



A Prospective Study on Quality of Life Outcomes Following Septoplasty in Patients with Deviated Nasal Septum.

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Abstract

Background: Deviated nasal septum (DNS) is a common cause of nasal blockage. It can also cause headache, nasal discharge, snoring, mouth breathing, and poor quality of life. Septoplasty is the surgery performed to correct the deviated septum and improve breathing. Aim: To evaluate the improvement in nasal obstruction and quality of life after septoplasty using the NOSE score. Materials and Methods: This prospective study included patients with symptomatic DNS who underwent septoplasty. The NOSE score was recorded before surgery and again at 1 month and 3 months after surgery. The scores were compared to assess improvement. Results: The mean age of the patients was 33.8 ± 10.4 years, and 64.3% were males. Nasal obstruction was the most common symptom. The mean NOSE score improved from 68.5 ± 12.4 before surgery to 21.7 ± 9.6 at 3 months after surgery ($p < 0.001$). Most patients had better nasal breathing, improved sleep, and better quality of life. Only a few minor complications were seen, and all were managed successfully. Conclusion: Septoplasty is a safe and effective treatment for symptomatic deviated nasal septum. It significantly improves nasal breathing and quality of life. The NOSE score is a useful tool for measuring the results of surgery.

Keywords: Deviated nasal septum, Septoplasty, NOSE score, Nasal obstruction, Quality of life.



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INTRODUCTION

Nasal obstruction is one of the most common symptoms and represents an important reason for outpatients' visits all over the world. Nasal obstruction is not a disease but a symptom, which could appear due to different diseases of the nose: anatomical, inflammatory, infectious, allergic or even neoplastic origin. The prolonged period of nasal obstruction might lead to the impairment of physiological functions of the nose, like humidification, filtration, and warming of the air that passes the nose; as a result, the patient would suffer much and his/her general condition would be negatively affected. Nasal obstruction is known not only to create problems with breathing but also to affect the quality of sleep, physical exercises, ability to concentrate, work and emotional state, making the patient's health-related quality of life significantly worse. Deviated nasal septum (DNS) is still one of the most frequently met abnormal structures which lead to nasal obstruction among all structural causes. This is an osteocartilaginous structure which separates nasal passages from each other and provides proper airflow balance in the nasal cavity. DNS leads to changes in natural flow dynamics, increased airway resistance and nasal obstruction of different severity. Besides the presence of DNS, depending on its type and location, one may also observe the occurrence of compensatory hypertrophy of the inferior turbinate, difficulties in mucociliary clearance, frequent sinonasal infections, facial pressure, epistaxis and poor sleep quality. Thus, DNS affects not only nasal function but also greatly influences on patients' health.[1,2]

The etiology of DNS is very diverse. There are several factors which may be involved in the development of nasal septum deformations including congenital anomalies, asymmetrical development of nasal bones during facial growth, birth trauma, facial injuries received either in childhood or in adult age or uneven growth of bony and cartilaginous parts of the nasal framework. In some cases, small deviations cause no complaints throughout a person's life; however, severe DNS may be accompanied by progressive symptoms which require surgery. Symptoms are highly variable; there may be a wide range of complaints including nasal obstruction (one-sided or both), recurrent sinusitis, headaches, snoring, postnasal discharge, epistaxis, anosmia or hyposmia, sleep disturbances. Severity of the symptoms is related not only to the level of septal deviation but also to coexisting nasal pathology such as allergic rhinitis, chronic rhinosinusitis, turbinate hypertrophy or

nasal valve dysfunction. The frequency of septal deviation is very heterogeneous in various populations because of different diagnostic criteria, ways of examination, and demographics. The epidemiologic research showed that septal deviation can affect from 20% to 80% of people. Not all of the affected individuals are experiencing any problems, however, those who experience some degree of nasal obstruction require medical assistance.[3] Being so common, DNS is a serious public health issue and is a considerable workload for otorhinolaryngology departments.

