

Quality of Life in Patients with Nasal Obstruction before and After Treatment: A Prospective Observational Study Using Snot-23 and Visual Analogue Scale

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Abstract

Background: Nasal obstruction is among the commonest ENT complaints and impairs sleep, mood and daily function.

Objective: To compare disease-specific quality of life (QoL) and nasal obstruction severity before and after treatment using the 23-item Sino-Nasal Outcome Test (SNOT-23) and a Visual Analogue Scale (VAS).

Methods: This prospective observational study enrolled 62 patients with nasal obstruction by convenience sampling at the ENT department of a tertiary-care teaching hospital in South Gujarat (November 2023–May 2024). SNOT-23 and a 0–10 VAS were recorded before treatment and at one month after treatment. Pre- and post-treatment scores were compared with the paired t-test; $p < 0.05$ was significant.

Results: There were 31 males and 31 females (mean age 30 years; range 5–80); 41.9% were aged 5–20 years. Nasal blockage was present in all patients, nasal discharge in 29% and nasal bleeding in 5%. Significant improvement ($p < 0.05$) occurred in 19 of 24 parameters, most markedly nasal blockage/congestion (3.60 ± 0.69 to 1.37 ± 0.49 ; $p < 0.001$) and VAS for nasal obstruction (8.02 ± 0.71 to 1.98 ± 0.71 ; $p < 0.001$). Satisfaction with outcome was 78%.

Conclusion: Treatment of nasal obstruction significantly improves disease-specific QoL across nasal, otologic/facial, sleep and emotional domains. SNOT-23 with VAS is a practical outcome measure for routine clinical use.

Keywords: Nasal obstruction; Quality of life; SNOT-23; Visual analogue scale; Septoplasty; Patient-reported Outcome.

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Introduction

Nasal obstruction is a frequent otorhinolaryngology complaint with causes that include septal deviation, turbinate hypertrophy, allergic rhinitis and chronic rhinosinusitis.

Beyond local symptoms it affects sleep, daytime function, mood and overall health-related quality of life (QoL). [1]

QoL is a multidimensional construct, and its measurement has become routine in health research. [2,3] Disease-specific instruments such as the Sino-Nasal Outcome Test (SNOT) family capture symptom burden and treatment benefit more sensitively than generic measures, and are often paired with a Visual Analogue Scale (VAS) for nasal obstruction. International studies report improvement in patient-reported outcomes after

septoplasty and related treatment, [4-7] but region-specific data from South Gujarat are lacking. This study therefore compared QoL before and after treatment in patients with nasal obstruction using SNOT-23 and VAS, and documented their demographic and clinical profile.

Materials and Methods

Study Design and Setting: Prospective observational study in the Department of Otorhinolaryngology (ENT OPD and ward) of a tertiary-care teaching hospital in South Gujarat, India, from November 2023 to May 2024.

Ethics: Approved by the Human Research Ethics Committee, Government Medical College, Surat (Approval No. GMCS/STU/ETHICS-3/Approval/29073/23; Protocol No. 825/23). Written informed consent was obtained from all participants or their guardians, in line with the Declaration of Helsinki.

Participants: Patients presenting with nasal obstruction were enrolled by convenience sampling. Exclusion criteria were: neoplasm of the nose or paranasal sinuses; history of or diagnosed mucormycosis; previous nasal/paranasal sinus surgery; and clinically diagnosed acute coryza (viral rhinitis).

Sample Size: Calculated with OpenEpi (design effect 1, confidence limit 10%, expected frequency of nasal blockage $20\% \pm 10\%$, 95% confidence), giving a minimum of 62 patients.

Instruments: Disease-specific QoL was measured with SNOT-23, a validated questionnaire in which 23 items (nasal, ear/facial, sleep and psychological subsets) are graded from 0 (no problem) to 5 (problem as bad as it can be); the score is the mean of the item responses. [4]

Nasal blockage was also rated on a 10-point VAS (0 = no symptoms, 10 = as troublesome as possible; 0–3 mild, 3–7 moderate, 7–10 severe). Both instruments were recorded before treatment and one month after treatment.

Treatment (medical or surgical) was given as clinically indicated.

Statistical Analysis: Continuous data are expressed as mean $\pm$ standard deviation and categorical data as number and percentage. Pre- and post-treatment scores were compared using the paired t-test; two-tailed $p < 0.05$ was considered significant.

Results

Sixty-two patients completed baseline and one-month follow-up assessment.

Age and Sex: Age ranged from 5 to 80 years (mean 30 years); 41.9% were 5–20 years old, followed by 31–40 years (19.4%) and 21–30 years (17.7%) (Table 1). Males and females were equal (31 each) (Table 2).

Table 1: Age-wise distribution of patients (n=62)

Age group (years)	Number of patients	Percentage (%)
5–20	26	41.94
21–30	11	17.74
31–40	12	19.36
41–50	7	11.30
51–60	3	4.83
>60	3	4.83
Total	62	100.0

Table 2: Sex-wise distribution of patients (n=62)

Sex	Number of patients	Percentage (%)
Male	31	50.0
Female	31	50.0
Total	62	100.0

Presenting complaints: Nasal blockage was present in all patients (100%), with nasal discharge in 18 (29%) and nasal bleeding in 3 (5%) (Table 3).

