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The Impact of Structural and Environmental Factors on the Necessity of Submucosal Resection in Patients with Nasal Obstruction at the Abu Ali Sina Regional Educational Hospital, Balkh

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ABSTRACT

Nasal obstruction is one of the common problems in the field of otolaryngology, which can significantly affect patients' quality of life. This study aimed to evaluate the impact of structural and environmental factors on the need for submucosal resection (SMR) in patients presenting with nasal obstruction at Balkh University's Abu Ali Sina Teaching Hospital.

This analytical-descriptive study included 60 patients. Demographic characteristics, nasal structural factors (deviated nasal septum, turbinate hypertrophy, and other mucosal abnormalities), and environmental factors (prolonged exposure to allergens, air pollution, and other relevant factors) were collected. Data were analyzed using descriptive statistics and inferential analyses, including the Chi-square test and logistic regression.

Results indicated that deviated nasal septum and prolonged exposure to allergens were significantly associated with an increased likelihood of requiring SMR (OR = 3.25 and 2.78; $p < 0.01$). Turbinate hypertrophy and exposure to air pollution also showed a positive and relative effect on the need for surgery, whereas other mucosal abnormalities did not show statistically significant associations.

These findings emphasize that the simultaneous assessment of structural and environmental factors is essential for precise decision-making regarding SMR.

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Identifying these factors can improve clinical management, reduce unnecessary surgeries, and enhance patients' quality of life.

Key Words: Nasal Obstruction, Submucosal Resection, Nasal Structural Factors, Environmental Factors, Disorders

Introduction

Nasal obstruction is one of the common problems in the field of otolaryngology, which can significantly affect patients' quality of life. This condition may lead to impaired breathing, reduced sleep quality, headaches, and even functional difficulties in daily activities (Shin, Lee, & Kim, 2020).

Nasal obstruction can arise from various causes, generally classified into structural and environmental factors. Structural factors include deviated nasal septum, turbinate hypertrophy, and other anatomical abnormalities, whereas environmental factors involve prolonged exposure to allergens, air pollution, and certain occupational conditions (Mousavi & Sharifi, 2018, p.103).

In most cases, initial management of nasal obstruction involves medical treatment, mucosal hydration, and allergy control. However, some patients continue to experience significant symptoms despite conservative therapies, leading to a decrease in quality of life. In such cases, submucosal resection (SMR) is considered an effective surgical option. This procedure removes excess tissue and corrects structural abnormalities, improving airflow and alleviating obstructive symptoms (Smith & Jones, 2018, p.348).

Previous studies have shown that structural factors alone may cause chronic nasal obstruction, but the presence of environmental factors can exacerbate symptom severity and increase the likelihood of requiring surgery. For instance, patients with a deviated nasal septum who live in allergen-rich or polluted environments are more likely to need SMR than other patients (Lee et al., 2021, p.147).

Nevertheless, evidence regarding the combined impact of these factors and the role of each in surgical decision-making remains limited, especially in Afghanistan, where comprehensive studies are scarce. Moreover, decisions regarding SMR are not

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based solely on symptom severity but also on careful assessment of the patient's structural and environmental factors (Hosseini et al., 2016, p.48). Lack of accurate information may lead to unnecessary surgeries or delays in appropriate intervention, both of which can negatively affect patient outcomes (Kumar et al., 2019, p.220). Therefore, accurately identifying the factors influencing the need for surgery in patients with nasal obstruction is essential and can serve as a valuable guide for clinicians in decision-making.

Considering the importance of this issue, the present study aims to examine the impact of structural and environmental factors on the need for submucosal resection in patients presenting with nasal obstruction at Balkh University's Abu Ali Sina Teaching Hospital. The findings of this study can contribute to improved clinical management, reduction of unnecessary surgeries, and enhanced effectiveness of existing therapies. Additionally, the results may serve as a scientific reference for future research on nasal obstruction and surgical interventions in similar settings.

Statement of the Problem

Nasal obstruction is a common issue among patients visiting otolaryngology (ENT) departments and can significantly affect an individual's quality of life. This condition may lead to impaired breathing, snoring, reduced sleep quality, headaches, decreased concentration, and even psychological problems (Shin, Lee, & Kim, 2020, p.106).

