



# Indian Expert Consensus on Allergic Rhinitis in Women: A Modified Delphi Survey

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## ABSTRACT

**Introduction:** At present, there are many significant gaps in understanding the clinical needs of Indian women with allergic rhinitis.

To address a critical gap in clinical practice, the consensus group created an innovative questionnaire tailored to assist Indian clinicians in the diagnosis and management of allergic rhinitis among female patients.

**Methods:** The modified Delphi survey utilized a systematic approach to group communication in addressing research questions and resolving conflicting viewpoints through detailed evaluation of various arguments. In total, 80 statements were developed focusing on disease burden, risk factors, clinical presentation, comorbidities, symptoms, and treatment of allergic rhinitis.

**Results:** Out of 61 statements reviewed by the expert panel, around 38 statements received over 80% agreement, leading to a consensus.

**Conclusion:** Allergic conditions are more common among Indian women, impacting them disproportionately. A high level of consensus indicates that many Indian women spend most of their time indoors, which can result in heightened exposure to indoor allergens and pollutants, consequently increasing their vulnerability to allergies. The experts also offered real-world clinical recommendations while assessing and managing modifiable and nonmodifiable allergens in Indian women with allergic rhinitis.

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## SIGNIFICANCE STATEMENT

Allergic rhinitis is the most widespread allergic disorder, with significant variations in prevalence among men and women. The female preponderance can be attributed to several factors, namely, the influence of hormones on the airway and increased airway reactivity to allergens. This modified Delphi survey provides clinically valuable insights in managing women with allergic rhinitis with respect to detailed history, allergen exposure, and treatment.

## INTRODUCTION

Allergic rhinitis is the most widespread allergic disorder caused by immune-mediated reactions to inhaled allergens.<sup>1</sup> It is a prevalent global health concern characterized by symptoms such as sneezing, nasal congestion, itching, and runny nose. Over 600 million individuals worldwide are affected by allergic rhinitis.<sup>2</sup> The incidence of allergic rhinitis is around 10–30% in adults globally.<sup>2</sup> Recent studies indicate a notable increase in allergic rhinitis in India over the past 2 decades, with reported incidences of 20 and 30%.<sup>3,4</sup>

## DISEASE BURDEN OF ALLERGIC RHINITIS

Allergic rhinitis is responsible for approximately 1 million work days being lost and 28 million work days being restricted annually.<sup>5</sup> Individuals with this condition experience negative effects on physical, psychological, and social tasks, leading to limitations in daily activities and sleep.<sup>3,6</sup>

Cognitive function and sleep quality are negatively affected by allergic rhinitis, resulting in irritability, fatigue, and decreased work performance.<sup>3,6,7</sup> Furthermore, symptoms such as sneezing, runny nose, and nasal itching impact sleep and daytime sleepiness, ultimately reducing overall quality of life (QoL).<sup>7</sup>

## CLINICAL PRESENTATIONS AND COMORBID DISEASES IN ALLERGIC RHINITIS

Allergic rhinitis is often categorized into “runners” and “blockers” based on different symptoms and treatments, as shown in Figure 1.<sup>8</sup> The “atopic march” theory suggests that atopic disorders progress from atopic dermatitis to allergic rhinitis and eventually asthma as sensitivities develop in the upper

and lower airways.<sup>9</sup> Perennial allergic rhinitis is associated with more severe asthma, especially in individuals with a personal or family history of atopy.<sup>10</sup> Managing allergic rhinitis effectively can have a positive impact on the long-term treatment of asthma, as approximately 60% of asthma patients also have allergic rhinitis.<sup>10,11</sup>

## CAUSATIVE ALLERGENS OF ALLERGIC RHINITIS IN INDIA

Allergic rhinitis and asthma are hypersensitivity diseases that involve the activation of immunoglobulin E (IgE) type 1 antibodies

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by various environmental allergens. These allergens can come from sources like fossil fuel, pollen (mostly found outdoors), arthropods, or mammals (mostly found indoors), as shown in Figure 1.<sup>12</sup> Some cases of rhinitis can be triggered by irritants or occupational allergens

in specific work environments (known as occupational rhinitis).<sup>13</sup>

In India, common allergens such as dust mites, fungi, pollens, and insects are prevalent.<sup>4</sup> The country also grapples with significant air pollution from biomass, fossil

fuels, and vehicular emissions, ranking among the highest globally. The World Health Organization (WHO) (2022) documents that around 2.4 billion women in India rely on open fires or inefficient stoves fueled by kerosene, biomass, and coal for cooking, leading to indoor air pollution and an estimated 3.2 million deaths annually.<sup>14</sup> Given that many Indian women spend a significant amount of time indoors, they are more exposed to indoor allergens and pollutants, potentially resulting in higher rates of allergen sensitization, as shown in Figure 1.<sup>15-17</sup>

