







# Perceptions and Management of Allergic Rhinitis Among Ecuadorian Otorhinolaryngologists: A Survey-Based Study

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**Objective:** Allergic rhinitis (AR) represents a large burden to the healthcare system due to its high prevalence and impact on patients' lives. Despite the existence of evidence-based guidelines, some studies have found that physicians do not always follow the latest recommendations. The aim of our study was to determine how Ecuadorian otorhinolaryngologists (ENTs) perceive some epidemiological aspects related to AR, as well as their preferences for managing the disease.

**Methods:** We conducted an observational, survey-based cross-sectional study, among 116 Ecuadorian ENTs. The survey used was adapted from a previous publication and consisted of 30 multiple choice questions, concerning several topics of AR. Descriptive statistics (frequency, and standard deviation) were performed for clinical and demographic variables.

**Results:** A total of 116 Ecuadorian ENTs completed the survey. Of them, 62.9% were male, with an average age of 42 years (SD ± 11.58). Computed tomography (CT) scan and nasal cytology were selected as the main diagnostic tests for AR by 62/91 (68.1%) and 45/91 (49.5%) of participants, respectively. Moreover, only 12/116 (10.3%) of participants performed skin prick tests (SPT). Allergen immunotherapy (AIT) was performed by 37/107 (36.4%) of participants.

**Conclusion:** In general, most participants agreed that the prevalence of AR appears to be increasing, with increased exposure to allergens, irritants, and pollutants as the main probable cause. Children and adolescents were accounted as the group most affected by AR, with sinusitis and asthma identified as the most frequent comorbidities. Finally, we found unmet needs in the diagnostic and management of AR that should be addressed among Ecuadorian ENTs, in particular the high use of CT scans as part of routine evaluations, as well as the low use of allergen immunotherapy.

**Keywords:** allergic rhinitis, Ecuador, epidemiology, Latin America, management

## Introduction

Allergic Rhinitis (AR) is a disease characterized by symptoms of sneezing, nasal pruritus, and airflow obstruction mediated by an IgE response against inhaled allergens, causing mucosal inflammation driven by T helper (Th2) lymphocytes.<sup>1</sup> This persistent Th2 response and eosinophilic inflammation may release several cytokines to the bloodstream that stimulate the bone marrow, and may function as a systemic amplifier of the eosinophilic inflammation.<sup>2</sup> The diagnosis of AR is often based on its clinical presentation: a history of symptoms related in time with the exposure to the sensitizing allergens. However, testing can confirm the diagnosis and determine the specific

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allergens, either by measuring the presence of allergen-specific IgE in the serum, or by positive epicutaneous skin prick tests (SPT) (ie, wheal and flare responses to allergen extracts).<sup>3</sup>

There is a strong association between AR and other atopic conditions, in particular asthma.<sup>4</sup> In general, radiological studies indicate that around 40% of adult and pediatric patients with asthma have sinus abnormalities, which interestingly enough increases among patients with severe asthma and/or a longer history of respiratory disease.<sup>2</sup> Asthma and AR are characterized by eosinophilic inflammation, and it appears that children with both conditions tend to present with a more severe inflammatory response when compared to those who only present with AR.<sup>2</sup> Thus, when evaluating patients with AR it is relevant to assess for other atopic conditions, as the former may act as a trigger or contribute to worsening of the disease.

Throughout the world the prevalence of allergic rhinitis has slightly increased, with recent estimates suggesting that between 10% and 30% of adults and 40% of children are affected.<sup>5,6</sup> Due to geographic differences in the type and potency of different allergens, and overall aeroallergen burden, the prevalence of AR varies within countries. For instance, the European Community Respiratory Health survey recorded a prevalence of AR between 10% and 41% among adults, while a Scandinavian study reported a lower cumulative prevalence at 14%.<sup>7,8</sup> In a large-scale study covering the major regions of the world, the highest prevalence of severe AR symptoms among children was observed in Africa and Latin America.<sup>9</sup>