The management of symptomatic deviated nasal septum is determined by the severity of symptoms, associated nasal pathology, and the effect of conservative treatment. Conservative treatment, such as the use of topical corticosteroids, antihistamines, saline irrigations, and decongestants, can relieve inflammation in patients with associated pathology; however, it does not treat the deformity. In this regard, septoplasty becomes the only possible solution of the problem of nasal obstruction. Septoplasty is one of the most frequently performed procedures in otolaryngology. It aims to normalize nasal breathing by correcting the anatomic deformation, ensuring enough support to nasal structure. Improvements in surgical technique, better understanding of nasal anatomy, and perioperative care led to increased efficacy of the procedure.[4,5] In the past, the results of septoplasty were evaluated mostly by assessing the postoperative position of septum and objective measurement of nasal patency. These findings are essential, however, they do not always match with the subjective evaluation of patients' feeling. For this reason, more and more importance is being paid to PROMs that allow determining how effective the procedure is from the patient's perspective.

Among many available disease-specific quality of life scales, the NOSE scale created by Stewart et al. is the most accepted owing to simplicity, reliability, validity, and responsiveness. The NOSE scale contains five symptom-specific items that evaluate the severity of nasal obstruction and its influence on daily activity. This tool is convenient for use in outpatient practice, does not require much time to be completed and proved its validity in several populations. Therefore, this scale became one of the most frequently used instruments to assess the outcomes of septoplasty.[6] A number of prospective and retrospective studies proved significant reduction of nasal obstruction symptoms after septoplasty based on validated quality of life measurement. For instance, Stewart et al. observed statistically significant decrease of postoperative NOSE scores which indicated substantial relief from nasal obstruction after correction.[6] Arunachalam et al. revealed statistically significant improvement of nasal breathing, sleep quality, and patient satisfaction after septoplasty in patients with symptomatic DNS.[7] Buckland et al. observed considerable improvement in disease-specific quality of life parameters after septal surgery which indicates effectiveness of septoplasty in carefully selected patients.[8] Others also found sustainable improvement of functional parameters after a period of long-term follow-up; however, the degree of improvement might differ between individuals.

Despite of mostly favorable outcomes reported in literature, not all patients experience complete resolution of their symptoms after septoplasty. In case of septoplasty success many factors should be taken into consideration, such as the type and degree of septal deviation, presence of turbinates hypertrophy, allergic rhinitis, chronic rhinosinusitis, nasal valve disorders, smoking habit, nasal trauma history, surgical technique, healing process, and patients' expectations. Moreover, improvement of nasal breathing might not always correlate with the objective measures of nasal airflow, which makes it important to include patients' reports in postoperative evaluation. Recent times were characterized by understanding that successful treatment of nasal obstruction should be estimated not only in terms of anatomical correction but also in the improvement of functional status and health-related quality of life. Nowadays with the implementation of the patient-oriented healthcare, validated quality of life questionnaires became an essential tool for assessment of the efficiency of surgical procedures and clinical decision making. With the help of such evaluations, clinicians are able to measure the degree of symptom improvement, compare the results of treatment among different populations and reveal the factors that affect the surgical success.

Despite of existence of numerous international trials that prove the benefits of septoplasty, very few prospective studies conducted in India evaluated the postoperative quality of life with standardized disease-specific instruments. The differences in demographic profile, environmental factors, healthcare system specifics and co-morbidities make additional investigation among the Indian population necessary. The acquisition of locally relevant data will allow improving patient education, making surgical decision and optimizing postoperative care. Thus, the present prospective study was carried out to estimate the change in quality of life after septoplasty in patients with symptomatic deviated nasal septum using the validated Nasal Obstruction Symptom Evaluation (NOSE) scale.

Aim and objectives

To study the effect on quality of life in patients having deviated nasal septum who have undergone septoplasty.

- 1) To measure the symptom severity of nasal obstruction before surgery and after surgery with the help of a valid questionnaire, such as the NOSE scale.
- 2) To measure the effect of septoplasty on the quality of life of the patients during follow-up visits.

- 3) To determine the relationship between the demographic and clinical characteristics and improvement in quality of life after septoplasty.

MATERIALS AND METHODS

Study Design

The study design used in the study was a prospective observational study carried out in order to assess the quality of life in patients undergoing septoplasty for deviated nasal septum.

Study Setting

The study was conducted in the Department of Otorhinolaryngology of a tertiary care teaching hospital for a period of 18 months between January 2025 and June 2026.

Study Population

Patients coming to ENT outpatient department with deviated nasal septum having nasal obstruction as main complaint and scheduled for septoplasty surgery were included in the study.