## ALLERGIC RHINITIS IN WOMEN: IS IT CLINICALLY DIFFERENT?

Epidemiological studies conducted worldwide have revealed significant variations in the prevalence of allergic rhinitis among adults, specifically between men and women. A recent study conducted in Asia has highlighted a higher prevalence of allergic rhinitis in women (23.9%) compared to men (8.7%,  $p = 0.028$ ).<sup>16</sup> This predominance in women can be attributed to several factors, including a heightened cough reflex sensitivity in the airway, the influence of hormones on the airway, and physiological disparities between men and women in terms of their airway reactivity to allergens.<sup>18</sup> It has long been hypothesized that hormones present in women, such as estrogen and progesterone, actively contribute to allergic diseases in women. This hypothesis appears plausible due to the evident disparities in the occurrence, severity, and fluctuations of allergic disorders between women and men.<sup>19</sup>

Research indicates that the prevalence of allergic diseases varies across different stages of a woman's life. Prior to puberty, men experience a higher frequency of clinical manifestations, but postpuberty, women surpass them in the occurrence of allergic symptoms. Furthermore, IgE levels are impacted by the menstrual cycle, indicating the potential influence of sexual hormones in exacerbating allergic rhinitis symptoms.<sup>20</sup>

## NONMODIFIABLE CAUSATIVE HORMONES ASSOCIATED WITH ALLERGIC RHINITIS IN WOMEN

While men tend to have a higher prevalence of allergic rhinitis during childhood and prepuberty, the situation changes after mid-adulthood, with women becoming more affected. This change implies that the hormones present in women, particularly

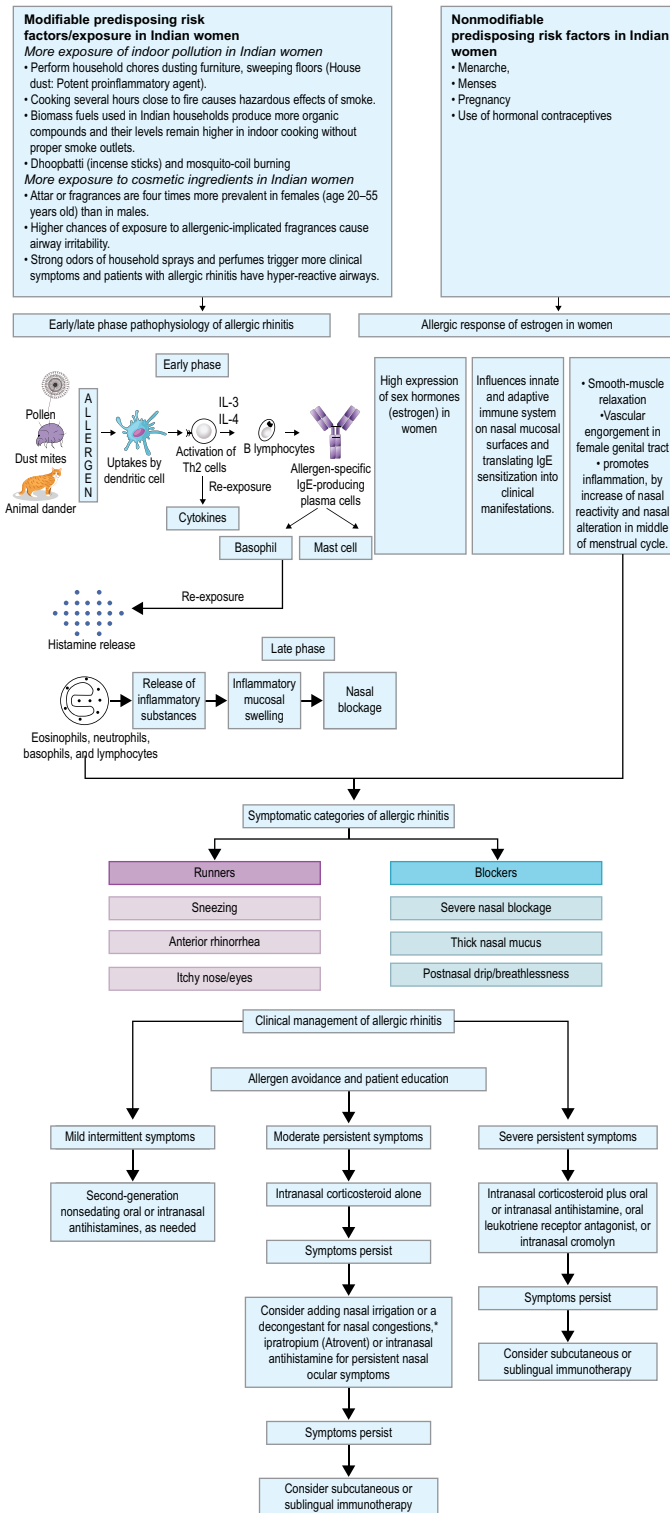


Fig. 1: Predisposing factors, pathophysiology, symptomatic categories, and clinical management of allergic rhinitis in women

estrogen, may have a significant impact on the development of allergic rhinitis. Research has shown that estrogen can impact immune cells in a manner that promotes allergic responses. This includes promoting Th2 polarization, encouraging B cells to switch classes and produce IgE, and triggering the degranulation of mast cells and basophils, as shown in Figure 2.<sup>1,19,21</sup>

