

Italian validation of the ENS6Q: a disease-specific questionnaire for empty nose syndrome

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Dear Editor,

this manuscript focuses on empty nose syndrome (ENS), a rare iatrogenic condition following nasal and paranasal sinus surgery, mainly involving the inferior turbinate (Fig. 1). Its pathophysiology is related to impaired nasal function due to reduced mucosal surface and loss of sensory receptors¹. Currently, diagnosis relies on clinical symptoms, endoscopy and surgical history². Paradoxical nasal obstruction is the most common symptom, often associated with dyspnoea, dryness, pain, crusting, hyposmia and depression³.

One of the most used questionnaires for ENS is the Sino-Nasal Outcome Test (SNOT)-25⁴, obtained by adding 5 ENS-related items to the SNOT-20. However, this questionnaire has never been validated in the ENS population and does not clearly distinguish ENS from other nasal conditions. To address this limitation, Velasquez et al.⁵ developed the disease-specific Empty Nose Syndrome 6-item Questionnaire (ENS6Q), a validated tool for symptom severity and quality of life (QoL) assessment. To date, no validated Italian version of the ENS6Q is available. Generic questionnaires currently used in Italy do not adequately capture ENS-specific symptoms. Therefore, this study aimed to translate and culturally adapt the ENS6Q into Italian (ENS6Q-IT) and to evaluate its psychometric properties, offering clinicians a robust tool for the assessment and follow-up of patients with ENS.

The ENS6Q-IT (Tab. I) was developed according to international guidelines for cross-cultural adaptation of patient-reported outcomes, ensuring semantic and conceptual equivalence with the original English version.

Two bilingual translators independently translated the questionnaire into Italian and a reconciled version was obtained. Back-translation into English was performed by 2 native English translators blinded to the original instrument. An expert committee reviewed the final version for clarity and equivalence. Comprehensibility and acceptability were subsequently assessed through cognitive debriefing in a pilot group of 10-15 individuals, leading to minor linguistic refinements and the final ENS6Q-IT.

A total of 125 adults were enrolled from the Otolaryngology Department of the University Hospital of Modena (Italy): 50 (40%) patients with chronic rhinosinusitis with nasal polyps (CRSwNP), 25 (20%) patients with ENS, and 50 (40%) healthy controls. CRSwNP was diagnosed according to EPOS 2020 criteria⁶, while ENS patients were identified based on persistent postoperative nasal symptoms despite endoscopic or radiological evidence of wide nasal cavities. Controls had no nasal symptoms and a normal otolaryngologic examination.

Inclusion criteria were age \geq 18 years, native Italian language, ability to complete the questionnaires and informed consent.

Exclusion criteria included sinonasal malignancy, prior head and neck radiotherapy, craniofacial syndromes, recent nasal trauma, chronic granulomatous diseases, pregnancy and illiteracy.



Figure 1. Coronal CT scan of a patient who underwent inferior turbinate surgery and subsequently developed empty nose syndrome.

Data were analysed using JASP and SPSS.

The study included 75 males (60%) and 50 females (40%), with a mean age of 44.5 ± 17.2 years (range, 18-86). Surgical history of the study population was the following: no intervention (55, 44%), one intervention (48, 38.4%), 2 interventions (12, 9.6%), 3 interventions (4, 3.2%), and more than 3 interventions (6, 4.8%).

The mean ENS6Q score was 5.86 ± 6.97 (median, 3; range, 0-26), while the mean SNOT-22 score was 20.28 ± 22.85 (median, 13 range, 0-97), indicating wide interindividual variability in symptom severity.

Normality of continuous variables (age, ENS6Q and SNOT-22) was assessed using Kolmogorov-Smirnov (KS) and Shapiro-Wilk (SW) tests for the entire sample and by group (Tab. II). In CRSwNP group, age was normally distributed ($p = 0.080$ for KS; $p = 0.152$ for SW), whereas ENS6Q and SNOT-22 both deviated significantly from normality ($p < 0.001$). In controls, all variables showed significant departures from normality ($p < 0.001$). Conversely, in the ENS group, all variables showed an approximately normal distribution (all $p > 0.05$), suggesting that within this subgroup, data approximated a Gaussian distribution.