Sample Size Calculation

The sample size was calculated based on a previous study by Stewart MG et al [6] evaluating quality of life after septoplasty using NOSE scores. Using the formula for comparison of mean difference:

$$n = (Z_{(\alpha/2)} + Z_{\beta})^2 \times 2 \times \sigma^2 \div d^2$$

Where:

- $Z_{(\alpha/2)} = 1.96$ at 95% confidence interval
- $Z_{\beta} = 0.84$ for 80% power
- $\sigma = 18$ (standard deviation from previous study)
- $d = 10$ (expected mean difference in NOSE score)

$$n = (1.96 + 0.84)^2 \times 2 \times [18]^2 \div [10]^2$$

Calculated sample size ≈ 51 participants.

After accounting for a 10% non-response/loss to follow-up rate:

$$51 + 5 \approx 56$$

Hence, the final sample size can be taken as 56 patients.

Sampling Technique

A consecutive sampling technique was used, where all eligible patients that met the inclusion criteria and posted for septoplasty during the study period were included till the desired number of participants was reached.

Inclusion Criteria

- Patients in the age group of 18 to 60 years.
- Patients with deviated nasal septum with nasal obstruction as main complaint.
- Patients who agree to be involved in the study and give written informed consent.

Exclusion Criteria

- Patients having sinonasal tumors or nasal polyposis.
- Patients with allergic fungal sinusitis or chronic rhinosinusitis needing further intervention.
- Patients having undergone any previous nasal surgery.
- Patients with craniofacial deformities or traumatic nasal deformities.
- Patients unwilling for follow-up evaluations.

Study Procedure

All eligible patients went through thorough clinical evaluation which included history taking, anterior rhinoscopy and diagnostic nasal endoscopy. All baseline demographic details, symptoms presented by the patients, duration of symptoms and comorbidities if present, were noted using a predesigned proforma. Quality of life assessment prior to surgery was carried out using the Nasal Obstruction Symptom Evaluation (NOSE) questionnaire. The questionnaire comprised of questions related to symptoms of nasal obstruction and its effect on their daily lives. Score for the questionnaire was noted prior to surgery. All patients underwent surgery for septoplasty under appropriate anesthesia by using standard surgical

techniques. The surgery was done by skilled ear, nose and throat surgeons. Management post-surgery included packing of nose if required, pain relievers, antibiotics and regular follow-up care. All patients were followed-up after 1 month and 3 months of surgery. Follow-up visits involved repeat assessment of symptoms post-surgery and re-evaluation of quality of life using the NOSE questionnaire. Any postoperative complications, like bleeding, septal hematoma, infection, crusting, adhesions and obstruction, were also recorded.

Outcome Measures

Improvement in quality of life based on NOSE score pre-surgery and post-surgery were the main outcomes of this study. Other secondary outcomes include

- Improvement in nasal obstruction symptoms.
- Association of demographic/clinical characteristics with post-surgery outcome.
- Complications post-surgery.

Data Collection Tool

Data was collected by predesigned semi-structured case record proforma consisting of demographic data, clinical examination results, surgery results and NOSE scores.

Statistical Analysis

Data analysis was done by entering data into Microsoft Excel and analyzing it using SPSS software version 25.0. Continuous variables were reported as mean and standard deviation, while categorical variables were expressed as frequency and percentage. Paired t-test was used to analyze differences between pre-operative and post-operative NOSE scores. Chi-square test or Fisher's exact test was used to compare categorical variables. $P < 0.05$ was considered statistically significant.

RESULTS

Table 1. Age Distribution of Study Participants (n=56)

Age Group (Years)	Frequency (n)	Percentage (%)
18–25	14	25.0
26–35	18	32.1
36–45	13	23.2
46–55	8	14.3
>55	3	5.4
Total	56	100.0

Mean age: 33.8 ± 10.4 years.

Table 2. Gender Distribution of Study Participants (n=56)

Gender	Frequency (n)	Percentage (%)
Male	36	64.3
Female	20	35.7
Total	56	100.0

Male patients constituted the majority of the study population.

