



CHARACTERISTICS OF ALLERGEN SENSITIVITY AMONG INDIVIDUALS WITH ALLERGIC RHINITIS AND ATOPIC ASTHMA IN BUKHARA

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ABSTRACT

This article examines the distinct features of allergen sensitivity patterns in patients diagnosed with allergic rhinitis and atopic asthma residing in Bukhara. Considering the region's specific environmental, occupational, and socioeconomic conditions, the study highlights the distribution of sensitization to inhalant allergens, the demographic variables influencing allergic profiles, and the implications for disease management. Particular attention is given to diagnostic challenges and preventive strategies relevant to the local population.

INTRODUCTION

Allergic respiratory diseases are increasingly recognized as a substantial health concern in many regions of Central Asia, including Uzbekistan. In Bukhara, the prevalence of allergic rhinitis and atopic asthma has risen markedly over the past two decades. This trend reflects not only changing environmental exposures but also evolving lifestyle patterns and demographic transitions. While global research has established the role of aeroallergens such as pollens and house dust mites in the pathogenesis of these conditions, the specific characteristics of sensitization in Bukhara's population remain incompletely understood. Understanding these patterns is essential to inform effective diagnostic and therapeutic interventions adapted to the region's distinctive context.

MATERIALS AND METHODS

The sensitization profile in Bukhara demonstrates several noteworthy characteristics, influenced by a combination of natural, occupational, and domestic exposures. First, the climatic conditions—hot summers, cold winters, and limited rainfall—create a landscape dominated by arid steppe vegetation. Seasonal peaks in weed pollen, notably from *Salsola* and *Artemisia* species, coincide with high rates of acute exacerbations in patients with established respiratory allergies. In addition to pollen, the widespread use of traditional rugs, blankets, and unsealed grain storage contributes to a complex mixture of indoor allergens, including storage mites, cockroach particles, and fungal spores.

Epidemiological surveys indicate that sensitization to multiple allergens is more common than monosensitization among both children and adults. Approximately two-thirds of patients evaluated in regional allergy clinics exhibit clinically relevant reactivity to at least two allergen groups, complicating the clinical course and often leading to year-round symptoms. This polysensitization is frequently associated with early-onset disease, increased symptom severity, and a greater likelihood of progression from intermittent rhinitis to persistent asthma.

RESULTS AND DISCUSSION



Another important dimension is the influence of demographic factors. Children and adolescents show higher rates of sensitization to indoor allergens, likely reflecting prolonged time spent indoors during cold seasons. Conversely, adult patients engaged in agricultural work tend to display dominant sensitization to outdoor allergens, particularly during harvesting periods. Women, especially those involved in domestic tasks such as cleaning and food processing, often experience sensitization to storage mites and mold spores, highlighting gender-related occupational risks.

Diagnosis in Bukhara remains challenging for several reasons. Limited access to standardized allergen extracts specific to the regional flora means that standard skin prick tests sometimes fail to capture the full range of relevant sensitivities. Moreover, cross-reactivity between botanically related allergens can lead to ambiguous test results. For example, patients sensitized to *Artemisia* may also exhibit positive tests to other Asteraceae family pollens, complicating the interpretation of sensitization patterns. To improve diagnostic accuracy, clinicians increasingly rely on detailed environmental histories and, where resources allow, serum-specific IgE assays targeting purified allergenic components.

Management of allergic rhinitis and asthma requires a multi-faceted approach. Pharmacologic treatments, such as intranasal corticosteroids, leukotriene receptor antagonists, and combination inhalers, remain central to symptom control. However, the success of therapy depends heavily on patient adherence, which is often hampered by economic constraints and limited disease awareness. Many individuals discontinue maintenance medications during periods of relative symptom improvement, leading to recurrent exacerbations and progressive disease. Therefore, educational interventions and culturally appropriate counseling have emerged as key strategies to promote sustained engagement with treatment plans.

Environmental control measures also play an important role. In households with heavy dust accumulation and poor ventilation, simple modifications—such as regular wet cleaning, reduction of textile surfaces, and improved food storage—can significantly decrease allergen exposure. Seasonal monitoring of pollen counts, although not yet systematically implemented in Bukhara, would further enhance patients' ability to anticipate and mitigate exposure during high-risk periods [1].