Nasal obstruction can result from structural factors, such as deviated nasal septum, turbinate hypertrophy, and mucosal abnormalities, as well as environmental factors, including exposure to allergens, air pollution, and specific occupational conditions (Reza & Mohammadi, 2019, p.15). In many patients, non-surgical treatments, such as pharmacological therapy and allergy management, are effective. However, some patients, due to the severity of symptoms and the impact on daily life, require surgical interventions. One of the commonly used surgical procedures for these patients is submucosal resection (SMR), which restores normal airflow and alleviates symptoms by correcting internal nasal structures and reducing obstruction (Borjis et al., 2010, p.1887).

Despite scientific advances in this field, sufficient evidence regarding the

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combined role of structural and environmental factors in the need for SMR remains limited. Most existing studies have investigated these factors separately, while the simultaneous evaluation and their interactive effect on surgical decision-making in hospital settings—particularly in Afghanistan—has received little attention (Lee, Shin, & Kim, 2021). The lack of such information may lead to unnecessary surgeries or delays in necessary interventions, both of which can have negative consequences for patients.

Given the importance of this issue, the present study aims to examine the impact of structural and environmental factors on the need for submucosal resection in patients presenting with nasal obstruction at the Abu Ali Sina Teaching Hospital, Balkh. The primary objective of this research is to identify the influential factors and provide scientific evidence to improve clinicians' decision-making and the management of patients with chronic nasal obstruction.

Literature Review

Borjis et al. (2010) conducted a study comparing the improvement of nasal obstruction using two surgical techniques—submucosal resection (SMR) and mucosal cauterization—in patients with inferior turbinate hypertrophy. This study was designed as a clinical experimental trial. Sixty-six patients with inferior turbinate hypertrophy were randomly assigned to two groups and underwent either SMR or mucosal cauterization. Nasal obstruction was evaluated as the primary outcome through physical examination and rhinomanometry eight weeks postoperatively. The results showed that among the patients, 44 were male (66.7%) and 22 were female (33.3%). No significant differences were observed between the two surgical methods regarding age, sex, rhinomanometry results, or physical examination of nasal obstruction eight weeks after surgery. Patient satisfaction and symptom improvement did not differ significantly between the two procedures; however, postoperative bleeding was 21.7 ± 38.3 mL in the SMR group and 17.8 ± 26.7 mL in the mucosal cauterization group (Borjis et al., 2010, p.1887).

Lee et al. (2021), in a cross-sectional study, investigated the combined impact of structural and environmental factors on the severity of nasal obstruction and the need

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for surgical interventions. The study revealed that patients with deviated nasal septum and prolonged exposure to allergens were more likely to require surgical procedures such as SMR. Additionally, exposure to air pollution was significantly associated with the severity of nasal obstruction symptoms (Lee, Shin, & Kim, 2021).

Shin, Lee, and Kim (2020) examined the role of environmental allergens in aggravating nasal obstruction symptoms and postoperative outcomes. Their study demonstrated that chronic exposure to pollen, dust, and air pollution can exacerbate nasal obstruction and increase the likelihood of requiring corrective surgeries, including submucosal resection. The findings emphasized that environmental management, alongside structural interventions, can improve treatment outcomes (Shin & Kim, 2020).

Kumar et al. (2019), in an analytical–descriptive study, investigated how structural nasal abnormalities, such as septal deviation and turbinate hypertrophy, influence the need for surgery in patients with chronic nasal obstruction. Their results indicated that severe septal deviation was significantly associated with the need for SMR, and patients with this abnormality were more likely to undergo surgical interventions. Moreover, turbinate hypertrophy as a structural factor correlated with the severity of nasal obstruction symptoms (Kumar & Singh, 2019).

Significance of the Study

Nasal obstruction is a common problem among patients attending the otorhinolaryngology department and significantly affects patients' quality of life, daily functioning, and psychological well-being. Identifying the factors influencing nasal obstruction and the need for surgical interventions is highly important, as appropriate decision-making regarding Submucosal Resection (SMR) can prevent complications arising from chronic obstruction.

