

Effectiveness of Treating Allergic Rhinitis in Symptomatic Control of Bronchial Asthma

Muhammad Tahir¹, Ali Murtaza², Ali Akber Aftab³, Ashfaq Hussain Rana⁴, Mohsin Raza⁵, Sahrish Amanat⁶

- 1 Associate Professor, Department of ENT, CIMS CMH, Multan Pakistan
Data Collection, Perform experimental work, Paper writing
- 2 Post Graduate Resident, Department of ENT, CIMS CMH, Multan Pakistan
Data collection
- 3 Senior Registrar, Department of ENT, Head & Neck Surgery Ziauddin University, Karachi Pakistan
Compiled the paper
- 4 Assistant Professor, ENT Department, Shahida Islam Hospital, Lodhran Pakistan
Data analysis and Review the paper
- 5 Associate Professor, Department of ENT, CMH Abbottabad, Pakistan
Data analysis, Sample collection
- 6 Post Graduate Resident, Department of ENT, CIMS CMH, Multan Pakistan
Result analysis

CORRESPONDING AUTHOR

Dr. Muhammad Tahir
Associate Professor Department of ENT, CIMS
CMH, Multan, Pakistan
Email: dr-tahir777@yahoo.com

Submitted for Publication: 07-09-2022
Accepted for Publication 10-12-2022

How to Cite: Tahir M, Murtaza A, Aftab AA, Rana AH, Raza M, Amanat S. Effectiveness of treating allergic rhinitis in symptomatic control of bronchial asthma. *APMC* 2022;16(4):363-366. DOI: 10.29054/APMC/2023.1181

ABSTRACT

Background: The bronchial acute symptomatic episodes associated with asthma can be deadly or life-threatening. **Objective:** To determine the effectiveness of treating allergic rhinitis in the symptomatic control of bronchial asthma. **Study Design:** Cross sectional study. **Settings:** Department of Otorhinolaryngology; combined Military Hospital, Multan from Feb to July 2022. **Methods:** Adult patients, with already diagnosed cases of bronchial asthma, were invited to the ENT department to assess the underprivileged symptoms of nasal allergy after informed consent. Approval was obtained from the Ethical committee review board. A detailed history was taken and after an E.N.T examination, they were prescribed anti-allergy prophylaxis along with local steroid nasal spray. All of them were reassessed subsequent to the 15th day and 30th day correspondingly. **Results:** The mean age of participants was 40.98±9.69 years, the frequency of symptoms was sneezing and rhinorrhea at 42%, post nasal dribble at 24%, and 34% of the patients had clinical evidence of unappreciated post-nasal dribble. At the end of the study, all the patients benefited from the control of nasal symptoms, the least response was seen among those, who had unappreciated post-nasal dribble. **Conclusion:** Controlling the nasal disease imposes greater effect in controlling the asthma.

Keywords: Allergic rhinitis, Asthma, Sneezing, Post-nasal dribble.

INTRODUCTION

The Upper and lower airways inherently share similar anatomical and physiological characteristics. The main difference is that the patency of the upper airway is dependent on vascular tone while the patency of the lower airway is mainly smooth muscle dependent. The nasal airway protects lower airways by sub-mucosal glandular secretions draining through a mucociliary mechanism of respiratory mucosa, leading to purification as well as air-conditioning of the inspired air.¹ Grossman (2007) proposed the “one airway-one disease” theory is based on the leukotrienes-mediated robust inflammatory process along with histamines involving the entire airway passages, while Lisa et. al (2018) supported this theory in favour of type 2 helper T cell-induced inflammatory response.² Allergic rhinitis and asthma frequently coexist

supporting the evidence of the united airway theory. It is estimated across the globe that allergic rhinitis occurs in 80% of cases of asthma, and up to 30% of cases of allergic rhinitis go through asthma in a lifetime.³ The prevalence of asthma without evidence of rhinitis is only less than 2%.⁴

According to an estimate, in Pakistan, the prevalence of allergic rhinitis is 41.57% and asthma is 25.68% in the aero-allergen-sensitized population.⁵ Allergic rhinitis is IgE-mediated inflammation of nasal passages and is characterized by the presence of two or more of these symptoms including nasal blockage, watery nasal discharge, sneezing, post-nasal dribble, and pruritis for more than 1 hour on most days.⁶ It affects 40% of the population worldwide. Allergic rhinitis is believed to

trigger a systemic inflammatory response that eventually involves the lower airway.⁷

Risk factors for coexistent allergic rhinitis and asthma include advancing age, urban lifestyle, higher education, positive family history, and those who never smoke.^{8,9} Disregarded nasal symptoms may cause poor asthma, consequently not only symptoms of asthma are aggravated but it may cause overtreatment with anti-asthmatic medications.^{10,11} Pharmacotherapy for both conditions aims to target mast cells and different receptors, like histamine, glucocorticoid, and leukotriene receptors carrying different levels of successful disease control responses.¹³

Asthma in the Pakistani population is poorly understood at the moment. The purpose of this research was to characterize the degree to which workers' asthma was under control and how severe their asthma was depending on whether or not they also suffered from allergic rhinitis.