Recent research has indicated that elevated levels of sex hormones during menarche, menstruation, pregnancy, or when using hormonal contraceptives play a significant role, as shown in Figure 1.<sup>16,17,22</sup> Previous studies have demonstrated that skin reactivity to histamine or allergen prick increases during the middle of the menstrual cycle, regardless of the woman's atopic status. Women with inflamed nasal mucosa may experience a general exacerbation of rhinitis symptoms, particularly nasal congestion, during ovulation. Therefore, gender and sex hormones may influence the differences in allergic responses between men and women.<sup>17</sup>

A delayed onset of menarche has been shown to provide protection against allergic rhinitis. Moreover, an increase in estrogen levels during the peri-ovulatory phase of the menstrual cycle is linked to heightened nasal congestion. While elevated estrogen levels are associated with more severe rhinitis symptoms, lower estrogen levels are linked to a higher risk of nasal polyposis. The most compelling evidence supporting the influence of sex hormones on rhinitis comes from studies on pregnancy. Approximately

20% of pregnant women experience new-onset rhinitis, with changes in sex hormones believed to be the primary cause. However, some studies propose that higher levels of placental growth hormones may also play a role. The precise mechanism behind these effects remains unclear.<sup>23</sup>

### MODIFIABLE CAUSATIVE ALLERGEN EXPOSURE ASSOCIATED WITH ALLERGIC RHINITIS IN WOMEN

Gender-related behaviors can also play a role in allergen exposure, access to healthcare, and health-seeking habits that impact the development of allergic reactions. Furthermore, disparities in AR between genders may stem from living conditions influenced by cultural, social, economic, and occupational factors, as shown in Figure 1.<sup>17,20,24-27</sup>

### CLINICAL MANAGEMENT OF ALLERGIC RHINITIS

Allergen avoidance is the key preventive step; use of a simple face mask can be a practical solution to curb exposure.<sup>28</sup> According to Allergic Rhinitis and its Impact on Asthma (ARIA) guidelines (2019), it is advised to avoid the use of sedating oral H1-antihistamines of the first generation and prolonged use of nasal alpha-sympathomimetics in vasoconstrictive nasal sprays.<sup>29</sup> The National Institute for Health and Care Excellence (NICE) guidelines (2022) recommend the use of an intranasal antihistamine as the first-line treatment on

an "as-needed" basis, or a nonsedating oral antihistamine of the second generation, depending on the individual's age and personal preference, if they have mild-to-moderate intermittent or mild persistent symptoms.<sup>30</sup>

When managing patients with allergic rhinitis, the decision between using a combination of oral antihistamines and INCS or just INCS alone should be determined based on the patient's preferences, values, and the potential advantages and disadvantages of each treatment. Oral antihistamines are recommended as a possible treatment for intermittent and mild persistent allergic rhinitis.<sup>30,31</sup>

### OBJECTIVES

There are currently several significant gaps in clinical needs related to allergic rhinitis in Indian women.<sup>32</sup> Some unanswered questions in the Indian population include whether women respond differently to allergens during hormonal cycles, if women are more exposed to indoor allergens, and if there is a difference in the severity of allergic rhinitis symptoms. Additionally, there is ambiguity regarding the specific factors that need to be carefully considered when managing allergic rhinitis in women. To address these unmet needs, a modified Delphi survey was conducted to bridge the gap between Indian clinical practice and evidence-based studies. The objective was to achieve a consensus on understanding and managing allergic rhinitis, particularly in Indian women.

### METHODS

The modified Delphi survey utilized a structured process of communication to tackle research questions and resolve differences of opinion by weighing the pros and cons of different arguments. An impartial third party oversaw the entire procedure to prevent any bias. In the final round, participants reviewed the agreed-upon statements. The methodology is shown in Figure 3.

A board of 4 key opinion leaders (KOLs) with long-term experience as specialists in the field of allergic rhinitis (otolaryngology) was appointed as a scientific committee, in charge of designing and supervising the study. A total of 80 statements were elaborated by the scientific committee based on the most relevant and updated literature on the main topics: disease burden, risk and predisposing factors, clinical presentations and history, comorbid diseases associated with allergic rhinitis, symptomatology of allergic rhinitis, QoL in allergic rhinitis, and treatment of allergic rhinitis.

