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## Original Research Article

## Physician beliefs and management practices of coexistent Asthma-Allergic Rhinitis: Indian results from multi-country ASPAIR study

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## ABSTRACT

**Context:** Frequent coexistence and strong etiological linkage between asthma and allergic rhinitis (AR) result in higher burden with comorbid condition than individual disease.

**Aim:** To understand attitude, perceptions, and current management practices among general practitioners (GPs) and pediatricians towards coexistent asthma-AR.

**Settings and Design:** A cross sectional survey was conducted in India, China, Malaysia, Vietnam, etc. Results presented here are focused on India. Physicians working in public and private sector of 10 Metropolitan cities were approached in person for this survey.

**Materials and Methods:** A representative national sample of physicians was recruited at hospitals and clinics using a probability-based sampling methodology for a total of 200 physician in India.

**Results:** 98 GPs and 102 pediatricians in India were surveyed. Clinical features and family history of atopy was used by 96% and 82% physicians, respectively to form a diagnosis of asthma. 54% of physicians enquired about common triggers, 48% conducted spirometry. 25% of physicians used patient outcome questionnaires to assess control. AR was diagnosed by nasal (91% of physicians) or ocular symptoms (72% of physicians) and 32% performed skin prick test or serum Immunoglobulin E (IgE). In uncontrolled coexisting asthma-AR, 78% of physicians modified treatment, 21% of physicians referred to a specialist. 88% of physicians were concerned that treating both conditions required added medications, 59% of physicians felt managing both simultaneously was difficult, and 55% of physicians believed it was enough to manage more severe condition.

**Conclusion:** Study highlights low implementation of guidelines despite awareness and need for continued medical education to encourage appropriate diagnosis and management of co-existent asthma-AR.

**Key Message:** Though the physicians are aware of the guidelines, there was poor utilization in clinical practice. This indicates a need for increase in awareness of guideline recommendations on co existent asthma-AR and improving management of patients. This also eludes to the development of an easy to use diagnostic tool for asthma- AR co-existence.

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### 1. Introduction

The increasing prevalence of asthma and allergic rhinitis (AR) is a global health issue.<sup>1,2</sup> Epidemiological and clinical studies show frequent coexistence and strong etiological

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linkage suggesting a common pathophysiology.<sup>3,4</sup>

Prospective cohort studies from India suggest a significant overlap between asthma and AR which presents a higher burden of disease and studies have demonstrated that these patients experience a poorer quality of life and greater physical and social limitations.<sup>1,2,5</sup> In adults with AR, 33 -50.2% were diagnosed with concomitant asthma.<sup>1,6</sup> There is a paucity of evidence about the real-life clinical management of asthma-AR overlap at the primary care level.<sup>7-9</sup>

We present the India results of a multi-country survey among general practitioners and pediatricians to understand the attitude and perceptions, and the current management practices.

## 2. Materials and Methods

### 2.1. Study design

The ASPAIR study was a cross-sectional survey of physicians in six Asian countries (China, Malaysia, Vietnam, Thailand, India, Philippines) who routinely treat pediatric and adult patients with asthma. Results from the multinational dataset are available.<sup>10</sup> We report the methodology and results specific to India here. A representative national sample of physicians was recruited at hospitals and clinics using a probability-based sampling methodology for a total of 200 physician in India. Professionally trained interviewers conducted all physician surveys onsite via Computer-Assisted-Personal-Interviewing (CAPI) tablets or laptops.

### 2.2. Study Population and Sampling Plan

For the survey, several metropolitan areas in different regions of India (3,3,2 and 2 cities from West, South, North, East regions respectively) were selected. Within each selected area, several districts/administrative areas were chosen. Within these areas, a listing of all hospitals and clinic was developed and stratified by hospital size and type (public and private). A sample of hospitals and clinics were drawn from the following cities in India: Bengaluru, Chennai, Delhi, Hyderabad, Kanpur, Kolkata, Mumbai, Ranchi, Vadodara, and Vizag. Probability sampling of urban cities, districts, and hospitals or clinics was utilized in this survey. These were sampled until the targeted number of interviews had been conducted for that metropolitan area. To qualify for the inclusion to survey, primary care physicians (PCPs), internists, allergists, and pediatricians were required to treat a minimum of ten asthma patients per month and agree via a screening question that patients can present with both asthma and AR. Non-respiratory specialists were excluded from this study.

