

Frequency of Allergic Rhinitis in Patients with Bronchial Asthma at a Tertiary Care Hospital

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ABSTRACT

OBJECTIVE: To evaluate the frequency of allergic rhinitis in patients with bronchial asthma and to identify risk factors for this association.

STUDY DESIGN: A cross sectional observational study.

PLACE & DURATION: At Liaquat University of Medical & Health Sciences Jamshoro/Hyderabad, from 1st Aug, 2014 to 31st Dec, 2015.

METHODOLOGY: A total of 100 patients with cough, dyspnea and chest pain were examined and out of those, 87 patients having bronchial asthma, as per clinical evaluation based on global initiative for asthma guidelines (GINA) were selected for the study and then those having allergic rhinitis, based on allergic rhinitis and its impact on asthma guidelines (ARIA) were identified using clinical and pathological parameters (Eosinophilic count on nasal smear).

RESULTS: Among a total of 87 patients of bronchial asthma, 43.68% were males and 56.32% females. Out of those, 64.37% were having allergic rhinitis. The most common variety of bronchial asthma was intermittent and the most common variety of allergic rhinitis was moderate to severe persistent. We found smoking, urban residence, traffic pollution, overcrowding, small ill ventilated rooms, use of carpets in rooms and use of wood for cooking and heating purposes as the risk factors for this association. Out of 56 patients of AR, 73.2% were smokers and smoking was more common in females (53.65%).

CONCLUSION: The frequency of allergic rhinitis is fairly high in patients with bronchial asthma. Urban residence, traffic pollution, overcrowding, small ill ventilated rooms and smoking were found responsible for this high prevalence.

KEY WORDS: Bronchial asthma, Allergic rhinitis, Frequency, Inflammation, Smoking, Pollution, Allergic Rhino bronchitis, Risk factors.

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INTRODUCTION

Allergic rhinitis and Bronchial Asthma are the disorders of two different organs. One affects the nose and the other involves the lungs. But if considered keenly, both are the disorders of the same common channel, one affecting the initial portion of the respiratory tract, the nose and the other affecting its end area, the lungs¹.

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World Health Organization (WHO) has defined Asthma as a disease which occurs due to inflammation of the air passages in the lungs and is characterized by recurring attacks of breathlessness and wheezing. Global initiative for asthma (GINA) classifies asthma as intermittent or persistent according to its duration and as mild, moderate or severe, according to clinical and lung function criteria². In a study carried out on children in Pakistan, the overall prevalence of asthma is 10.2%³. Allergic rhinitis is defined as a disorder of the nose which is triggered by an immunoglobulin-E mediated inflammation of the membranes of the nose, following an allergen exposure. This in turn results in the generation of excessive amount of mucus producing runny nose, nasal congestion, nasal and soft palate itching and sneezing⁴. Allergic rhinitis is classified as intermittent or persistent according to its duration and as mild or moderate to severe according to its severity as per Allergic rhinitis and its impact on asthma (ARIA) position paper⁵. There is an increasing recognition in world literature about the existing link between allergic rhinitis and bronchial asthma because both are inflammatory disorders sharing similar pathophysiology and treatment approaches⁶. Upper and lower airways has many similarities like circadian rhythm, triggers like cold air, smoke, pollens, dust mites, Cockroaches and pattern of inflammation⁷. Allergic rhinitis is associated with development and severity of asthma. Although over 80% of asthmatics have AR, the condition is frequently under diagnosed in subjects with asthma⁸. According to Simon⁹ the link between allergic rhinitis and bronchial asthma existed for centuries which got

dull with the specialization in medicine and medication. He proposed the term "Allergic Rhino bronchitis" for this link. Since asthma and allergic rhinitis are very prevalent disorders that sometimes appear concomitantly¹⁰, we undertook this study to evaluate the frequency of allergic rhinitis in patients with bronchial asthma and to identify the risk factors for this association, at a tertiary care hospital.

METHODOLOGY

This cross sectional observational study was conducted at the Departments of Medicine and ENT of Liaquat University Hospital Jamshoro/Hyderabad, a tertiary health care facility catering the needs of patients from Hyderabad and interior of Sindh, from 1st Aug, 2014 to 31st Dec, 2015. Patients of asthma diagnosed on history and clinical examination, aged between 15-60 years, were included in the study. Patients having persistent symptoms due to respiratory infections, patients having Chronic Obstructive Pulmonary Disease and patients having Ca Lung were excluded from the study. After taking ethical committee approval and explaining the procedure, informed consent was taken. It involved 100 consecutive patients who presented at the Department of Medicine with the clinical features mimicking those of bronchial asthma. The patients were recruited by convenience sampling. Eighty seven patients were enrolled for the study who had the symptoms of shortness of breath, wheezing and cough intermittently for the last 3 months or more. All the patients underwent a diagnostic protocol with history and clinical examination. The history included the demographic profile, smoking habits, age, environmental factors like urban residence, traffic pollution, small confined houses, overcrowding, carpeted rooms, burning wood for cooking and heating purpose and nocturnal attacks of asthma onset. The frequency and severity of asthma was evaluated and classified according to GINA 2005 guidelines¹. Having confirmed the patients to be asthmatic, these patients were then collaborated with the E.N.T. department to look for signs and symptoms of allergic rhinitis. The patients having itching in nose and palate with running or blocked nose for quite a long time were considered and their nasal smears were taken for increased eosinophil counts to confirm them as having allergic rhinitis. Their frequency and severity of symptoms were evaluated and classified according to ARIA guidelines⁴. **Data Analysis:** All the data was then fed into SPSS-version-18 to have the statistical assistance. Frequency and percentage were computed for categorical variables like gender, risk factors, categories of asthma and allergic rhinitis. Mean and Standard deviation was computed for continuous variables like age of the patients. Association between categorical variables was determined using Chi-square test. Odds ratio was calculated using 2x2 contingency tables.

