experiment [33], the Ontario Child Health Study [34], and The Health Institute Child Health Questionnaire (CHQ) [35]. However, none of them were specifically designed to measure the quality of life related to sinonasal symptoms and, therefore, they do not contain related domains for those conditions.

The SN-5 questionnaire fills that void in pediatric otolaryngology, allowing researchers and clinicians to compare and measure the QOL of patients with sinonasal conditions. This questionnaire offers additional value compared with others, its short extension, which allows parents to fill it in 1–2 min, a crucial advantage in its day-to-day use.

The SN-5 has shown excellent results in its English and Portuguese versions. However, it has not previously been used in Spanish. The cross-cultural adaptation process is essential in that it ensures that the overall meaning of the original instrument is preserved. In that way we followed the recommendations of the WHO. However, despite the good construct validity found in this study, we experienced some trouble when validating the test. First, the item “head banging”, as a symptom described in item 1 of the original questionnaire was hard to translate into Spanish as it does not have a direct translation. Secondly, we believe that the test offers too many scoring options, as each item may be scored from 0 to 6. In our experience and, according to available evidence, too many options may generate problems for parents when answering [36]. Finally, according to Kay et al. each domain of the questionnaire was represented by a single item listing several ways in which different sinonasal symptoms might affect that domain [12]. For example, the “sinus infection” domain included the symptom cluster of nasal discharge, bad breath, daytime cough, post-nasal drip, headache, facial pain or head-banging. Despite their assertion that this approach permits rapid sampling of multiple domains and is a validated means of assessing generic and disease-specific health outcomes, our experience suggests that parents experienced difficulties with this method, as they often misunderstood the objective of the test and they felt that the child must show all the symptoms, or that they had to score each symptom independently.

Despite the difficulties above explained, in this study we found a high correlation coefficient between the overall QOL measured with the VAS score and the Sp-SN-5 symptom score in all the age subgroups. This
demonstrates the extent to which the VAS score corresponds to the overall clinical picture of the patient and that questionnaire items are, in fact, consistent with the phenomena of interest. The Portuguese version obtained a coefficient of 0.62, while the Spanish version herein presented obtained a value of 0.77. This score is also in agreement with the trend identified by Wentzel et al. [37] and Xie et al. [38] using the Spearman r coefficient in patients affected with cystic fibrosis. In Xie et al.’s work, this relationship did not hold true for older children. However, in our version of the questionnaire this correlation was high for all age subgroups and items in the questionnaire.

**4.1. Limitations**

Despite the fact that the original SN-5 survey has been validated in children aged between 2 and 12, we did not included children between 2 and 4 years old as cases were only included for surgery if they were older than 4. The same limitation was found by Bettadahalli et al., who performed adenoidectomy [14], and Taylor et al. [21], who performed endoscopic sinus surgery. Both included children from 5 years old upwards. Even with this limitation, our results are similar to those reported in the original version of the SN-5.
In the same manner as previously mentioned authors, we selected patients whose chronic sinonasal symptoms were severe enough to warrant surgical intervention. This restriction was purposeful to more precisely define the disease process. Extrapolation of the results, however, to pediatric patients with rhinosinusitis whose disease is successfully medically managed is questionable. In fact, we have only included cases with severe allergic rhinitis, but not chronic rhinosinutis. Despite the fact that this test has been previously used in this type of patients [13], results herein reported may not be representative of that population.

Despite the words and expressions in the Sp-SN5 has been carefully selected to be easily understood, we cannot exclude some degree of bias introduced by the socioeconomic status of the parents.

Differently from other authors [12,25] we did not perform a long-term follow up.

### 4.2. Strengths

Our cohort is the largest published cohort for the SN-5 questionnaire. When considering only cases severe enough to warrant surgical intervention, this is the second largest cohort. This large sample allowed us to perform subgroup analysis.

We have included all the spectrum of severity, while other authors only included symptomatic children. This enabled us to calculate the external validity of the test and assess its performance in all the spectrum of severity.

We were very thorough with regards to methodology. We followed the WHO guidelines for translation and adaptation of instruments, and we carefully ensured the blinded assessment of participants.

### 5. Conclusion

The Sp-SN–5 questionnaire was successfully translated and cross-culturally adapted into Spanish, and the translated version exhibited adequate properties. The survey was effective in assessing the quality of life of pediatric patients with sinonasal complaints and can be used for this purpose both in a clinical setting and in future research.

Validation of SN-5 provides clinicians and researchers with a simple and useful evaluative tool, which was urgently needed given the high prevalence of pediatric sinonasal symptoms and their associated procedures. This is especially true for studies of pediatric rhinitis and rhinosinusitis, which rely on appropriate patient-based outcome measures for validity.

Quality of life data can be used in conjunction with objective parameters like symptom persistence and computed tomographic findings to determine criteria for medical or surgical treatment. The sequential application of Sp–SN–5 at specific posttreatment intervals may prove useful in judging the outcome of such therapeutic interventions.

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Conflicts of interest

This work is part of the research effort completed by Christian Calvo-Henríquez, MD, to obtain a PhD degree. The other authors declare no disclosure or conflict of interest.

References