METHODS

This study was conducted in the Department of Otorhinolaryngology at Combined Military Hospital, Multan, from February to July 2022, following approval from the ethical review board (ERC/CMH/120/2022). The study included adult patients who were already diagnosed with asthma by the Pulmonology Department and were using bronchodilators for symptom control. Informed consent was obtained from all participants. The diagnosis of allergic rhinitis was made based on a history questionnaire according to ARIA guidelines, and symptoms were recorded using a departmental Performa. Self-administered questionnaires, adapted from the European Community Respiratory Health Survey (ECRHS), were distributed to a random sample of participants. These questionnaires included ten questions assessing respiratory symptoms and asthma history. Participants who reported an asthma attack within the past year or were currently taking asthma medication were classified as "current asthmatics," while those with a history of asthma but no recent symptoms were labeled as "previous asthmatics." Participants who answered negatively to all questions were classified as "never having asthma."

Allergic rhinitis was assessed using the questionnaire item, "Do you have any nasal allergies including hay fever?" Participants who reported current symptoms and had used antihistamines in the previous year were categorized as having "current allergic rhinitis," while those with a history of allergic rhinitis but no recent use of antihistamines were classified as having "previous allergic rhinitis." Participants without any evidence of allergic rhinitis were classified accordingly. Data were

analyzed using SPSS version 22, with a p-value of <0.05 considered statistically significant.

RESULTS

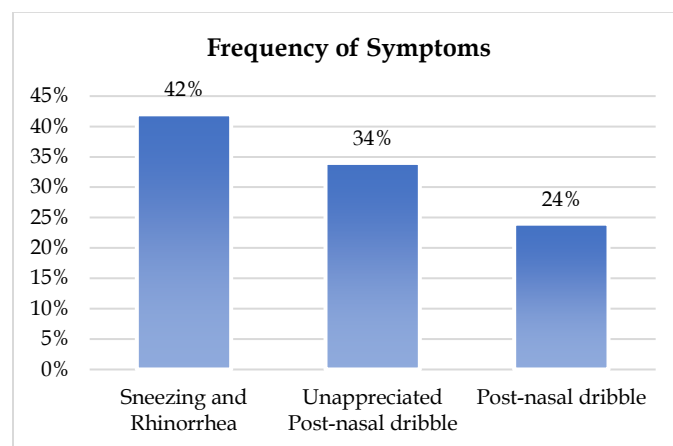
The study included 50 participants with a mean age of 40.98 ± 9.69 years; 74% were women, and 26% were men. Most participants had never smoked (52%), and BMI categories showed 36% were overweight and 26% were obese. Pulmonary function was normal ($\geq 80\%$) in 44% of participants, and 44% had allergic rhinitis shown in table 1.

Table 1: Demographic characteristics of patients

Variables	Category	Number (%)
Age (Years)	Mean \pm SD	28.5 \pm 3.1
	Age Range	24 - 34
Gender	Male	130 (57.8%)
	Female	95 (42.2%)
Year of Undergraduate	1 st Year	60 (26.7%)
	2 nd Year	70 (31.1%)
	3 rd year	55 (24.4%)
	4 th year	40 (17.8%)

The figure 1 illustrates the frequency of symptoms among participants, with sneezing and rhinorrhea being the most common at 42%. Unappreciated post-nasal dribble was reported by 34%, while 24% experienced post-nasal dribble.

Figure 1: Distribution of respiratory symptoms



Among asthmatics with allergic rhinitis, 72% had nocturnal symptoms less than twice a month, ($p=0.026$). For diurnal symptoms, 30% had none or less than once a week, 6% had them at least once a week but less than daily, and 16% had them daily or more ($p=0.05$). Additionally, 40% had at least one asthma attack in the past year, 8% had recent absenteeism, with 13.7% having intermittent, 44.2% mild-persistent, 10.5% moderate, and 31.6% severe-persistent asthma ($p=0.15$). Control status was 36% controlled, 38% partly controlled, and 26% uncontrolled ($p=0.18$).