Construct validity was examined by exploratory factor analysis (EFA), which showed a strong unidimensional structure for the Italian ENS6Q. Adequacy of the correlation matrix was confirmed (KMO = 0.853; Bartlett's $\chi^2(15) = 379.16$, $p < 0.001$). Measures of sampling adequacy (MSA) ranged from 0.81 to 0.92. Communalities ranged 0.43-0.78, with the highest for "reduced

nasal airflow" (0.78) and "nasal dryness" (0.75). A single factor (eigenvalue 3.69) explained 61.4% of the total variance, with all items loading strongly (0.66-0.88), consistent with the original validation by Velasquez et al.⁵ and subsequent replications⁷.

Mean ENS6Q item scores ranged from 0.55-1.39 (SD 1.2-1.7), suggesting low-to-moderate symptom frequency. Corrected item-total correlations were 0.532-0.806, all above the minimum acceptable threshold of 0.30, indicating strong internal consistency. The full scale showed excellent internal reliability (Cronbach's α 0.873; McDonald's ω 0.886), with no improvement from item deletion ($\alpha_{if_deleted} = 0.827$ -0.874; $\omega_{if_deleted} = 0.841$ -0.888), confirming all items contributed meaningfully. The ENS6Q-IT thus exhibited high internal stability, homogeneity and reliability comparable to the original version. The Kruskal-Wallis test revealed significant differences among groups ($H(2) 57.33$, $p < 0.001$). ENS6Q scores were higher in the ENS patients (mean, 17.08; median, 16) than CRSwNP (mean, 4.04; median, 2.5) and controls (mean, 2.08; median, 1).

The mean rank distribution indicated a clear gradient of severity: Empty Nose (110.38) > CRSwNP (57.18) > Control (45.13), confirming strong discriminant validity (Tab. III). ENS6Q correlated strongly with SNOT-22 (Spearman's $\rho = 0.724$, $p < 0.001$), indicating that higher ENS6Q scores were associated with poorer sinonasal-related QoL and closely replicating the original validation ($r = 0.71$). Diagnostic validity was excellent, with ENS6Q ROC AUC of 0.974, indicating outstanding discrimination between ENS and non-ENS subjects. The optimal cut-off score of 10.5, determined via the Youden Index, provided sensitivity 0.87 and specificity 0.97. The Gini index (0.948) and maximum KS statistic (0.950) confirmed high diagnostic accuracy.

In conclusion, this study presents a validated Italian version of the ENS6Q with strong psychometric properties and fidelity to the original instrument. Translation and cultural adaptation followed international guidelines, ensuring semantic and conceptual equivalence. Both EFA and reliability indices confirmed that the Italian ENS6Q maintains the same unidimensional structure and internal consistency as the original version. Strong correlations with SNOT-22 support convergent validity, showing that ENS6Q-IT reliably reflects symptom severity and QoL in rhinological patients. On the other hand, ENS6Q is more effective than SNOT-22 in identifying patients with ENS, due to its greater disease specificity. ROC analysis showed excellent diagnostic accuracy (AUC 0.974), with the original cut-off of 10.5, confirming that ENS6Q-IT reliably identifies patients with significant ENS symptoms.

Overall, the Italian ENS6Q preserves the conceptual integrity and measurement precision of the original questionnaire, as previously done by Lindemann et al.⁸ It provides a brief, reliable and validated tool for assessing ENS, enabling standardised evaluation and cross-cultural comparison.

Conflict of interest statement

The authors declare no conflict of interest.

Table I. Italian version of Empty Nose Syndrome 6-Item Questionnaire (ENS6Q-IT).

Sintomo	Assente	Molto lieve	Lieve	Moderato	Grave	Molto grave
Secchezza nasale	0	1	2	3	4	5
Sensazione di riduzione del flusso nasale	0	1	2	3	4	5
Sensazione di soffocamento	0	1	2	3	4	5
Il naso sembra "troppo aperto"	0	1	2	3	4	5
Croste nasali	0	1	2	3	4	5
Brucciore nasale	0	1	2	3	4	5

Table II. Normality tests by diagnostic group.