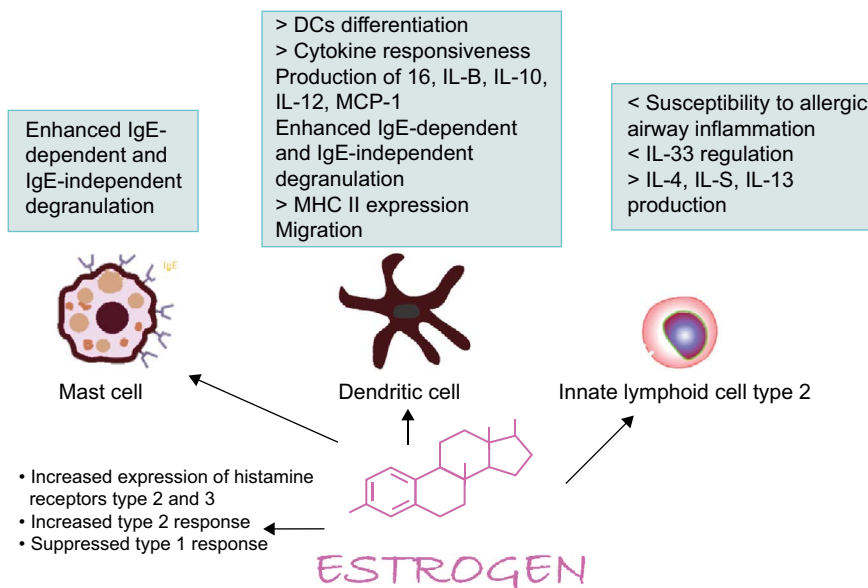


Fig. 2: Influence of estrogen hormone on immunity

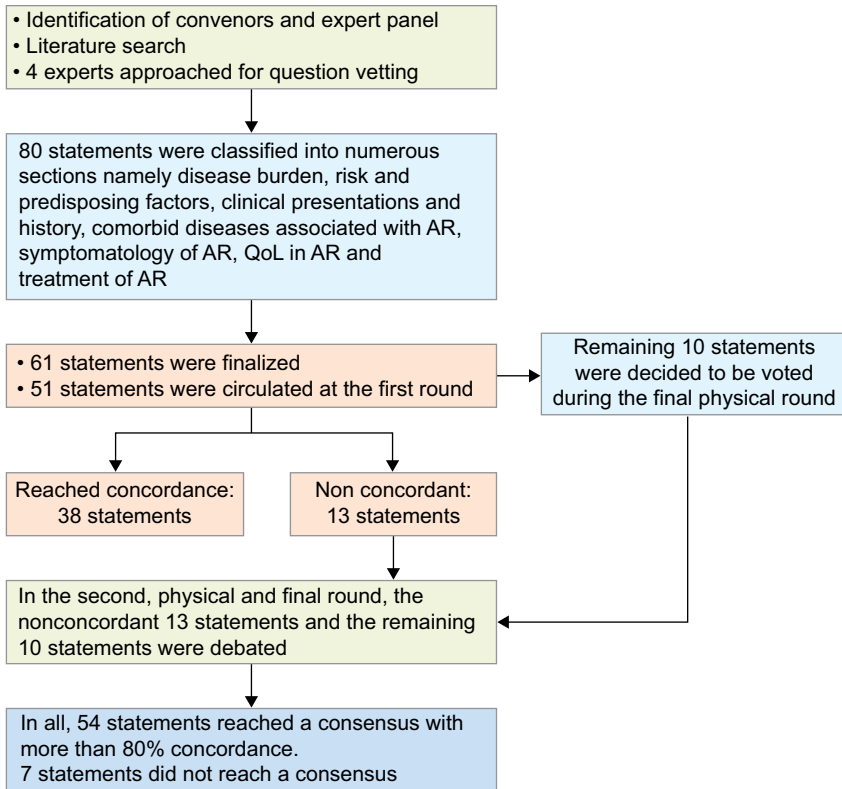


Fig. 3: Modified Delphi survey methodology

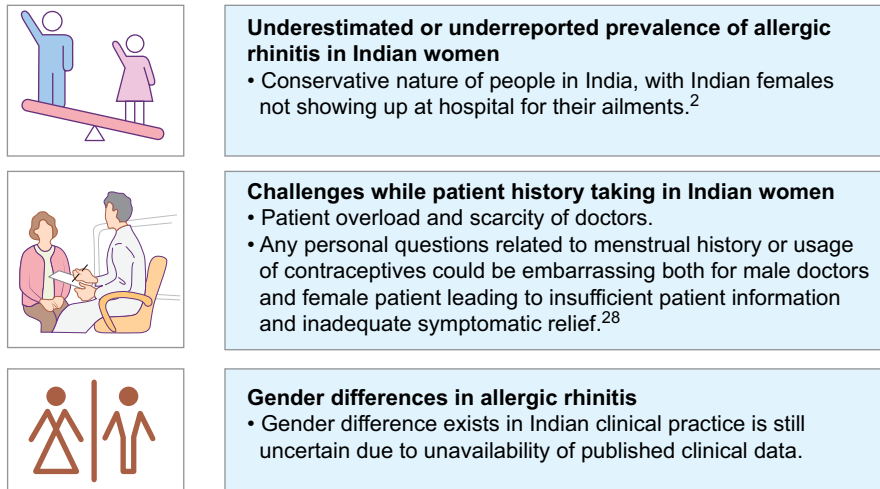


Fig. 4: Clinical need gaps associated with allergic rhinitis in Indian women

From these 80 statements, 61 were finalized, and 51 statements were circulated in the first round as per the board. The remaining 10 statements were based on guideline recommendations and were deliberated in the final round. The Institutional Review Board (IRB) review was not applicable.