Table 2: Effectiveness of asthmatics with allergic rhinitis (AR)

Effectiveness of Asthmatics with AR	N(%)	P-Value
Nocturnal symptoms (last 3 months)		
No symptoms or <2 times/month	36(72%)	0.026
≥ 2 times/month but < once/week	8(16%)	
> once a week	6(12%)	
Diurnal symptoms (last 3 months)		
No symptoms or < once/week	15(30%)	0.05
≥ once a week but < once/day	3(6%)	
≥ once a day	8(16%)	
At least one asthma attack in last year	20(40%)	
Absenteeism in last 3 months	4(8%)	
Severity		
Intermittent	17(13.7%)	0.15
Mild-persistent	2(44.2%)	
Moderate	10(10.5%)	
Severe-persistent	21(31.6%)	
Control		
Controlled	18(36%)	0.18
Partly controlled	19(38%)	
Uncontrolled	13(26%)	

DISCUSSION

Symptoms of allergic rhinitis are often disregarded in asthmatic patients; though they not only trigger asthma but also contribute to its severity.¹⁴ Our study participants comprised 26% males and 74% females. Gender predisposition is seen in males in childhood and shifts to females in adolescence. The reason is deemed to be the late appearance of surfactant in newborn males and narrower airways till 1st year of life as compared to female children. Meilan *et al* (2018) stated that testosterone exerts bronchodilatory effects thus severity of asthma is seemed to affect women more as compared to men.¹⁵

The mean age of our patients was found to be 40.98 ± 9.69 years. Inhalant allergic diseases like asthma and allergic rhinitis have a strong genetic predisposition.¹⁶ Among all the participants, dominant nasal features were sneezing and rhinorrhea (42% cases), which indicates the Ig-E mediated initial response of nasal mucosa against the allergen.¹⁷

Only 24% of patients complained of dribbling of mucous plug sensation at the back of the throat; whilst 34% of patients had clinical evidence of post-nasal dribble but they failed to appreciate it. Along with lower airway blockage, it is theorized that it directly irritates Arnold's nerve causing upper airway cough syndrome.¹⁸

After an initial assessment, all the patients were sent home after the prescription of medicines, for a period of

a fortnight. 1st assessment proved a marked improvement in all patients with sneezing and rhinorrhea. Yangquin *et al* (2021) also proved a marked decline in eosinophils and other inflammatory markers in the nasal mucosa after fortnightly treatment in asthmatic patients.¹⁹ Kachoran *et al.* (2019) evidenced the efficacy of combination therapy with anti-histamine and leukotriene receptor antagonists in controlling symptoms of allergic rhinitis especially sneezing and rhinorrhea as compared to treating with either one of these agents alone.²⁰ Faisal *et. al.* (2020) evidenced the efficacy of montelukast in symptomatic relief in asthma (63.9%) and allergic rhinitis (70.1%) patients and improved quality of life was noted in overall 60.37% of total patients. Unappreciated post-nasal drip did not improve in any subject at all.²¹ Then patients were asked to continue taking the same treatment for another fortnight; in the meantime, stop taking all inhaled bronchodilators.

On the next visit, various symptoms of bronchial asthma including cough, and episodes of chest tightness with and without clinical pieces of evidence of wheezes, relapsed in 64% of the patients out of which 40.62% were those who failed to appreciate hyper mucus secretion dribbling at the back of the throat. Relapse in such cases indicates that the airway hyper mucus secretion contributes to increased morbidity in asthmatics patients, thus it highlights the need for the introduction of mucolytic agents in such cases. Extensive researches are required on this topic at national level. Educating the internists and general physicians is important in order to spread awareness that all asthmatic patients should be referred to rhinology clinics for proper history and detailed examination

CONCLUSION

Allergic rhinitis and asthma jointly begin a systemic inflammatory process involving the respiratory tract, thus an integrated diagnostic and therapeutic approach ought to be the goal of disease control. All patients with asthma are supposed to assess by an Otorhinolaryngologist and symptomatic treatment to control allergic rhinitis should be started as early as possible.

LIMITATIONS

One limitation of the study is the reliance on self-reported symptoms, which may lead to inaccuracies or biases in symptom frequency and severity assessments.

SUGGESTIONS / RECOMMENDATIONS

Future studies should include objective measures of symptom frequency and severity to enhance accuracy and reliability in assessing asthma control and allergic

rhinitis impact, as well as consider a larger and more diverse sample population.

CONFLICT OF INTEREST / DISCLOSURE

None.

ACKNOWLEDGEMENTS

Thanks to all participants for contributing to this study.