Group	Variable	Kolmogorov-Smirnov Statistic	df	Sig. (KS)	Shapiro-Wilk Statistic	df	P (SW)
CRSwNP	Age	0.118	50	0.080	0.966	50	0.152
	ENS6Q	0.223	50	< 0.001*	0.755	50	< 0.001*
	SNOT-22	0.191	50	< 0.001*	0.753	50	< 0.001*
Control	Age	0.270	50	< 0.001*	0.476	50	< 0.001*
	ENS6Q	0.233	50	< 0.001*	0.811	50	< 0.001*
	SNOT-22	0.199	50	< 0.001*	0.830	50	< 0.001*
Empty nose	Age	0.103	25	0.200	0.956	25	0.348
	ENS6Q	0.159	25	0.101	0.941	25	0.156
	SNOT-22	0.084	25	0.200	0.964	25	0.507

*Significant deviation from normality ($p < 0.05$).

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Author contributions

MAC and DL contributed to the conceptualization, methodology and supervision. LP supported data curation and formal analysis. SP and LR drafted the original manuscript and prepared the visualizations.

Ethical consideration

This study was approved by the Institutional Ethics Committee "Comitato Etico Area Vasta Emilia Nord" (protocol number AOU 0014266/25 of 19th May 2025). The research was conducted ethically, with all study procedures being performed in accordance with the requirements of the World Medical Association's Declaration of Helsinki.

References

¹ Kanjanawasee D, Campbell RG, Rimmer J, et al. Empty nose syndrome pathophysiology: a systematic review. *Otolaryngol Head Neck Surg* 2022;167:434-451. <https://doi.org/10.1177/01945998211052919>

² Kudas Z, Dąbrowska N, Nowocin P, et al. Empty nose syndrome: a review of pathogenic mechanisms, diagnostic strategies, and patient-centered treatments. *Med Sci* 2025;29:e26ms3504. <https://doi.org/10.54905/diss.v29i156.e26ms3504>

Table III. Group comparison of ENS6Q Scores (Kruskal-Wallis Test).

Group	N	Mean rank	ENS6Q median (mean)
CRSwNP	50	57.18	2.5 (4.04)
Control	50	45.13	1 (2.08)
Empty nose	25	110.38	16 (17.08)

³ Go BC, Deane EC, Friedman O. Empty nose syndrome. *Plast Aesthet Res* 2024;11:110. <https://doi.org/10.20517/2347-9264.2023.110>

⁴ Jiang C, Wang F, Chen K, et al. Assessment of surgical results in patients with empty nose syndrome using the 25-item Sino-Nasal Outcome Test evaluation. *JAMA Otolaryngol Head Neck Surg* 2014;140:453-458. <https://doi.org/10.1001/jamaoto.2014.84>

⁵ Velasquez N, Thamboo A, Habib ARR, et al. The empty nose syndrome 6-item questionnaire (ENS6Q): a validated 6-item questionnaire as a diagnostic aid for empty nose syndrome patients. *Int Forum Allergy Rhinol* 2017;7:64-71. <https://doi.org/10.1002/alr.21842>

⁶ Fokkens WJ, Lund VJ, Hopkins C, et al. European position paper on rhinosinusitis and nasal polyps 2020. *Rhinology* 2020;58(Suppl. S29):1-464. <https://doi.org/10.4193/Rhin20.600>

⁷ Amanian A, Hari K, Habib A, et al. The empty nose syndrome 6-item questionnaire (ENS6Q): a diagnostic tool to distinguish empty nose syndrome from primary nasal obstruction. *Int Forum Allergy Rhinol* 2021;11:1113-1115. <https://doi.org/10.1002/alr.22761>

⁸ Lindemann J, Goldberg-Bockhorn E, Stupp F, et al. Erstellung einer deutschen Version des "Empty Nose Syndrome 6 Item Questionnaire" (ENS6Q). *Laryngorhinotologie* 2022;101:979-986. <https://doi.org/10.1055/a-1841-6542>