Current guidelines advocate for a stepwise approach to the management of AR, recommending the initiation of treatment based on clinical presentation, and performing additional testing in patients who have persistent symptoms.<sup>10,11</sup> New management strategies have also been incorporated in the care of patients with AR, mainly related to advances in the understanding of the role of specific allergen determination, and immunotherapy, in reducing symptoms and improving quality of life.<sup>12</sup> However, AR still represents a large burden to the healthcare system due to its high prevalence and impact on patient's lives, highlighting the importance of adequate management by healthcare providers to improve patients' outcomes.<sup>13</sup>

Despite the existence of evidence-based guidelines, some studies have found that physicians do not always follow the latest recommendations.<sup>14,15</sup> For instance, in an international survey of healthcare providers, 54.4% of

physicians claimed to know the ARIA (Allergic Rhinitis and its Impact on Asthma) guidelines, while only 49.7% said they used them in clinical practice.<sup>15</sup> The same study also noted that physicians who followed the guideline were more likely to offer allergen testing and immunotherapy than those who did not.<sup>15</sup> On the other hand, patient satisfaction may be a reason for the frequent non-adherence to therapy seen in AR.<sup>16</sup> To the best of our knowledge, there are no studies assessing how Ecuadorian otorhinolaryngologists manage patients with AR. Consequently, our study aims to determine how this specific subset of clinicians perceive some epidemiological aspects related to AR, as well as their preferences for managing the disease.

## Methods

### Study Design and Population

We conducted an observational, survey-based cross-sectional study, among Ecuadorian physicians participating at a national scientific meeting in July 2019. Due to accessibility and availability, convenience sampling was applied to include participants that had a specialization in otorhinolaryngology, as well as an active medical practice either at private or public centers.

### Procedure

A survey from a previous publication which included 25 multiple choice questions concerning several topics of allergic rhinitis (see [Table S1](#)) was used.<sup>14</sup> Questions 1 to 9 inquired participants about general perceptions of allergic rhinitis regarding epidemiology and clinical presentation (eg, prevalence, most frequently affected groups, most commonly found comorbidities, most common suspected causal aero allergens, most frequently reported symptoms, etc.). Questions 10 to 21 were related to diagnostic strategies (eg, SPT, most frequently tested allergens, measurement of total and specific IgE, and other diagnostic modalities used). Finally, questions 22 to 25 were about the preferences for managing patients with allergic rhinitis (eg, immunotherapy, and most prescribed medications)

Participants were approached by qualified previously trained personnel during meeting breaks. After explaining the purpose of the study and obtaining the consent to participate, a printed copy of the survey was handed. Participants filled their questionnaire either by following the instructions by themselves or with the help of the trained personnel.

## Ethical Considerations

This study was approved by the ethics committee Comité de ética e Investigación en Seres Humanos (HCK-CEISH-19-0058), Guayaquil, Ecuador. Prior to obtaining verbal informed consent, the investigators explained the purpose of the study to the participants and their role in it. With the information recollected in the survey, personal identification was not possible; as such anonymity/personal data protection was conserved. The survey for our study was used under the terms of the Creative Commons Attribution Non-Commercial License (CC NC 4.0), which permits unrestricted non-commercial use provided the original work is properly cited.

## Statistical Analysis

Descriptive statistics were performed for participant's demographics and questions of interest. Data gathered from the surveys was examined descriptively in terms of general perceptions regarding epidemiology and clinical presentation, diagnostic strategies, and preferences on patient management. Frequencies and percentages were the selected method to represent proportions of nominal variables, whereas mean and standard deviation were preferred to summarize continuous data given a normal sample distribution with no significant outliers. All data were analyzed using SPSS, version 24.0 software (SPSS Inc., Chicago, IL, USA).

## Results

### Demographic Statistics

Of the 200 participants approached for the study, 116 completed the survey and were included in the analysis (response rate 58%), with a gender distribution of 62.9% male, and an average age of 42 years (SD  $\pm$  11.58) (Table 1). 43.1% of the participants offered their services in private practices.