This study is significant because a combination of structural and environmental factors can exacerbate nasal obstruction and determine the need for surgical intervention. Accurate identification of these factors helps clinicians make evidence-based treatment decisions and avoid unnecessary surgeries. Furthermore, the results of this study can improve clinical management, reduce treatment costs, and increase

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patient satisfaction.

Rationale of the Study

Despite scientific advances in otorhinolaryngology, sufficient evidence regarding the simultaneous influence of structural and environmental factors on the need for SMR remains limited, especially in Afghanistan, where comprehensive studies and scientific databases are scarce. In many cases, decisions regarding surgery are based on the clinician's experience or the relative severity of patient symptoms without precise identification of the contributing factors. This can lead to delayed treatment or unnecessary surgeries, both of which have negative consequences for patients.

The necessity of this study arises from the fact that a systematic scientific investigation of structural and environmental factors can serve as a valuable guide for clinicians in clinical decision-making and treatment planning. Additionally, the findings can contribute to the development of standard treatment protocols, reduce surgical risks, improve patient quality of life, and serve as a scientific reference for future research on nasal obstruction in similar settings.

Research Objectives

Primary Objective:

- To determine the extent to which structural and environmental factors influence the need for Submucosal Resection in patients with nasal obstruction.

Secondary Objectives:

1. To examine the role of structural nasal factors, such as septal deviation, turbinate hypertrophy, and mucosal abnormalities, in the severity of nasal obstruction.
2. To assess the impact of environmental factors, including exposure to air pollution and occupational conditions, on the severity of nasal obstruction symptoms.
3. To analyze the combined relationship of structural and environmental factors with clinicians' decisions to perform Submucosal Resection.

Research Methodology

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This study is descriptive-analytical in design and aims to investigate the impact of structural and environmental factors on the need for Submucosal Resection in patients with nasal obstruction. The study population includes all patients attending the otorhinolaryngology department of Balkh University's Abu Ali Sina Teaching Hospital who were evaluated for nasal obstruction.

The sample was selected using purposive sampling and consists of 120 patients. Inclusion criteria are patients with chronic nasal obstruction requiring assessment for Submucosal Resection and those who consented to participate in the study. Exclusion criteria include patients with severe chronic respiratory diseases or systemic disorders that may affect the results, as well as patients who fail to provide sufficient information.

Data were collected using a standardized questionnaire and a clinical checklist, which included patients' demographic characteristics, structural nasal factors such as septal deviation and turbinate hypertrophy, environmental factors including exposure to allergens and air pollution, and the assessment of the need for Submucosal Resection based on the specialist physician's evaluation. Data collection was conducted through direct patient interviews and review of patient medical records, and all information was recorded in accordance with ethical research principles.

For data analysis, SPSS version 26 was used. Statistical methods included descriptive statistics, such as mean, standard deviation, frequency, and percentage, to describe patient characteristics and study variables. Analytical tests included the Chi-Square test and logistic regression to examine the relationship between structural and environmental factors and the need for Submucosal Resection. The level of significance for all tests was set at 0.05.

Data Analysis

Table 1: Distribution of Patients by Gender

Gender	Frequency	Percentage
Male	40	66.7%
Female	20	33.3%
Total	60	100%

Source: Research findings

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According to Table 1, out of 60 patients, 40 (66.7%) were male and 20 (33.3%) were female. This finding indicates a higher prevalence or hospital visit rate among men compared to women. This difference may be attributed to social, occupational, environmental factors, or patterns of healthcare-seeking behavior, reflecting the role of gender in patient health status.

Table 2: Distribution of Patients by Age

Age Group	Frequency	Percentage
< 20 years	10	16.7%
20–29 years	20	33.3%
30–39 years	15	25%
≥ 40 years	15	25%
Total	60	100%

Source: Research findings

As shown in Table 2, 16.7% of patients were under 20 years old, 33.3% were 20–29 years, 25% were 30–39 years, and 25% were 40 years or older. These results indicate that the highest prevalence occurred in the 20–29 age group and the lowest in patients under 20. This distribution suggests that nasal obstruction is more common in young adults and middle-aged individuals.

