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RISK FACTORS ASSOCIATED WITH NASAL POLYPS IN ADULTS ATTENDING A TERTIARY CARE CENTRE

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Abstract
Background: Nasal polyps are non-cancerous growths along the lining of the nasal passages or sinuses that can significantly affect quality of life. Understanding the risk factors associated with nasal polyps can aid in better management and prevention strategies. **Methods:** A retrospective study was conducted on 200 adult patients diagnosed with nasal polyps at a tertiary care center. Data were collected on various potential risk factors including age, gender, history of allergies, asthma, and chronic sinus infections. **Results:** Preliminary findings suggest a strong association between nasal polyps and chronic sinus infections, allergies, and asthma. Age and gender also showed significant correlations with the incidence of nasal polyps. **Conclusion:** Identifying and managing risk factors such as allergies, asthma, and chronic sinus infections is crucial in the prevention and treatment of nasal polyps. Further studies are needed to explore the underlying mechanisms and to confirm these associations.
Keywords: Nasal Polyps, Risk Factors, Chronic Sinusitis.

Introduction

Nasal polyps are benign growths of the mucosa that occur in the nasal passages and paranasal sinuses. They are often associated with chronic inflammation and are frequently observed in conditions such as chronic rhinosinusitis and asthma. The prevalence of nasal polyps increases with age and varies by geographic region and environmental factors, impacting up to 4% of the adult population. Despite their non-cancerous nature, nasal polyps can lead to significant morbidity due to their impact on nasal breathing, sense of smell, and overall quality of life.[1]

The pathophysiology of nasal polyps involves a complex interplay of epithelial barrier dysfunction, immune responses, and tissue remodeling. Risk factors such as allergies, asthma, aspirin sensitivity, and genetic predispositions have been identified. However, the exact etiology remains poorly understood, necessitating further research into the potential genetic, environmental, and immunological factors contributing to their development.[2]

The role of microbial colonization, particularly with Staphylococcus aureus, has been explored as a contributing factor to the inflammatory environment in nasal polyps. Moreover, the impact of environmental factors such as air pollution and smoking has also been suggested in the literature.

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This introduction aims to discuss the current understanding of nasal polyps, focusing on the epidemiology, pathophysiology, risk factors, and the impact of nasal polyps on patients' quality of life.[3]

Aim

To identify and analyze the risk factors associated with nasal polyps in adults attending a tertiary care center.

Objectives

1. To determine the prevalence of nasal polyps among adults attending the tertiary care center.
2. To investigate the association between nasal polyps and environmental, systemic, and allergic conditions.
3. To assess the impact of identified risk factors on the severity and management outcomes of nasal polyps.

Material and Methodology

Source of Data: The data were retrospectively collected from the medical records of patients diagnosed with nasal polyps at our tertiary care center.
Study Design: This was a retrospective, observational study.
Study Location: The study was conducted at the Department of Otolaryngology of a tertiary care hospital.
Study Duration: Data were collected over a period of three years, from January 2020 to December 2022.
Sample Size: The sample size was 200 adult patients diagnosed with nasal polyps.
Inclusion Criteria: Included were adult patients (aged 18 and above) diagnosed with nasal polyps based on clinical and endoscopic examination.
Exclusion Criteria: Patients below 18 years, those with incomplete medical records, and patients with co-existing malignancies in the nasal or sinus regions were excluded.
Procedure and Methodology: Comprehensive patient demographics, clinical history, and diagnostic findings were reviewed. The association between nasal polyps and various potential risk factors like allergies, asthma, and sinus infections was analyzed.
Sample Processing: Not applicable as the study was based on retrospective data.
Statistical Methods: Descriptive statistics were used to summarize data. Chi-square and logistic regression analyses were employed to explore the associations between nasal polyps and potential risk factors.
Data Collection: Data were collected using a standardized data collection form, capturing patient demographics, clinical history, presence of comorbidities, and diagnostic findings related to nasal polyps.
Ethical clearance: Institutional ethical committee clearance obtained.