**Table 1** Demographics of the Surveyed Population (n=116)

Characteristics	Value, n (%)
<b>Age (mean)</b>	42.34
<b>Gender</b>	
Male	73 (62.9)
Female	43 (37.1)
<b>Type of institution</b>	
Public	32 (27.6)
Private	50 (43.1)
Both	34 (29.3)

## General Perceptions About Allergic Rhinitis Regarding Epidemiology and Clinical Presentation

75/115 (65.2%) of the participants estimated the prevalence of allergic rhinitis to be over a third of the general population. 102/112 (91.1%) described its status as "surely increasing". Increased exposure to allergens, irritants and pollutants was chosen by 85/113 (75.2%) of the participants as the main cause for the increased prevalence. Children and adolescents were appointed as the group most commonly affected by allergic rhinitis by 60/113 (53.1%) of the surveyed participants. Sinusitis and asthma were the most commonly reported comorbidities, whereas nasal blockage and rhinorrhea were the symptoms most often indicated by the ENTs as bothersome to their patients (Table 2). Furthermore, 51/113 (45.1%) of the participants selected ENT as the specialty most likely to be consulted by their patients in case of allergic rhinitis. House dust mites were regarded as the most common aeroallergen in our country.

## Diagnostic Strategies

Computed tomography (CT) scan and nasal cytology were selected as the main diagnostic tests for allergic rhinitis by 62/91 (68.1%) and 45/91 (49.5%) of participants, respectively. In addition, nasal cytology in outpatients was performed by only 27/111 (24.3%) of participants. 57/108 (52.8%) of the sample participants considered the rationale for performing nasal

**Table 2** Comorbidities and Symptoms Most Commonly Reported in Patients with Allergic Rhinitis by Ecuadorian Otorhinolaryngologists

	% (n)	
<b>Frequently reported comorbidities (n=112)</b>		
Sinusitis	61.6	(69)
Asthma	58	(65)
Conjunctivitis	31.3	(35)
Nasal polyposis	31.3	(35)
Otitis media	19.6	(22)
<b>Most reported symptoms (n=116)</b>		
Nasal blockage	85.3	(99)
Rhinorrhea	84.5	(98)
Chronic cough	39.7	(46)
Snoring, sleep problems	29.3	(34)
Conjunctivitis	23.3	(27)
Hypo-anosmia	16.4	(19)
Asthma	13.8	(16)
Sedation	1.7	(2)

cytology as an aid in the differential diagnosis between allergic and non-allergic or infectious rhinitis. 40/84 (47.5%) of participants routinely requested serum total and specific IgE in cases of allergic rhinitis after SPT. From all the participants that performed nasal provocation tests, 8/15 (53.3%) considered this test useful for cases of occupational rhinitis.

Moreover, only 12/116 (10.3%) of participants performed SPT. The frequency of specific extracts tested for those who performed SPT was as follows: animal dander 12/12 (100%), mites 8/12 (66.6%), fungal 6/12 (50%), pollens 6/12 (50%), and insect allergens 6/12 (50%). 34/45 (75%) of ENTs considered a wheal's diameter >3mm after 15 minutes as the criteria for a positive SPT.

## Preferences for Managing Patients

Regarding symptomatic treatment for allergic rhinitis, oral H1-antihistamines and intranasal corticosteroids were the most prescribed medications (Figure 1). Allergen-specific immunotherapy was performed by 37/107 (36.4%) of surveyed participants. Intranasal administration was chosen as the preferred route for immunotherapy 27/80 (33.8%).