**RESULTS**

All 14 panelists, including ENT surgeons and allergologists, completed both rounds to reach a final consensus on specific clinical factors and treatment of allergic rhinitis in Indian women. Out of the 51 statements

provided to the expert panel in the first round, around 38 statements received over 80% agreement. However, 13 statements did not meet the 80% agreement target.

In the second physical round, these 13 nonconcordant statements were deliberated along with 10 statements on guideline recommendations. In all, 54 statements were considered consensus statements.

**Prevalence, Risk and Predisposing Factors**

The experts agreed that there is a higher prevalence of allergic rhinitis in women

after puberty compared to men, which is evident in their clinical practice. This could be attributed to women having more exposure to trigger factors and allergens. An important contributing factor is the influence of cyclic hormonal changes in women, which makes them more susceptible to allergic rhinitis. However, it is important to note that this may be under-reported due to limited access to healthcare for women, as shown in Figure 4.

Additionally, it has been observed that most Indian women spend more time indoors, leading to increased exposure to indoor allergens and pollutants, which can result in higher rates of allergen sensitization. These allergens can include open fires or inefficient stoves fueled by kerosene, biomass, and coal for cooking. Increased prevalence of allergic rhinitis among women is also triggered by the use of agarbatti (incense sticks), agarwood, dhoopbatti, and similar products. Urban women are more exposed to cosmetics such as perfumes and body sprays, which can result in a higher prevalence of allergic rhinitis.

Conversely, some experts noted that individuals, regardless of gender, who work on farms are less prone to allergic rhinitis. This is because they develop immunity and tolerance to allergens through early and consistent exposure during childhood.

**Clinical Presentation and History**

The experts verified that a lesser number of Indian women visit the outpatient department (OPD) due to neglect of their own health, financial limitations, and numerous family and household duties, as shown in Figure 4. The experts stressed the importance of inquiring about the year of menarche, menstrual history, cycle length, regularity of periods, and discomforts related to allergic rhinitis in women patients, if relevant. When obtaining patient history from women with allergic rhinitis, all specialists suggested the use of an allergy factors examination form to gather comprehensive information about menstrual cycles and associated discomforts in women during allergic rhinitis, as described in the allergy factors examination form.

**Comorbid Diseases Associated with Allergic Rhinitis**

The experts reached a consensus on the correlation between allergic rhinitis and sleep patterns, the emergence of social and interpersonal difficulties, and decreased productivity, ultimately leading to depression. Cognitive function and sleep quality are

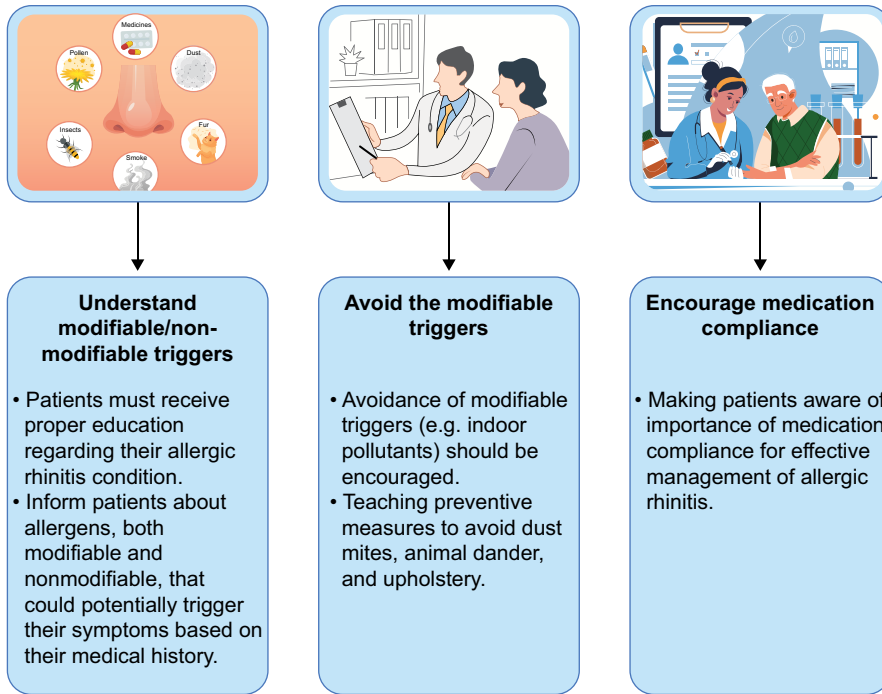


Fig. 5: Management of allergic rhinitis with patient education

negatively affected by allergic rhinitis, resulting in irritability, fatigue, and decreased work performance. Increased snoring and prevalence of obstructive sleep apnea are noted in AR and may be a factor for intrauterine growth retardation in pregnancy.