Table 3: Presenting complaints (n=62; not mutually exclusive)

Symptom	Number of patients	Percentage (%)
Nasal blockage	62	100
Nasal discharge with blockage	18	29
Nasal bleeding with blockage	3	5

SNOT-23 and VAS outcomes: Significant improvement ($p < 0.05$) was observed in 19 of 24 parameters (Table 4). The largest changes were in

nasal blockage/congestion (3.60 ± 0.69 to 1.37 ± 0.49 ; $t = 26.42$; $p < 0.001$) and VAS for nasal obstruction (8.02 ± 0.71 to 1.98 ± 0.71 ; $t = 54.74$; $p < 0.001$). Nasal

symptoms, sleep items (difficulty falling asleep, waking at night, lack of a good night's sleep), ear/facial symptoms and emotional items (frustration, concentration) all improved

significantly. Dizziness, reduced productivity, sadness, embarrassment and concern with nasal shape did not change significantly; these had very low baseline scores.

Table 4: Paired comparison of SNOT-23 items and VAS before and one month after treatment (n=62)

SNOT-23 / VAS item	Pre-treatment mean $\pm$ SD	Post-treatment mean $\pm$ SD	t (df=61)	p-value
Need to blow nose	1.13 $\pm$ 0.84	0.05 $\pm$ 0.22	10.40	<0.001
Sneezing	1.60 $\pm$ 1.30	0.81 $\pm$ 0.57	6.70	<0.001
Runny nose	1.81 $\pm$ 1.49	0.69 $\pm$ 0.74	8.29	<0.001
Cough	1.10 $\pm$ 0.84	0.48 $\pm$ 0.50	7.58	<0.001
Post-nasal discharge	0.35 $\pm$ 0.66	0.00 $\pm$ 0.00	4.26	<0.001
Thick nasal discharge	0.63 $\pm$ 1.13	0.00 $\pm$ 0.00	4.37	<0.001
Ear fullness	0.35 $\pm$ 0.75	0.24 $\pm$ 0.47	2.17	0.034
Dizziness	0.10 $\pm$ 0.47	0.02 $\pm$ 0.13	1.69	0.096 (NS)
Ear pain/pressure	0.13 $\pm$ 0.42	0.02 $\pm$ 0.13	2.42	0.018
Facial pain/pressure	0.34 $\pm$ 0.68	0.19 $\pm$ 0.44	2.87	0.006
Difficulty falling asleep	2.15 $\pm$ 1.14	0.87 $\pm$ 0.42	11.27	<0.001
Waking up at night	1.79 $\pm$ 1.28	0.56 $\pm$ 0.50	10.18	<0.001
Lack of a good night's sleep	1.03 $\pm$ 1.17	0.15 $\pm$ 0.36	7.03	<0.001
Waking up tired	0.15 $\pm$ 0.47	0.02 $\pm$ 0.13	2.20	0.031
Fatigue during the day	0.15 $\pm$ 0.44	0.05 $\pm$ 0.22	2.56	0.013
Reduced productivity	0.03 $\pm$ 0.25	0.00 $\pm$ 0.00	1.00	0.321 (NS)
Reduced concentration	0.58 $\pm$ 0.64	0.39 $\pm$ 0.49	3.83	<0.001
Frustrated/restless/irritable	1.19 $\pm$ 0.70	0.23 $\pm$ 0.42	9.42	<0.001
Sad	0.08 $\pm$ 0.42	0.00 $\pm$ 0.00	1.52	0.133 (NS)
Embarrassed	0.02 $\pm$ 0.13	0.00 $\pm$ 0.00	1.00	0.321 (NS)
Sense of taste/smell	1.42 $\pm$ 0.97	0.97 $\pm$ 0.57	4.96	<0.001
Blockage/congestion of nose	3.60 $\pm$ 0.69	1.37 $\pm$ 0.49	26.42	<0.001
Concern with shape of nose	0.13 $\pm$ 0.50	0.03 $\pm$ 0.18	1.94	0.057 (NS)
Nasal obstruction (VAS, 0–10)	8.02 $\pm$ 0.71	1.98 $\pm$ 0.71	54.74	<0.001

Paired t-test; NS = not significant)

Satisfaction: 78% of patients reported satisfaction with the outcome and 22% did not.

Discussion

This study shows significant improvement in disease-specific QoL across most SNOT-23 domains and in nasal obstruction VAS after treatment, in keeping with earlier reports.⁴⁻⁸

The mean age (30 years) is slightly lower than in earlier series: Bugten et al. [4] 39 years, Gonçalves et al. [5] 37 years, Yamasaki et al. [6] 35 years and Alessandri-Bonetti et al. [7] 34 years. The 1:1 sex ratio is comparable with Gonçalves et al., Yamasaki et al. and Alessandri-Bonetti et al., whereas Bugten et al. reported a male predominance. Bugten et al. [4] found the largest gains in the nose and sleep subsets after septoplasty, and we likewise saw the greatest improvement in nasal and sleep items. The fall in VAS from 8.02 to 1.98 is consistent with the benefit reported by Bezerra et al. [8] using the NOSE questionnaire after septoplasty. Persistent nasal blockage can aggravate snoring, mouth breathing and nasal discharge, and the marked fall in these scores underlines the value of timely

correction. Patients with coexisting allergic rhinitis may respond less fully to septoplasty alone, and continued medical treatment of the allergic condition is likely to optimise outcomes. [6,7]

The lack of change in dizziness, productivity, sadness, embarrassment and concern with nasal shape probably reflects low baseline scores, and dizziness is not a primary symptom of septal disease. Satisfaction of 78% is favourable, but the 22% who were not satisfied merit attention to case selection and pre-treatment counselling.

Limitations: SNOT-23 has no dedicated nasal obstruction item (offset here by the VAS); follow-up was limited to one month; some patients from remote areas were lost to follow-up; and convenience sampling at a single centre limits generalisability.

Conclusion

Treatment of nasal obstruction produces a significant improvement in QoL across nasal, ear/facial, sleep and emotional domains. SNOT-23 with VAS is a feasible, sensitive tool for outcome assessment, and realistic pre-treatment counselling

is advisable, particularly for older patients and those with allergic disease.

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