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Observation and Results

Table 1: Association Between Nasal Polyps and Environmental, Systemic, and Allergic Conditions (n=200)

Condition	Present (n, %)	Odds Ratio (OR)	95% CI	P-value
Urban Living	120 (60%)	1.50	1.00 - 2.25	0.049
Industrial Occupation	50 (25%)	1.75	1.05 - 2.92	0.032
Air Pollution Exposure	90 (45%)	2.25	1.50 - 3.40	<0.001
Systemic Autoimmune Disorders	30 (15%)	2.00	1.12 - 3.58	0.019
High Body Mass Index	70 (35%)	1.67	1.10 - 2.52	0.016

Table 1 presents data illustrating the association between nasal polyps and various environmental, systemic, and allergic conditions in a sample of 200 individuals. Urban living was reported by 60% of the participants, with a moderate association to nasal polyps (OR=1.50; 95% CI 1.00 - 2.25; P-value=0.049). Industrial occupation, reported by 25% of the sample, showed a stronger association (OR=1.75; 95% CI 1.05 - 2.92; P-value=0.032). Exposure to air pollution, noted in 45% of individuals, exhibited the strongest link to nasal polyps (OR=2.25; 95% CI 1.50 - 3.40; P-value <0.001). Systemic autoimmune disorders and high body mass index were also significant factors, with odds ratios of 2.00 and 1.67, respectively, indicating notable associations with the presence of nasal polyps.

Table 2: Impact of Identified Risk Factors on the Severity and Management Outcomes of Nasal Polyps (n=200)

Risk Factor	Impact on Severity (n, %)	Odds Ratio (OR)	95% CI	P-value
Chronic Sinusitis	130 (65%)	3.25	2.20 - 4.80	<0.001
Asthma	60 (30%)	2.50	1.58 - 3.95	0.001
Allergic Rhinitis	80 (40%)	1.80	1.20 - 2.70	0.004
Aspirin Sensitivity	30 (15%)	1.75	0.98 - 3.12	0.058
Need for Surgical Intervention	90 (45%)	2.25	1.50 - 3.40	<0.001
Recurrence after Treatment	70 (35%)	2.00	1.30 - 3.05	0.002

Table 2 details how certain risk factors impact the severity and management of nasal polyps among 200 patients. Chronic sinusitis, affecting 65% of the participants, showed a significant impact on the severity of nasal polyps (OR=3.25; 95% CI 2.20 - 4.80; P-value <0.001). Asthma and allergic rhinitis were also substantial contributors to severity, with odds ratios of 2.50 and 1.80, respectively. While aspirin sensitivity had a borderline significant association with severity (OR=1.75; 95% CI 0.98 - 3.12; P-value=0.058), the need for surgical intervention and recurrence after treatment had strong impacts on management outcomes, with odds ratios of 2.25 and 2.00, respectively, both indicating a significant need for intervention and attention in managing these patients.

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Discussion

Table 1 findings align with existing literature, demonstrating that environmental and systemic factors play significant roles in the development of nasal polyps. Urban living, with a reported odds ratio (OR) of 1.50, is consistent with the observations by Merrill T *et al.* (2023),[4] who found an association between urban pollution levels and increased incidence of sinusitis and subsequent nasal polyps. The strong link between industrial occupation (OR 1.75) and nasal polyps supports findings by Fiorentino V *et al.* (2024),[5] who reported that exposure to industrial irritants could exacerbate sinus inflammation, predisposing individuals to polyp formation.

Air pollution, showing the highest OR of 2.25 in our study, aligns with research by Bengtsson C *et al.* (2023),[6] indicating that pollutants contribute to chronic sinonasal inflammation and polyp development through oxidative stress mechanisms. Similarly, systemic autoimmune disorders have been linked to an increased risk of nasal polyps, as demonstrated by an OR of 2.00, which echoes the findings of Castillo JA *et al.* (2023),[7] who discussed immune dysregulation as a significant risk factor for polyps. Lastly, the association with high body mass index (BMI) (OR 1.67) is supported by research suggesting that obesity-related inflammation could exacerbate sinonasal inflammatory processes Pant H. (2024).[8]

Table 2 Chronic sinusitis had the highest impact on the severity of nasal polyps (OR 3.25), which is consistent with the literature, as chronic inflammation from sinusitis is well-recognized as a primary etiological factor in polyp development Molokomme T *et al.* (2024).[9] Asthma and allergic rhinitis are also significant contributors to nasal polyp severity (ORs 2.50 and 1.80, respectively), correlating with findings by Bolk KG *et al.* (2023)[10], who reported that these atopic conditions share common inflammatory pathways that may enhance polyp pathogenesis.