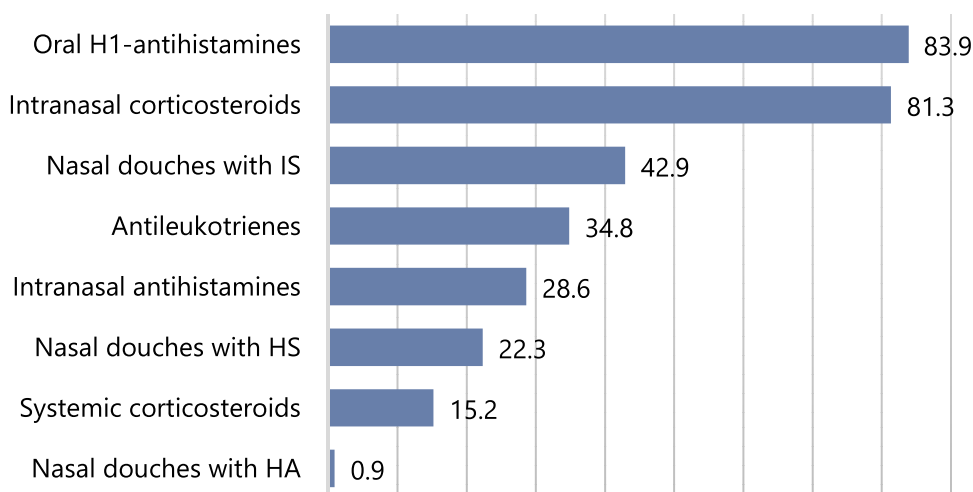
## Discussion

Allergic rhinitis is a disease with varying prevalence according to the demographic characteristics of the population studied. For instance, in Latin America, the prevalence of AR in children has been estimated between 8.9% and 45.1%.<sup>17,18</sup> Even though in Ecuador the prevalence of AR has been estimated at 23.9%, in our study, around two-thirds of participants considered the prevalence to be higher than 35%.<sup>18</sup> This discrepancy could be attributed

to the paucity of epidemiological data readily available for practitioners. Furthermore, they agreed that children and adolescents are the most affected group.

Regarding clinical presentation, current evidence points to nasal congestion, postnasal drip, repeated sneezing, and nasal discharge as the most common complaints among patients with AR.<sup>3</sup> In accordance, most participants in our study reported nasal blockage and rhinorrhea as the main presenting symptoms of AR encountered in the clinical practice. Furthermore, roughly a third of participants selected snoring and sleeping problems as a frequent complaint among their patients, highlighting the need for increased awareness of sleep-related pathologies, since it has been documented that AR affects sleep patterns by producing microarousals through an increase in upper airway resistance, leading to chronic non-restorative sleep which alters daytime performance.<sup>19-21</sup>

Specific allergen testing is an important part of the workup of AR, especially of the more severe cases, where co-management with allergen immunotherapy can improve the general outcome.<sup>11</sup> The two main tests available for this purpose are SPT and serum-specific IgE testing. SPT is a reliable method to diagnose IgE-mediated allergic diseases.<sup>22</sup> A recent meta-analysis reported that SPT sensitivity ranged from 68% to 100% and SPT specificity from 70% to 91%.<sup>23</sup> Interestingly, in our survey, amongst all participants, only 10.3% performed prick tests as part of the workup of AR. Although this is not a direct comparison, this rate stands in contrast with a British ENT survey, where SPT was the most frequently ordered test (81%) for the evaluation of this disease.<sup>22</sup> On the other hand, 47.5% of participants



**Figure 1** Preferences for the symptomatic management of patients with allergic rhinitis among Ecuadorian otorhinolaryngologists (n=112).  
**Abbreviations:** IS, isotonic saline; HS, hypertonic saline; HA, hyaluronic acid.

routinely requested serum total and specific IgE after performing SPT. Studies comparing these two testing methods have found substantial differences between specific IgE and SPT results, suggesting that these methods complement each other and cannot be used interchangeably.<sup>24</sup>

Additional testing is often unwarranted in the initial evaluation of AR. For instance, recent guidelines recommend against routinely ordering computed tomography (CT) scans, unless other characteristics such as very severe disease, additional complications, or vulnerable patient populations are present.<sup>10,25</sup> Despite this recommendation, we found in our study that most physicians reported ordering CT scans of the paranasal sinuses as part of the evaluation of AR (68.1%). Concerns regarding unnecessary exposure to ionizing radiation and the potential risk for future cancer development have been well described in the literature.<sup>26,27</sup> Consequently, it is relevant to address this finding by raising awareness to the associated risks of unnecessary imaging studies, excluding any recommendation for its routine use.