List of general practitioners or physicians at hospitals or clinics was generated, then random selection from the list for recruitment was created. Physicians were recruited

in-person and surveys conducted in-person. The survey was administered in local languages viz. Bengali, Gujarati, Hindi, Kannada, Tamil, Telegu. Interviewers visited the offices of the physicians until the required number of interviews was obtained. A maximum number of four completed interviews (two general practitioners and two pediatricians) were allowed per facility.

### 2.3. Questionnaire Development

The development of the questionnaire followed four steps: 1. In consultation between the study team and local key experts, the objectives and research questions were developed into an English-language questionnaire. 2. The English-language questionnaire was reviewed by key experts to ensure that questions and response options were well-suited for India. 3. The approved English-language questionnaire was translated into local languages by an accredited independent translator. 4. Depending on availability, the study team and key experts reviewed the translations and made recommendations to the study team. The translated version was piloted-tested with eight to ten physicians in India to assess respondent engagement and how well the questionnaire was understood.

The questionnaire assessed physician's perspective on the research question topics: i. Management and treatment practices for patients with co-existing asthma and AR. ii. Medications prescribed to patients with co-existent asthma & AR compared to those only with asthma or AR. iii. Attitudes and beliefs about concomitantly occurring asthma and AR in pediatric and adult populations. iv. Knowledge and adherence to GINA (asthma) and ARIA (asthma and AR) guidelines.

Following ethical guidelines established by Council of American Survey Research Organizations (CASRO), the European Society for Opinion and Market Research (ESOMAR), and the Asia Marketing Federation (AMF), respondent anonymity was fully protected. All physician identities and responses were kept confidential. The data are not weighted by demographic parameters, such as age and gender; no statistical comparisons were performed.

## 3. Results

### 3.1. Physicians profile

Survey was conducted in 2018. ASPAIR survey was conducted amongst 200 Indian physicians of whom 98 were general physicians and 102 pediatricians with a mean duration in clinical practice of 19.7 years. 66% physicians were working in the private sector with the rest from the government sector. On average, each one of them treated over 50 asthma patients and 50 allergic rhinitis (AR) patients per month from age groups of <12 years up to 64 years. [Table 1, Figure 1].

### 3.2. Approach to asthma

Diagnosis: 96% physicians interviewed diagnosed asthma based on clinical history of common respiratory symptoms such as wheezing, coughing, chest tightness, breathlessness and 82% by probing into family history of atopy and asthma. 54% physicians in ASPAIR enquired about common triggers such as pets, exercise, exhaust, tobacco smoke. 48% of physicians conducted spirometry in their patients. Amongst the physicians, only 37% performed post bronchodilator reversibility testing for diagnosis of asthma [Figure 2].

### 3.3. Treatment

25% of the physicians in ASPAIR-India used validated patient outcome questionnaires like Asthma Control Test (ACT) or Asthma Control Questionnaire (ACQ) to assess asthma control. For long term asthma management, 42% physicians interviewed prescribed ICS (Inhaled Corticosteroids) + LABA (Long acting beta-2 agonists) combinations and 68% physicians used ICS in addition to SABA. However, 43% physicians surveyed preferred using only SABA (Short acting beta-2 agonists). LTRAs (Leukotriene receptor antagonists) were the most commonly used (47%) followed by oral corticosteroids (36%) and beta-2 agonists (30%) [Figure 3].

### 3.4. Approach to allergic rhinitis

Allergic rhinitis was diagnosed predominantly on the basis of history of nasal symptoms (e.g. nasal congestion, loss of smell, nasal redness, runny nose, post-nasal drip, sneezing, or blocked nose) by 91% of the physicians in the survey and by ocular symptoms (e.g. itchy, watery, red, or puffy eyes) by 72% of the physicians. Over 60% physicians interviewed sought family and seasonal variability history. 32% physicians further investigated AR by doing skin prick test or serum Immunoglobulin E (IgE) studies. 38% of physicians prescribed Intranasal corticosteroids (INCS) for AR [Figure 4].

### 3.5. Asthma with coexisting AR

In asthma patients, 79% physicians in ASPAIR-India enquired about AR symptoms at every visit, 36% of the physicians enquired seasonally, and 33% physicians during increased symptoms. In AR patients, 76% of physicians enquired about asthma symptoms at every visit. 16% of physicians used validated patient outcome questionnaires like ACT or ACQ in patients having asthma with coexisting AR to assess control. 78% interviewed modified treatment when coexisting asthma -allergic rhinitis was uncontrolled and 21% of them referred to a specialist for further management.

