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Reversible Smell Loss in Allergic Rhinitis: Clinical Insights and Therapeutic Implications

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KEYWORDS

Smell Loss, Allergic Rhinitis, Intranasal corticosteroids, Olfactory dysfunction, Antihistamines, Visual Analog Scale.

ABSTRACT:

Background: Odor is crucial for flavor, security, and overall well-being, and its absence can disrupt everyday activities. Allergic rhinitis often leads to olfactory impairment, but information regarding its prevalence, severity, and reversibility in Bangladesh is scarce. This study examines smell dysfunction in patients with allergic rhinitis and analyzes treatment results.

Methods: A observational study took place at the ENT Outpatient Department of Cumilla Medical College and Hospital (October 2024–September 2025). Eighty individuals with allergic rhinitis were recruited. Olfactory performance was evaluated with a VAS (1–10) and categorized as mild, moderate, or severe. Patients who were affected were given intranasal corticosteroids and oral antihistamines for four weeks, with results noted as complete, partial, or no recovery.

Results: In a study involving 80 adults with allergic rhinitis (average age 34 ± 11; 55% female), 63.8% experienced seasonal rhinitis, while 47.5% reported symptoms lasting 1–5 years. Loss of smell happened in 56.3%, primarily moderate. Following four weeks of treatment, 80% showed improvement (37.8% fully, 42.2% partially; VAS 4.9 → 1.7). The highest persistent loss was found in individuals with symptoms lasting over 5 years (28.6%), though it was not statistically significant ($\chi^2 = 1.07$, $p = 0.585$).

Conclusion: Loss of smell, primarily moderate, impacted more than half of patients with allergic rhinitis. Treatment enhanced 80% of cases, and prompt intervention can lessen lasting olfactory dysfunction.

INTRODUCTION:

The sense of smell is crucial for flavor recognition, safety, and overall well-being; its absence or alteration can adversely affect everyday tasks, work responsibilities, and food cravings [1,]. Olfactory dysfunction is a common clinical manifestation in patients with allergic rhinitis (AR) and has a significant negative impact on quality of life [2]. Globally, AR affects approximately 10–25% of the population, representing a considerable public health burden [3].

Allergic rhinitis is a chronic inflammatory disorder of the nasal mucosa and is classified as intermittent or persistent according to the Allergic Rhinitis and its Impact on Asthma criteria [4]. Smell impairment is primarily triggered by aging, persistent sinonasal conditions—particularly allergic rhinitis (AR) and chronic rhinosinusitis (CRS)—infections of the upper airway, head injuries, and neurodegenerative diseases [5]. Smell perception happens through two routes: oronasal, where scents come in through the nose, and retro nasal, where odors from the mouth reach the olfactory cleft, aiding in flavor perception and frequently confused with taste [6].

A recent global study indicated that 42.9% of patients with AR experienced measurable loss of smell, in contrast to 9% of controls, underscoring a notably higher prevalence among those with AR [7]. Pediatric research indicates significant occurrences of olfactory impairment, particularly among children aged 6–12 years

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with allergic rhinitis, especially in instances of chronic conditions [3].

In Bangladesh, allergic rhinitis is commonly triggered by environmental allergens such as dust, with many patients presenting with intermittent or persistent symptoms and reporting moderate to severe impairment of daily activities and sleep [8]. Furthermore, hospital-based studies during the COVID-19 pandemic documented a considerable prevalence of olfactory dysfunction, with associations observed between smell loss and factors such as younger age, smoking status, and systemic symptoms including cough and weakness [9].

Despite the high prevalence of allergic rhinitis, data regarding olfactory dysfunction in AR patients in Bangladesh remain limited, particularly concerning its prevalence, severity, and reversibility following treatment. Therefore, this study aims to assess olfactory dysfunction among patients with allergic rhinitis, evaluate its clinical characteristics and associated factors, and determine the extent of recovery after appropriate therapeutic intervention, thereby contributing to improved clinical management strategies.

METHODOLOGY:

Study Design and Setting

This was a prospective observational study conducted at the ENT Outpatient Department of Cumilla Medical College and Hospital, from October 2024 to September 2025. The study aimed to assess the prevalence, severity, and reversibility of smell loss among patients with allergic rhinitis and to evaluate the effect of standard treatment on olfactory dysfunction.

Study Population

Adult patients (≥18 years) clinically diagnosed with allergic rhinitis were recruited. Both seasonal and perennial forms were included. Patients with chronic sinusitis, nasal polyps, prior nasal surgery, neurological disorders affecting smell, or any other condition potentially influencing olfaction were excluded to avoid confounding factors.

Sample Size

A total of 80 patients were included consecutively during the study period. This sample size was considered adequate to represent the spectrum of seasonal and perennial allergic rhinitis and to evaluate clinically meaningful patterns of smell loss and treatment outcomes.

Data Collection

Baseline Assessment

Demographic information, including age and gender, was recorded. The type of allergic rhinitis (seasonal or perennial) and duration of symptoms (<1 year, 1–5 years, >5 years) were documented using standardized questionnaires and confirmed by ENT specialists.