Table 3. Distribution of Presenting Symptoms Among Study Participants (n=56)

Presenting Symptom	Frequency (n)	Percentage (%)
Nasal obstruction	56	100.0
Headache	28	50.0
Nasal discharge	19	33.9
Sneezing	16	28.6
Snoring	14	25.0
Hyposmia	9	16.1

Nasal obstruction was the most common presenting complaint observed in all patients.

Table 4. Comparison of Preoperative and Postoperative NOSE Scores (n=56)

NOSE Score	Mean $\pm$ SD	Mean Difference	p value
Preoperative	68.5 ± 12.4		
Postoperative (1 month)	20.5 ± 7.5	45.8 ± 11.2	$<0.001^*$

Table 5. Comparison of Preoperative and Postoperative NOSE Scores (n=56)

NOSE Score	Mean $\pm$ SD	Mean Difference	p value
Preoperative	68.5 $\pm$ 12.4		
Postoperative (3 months)	21.7 $\pm$ 9.6	46.8 $\pm$ 11.2	<0.001*

*Statistically significant.

Table 6. Postoperative Complications Among Study Participants (n=56)

Complication	Frequency (n)	Percentage (%)
Crusting	6	10.7
Synechiae formation	3	5.4
Mild postoperative bleeding	2	3.6
Septal hematoma	1	1.8
Persistent nasal obstruction	4	7.1
No complications	40	71.4

DISCUSSION

Deviated nasal septum (DNS) is one of the most common causes of nasal obstruction and can affect the quality of life. Septoplasty is the surgical procedure performed to improve nasal airflow and relieve symptoms. In the present study, the outcome of septoplasty was assessed using the NOSE score before surgery and during follow-up. In this study, the mean age of the patients was 33.8 ± 10.4 years, and most patients (32.1%) belonged to the 26–35 years age group. This finding is similar to previous studies by Gandomi et al.,[4]

Stewart et al.,[6] and Arunachalam et al.,[7] which also reported that septoplasty is commonly performed in young adults. There was a male predominance (64.3%) in the present study. This may be because males are more likely to seek treatment for nasal obstruction or sustain nasal trauma. The most common presenting symptom was nasal obstruction (100%), followed by headache (50%), nasal discharge (33.9%), sneezing (28.6%), snoring (25%), and hyposmia (16.1%), where nasal obstruction was the main indication for septoplasty.

The main objective of this study was to evaluate improvement after septoplasty using the NOSE score. The mean preoperative NOSE score was 68.5 ± 12.4 , indicating severe nasal obstruction. At 1 month, the NOSE score showed a marked reduction, indicating early improvement in symptoms. At 3 months, the mean NOSE score further decreased to 21.7 ± 9.6 , with a mean improvement of 46.8 points, which was statistically significant ($p < 0.001$).

This shows that septoplasty provides significant relief from nasal obstruction and improves patients' quality of life. The gradual improvement from 1 month to 3 months suggests continued healing and better functional outcomes over time. The findings of the present study are consistent with those of Stewart et al., Gandomi et al.,[4] and Arunachalam et al.,[7] who also reported significant improvement in postoperative NOSE scores and high patient satisfaction following septoplasty. Postoperative complications were minimal in the present study. Most patients (71.4%) had no complications.

The complications observed were crusting (10.7%), persistent nasal obstruction (7.1%), synechiae (5.4%), mild postoperative bleeding (3.6%), and septal hematoma (1.8%). All complications were minor and managed conservatively. No major complications such as septal perforation or saddle nose deformity were observed, confirming the safety of septoplasty. One of the strengths of this study was the use of the validated NOSE questionnaire, which is a simple and reliable tool for assessing patient-reported improvement after septoplasty.

The present study has a few limitations. It was conducted at a single center with a sample size of 56 patients, and the follow-up period was limited to 3 months. Longer follow-up with a larger sample and objective tests such as rhinomanometry or acoustic rhinometry would provide more comprehensive results.

Overall, the present study demonstrates that septoplasty is a safe and effective procedure for symptomatic deviated nasal septum. It significantly improves nasal obstruction and quality of life, with high patient satisfaction and a low rate of postoperative complications.

CONCLUSION

The present study shows that septoplasty is a safe and effective procedure for treating symptomatic deviated nasal septum. It significantly improves nasal obstruction and other associated symptoms such as headache, nasal discharge, mouth breathing, sleep disturbance, and poor daytime functioning, leading to a better quality of life.

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