Currently, AR management is based on symptomatic control with nasal corticosteroids, nasal antihistamines, leukotriene receptor antagonists, antihistamines, mast cell stabilizers, short-term nasal decongestants, and in the most severe cases, systemic corticosteroids.<sup>11</sup> In our study, oral antihistamines and intranasal corticosteroids were the most commonly prescribed treatments for symptomatic management of AR. Different organizations have produced consensus statements highlighting research that supports the efficacy, safety, and pharmacology of newer generation oral H1 antihistamines and intranasal corticosteroids (INCSs), giving a strong recommendation for use of the latter in AR, while the former are still considered a good option in milder cases.<sup>28</sup> The potent anti-inflammatory properties of INCSs are directed against the pathophysiologic mechanisms of nasal inflammation in AR.<sup>29</sup> In comparative studies, INCS therapy has shown superior efficacy to H1 antihistamines and antileukotrienes in controlling nasal symptoms, including nasal congestion.<sup>30–32</sup>

In the case of allergen immunotherapy (AIT), this treatment modality is considered as the only disease-modifying treatment currently available for AR, and has been regarded as effective in reducing allergy symptoms.<sup>33–35</sup> Research has shown that AIT can achieve long-term clinical results by improving symptoms, and reducing medication need.<sup>36</sup> Interestingly, despite the current evidence and guideline recommendations, only a third of the surveyed ENTs recommended AIT. This finding

stands contrasts with a survey among Chinese ENTs, which found that over 70% of specialists recommended AIT as early as possible for the treatment of AR.<sup>37</sup> In this regard, a recent position paper on the international consensus on allergy immunotherapy argued that the main reasons for the slow rate of adoption are a lack of agreement on AIT efficacy, and insufficient data on its cost-effectiveness and long-term pharmacoeconomic impact.<sup>38</sup>

Finally, in light of our findings, there are several limitations that need to be disclosed. Firstly, even though we used a method of back to back translation, as well as a certified translator, and an expert panel of physicians review the final questionnaire, this instrument has not been validated yet. Secondly, there are different sample sizes for the proportions depicted in the results, which are the consequence of missing values in some questions. Thirdly, the epidemiological aspects studied in the questions stem directly from the surveyed ENTs' perspectives, and as such should not be interpreted as factual reality of the disease. Fourthly, even though convenience sampling is widely used in clinical research, it is certain that non-probability methods are often not representative of the population of interest, which is why the results may be subject to bias and are thus left under the reader's discretion and interpretation. However, to the best of our knowledge, this is the first study to assess the perceptions and management of AR among Ecuadorian ENTs, and may provide insights into the management of AR that could extend to other countries in South America.

## Conclusion

Adequate knowledge of recent evidence-based recommendations related to AR is important for adequate management of the disease by healthcare providers. In our study, we found that most Ecuadorian ENTs surveyed agreed that the prevalence of AR appears to be increasing, with increased exposure to allergens, irritants and pollutants as the main probable cause. Children and adolescents were appointed as the group most affected by AR, with sinusitis and asthma identified as the most frequent comorbidities. However, there are unmet needs in the diagnostic and management of AR that should be addressed among Ecuadorian ENTs, in particular the high use of CT scans as part of routine evaluations, as well as the low use of allergen immunotherapy. Further studies and potential interventions are needed to increase the awareness of guideline recommendations and their application in the clinical practice.

## Abbreviations

AR, allergic rhinitis; ENTs, otorhinolaryngologists; SD, standard deviation; AIT, allergen immunotherapy; SPT, skin prick tests; ARIA allergic rhinitis and its impact on asthma; CT, computed tomography; INCSs, intranasal corticosteroids.

## Data Sharing Statement

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

## Ethics Approval

This study was approved by the ethics committee Comité de ética e Investigación en Seres Humanos (HCK-CEISH -19-0058) in accordance to the principles established by the declaration of Helsinki.

## Consent for Publication

Not applicable.

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## Author Contributions

All authors made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; agreed to submit to the current journal; gave final approval of the version to be published; and agree to be accountable for all aspects of the work.

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## Disclosure

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The authors declare no other relevant conflicts of interest related to this work.

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