Assessment of Smell Loss

Olfactory function was assessed at baseline using a Visual Analog Scale (VAS)**,** ranging from 1 (mild) to 10 (severe). Based on VAS scores, smell loss was categorized as:

- **Mild:** 1–3
- **Moderate:** 4–6
- **Severe:** 7–10

The prevalence and severity of smell loss were recorded for all participants and analyzed according to the type of allergic rhinitis.

Intervention

Participants with documented smell loss (n=45) received standard therapy consisting of intranasal corticosteroids and oral antihistamines for four weeks. Treatment adherence and any adverse effects were monitored during follow-up visits. Post-treatment olfactory function was reassessed using the VAS, and outcomes were classified as:

- Complete recovery
- Partial recovery
- No improvement

Outcome Measures

The primary outcomes were:

1. Prevalence of smell loss among patients with allergic rhinitis
2. Severity of smell loss based on VAS scores
3. Treatment response, measured as complete or partial recovery following four weeks of standard therapy

The secondary outcome was the association between symptom duration and persistent smell loss after treatment.

Statistical Analysis

Data were analyzed using SPSS version 26.0. Continuous variables were expressed as mean ± standard

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deviation (SD), and categorical variables as frequency and percentage (%). The association between symptom duration and persistent smell loss was evaluated using the Chi-square test. A p-value of <0.05 was considered statistically significant.

Ethical Considerations

The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board of Cumilla Medical College. Written informed consent was obtained from all participants, and confidentiality was maintained using coded identifiers. Participation was voluntary, and patients could withdraw at any time without affecting their care. Standard treatment was provided, and any adverse effects were managed according to routine clinical practice.

RESULTS

Baseline Characteristics of Study Participants,

Table I shows total of 80 patients with allergic rhinitis were included. The majority of participants were young to middle-aged adults, with 36.3% aged 18–30 years and 35.0% aged 31–45 years, while 28.7% were older than 45 years. The mean age was 34 ± 11 years, with 44 females (55%) and 36 males (45%). Seasonal allergic rhinitis accounted for 51 participants (63.8%) and perennial for 29 participants (36.2%). In terms of symptom duration, nearly half of the participants (47.5%) had symptoms for 1–5 years, followed by 31.2% with symptoms for more than 5 years and 21.3% with symptoms for less than 1 year. Baseline characteristics of the participants.

Table I: Baseline Characteristics of Study Participants (n=80)

Variables	Frequency	Percentage (%)
Age (years)		
18–30	29	36.3
31–45	28	35.0
>45	23	28.7
Gender		
Male	36	45.0
Female	44	55.0
Type of Allergic Rhinitis		
Seasonal	51	63.8
Perennial	29	36.2
Duration of Symptoms		
<1 year	17	21.3
1–5 years	38	47.5
>5 years	25	31.2

Prevalence and Severity of Smell Loss

Figure 1 and Tables II illustrate the prevalence and severity of smell loss among the study participants. Out of the total 80 patients, 45 experienced smell loss, while 35 did not report any olfactory dysfunction. When analyzed according to the type of allergic rhinitis, smell loss was observed in 27 of 51 patients with seasonal allergic rhinitis and in 18 of 29 patients with perennial allergic rhinitis. (Figure 1) Regarding the severity of smell impairment among the 45 affected patients, moderate smell loss was the most frequently reported category, affecting 23 patients (51.1%). Mild and severe smell loss were equally distributed, each observed in 11 patients (24.4%). (Table II)

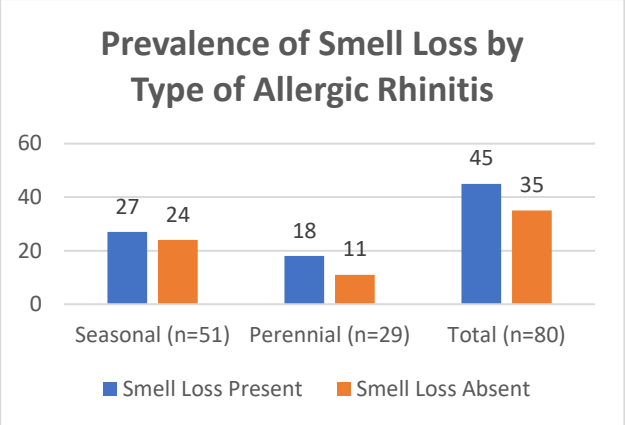

Figure 1: Prevalence of Smell Loss by Type of Allergic Rhinitis

Table II: Severity of Smell Loss (VAS Score) Among Affected Participants (n=45)

Severity Category	VAS Range	Frequency	Percentage (%)
Mild	1–3	11	24.4
Moderate	4–6	23	51.1
Severe	7–10	11	24.4

Effect of Standard Treatment on Smell Loss

Figure 2 presents 17 patients (37.8%) achieved complete recovery, while 19 patients (42.2%) showed partial improvement. Overall, 36 patients (80.0%) demonstrated improvement following 4 weeks of intranasal corticosteroids and oral antihistamines, whereas 9 patients (20.0%) had no significant change. The mean VAS score improved from 4.9 ± 1.6 at baseline to 1.7 ± 1.1 post-treatment, indicating substantial symptomatic relief.