90% of physicians preferred nasal and 75% preferred ocular symptoms to diagnose AR in patients with diagnosed asthma. 94% physicians diagnosed asthma in patients with AR by asking about history of wheezing episodes, shortness of breath, chest tightness or cough and 84% enquired about family history or atopy. 40% and 30% patients of AR suspected to have asthma underwent spirometry and reversibility testing, respectively. Over 85% of physicians agreed that co-existing AR and Asthma was more burdensome than having one of the two conditions.

### 3.6. Physician's views on symptoms and behavior in patients with coexistent asthma and AR

76% physicians in ASPAIR-India said that their patient's sleep was disturbed more, the patients avoid outdoor activities and sports, and their school or work performance is compromised more when they have coexisting asthma-AR as compared to either condition alone. 89% physicians surveyed agreed that patient's asthma symptoms worsen when allergic rhinitis is present, while 74% agreed that AR symptoms are worse when patients have asthma. Up to 33% physicians said that school, work, ADL (Activities of Daily Living) and sleep were worse compared to having one condition. Up to 17% physicians believed that impact on sleep & productivity relative to having only one condition is about the same when asthma and AR coexists [Figure 5].

### 3.7. Management and treatment of asthma with coexisting AR

Almost all (95%) physicians in ASPAIR-India agreed that nasal symptoms in patients with asthma and asthma symptoms in patients with AR should be asked for and 85% physicians agreed that both should be treated appropriately. 88% physicians believed that treating both the conditions requires too much medication and 80% agreed that there are too many side effects of using steroids for asthma and AR. 59% physicians felt that managing both conditions simultaneously is difficult and 55% consider that managing the more severe condition is sufficient. 60% physicians managed both asthma and AR simultaneously while around 35% treated one condition at a time.

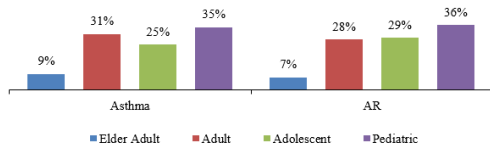
Most common factors influencing asthma with coexisting AR treatment choice are physician's personal experience (85%), practice guidelines (82%), and patient affordability (33%) [Figure 6A]. The most preferred treatments are ICS+INCS (40%), ICS+LTRA (20%), ICS + Oral antihistamines (11%) [Figure 6B]. 55% physicians agreed that patients prefer oral medications over inhalers and nasal sprays, also 51% physicians said that taking different medications is inconvenient for the patient. 60% agreed that ICS and INCS can be given together.

37% felt that INCS should be delayed for children with AR until they are adults, while 21% strongly disagreed

that INCS should be delayed. For management of asthma (59%) physicians disagree that ICS should be delayed in children, while 36% agreed or strongly agreed that ICS should be delayed [Figure 7]. Most physicians considered their patients to be well managed if there was improvement in symptoms (94%) and 2 or less unplanned visits to doctor/clinic for asthma per year (91%).

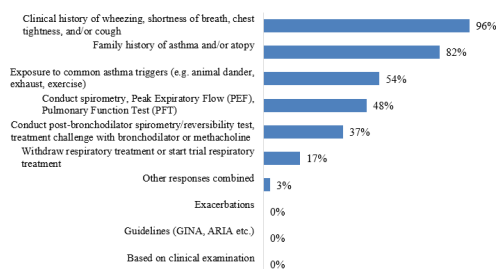
**Table 1: Physician Profile**

Physician Attribute	N=200 (%)
<b>Age</b>	
<35	10
35-44	34
45-54	33
55-64	18
>65	7
<b>Gender</b>	
Male	76
Female	25
<b>Type of Practice</b>	
Gov't Clinic or Doctor's Office	6
Gov't Hospital/Hospital-Based	29
Private Clinic or Doctor's Office	32
Private Hospital/Hospital-Based	34
<b>Years in Clinical Practice</b>	
Mean	19.7
Median	18
Continuing Medical Education, Attended Medical Congresses, or Training in the Past 5 Years	
Asthma management & treatment	77
AR management & treatment	70