**Symptomatology of Allergic Rhinitis**

The experts confirmed that the main allergen causing ocular symptoms in allergic rhinitis for the majority of patients is the house dust mite. The ocular symptoms, such as recurrent bilateral conjunctival inflammation with intense itching (pruritus), excessive tearing (epiphora), and redness (erythema), are common in women and can be equally disabling as nasal symptoms. The experts also mentioned that hormone-induced rhinitis encompasses rhinitis of pregnancy and rhinitis related to the menstrual cycle. They agreed that during the ovulation period of the menstrual cycle, women with allergic rhinitis (inflamed nasal mucosa) are more likely to experience a general worsening of rhinitis symptoms, particularly nasal obstruction. Premenstrual rhinitis occurs on a recurring cyclic basis and is associated with premenstrual symptoms. These symptoms are influenced by increased levels of estrogen, which can lead to nasal congestion due to vascular engorgement.

**Treatment of Allergic Rhinitis in Women**

Patients with allergic rhinitis are strongly advised to practice allergen avoidance. The

first step in managing allergic rhinitis is to provide optimal patient education, as shown in Figure 5. The treating physician should additionally encourage the avoidance of modifiable indoor pollution exposure, such as cooking, dusting, incense stick burning, cosmetic ingredients, and environmental allergens. Lifestyle recommendations, such as physical exercise, healthy dietary habits, and yoga poses, can be beneficial as level I evidence. All experts recommend nasal irrigation with isotonic saline solution as a simple and cost-effective treatment for allergic rhinitis. The panel of experts stressed the importance of adjusting or modifying treatment for women patients with allergic rhinitis during specific periods to achieve better symptom relief. The expert panel opined that uptitrating treatment during these specific periods can be helpful for women patients who do not respond consistently to standard doses of treatment.

**DISCUSSION**

Allergic inflammation can have a secondary impact on the reproductive system through interactions with sex hormones, particularly estrogens.<sup>20</sup> These interactions can lead to increased sensitivity to allergens, elevated estrogen levels triggering an increase in lutropin in the pituitary gland, and ultimately signaling ovulation. Even small doses of allergens can induce clinical symptoms in the presence of estrogen. Research has shown a link between the

severity of allergic reactions in women and the concentration of estrogen, regardless of allergen concentration. There is a positive relationship between the number of estrogen (ER)-β receptors in the nasal mucosa and nasal symptoms. The severity of nasal mucosa hyperactivity following a histamine challenge was significantly associated with serum estrogen levels.<sup>21</sup> Thus, interconnections have been made between menstruation, pregnancy, hormone therapy, and the severity of allergic reactions.<sup>33</sup>

Research has shown that allergic rhinitis is linked to sleep-disordered breathing, obstructive sleep apnea, shorter sleep duration, poor sleep quality, night sweating, and nocturnal enuresis. Population-based studies are increasingly investigating the relationship between allergic rhinitis and sleep patterns. A comparison of demographic data revealed that a high percentage of women (96%) and men (81.3%) allergic rhinitis patients also experienced depression. Sleep disturbances commonly seen in allergic rhinitis patients may contribute to the development of depression, possibly due to obstructive symptoms and the release of cytokines leading to increased nasal secretions.<sup>34</sup>

Studies indicate that hormone-induced rhinitis encompasses rhinitis of pregnancy and rhinitis related to the menstrual cycle. Additionally, there are other types involving β-estradiol, which enhances the expression of histamine H1 receptors on nasal epithelial and endothelial cells, resulting in eosinophilic migration and degranulation. Various other pathophysiologic mechanisms have been proposed, including progesterone, insulin-like growth factor-1, prolactin, a variant of placental growth hormone, and elevated levels of human growth factor, which contribute to vasodilation through an increase in circulatory blood volume.<sup>35</sup>

Lee and colleagues reported that individuals with perennial allergic rhinitis had a higher occurrence of ocular symptoms compared to those with seasonal allergic rhinitis. This disparity could be attributed to the presence of house dust mites, a perennial allergen that remains a major trigger all year round, as opposed to seasonal allergens like pollen.<sup>21</sup> Additionally, a higher percentage of women patients (72.5%) reported ocular symptoms in comparison to men (55.1%). The reason behind this gender difference remains unclear, but one possible explanation is that women are more likely to experience eye irritation from cosmetics than men.<sup>35</sup>

The research by Klossek and colleagues, which involved 4,019 participants, revealed that men experienced notably fewer ocular