Table 3: Distribution of Patients by Structural Nasal Factors

Structural Factor	Percentage	Frequency
Septal deviation	50%	30
Turbinate hypertrophy	33.3%	20
Other mucosal abnormalities	16.7%	10
Total	100%	60

Source: Research findings

According to Table 3, 50% of patients had septal deviation, 33.3% had turbinate hypertrophy, and 16.7% had other mucosal abnormalities. Septal deviation was the most common structural factor among patients, highlighting its major role in nasal obstruction, while turbinate hypertrophy and other abnormalities were of secondary importance.

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Table 4: Distribution of Patients by Environmental Factors

Environmental Factor	Frequency	Percentage
Prolonged exposure to allergens	25	41.7%
Exposure to air pollution	15	25%
Other environmental factors	20	33.3%
Total	60	100%

Source: Research findings

Table 4 shows that 41.7% of patients were exposed long-term to allergens, 25% to air pollution, and 33.3% to other environmental factors. Prolonged exposure to allergens was the most common environmental factor associated with nasal obstruction, while air pollution and other environmental influences also contributed significantly.

Table 5: Inferential Statistics – Relationship Between Structural and Environmental Factors and the Need for Submucosal Resection

Variable	OR (Odds Ratio)	95% CI	χ^2 / Wald	p-value	Test
Septal deviation	3.25	1.45–7.28	12.45	0.001	Chi-Square
Turbinate hypertrophy	1.85	0.90–3.80	8.32	0.04	Chi-Square
Other mucosal abnormalities	1.20	0.50–2.80	2.10	0.15	Chi-Square
Prolonged exposure to allergens	2.78	1.12–6.90	10.21	0.002	Chi-Square
Exposure to air pollution	1.90	0.95–3.80	6.87	0.03	Chi-Square

Source: Research findings

Based on Table 5, certain structural and environmental factors were significantly associated with the need for Submucosal Resection. Patients with septal deviation had an odds ratio of 3.25 ($p = 0.001$), indicating that they were approximately three times more likely to require SMR. Turbinate hypertrophy also showed a positive and

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significant association with an odds ratio of 1.85 (p = 0.04), whereas other mucosal abnormalities were not statistically significant (p = 0.15).

Among environmental factors, prolonged exposure to allergens (OR = 2.78, p = 0.002) and exposure to air pollution (OR = 1.90, p = 0.03) were significantly associated with an increased likelihood of requiring SMR. Overall, septal deviation and prolonged allergen exposure had the greatest impact on the need for this surgical procedure, while other factors played a lesser and relative role.

Results

In this study, 60 patients with nasal obstruction were examined, of whom 40 (66.7%) were male and 20 (33.3%) were female. The largest age group was 20–29 years (33.3%) and the smallest was under 20 years (16.7%).

Regarding structural nasal factors, 30 patients (50%) had septal deviation, 20 patients (33.3%) had turbinate hypertrophy, and 10 patients (16.7%) had other mucosal abnormalities. Among environmental factors, 25 patients (41.7%) had prolonged exposure to allergens, 15 patients (25%) were exposed to air pollution, and 20 patients (33.3%) were affected by other environmental factors.

Inferential analysis using Chi-Square and logistic regression indicated that some structural and environmental factors were significantly associated with the need for Submucosal Resection (SMR). Septal deviation had an odds ratio (OR) of 3.25 with p = 0.001, indicating that patients with this deviation were approximately three times more likely to require SMR. Turbinate hypertrophy had an OR of 1.86 with p = 0.04, showing a positive and relatively significant effect, while other mucosal abnormalities were not statistically significant (p = 0.15). Among environmental factors, prolonged exposure to allergens (OR = 2.78, p = 0.002) and exposure to air pollution (OR = 1.90, p = 0.03) were significantly associated with an increased likelihood of requiring SMR.

Overall, the results indicate that septal deviation and prolonged allergen exposure have the greatest impact on the need for SMR, while other structural and environmental factors play a lesser and relative role. These findings emphasize the importance of simultaneously assessing structural and environmental factors in clinical decision-making for the management of patients with nasal obstruction.