**Fig. 1: Age Profile of Patients Seen (Mean %)**

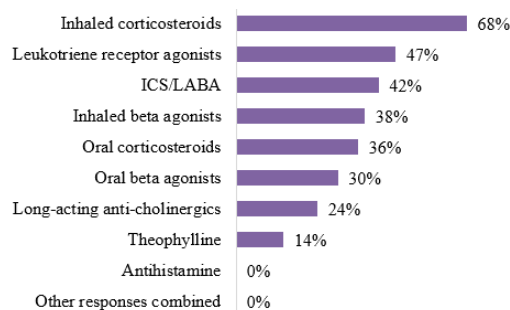
Base: All respondents who provided a valid response. Mean %, will not sum to 100%.



**Fig. 2: Criteria to Diagnose Asthma**

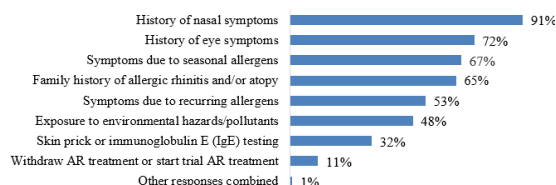
Base: All respondents (n=200)

Survey Question: What criteria do you utilize to diagnose asthma? [Response options not read or shown to respondents]



**Fig. 3: Asthma Treatment on top of SABA (Mean %)**

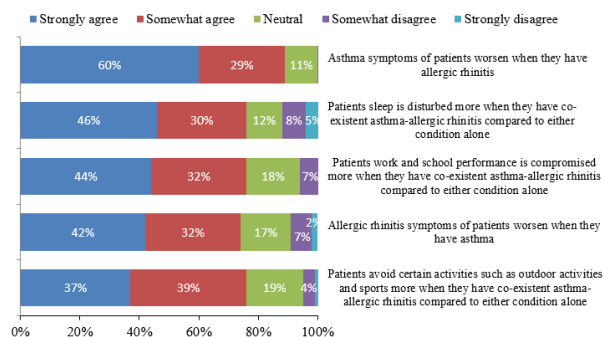
Survey Question: Thinking about these medications taken for asthma in addition to a short-acting bronchodilator, what classes of medications are these? [Response options not read or shown to respondents]



**Fig. 4: Criteria Used by Physicians to Diagnose AR**

Base: All respondents

Survey Question: What criteria do you utilize to diagnose allergic rhinitis? [Response options not read or shown to respondents]



**Fig. 5: Physician views on Symptoms and Behaviour**

Base: All respondents. Value labels excluded for values < 5%.

Survey Question: The next questions ask your opinion about symptoms and behavior of patients, in general, with co-existent asthma-allergic rhinitis. Choose one of

the following: Strongly Agree, Somewhat Agree, Neutral, Somewhat Disagree, or Strongly Disagree.

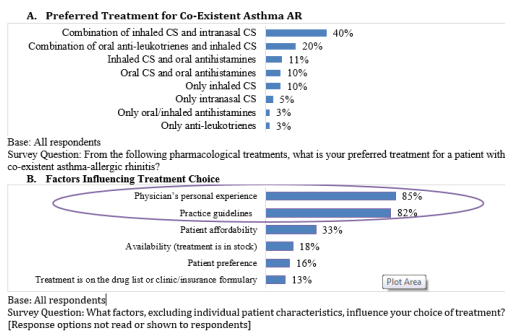


Fig. 6: Preferred Asthma AR Treatment & Factors for Choosing

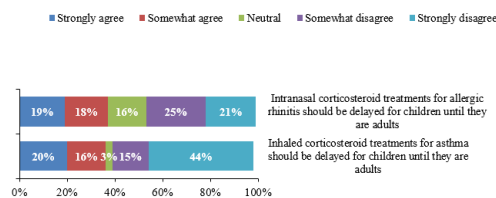


Fig. 7: Views on Delaying Corticosteroid Treatment for Children

Base: All respondents

Survey Question: Please indicate your opinion regarding the following statements. Choose one of the following: Strongly Agree, Somewhat Agree, Neutral, Somewhat Disagree, or Strongly Disagree.