An emerging area of interest is the impact of climate variability on allergen profiles. Rising average temperatures and shifting precipitation patterns are expected to extend pollen seasons and possibly increase the allergenicity of local plant species. Such changes may alter the timing and intensity of sensitization peaks, necessitating continuous epidemiological surveillance and adaptation of clinical protocols.

Finally, the psychological burden of chronic allergic diseases should not be underestimated. Persistent symptoms can disrupt daily activities, impair sleep, and reduce overall quality of life. Studies have shown that patients with poorly controlled allergic rhinitis are at increased risk of anxiety and depression, underscoring the importance of integrated care models that address both physical and emotional health [2].

Another dimension that merits special attention in analyzing allergen sensitivity among patients with allergic rhinitis and atopic asthma in Bukhara is the role of urbanization and evolving living standards. Over the past two decades, the region has undergone marked demographic shifts, with an increasing proportion of the population migrating to urban and



peri-urban settlements. These changes have introduced new environmental exposures and modified traditional patterns of allergen contact. For example, modern housing with limited ventilation, synthetic building materials, and widespread use of air conditioning has contributed to higher indoor humidity in some dwellings, favoring the growth of mold colonies such as *Aspergillus* and *Penicillium*. Although these molds were historically considered rare sensitizers in the arid climate of Bukhara, contemporary surveys indicate a gradual rise in their relevance as triggers for chronic rhinitis and asthma exacerbations.

In addition, the influence of dietary and lifestyle changes on allergic sensitization profiles cannot be overlooked. Increased consumption of processed foods rich in preservatives and artificial additives, combined with reduced exposure to traditional diets rich in antioxidants and anti-inflammatory micronutrients, may contribute to a general state of heightened immune reactivity. Several studies have demonstrated correlations between Westernized dietary patterns and elevated risk of atopic disorders, although the precise mechanisms remain under investigation [3]. This observation supports the hypothesis that allergen sensitization does not occur in isolation but is shaped by a web of interrelated factors, including nutrition, microbiome diversity, and environmental pollutants.

Another important consideration is the contribution of passive and active tobacco smoke exposure to the burden of sensitization and disease severity. In many households in Bukhara, especially those where multiple generations live together, children and elderly individuals are regularly exposed to environmental tobacco smoke. This exposure not only exacerbates existing respiratory inflammation but also promotes the development of sensitization by impairing mucosal barriers and modulating immune responses. Epidemiological data suggest that children exposed to household smoking during the first years of life have a significantly higher prevalence of polysensitization later in childhood, further complicating management [4].

It is also essential to recognize the heterogeneity of clinical presentations associated with allergen sensitization in this population. While some patients present with classic seasonal symptoms such as sneezing, nasal congestion, and conjunctival irritation during pollen peaks, others experience non-specific respiratory complaints, including chronic cough and intermittent wheezing. This variability often leads to misclassification and underdiagnosis, particularly in primary care settings where access to specialized allergy diagnostics is limited. Therefore, there is a pressing need for training initiatives to enhance the capacity of general practitioners to recognize less typical presentations of allergic airway disease.

Moreover, cultural perceptions surrounding allergic diseases can influence both help-seeking behavior and adherence to treatment recommendations. In certain communities, allergic symptoms may be viewed as transient or inconsequential, leading patients to rely on home remedies or to delay medical consultation until symptoms become debilitating. These attitudes, combined with economic constraints, often result in fragmented care and poor disease control. Patient-centered education campaigns that respect cultural values and incorporate local languages and metaphors could play a transformative role in improving disease outcomes [5].

CONCLUSION



The allergen sensitivity characteristics among individuals with allergic rhinitis and atopic asthma in Bukhara reflect a complex interplay between environmental exposures, demographic variables, and socioeconomic constraints. The predominance of polysensitization, seasonal variability in allergen loads, and diagnostic limitations pose unique challenges for clinicians and patients alike. Addressing these challenges requires a coordinated strategy combining improved diagnostic capabilities, patient education, environmental interventions, and accessible evidence-based treatment. In the face of ongoing environmental change and rising disease prevalence, proactive efforts to adapt healthcare practices to the region's specific realities will be essential to reducing the burden of allergic respiratory diseases in Bukhara.

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