**Table 1:** Allergic rhinitis: stepwise management based on severity from ARIA guidelines

Step/clinical situation	Intervention/management	Considerations
<b>Step 1: Initial presentation</b>		
≥2 nasal symptoms suggestive of AR	<ul style="list-style-type: none"> <li>• Patient education (disease + therapy adherence)</li> <li>• Avoid irritants and allergens</li> <li>• Advise saline nasal sprays/douching</li> </ul>	<ul style="list-style-type: none"> <li>• Take into account: physician's clinical experience, patient symptoms, preferences, expectations, provoking triggers, comorbidities</li> <li>• Aim for optimal outcomes</li> </ul>
First-line care If uncontrolled (VAS ≥5 cm)	<ul style="list-style-type: none"> <li>• Confirm diagnosis</li> <li>• Check medication adherence</li> <li>• Evaluate comorbidities</li> </ul> <p>Treatment</p> <ul style="list-style-type: none"> <li>• Nasal corticosteroid (INCS) and/or</li> <li>• Antihistamine (anti-H1) (oral nonsedating or intranasal)</li> </ul>	<ul style="list-style-type: none"> <li>• Begin with monotherapy or combination depending on severity</li> <li>• Add-on therapy to INS is not recommended at this stage</li> </ul>
<b>Step 2: Failed on step 1 therapy/difficult-to-treat AR</b>		
Step-up therapy	<ul style="list-style-type: none"> <li>• Fixed combination INCS + intranasal anti-H1 &gt; INCS alone</li> <li>• Alternative: INCS + oral anti-H1</li> </ul>	<ul style="list-style-type: none"> <li>• Based on severity and control</li> </ul>
Add-on therapies (symptom-directed)	<ul style="list-style-type: none"> <li>• Isolated watery rhinorrhea → ipratropium</li> <li>• Rhinorrhea in asthmatics → leukotriene receptor antagonist</li> <li>• Ocular itch/skin rash → oral nonsedating anti-H1</li> <li>• Ocular symptoms → intra-ocular anti-H1 or cromones</li> <li>• Sudden onset nasal blockage (≤7 days) → nasal/oral decongestant</li> </ul>	<ul style="list-style-type: none"> <li>• Individualized add-on options</li> </ul>
<b>Step 3: Step for refractory/severe cases</b>		
If uncontrolled despite step-up (VAS ≥5/10 cm)	<p>Reevaluate diagnosis</p> <p>Symptom-directed add-on therapies to fixed-dose INS/INAH may include:</p> <ul style="list-style-type: none"> <li>• Ipratropium (isolated watery rhinorrhea)</li> <li>• Leukotriene receptor antagonist (asthmatics/rhinorrhea)</li> <li>• Nonsedating OAH (skin rash/itch)</li> <li>• Ocular antihistamine or cromone (ocular symptoms)</li> <li>• Nasal/oral decongestant (≤7 days, for sudden nasal blockage)</li> </ul>	<p>Other options:</p> <ul style="list-style-type: none"> <li>• Allergen-specific immunotherapy (AIT)</li> <li>• Short course of oral corticosteroids (severe AR)</li> <li>• Surgery (pharmacological therapy-resistant severe nasal obstruction) Must weigh availability and risk/benefit ratio</li> </ul>
<b>Step 4: AR patients aiming for sustained effects</b>		
AIT (subcutaneous or sublingual)	<ul style="list-style-type: none"> <li>• Recommended for patients seeking sustained reduction of rhinitis symptoms</li> <li>• Indicated in patients with uncontrolled moderate-to-severe AR (±conjunctivitis) due to allergen exposure, with confirmed IgE sensitization, and poor control despite pharmacotherapy and allergen avoidance (or unacceptable adverse effects of medication)</li> </ul>	<ul style="list-style-type: none"> <li>• Choice depends on the pattern of patient sensitization, preferences, lifestyle, adherence history, and comorbidities (e.g. asthma)</li> </ul>

symptoms compared to women (odds ratio 0.71, 95% CI 0.57–0.89). The most common troublesome ocular symptoms reported were itching eyes (51.1%), watery eyes (38.6%), red eyes (6.6%), and swollen eyelids (3.6%).<sup>36</sup>

The stepwise treatment approach for the management of allergic rhinitis is shown in Table 1.<sup>37</sup> First-generation antihistamines often have interactions with multiple receptors, resulting in anticholinergic, anti-adrenergic, and anti-serotonin effects due to their lack of specificity. Therefore, second-generation antihistamines are preferred for treating allergic rhinitis. Currently, oral second-generation H1-antihistamine medications are the recommended initial treatment for all allergic rhinitis patients. These medications are nondrowsy, have a better safety profile at recommended doses,

are cost-effective, and have a quick onset of action. These drugs include loratadine, desloratadine, levocetirizine, fexofenadine, and bilastine.<sup>29</sup>

According to the ARIA guidelines, antihistamines like bilastine and fexofenadine generally meet the criteria for oral H1 antihistamines<sup>30,31</sup> and are categorized as “nonbrain-penetrating antihistamines.” Bilastine exhibits a stronger binding affinity to the H1 receptor, and its effects tend to last longer.<sup>38</sup> The dosing frequency of bilastine is once-daily, while that of fexofenadine is twice-daily. With the available data on efficacy from various clinical studies along with its nonsedating properties, bilastine may be one of the best options for oral H1 antihistamines for management of allergic rhinitis.<sup>30</sup> There are no dose adjustments

required for bilastine and fexofenadine in hepatic or renal dysfunction.<sup>30</sup> Bilastine up-titration up to a dose of 220 mg or administration of the medication with CYP450 or P-glycoprotein (P-gp) inhibitors does not change the good cardiac safety profile of the drug.<sup>39</sup>

## CONSENSUS STATEMENTS

- Dust mites, pollens, dust, fungi, insects, outdoor pollution, and smoke are the most common allergens in India.
- Estrogen and progesterone play a significant role in allergic diseases among women. This is evident from the distinct variations in the occurrence, severity, and fluctuations of allergic conditions in women compared to men.