#### 4. Discussion

ASPAIR-India focuses on how asthma, allergic rhinitis and their coexistence are managed by general physicians and pediatricians. As per the ASPAIR India results more than 95% of GPs and pediatricians surveyed rely on history, clinical examination and family history however lesser emphasis was laid on assessment of symptom control, exacerbation history and having an association between trigger and symptoms for the diagnosis of asthma. There is a lack of uniformity or protocol of history taking and building a positive association between symptoms and possible triggers. Similar results were also observed with respect to diagnosis of allergic rhinitis.

Physicians who were surveyed in ASPAIR saw 30%-40% of patients having coexisting Asthma-AR. In other studies, nasal symptoms have been reported to occur in 28-78% asthmatics while 17-38% of patients with AR.<sup>11</sup>

“Rarely does one hear a wheeze without a sneeze” in an editorial by Shah et al<sup>12</sup> who elaborated on close links between asthma and allergic rhinitis. AR has been identified as a risk factor to develop asthma. In a survey results from China, interviewed physicians (n=200) estimated that 47%

of their asthma patients also had AR and that 40% of their patients with AR also had asthma<sup>13</sup> whereas, in Thailand, physicians interviewed stated that in their experience half of asthma patients had AR and 28% of AR patients had asthma<sup>14</sup> prevalence of allergic rhinitis and asthma even in the pediatric population is showing a rising trend in India. Sanjana et al. in their study have shown that prevalence of asthma and allergic rhinitis is 17.14% and 21.29% respectively, amongst children of 6-14 age group.<sup>11</sup>

Majority of these patient usually consult their general physicians as the first point of contact.<sup>15</sup> As per AP-AIM survey there was very poor utilization of asthma questionnaire by the physicians while evaluating asthma control,<sup>15</sup> similar results are seen in ASPAIR survey with respect to use of questionnaire as well.

Spirometry has been an underutilized tool in the management of asthma. 75% of asthmatic surveyed by Salvi et al in 2015 did not undergo spirometry.<sup>15</sup> In the ASPAIR survey only 48% of physicians subjected their patients for spirometry and only 37% performed post bronchodilator reversibility testing. There is need for spirometry trainings and workshops to be conducted for family physicians by chest physicians for them to use this tool appropriately.<sup>15</sup>

Pediatricians usually prefer regular ICS with SABA prn than using ICS+ LABA combination for their patients with asthma and these results correspond with the AP-AIM study which documented that only 32% of patient were found be on regular ICS + LABA combination. The underutilization of controller medications is compounded at the patient level. Among the AP-AIM study population 64% patients believed that they do not need any controller medication, 50% had an apprehension regarding use of inhaled corticosteroids.<sup>15</sup> Multiple studies have looked at contributing factors for underutilization such as sociocultural factors, poor perception of symptoms, alternative non-pharmacological options, affecting the final outcome of use of prescribed inhaled medications and asthma control.<sup>16-18</sup>

AR is a risk factor for asthma<sup>19</sup> and uncontrolled moderate to severe AR affect asthma control.<sup>20</sup> It was observed in most global studies that 20–50% of AR patients had asthma, and AR was reported by 30% to 80% of asthmatic patients. A large European study with sensitive interview protocols found rhinitis in 98.9% of allergic subjects with asthma and in 78.4% of non-allergic subjects with asthma. Physicians often diagnose asthma and AR on the basis of symptoms and clinical examination, which could potentially contribute to leads to complacency among clinicians that leads to poor clinical outcome or persistence of symptoms in patients.<sup>21</sup>

Even though most physicians in ASPAIR-India agreed that both asthma and AR should be treated they were also concerned about prescribing too much medication and potential side effects with steroids. This is also evident from

the results of asthma outcomes for pediatric patients in the Asia-Pacific region<sup>22,23</sup> survey which demonstrated that use of ICS in pediatric patients is low which may have been a contributing factor for the lack of improvement in their clinical symptoms. ICS use may be low probably because of several factors including patient preference<sup>15</sup> and/or patients not being treated according to regional and global treatment guidelines.<sup>22</sup>

INCS and ICS therapy is the most effective anti-inflammatory treatment for allergic rhinitis and asthma.<sup>21</sup> In a study done in Delhi it was observed that more patients of rhinitis with asthma (75%) took treatment, relative to those without asthma (40%) who, mostly relied on home remedies (42%) or, did not seek any treatment (18%).<sup>24</sup> This highlights the fact that when both conditions are present patients are more likely to seek treatment as compared to when only AR is present.