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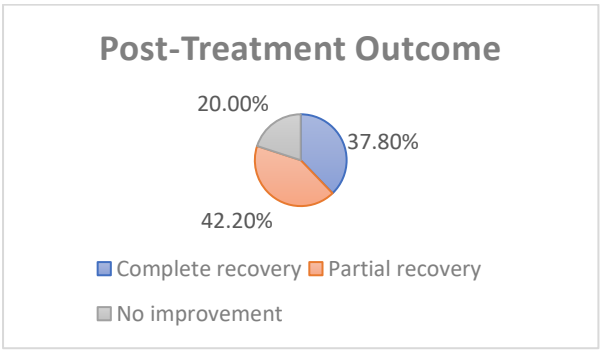

Figure 2: Improvement in Smell Loss Post-Treatment (n=45)

Association Between Symptom Duration and Persistent Smell Loss

Table III shows, persistent smell loss was observed most frequently in patients with symptom duration greater than 5 years (28.6%), compared to 14.3% in the 1–5 years group and 20.0% in those with symptoms less than 1 year. Although a higher proportion of persistent olfactory dysfunction was noted among patients with longer disease duration, the association between symptom duration and persistent smell loss was not statistically significant ($\chi^2 = 1.07$, $p = 0.585$).

Table III: Association Between Duration of Symptoms and Persistent Smell Loss (n=45)

Duration of Symptoms	Persistent Smell Loss n (%)	Improved n (%)	Total n (%)	χ^2	p-value
<1 year	2 (20.0)	8 (80.0)	10 (22.2)	1.07	0.585
1–5 years	3 (14.3)	18 (85.7)	21 (46.7)		
>5 years	4 (28.6)	10 (71.4)	14 (31.1)		
Total	9 (20.0)	36 (80.0)	45 (100.0)		

DISCUSSION

Our study involving 80 adults with allergic rhinitis, the average age was 34 ± 11 years, with a slight majority of females. This corresponds with meta-analysis findings revealing that the ratio of males to females with allergic rhinitis in adults is about 0.98, suggesting almost equal occurrence between genders [10]. Seasonal allergic rhinitis was the most common type in contrast to perennial, aligning with broader descriptive data indicating that seasonal rhinitis typically constitutes the majority of allergic rhinitis cases in clinical and epidemiological studies, although the ratio differs by region and criteria [11]. Almost half of the participants experienced symptoms for 1–5 years, emphasizing the persistent nature of allergic rhinitis in adults. Other clinical studies also indicate that numerous patients suffer from ongoing or returning symptoms for several years, highlighting the enduring impact of the condition [12].

Our study, indicated 45 issues with their sense of smell. The loss of smell occurred somewhat more frequently in seasonal rhinitis and moderate smell loss was the most common severity. These results align with earlier research indicating that 20–40% of individuals with allergic rhinitis suffer from varying levels of smell dysfunction, typically mild to moderate in intensity [2]. Objective olfactory assessments also demonstrate that both seasonal and perennial rhinitis can impair smell function, even in the absence of nasal polyps or sinus conditions [7].

In this study, most of individuals experiencing smell loss showed improvement after 4 weeks of intranasal corticosteroids and oral antihistamines. These findings correspond with research indicating that intranasal corticosteroids enhance olfactory function in allergic rhinitis by diminishing nasal mucosal inflammation and reinstating airflow to the olfactory cleft, thereby improving odor recognition and detection [13]. Combined treatment with antihistamines and corticosteroids offers enhanced symptom relief, including better smell, by reducing nasal blockage and mucosal swelling caused by histamine. Standard therapy generally improves nasal and smell symptoms, but a minority may retain persistent dysfunction [13,14,15].

In our study, ongoing smell loss was most common in individuals with symptoms lasting over 5 years. This trend corresponds with earlier studies indicating that a prolonged period of allergic rhinitis could elevate the likelihood of olfactory impairment because of ongoing nasal inflammation [2,16].

Generally, allergic rhinitis in adults tends to be chronic, frequently affects smell—particularly with extended disease duration—and typically responds effectively to standard treatment, although some individuals might face ongoing olfactory issues

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CONCLUSION

Smell loss is a common symptom in patients with allergic rhinitis, affecting over half of the study population, with moderate impairment being the most frequent. Both seasonal and perennial forms were associated with olfactory dysfunction, slightly more in perennial cases. Standard treatment with intranasal corticosteroids and oral antihistamines led to improvement in 80% of affected patients, including 37.8% with complete recovery and 42.2% with partial recovery. Persistent smell loss was more common among patients with longer symptom duration, although this association was not statistically significant. These findings highlight that early recognition and timely management of allergic rhinitis can substantially improve olfactory function and reduce the risk of chronic smell impairment.

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