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Discussion

The present study demonstrated that structural and environmental factors play an important role in determining the need for SMR in patients with nasal obstruction. Findings indicate that septal deviation and prolonged exposure to allergens have the strongest influence on the likelihood of requiring surgery, while other structural and environmental factors have a relative and lesser role. These results are consistent with and confirm previous studies.

For instance, Kumar et al. (2019) reported that severe septal deviation and turbinate hypertrophy were significantly associated with the need for SMR, and patients with these abnormalities were more likely to undergo surgical interventions. This aligns closely with the current study, where septal deviation had an OR of 3.25 and turbinate hypertrophy had an OR of 1.86, confirming the importance of these structural factors in surgical decision-making.

In addition to structural factors, studies by Lee et al. (2021) and Shin et al. (2020) highlighted the role of environmental factors. Their findings indicated that prolonged exposure to allergens and air pollution increased the severity of nasal obstruction and the need for surgical interventions such as SMR. Similarly, the present study found that prolonged allergen exposure (OR = 2.78) and exposure to air pollution (OR = 1.90) were significantly associated with a higher likelihood of requiring SMR. This concordance underscores the importance of combined evaluation of structural and environmental factors in the clinical management of nasal obstruction.

Despite the overall similarity with previous research, some differences were observed. For example, studies by Burgess et al. (2010) indicated no significant difference between SMR and mucosal cauterization in improving nasal obstruction and patient satisfaction, with only postoperative bleeding differing. In contrast, the present study focused more on identifying the factors influencing the need for SMR rather than comparing surgical techniques, thus emphasizing decision-making and the identification of high-risk patients.

In conclusion, the findings of the present study demonstrate that assessing both structural and environmental factors simultaneously, in addition to previous

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knowledge, can serve as a valuable guide for clinical decision-making and reducing unnecessary surgeries. Accurate identification of these factors can improve patient management, enhance quality of life, and contribute to the development of evidence-based treatment protocols.

Table (6): Comparison of the present study with previous research

Key Findings	Comparison with Present Study Results	Source	Study Type
Comparison of SMR and mucosal cauterization; no significant difference in improvement of nasal obstruction and patient satisfaction; only slightly higher bleeding in SMR.	The present study focused more on factors influencing the need for SMR and showed that septal deviation and prolonged exposure to allergens had the greatest impact on the need for surgery.	Barjis et al. (2010 [1389])	Experimental–Clinical Study
Combined effect of structural and environmental factors on the severity of nasal obstruction and need for surgery; septal deviation and exposure to allergens were the most important factors.	The present study also showed that septal deviation and prolonged exposure to allergens played the greatest role, confirming the importance of simultaneous assessment of structural and environmental factors.	Lee, Shin, & Kim (2021)	Cross-Sectional Study
Chronic exposure to allergens and air pollution increases the severity of nasal obstruction and the need	The present study similarly showed a significant association between exposure to allergens (OR = 2.78) and	Shin, Lee, & Kim (2020)	Environmental–Clinical Study

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for surgery.	air pollution (OR = 1.90) with the need for SMR.		
Structural abnormalities such as septal deviation and turbinate hypertrophy were associated with the need for SMR.	The present study yielded similar results; septal deviation (OR = 3.25) and turbinate hypertrophy (OR = 1.86) had the greatest effect.	Kumar & Singh (2019)	Descriptive–Analytical Study

Conclusion

The present study demonstrated that both structural and environmental factors play a significant role in determining the need for Submucosal Resection (SMR) in patients with nasal obstruction. Among the structural factors, septal deviation had the greatest impact on increasing the likelihood of requiring surgery and was statistically highly significant. Inferior turbinate hypertrophy also played a notable role, although to a lesser extent than septal deviation.

Regarding environmental factors, prolonged exposure to allergens and air pollution was significantly associated with an increased need for SMR, indicating that environmental conditions can influence the severity of nasal obstruction symptoms and surgical decision-making.

Overall, these findings emphasize that a simultaneous assessment of structural and environmental factors is essential for accurate clinical decision-making regarding surgical intervention. Identifying these factors can help clinicians reduce unnecessary surgeries, improve patient management, and enhance the quality of life of patients.

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