INCS and ICS are first line treatment for pediatric patients in moderate to severe AR cases<sup>25</sup> and asthma,<sup>9</sup> respectively however in this survey many physicians said that INCS and/or ICS should be delayed in the pediatric population potentially leading to undertreatment and poor control of disease. An encouraging finding is that once decided about using ICS and INCS; 60% agreed that ICS and INCS can be given together.

Although in our study 82% physicians said that practice guidelines influence choice of treatment for management of asthma and AR. However, preference for the appropriate medication does not indicate that they are following guidelines for selection of appropriate treatments such as ICS or INCS. Considerable proportion of patients with asthma are treated in primary care, guidelines should be easily accessible and understandable for physicians to prescribe the most effective medications and deliver comprehensive education to their patients.<sup>22</sup>

## 5. Conclusion

Though the physicians are aware of the guidelines, there was poor utilization in clinical practice. This indicates a need to increase awareness of guideline recommendations on co-existent asthma-AR and improving the management of patients. This also eludes to the development of an easy to use diagnostic tool for asthma -AR co-existence.

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## 7. Source of Funding

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## 8. Conflict of Interest

Neeraj Markandeywar is a GSK employee. Neeraj Markandeywar reports no other conflicts of interest in this work.

Vaibhav Kubal is a GSK employee. Vaibhav Kubal reports no other conflicts of interest in this work.

Indu Khosla declares no conflict of interest.

Sumitra Shantakumar is a GSK employee and holds GSK shares. Sumitra Shantakumar reports no other conflicts of interest in this work.

David Hinds was a GSK employee and had shares in GSK at the time of doing this study and is no longer employed with GSK.

Nivedita Telang is a GSK employee and holds GSK shares. Nivedita Telang reports no other conflicts of interest in this work.

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## References

- Giriraja KV, Chandrashekar P, Bindumathi PL. A Cross Sectional study of Bronchial Asthma in Allergic Rhinitis Patients: A Community Based Assessments among Adults in Bangalore. *J Evol Med Dent Sci*. 2015;4(101):16596–8. doi:10.14260/jemds/2015/2474.
- Ozdoganoglu T, Songu M. The burden of allergic rhinitis and asthma. *Ther Adv Respir Dis*. 2012;6(1):11–23. doi:10.1177/1753465811431975.
- Maresh PA, Vedanthan PK, Holla AD, Jayaraj BS, Prabhakar AK. Time Interval and the Factors Associated with the Development of Asthma in Patients with Allergic Rhinitis. *Lung*. 2009;187(6):393–400. doi:10.1007/s00408-009-9179-x.
- Compalati E, Ridolo E, Passalacqua G, Braido F, Villa E, Canonica GW, et al. The link between allergic rhinitis and asthma: the united airways disease. *Expert Rev Clin Immunol*. 2010;6(3):413–23. doi:10.1586/eci.10.15.
- Braido F, Baiardini I, Menoni S, Gani F, Senna GE, Ridolo E, et al. Patients with Asthma and Comorbid Allergic Rhinitis: Is Optimal Quality of Life Achievable in Real Life? *PLoS ONE*. 2012;7(2):e31178. doi:10.1371/journal.pone.0031178.
- Deb A, Mukherjee S, Saha BK, Sarkar BS, Pal J, Pandey N, et al. Profile of Patients with Allergic Rhinitis (AR): A Clinic Based Cross-Sectional Study from Kolkata India. *J Clin Diagn Res*. 2014;8(1):67–70.
- Bousquet J, Schunemann HJ, Togias A, Bachert C, Erhola M. Next-generation Allergic Rhinitis and Its Impact on Asthma (ARIA) guidelines for allergic rhinitis based on Grading of Recommendations Assessment, Development and Evaluation (GRADE) and real-world evidence. *J Allergy Clin Immunol*. 2020;145:70–80.
- Brozek JL, Bousquet J, Baena-Cagnani CE, Bonini S, Canonica GW, Casale TB, et al. Global Allergy and Asthma European Network; Grading of Recommendations Assessment, Development and Evaluation Working Group. Allergic Rhinitis and its Impact on Asthma (ARIA) guidelines: 2010 Revision. *J Allergy Clin Immunol*. 2010;126:466–76.
- Global initiative for asthma 2017 Guidelines. 2017; Available from: <http://ginasthma.org/2017-gina-report-global-strategy-for-asthma-management-and-prevention/>.