REFERENCES

- Grossman J. One airway, one disease. *Chest*. 2022;111(2):11S-6S.
- Giovannini-Chami L, Paquet A, Sanfiorenzo C, Pons N, Cazareth J, et al. The "one airway, one disease" concept in light of Th2 inflammation. *Eur Respir J*. 2018 Oct 25;52(4):1800437.
- Tiotiu A, Plavec D, Novakova S, Mihaicuta S, Novakova P, Labor M, et al. Current opinions for the management of asthma associated with ear, nose and throat comorbidities. *Eur Respir Rev*. 2018 Nov 21;27(150):180056.
- Licari A, Caimmi S, Bosa L, Marseglia A, Marseglia GL, Caimmi D. Rhinosinusitis and asthma: a very long engagement. *Int J Immunopathol Pharmacol*. 2014 Oct-Dec;27(4):499-508.
- Hussain A, Ahmed F, Dharmage SC, Aslam MS, Abbas Z. Aero and Food Allergens Sensitization Patterns in a Clinic-Based Sample in Pakistan: A One Year Retrospective Study. *Pakistan Journal of Zoology*. 2019 Aug 1;51(4).
- Akhouri S, House SA. Allergic Rhinitis. [Updated 2023 Jul 16]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK538186/>
- Bao Y, Chen J, Cheng L, Guo Y, Hong S, Kong W et al. Chinese Guideline on allergen immunotherapy for allergic rhinitis. *J Thorac Dis*. 2017 Nov; 9(11):4607-4650.
- Salvi S. (2007). Health effects of ambient air pollution in children. *Paediatr. Respir. Rev*8 (4), 275–280.
- Lambrecht BN, Hammad H. The immunology of the allergy epidemic and the hygiene hypothesis. *Nat. Immunol*. 2017; 18(10):1076-83.
- Gao H, Niu Y, Wang Q, Shan G, Ma C, Wang H, et al. Analysis of Prevalence and Risk Factors of Adult Self-Reported Allergic Rhinitis and Asthma in Plain Lands and Hilly Areas of Shenmu City, China. *Front Public Health*. 2022 Jan 4; 9:749388.
- Porsbjerg C, Menzies-Gow A. Co-morbidities in severe asthma: Clinical impact and management. *Respirol*. 2017; 22(4):651-61.
- Klimek L, Sperl A, Becker S, Mösges R, Tomazic PV. Current therapeutical strategies for allergic rhinitis. Expert opinion on pharmacotherapy. 2019 Jan 2; 20(1):83-9.
- Daley-Yates PT, Larenas-Linnemann D, Bhargava C, Verma M. Intranasal Corticosteroids: Topical Potency, Systemic Activity and Therapeutic Index. *J Asthma Allergy*. 2021 Sep 8; 14:1093-1104.
- Hao S, Yuan F, Pang P, Yang B, Jiang X, Yan A. Early childhood traffic-related air pollution and risk of allergic rhinitis at 2–4 years of age modification by family stress and male gender: a case-control study in Shenyang, China. *ISO4 Standard Environ. Health Prev. Med*. 2021 Dec; 26(1):1-1.
- Han MK, Arteaga-Solis E, Blenis J, Bourjeily G, Clegg DJ, DeMeo D et al. Female Sex and Gender in Lung/Sleep Health and Disease. Increased Understanding of Basic Biological, Pathophysiological, and Behavioral Mechanisms Leading to Better Health for Female Patients with Lung Disease. *Am J Respir Crit Care Med*. 2018; 198(7):850-858.
- Kurukulaaratchy RJ, Karmaus W, Arshad SH. Sex and atopy influences on the natural history of rhinitis. *Curr Opin Allergy Clin Immunol*. 2012; 12(1):7-12.
- Wheatley LM, Togias A. Clinical practice. Allergic rhinitis. *N Engl J Med*. 2015; 372(5):456-63.
- Hirai K, Kaiga C, Otomo T, Kuruma K, Kama Y, Yamaguchi K et al. Effect of Post-nasal Drip on Overnight-cough Frequency and Cough Pattern in Children with Asthma. *Tokai J Exp Clin Med*. 2022; 47(2):79-84.
- Ju X, Xie Y, Beaudin S, Wiltshire L, Oliveria JP, MacLean J, et al. Effect of Intranasal Corticosteroid Treatment on Allergen Induced Changes in Numbers, Activation and Phenotype of Group 2 Innate Lymphoid Cells in Mild Allergic Rhinitis with Asthma. In A21. AIRWAY IMMUNOLOGY 2020 May (pp. A1057-A1057). American Thoracic Society.
- Klimek L, Sperl A, Becker S, Mösges R, Tomazic PV. Current therapeutical strategies for allergic rhinitis. Expert opinion on pharmacotherapy. 2019 Jan 2; 20(1):83-9.
- Zuberi FF, Haroon MA, Hayseed A, Khuhawar SM. Role of Montelukast in Asthma and Allergic rhinitis patients. *Pak J Med Sci*. 2020; 36(7):1517.