- Hormones have a notable impact on the development of asthma, rhinitis, and eczema.
- Approximately 2.4 billion women, which is around one-third of the global population, use open fires or inefficient stoves fueled by kerosene, biomass, and coal for cooking. Women are particularly vulnerable to indoor pollutants from these sources, which can lead to allergic rhinitis.
- Women who engage in household cleaning are at a higher risk of allergic rhinitis.
- Increased prevalence of allergic rhinitis among women is triggered by the use of agarbatti (incense sticks), agarwood, dhoopbatti, and similar products.
- Urban women are more exposed to cosmetics such as perfumes and body sprays, which can result in a higher prevalence of allergic rhinitis.
- Women are more susceptible to indoor allergens like pets, carpets, and bedding, which contributes to their suffering from allergic rhinitis.
- Indian women have limited access to healthcare facilities because of financial limitations and numerous family and household duties, which can result in inadequate health monitoring. Along with routine clinical evaluation, inquiring about allergic rhinitis symptoms in relation to menstrual history, hormonal pills, pregnancy, and menopause is important for better allergic rhinitis management in women patients.
- Depression is more commonly seen among women patients with allergic rhinitis than among men.

## CONSENSUS STATEMENTS

- Women are often categorized as runners.
- During the ovulation period of the menstrual cycle, women with allergic rhinitis (inflamed nasal mucosa) are more likely to experience a general worsening of rhinitis symptoms, particularly nasal obstruction.
- Premenstrual rhinitis occurs on a recurring cyclic basis and is associated with premenstrual symptoms. These symptoms are influenced by increased levels of estrogen, which can lead to nasal congestion due to vascular engorgement.
- Women with perennial allergic rhinitis and severe allergic rhinitis have a higher prevalence of ocular symptoms.
- Ocular symptoms, such as recurrent bilateral conjunctival inflammation with intense itching (pruritus), excessive tearing (epiphora), and redness (erythema), are more commonly observed in women.

These symptoms can be disabling and may be as severe as nasal symptoms.

- During specific periods when women patients experience worsened symptoms related to hormones or the menstrual cycle, it may be beneficial to up-titrate or modify their treatment regimen to achieve improved relief from these symptoms.

## CONCLUSION

Allergic rhinitis, which is a prevalent allergic disorder, has a significant impact on the overall well-being of individuals. Among Indian women, allergic conditions are more prevalent and have a disproportionate effect on them. Many Indian women spend most of their time indoors, leading to increased exposure to indoor allergens and pollutants, making them more susceptible to allergies. Notably, hormones present in women, particularly estrogen, play a crucial role in allergic diseases like allergic rhinitis. Despite the availability of treatments, allergic conditions continue to significantly disrupt the daily lives of women with allergic rhinitis, specifically during the menstrual cycle.

The results of this modified Delphi survey highlight the significance of inquiring about the relevance of allergic rhinitis symptoms with menstruation, ovulation, pregnancy, oral contraceptive pills, and similar factors. While managing allergic rhinitis in Indian women, physicians should advise avoidance of modifiable risk factors, such as indoor allergen exposure and, when possible, outdoor exposure. For nonmodifiable risk factors, like menstruation, pregnancy, or the use of hormonal contraceptives, the panel opined positively about utilizing an allergy factors assessment form to gather a comprehensive record of allergic symptoms during these periods in women for better management of allergic rhinitis. Additionally, in women where hormonal relevance or exacerbation of symptoms related to the menstrual cycle is present, up-titrating or modifying treatment during those times can be considered to achieve improved symptom relief.

## Limitations

Conducting a modified Delphi survey can be time-consuming and lacks a standardized methodology. The consensus reached in the final round may be influenced by participants, making it more reflective of individual opinions rather than a true consensus.

Based on their clinical expertise, experts have provided their opinions. However, the lack of publicly available data on the exact number of Indian women suffering from allergic rhinitis

compared to men makes it impossible to confirm the prevalence based on gender.

## Statement of Ethics

This modified Delphi survey was solely based on input from expert healthcare professionals, and no patients were involved. Hence, informed consent from patients was not required as per applicable regulatory guidelines.

## Future Research

Future research in Indian women with allergic rhinitis should explore gender-specific differences in disease expression, symptom severity, and treatment response. Hormonal influences across reproductive stages, such as menstruation, pregnancy, and menopause, still remain underexplored and may significantly affect outcomes in allergic rhinitis. Additionally, studies evaluating the impact of allergic rhinitis on QoL, work productivity, and caregiving roles in women would provide valuable insights and can help address current knowledge gaps and support the development of gender-sensitive management strategies for AR in India.

## Consent to Participate Statement

Health care professionals who participated in the survey provided their consent for participation and for providing responses to the survey questionnaire.

## Data Availability

All data generated or analyzed during this study are included in this article. Further inquiries can be directed to the corresponding author.

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## SUPPLEMENTARY MATERIALS

Consensus Statements (Allergy Factors Examination Form) available with the Corresponding author can be provided on demand.

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