10. Aggarwal B, Shantakumar S, Hinds D, Mulgirigama A. Asia Pacific Survey of Physicians on Asthma and Allergic Rhinitis (ASPAIR): Physician beliefs and practices about diagnosis, assessment and treatment of coexistent disease. *J Asthma Allergy*. 2018;11:293–307.
11. Sanjana J, Mahesh PA, Jayaraj BS, Lokesh KS. Changing trends in the prevalence of asthma and allergic rhinitis in children in Mysore, South India. *Eur Respir J*. 2014;44:1187.
12. Shah A. Rarely does one hear a wheeze without a sneeze. *Indian J Chest Dis Allied Sci*. 2000;42:143–5.
13. Hinds D, Aggarwal B, Du X, Mulgirigama A, Shantakumar S. Asia Pacific survey of physicians on asthma and allergic rhinitis (ASPAIR). *Chin Med J (Engl)*. 2019;132(11):1264–71. doi:10.1097/cm9.0000000000000229.
14. Bunupuradah T, Siriakorn S, Hinds D, Shantakumar S, Mulgirigama A, Aggarwal B, et al. A survey of management practices in coexistent allergic rhinitis and asthma (Asia-pacific Survey of Physicians on Asthma and allergic Rhinitis): results from Thailand. *Asia Pacific Allergy*. 2019;9(3):e24. doi:10.5415/apallergy.2019.9.e24.
15. Salvi SS, Apte KK, Dhar R, Shetty P, Faruqi RA, Thompson PJ, et al. Asthma Insights and Management in India: Lessons Learnt from the Asia Pacific -Asthma Insights and Management (AP-AIM) Study. *J Assoc Physic India*. 2015;63:36–43.
16. Hand C, Morley S, Adams M. Patients' beliefs about inhalers: *Primary Care Respir J*. 2000;8(1):9–11. doi:10.1038/pcrj.2000.4.
17. Conn KM, Halterman JS, Lynch K, Cabana MD. The Impact of Parents' Medication Beliefs on Asthma Management. *Pediatr*. 2007;120(3):e521–6. doi:10.1542/peds.2006-3023.
18. Conn KM, Halterman JS, Fisher SG, Yoos HL, Chin NP, Szilagyi PG, et al. Parental Beliefs About Medications and Medication Adherence Among Urban Children With Asthma. *Ambul Pediatr*. 2005;5(5):306–10. doi:10.1367/a05-004r1.1.
19. Guerra S, Sherrill DL, Baldacci S, Carrozzi L, Pistelli F, Pede FD, et al. Rhinitis is an independent risk factor for developing cough apart from colds among adults. *Allergy*. 2005;60(3):343–9. doi:10.1111/j.1398-9995.2005.00717.x.
20. Taramarcz P, Gibson PG. Intranasal corticosteroids for asthma control in people with coexisting asthma and rhinitis. *Cochrane Database Syst Rev*. 2003;(3):CD003570. doi:10.1002/14651858.cd003570.
21. Mehta P. Allergic Rhinitis and Bronchial Asthma. *Suppl J Assoc Physicians India*. 2014;62:23–6.
22. Cho SH. Asthma Control in Asia-Pacific Countries and Actions for Future Progress. 2010 KAAACI Spring Congress. Special Lecture II. 2010;p. S249–53. Available from: <http://www.allergy.or.kr/journal/abst/2010s/035.pdf>.
23. Lai CKW, Guia TS, Kim YY, Kuo SH, Mukhopadhyay A, Soriano JB, et al. Asthma Insights and Reality in Asia-Pacific Steering Committee. Asthma control in the Asia-Pacific region: The Asthma Insights and Reality in Asia-Pacific Study. *J Allergy Clin Immunol*. 2003;111(2):263–8.
24. Sinha B, Vibha, Singla R, Chowdhury R. Allergic Rhinitis: A neglected disease - A community based assessment among adults in Delhi. *J Postgrad Med*. 2015;61(3):169–75. doi:10.4103/0022-3859.159418.
25. Scadding GK, Kariyawasam HH, Scadding G, Mirakian R, Buckley RJ, Dixon T, et al. BSACI guideline for the diagnosis and management of allergic and non-allergic rhinitis. *Clin Exp Allergy*. 2007;47:856–89.

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