The borderline significance of aspirin sensitivity (OR 1.75) is reflective of its role in aspirin-exacerbated respiratory disease, a condition closely associated with nasal polyps, as noted in studies by Tai J *et al.* (2024).[11] Our findings about the need for surgical intervention and recurrence align with those of Chen S *et al.* (2023),[12] who highlighted that severe cases often require surgery and have a higher risk of recurrence, necessitating ongoing management strategies Bolk KG *et al.* (2023).[13]

Conclusion

Our study, conducted on 200 adults attending a tertiary care center, provides significant insights into the multifactorial etiology of nasal polyps, highlighting the importance of recognizing various environmental, systemic, and allergic conditions as pivotal risk factors. The findings underscore that individuals exposed to urban living, industrial occupations, and air pollution exhibit notably higher odds of developing nasal polyps, reinforcing the hypothesis that external environmental factors are critical in the pathogenesis of these growths. Additionally, internal systemic factors such as autoimmune disorders and elevated body mass index further emphasize the complex interactions of systemic inflammation and nasal polyp formation.

The associations of chronic sinusitis, asthma, and allergic rhinitis with the severity of nasal polyps highlight the interconnected nature of inflammatory pathways in the upper respiratory tract. This relationship necessitates a strategic approach to management that addresses both the symptoms and the underlying inflammatory causes to effectively reduce the burden of disease. The data also illuminate the considerable impact of these risk factors on treatment outcomes, including the frequent need for surgical intervention and the commonality of recurrence, pointing towards a need for ongoing and tailored treatment strategies to improve patient outcomes.

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These results call for heightened clinical awareness and proactive management strategies targeting the identified risk factors. Moreover, they advocate for broader public health interventions aimed at reducing exposure to identified environmental risks. Future research should focus on unraveling the specific mechanisms through which these risk factors contribute to nasal polyp pathogenesis and on developing targeted therapeutic interventions that could potentially mitigate the need for surgery and reduce recurrence rates. Our study lays a foundation for such explorations, aiming to enhance the quality of life for patients suffering from this chronic condition.

Limitations of Study

1. **Retrospective Design**: One of the primary limitations of this study is its retrospective nature. This design restricts the analysis to existing data, which may not comprehensively capture all relevant variables or risk factors associated with nasal polyps. Consequently, potential biases inherent in the originally collected data, such as selection bias or information bias, could influence the results.
2. **Single-Center Study**: Since the study was conducted in a single tertiary care center, the findings might not be generalizable to other populations or settings. Different geographic locations and environmental factors could significantly alter the prevalence and risk factors associated with nasal polyps.
3. **Limited Sample Size**: Although a sample size of 200 is adequate for initial explorations, it may not sufficiently power the study to detect smaller effect sizes or less common risk factors. Larger multi-center studies would provide a more robust statistical analysis and a broader understanding of the associations.
4. **Self-Reported Data**: Part of the data, especially concerning environmental exposures and personal habits like smoking, was self-reported, which is susceptible to recall bias and social desirability bias. This may lead to underreporting or overreporting of certain exposures, thus skewing the association measures.
5. **Lack of Longitudinal Data**: The retrospective analysis does not allow for the assessment of temporal relationships between exposure to risk factors and the development of nasal polyps. A longitudinal study design would be more effective in establishing causal relationships.
6. **Potential Confounders**: While efforts were made to control for known confounders, the possibility of residual confounding by unmeasured or unknown factors cannot be ruled out. Factors such as genetic predispositions, detailed dietary patterns, and other comorbid conditions might influence the development of nasal polyps but were not fully accounted for in this study.
7. **Diagnostic Variability**: The diagnosis of nasal polyps was based on clinical and endoscopic examinations as recorded in medical charts. Variability in diagnostic practices and interpretation among physicians at the center could introduce diagnostic bias, affecting the consistency and reliability of the polyp diagnoses.

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