RESULTS

A total of 87 patients having clinical diagnosis of asthma took part in the study. Among them 38 (43.68%) were males and 49 (56.32%) were females with a male to female ratio of 1:1.3. The age range was 15-60 years with a mean age of 17.4 ± 8.08084 (SD). Fig. - 1 show the age distribution of subjects. Table - I show

the association of asthma with gender. Out of 87 subjects, 37 were classified as having intermittent asthma (42.53%) and 50 have persistent asthma (57.47%). Patients with persistent asthma were further categorized as having mild persistent (n =12, 13.79%), moderate persistent (n = 23, 26.43%) and severe persistent asthma (n =15, 17.24%) according to GINA guidelines. The frequency of allergic rhinitis in patients with bronchial asthma came out to be 56 (64.37%) patients. Among them 23 (41.07%) were males and 33 (58.93%) were females. Table - II shows the association of gender with AR. The age range was 17-53 years with the mean age of 11.2 ± 8.40833 (SD). They were grouped into intermittent (n = 24, 42.85%) and persistent (n=32, 57.13%) according to ARIA guidelines. Of the intermittent group, 11 (19.64%) patients were having mild intermittent and 13 (23.21%) have moderate-severe intermittent. Similarly among the persistent group, 15(26.78%) were classified into mild persistent and 17 (30.35%) into moderate-severe persistent group. Among the patients with allergic rhinitis, 41 (73.2%) were smokers and 15 (26.8%) were nonsmokers. Among the smokers, 22(53.66%) were females and 19 (46.34%) were males. Table - III shows the association of smoking with AR. Over half of our subjects lived in urban areas where traffic related air pollution was abundant. A quarter of our study population lived in confined packed homes with large families occupying a single ill ventilated room. Another quarter of our subjects were exposed to carpets in their homes. Burning wood for cooking and heating purpose was prevalent in our study population. Table - IV shows the risk factors for asthma and allergic rhinitis among study population. Computing the whole result, asthma was more common in female population 49(56.32%) and the most common variety of asthma was intermittent. Similarly, the most common variety of allergic rhinitis was moderate to severe persistent and it was also more common among females i.e. 33(58.93%). Smoking habit was present in 41(73.2%) patients of allergic rhinitis and surprisingly enough, majority 22(53.66%) of smokers in our study were females.

DISCUSSION

Over last one or two decades, various links between Asthma and Allergic Rhinitis have been studied and documented at epidemiological, pathophysiologic and therapeutic levels. The evidence is very convincing of the existence of a strong link. And this in turn has promoted the concept of a united airway. Epidemiologically, asthma and allergic rhinitis are frequently associated with atopy with preferential sensitization to airborne allergens. Pathophysiologically, the mucus membranes of both the upper and lower airways are covered by a pseudostratified columnar ciliated epithelium with a continuous basement membrane, and therapeutically, the responses of both upper and lower airway diseases to pharmacologic and immunologic interventions are comparable. It is therefore concluded that upper airway should be carefully assessed in asthmatics and lower airway in patients with allergic rhinitis¹¹. Asthma and Allergic Rhinitis are the most common chronic diseases worldwide and the individual prevalence of allergic rhinitis range from 9-42% worldwide¹². The prevalence of allergic rhinitis in many parts of Asia is found to be 18-44% and it is

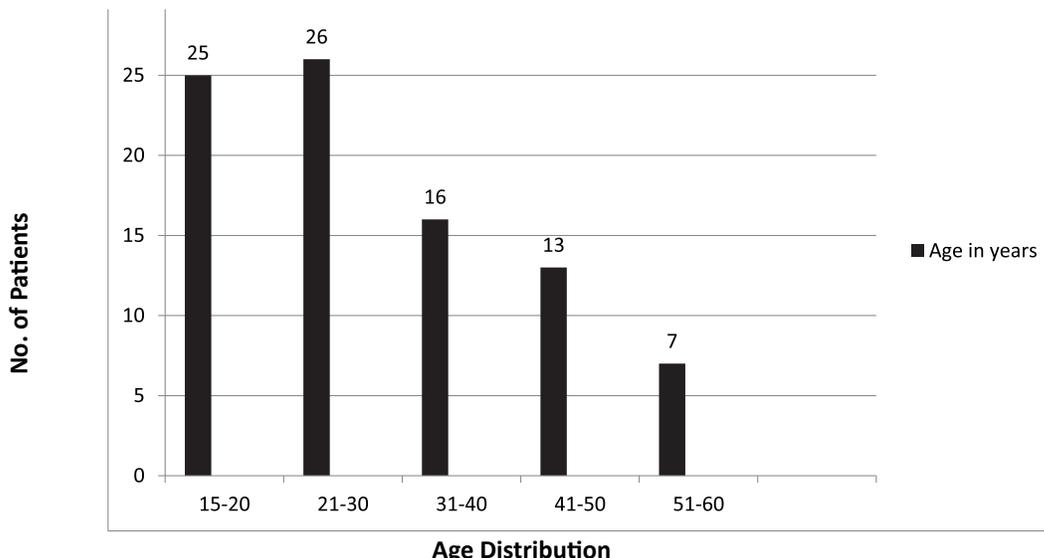


Fig - 1: FREQUENCY OF AGE DISTRIBUTION OF ASTHMATIC SUBJECTS STUDIED (n=87)

TABLE - I: ASSOCIATION OF ASTHMA AND GENDER (N=87)

Gender	Asthma						OR	95%CI	Chi Square	P-value
	Inter-mitt-ent	Mild Persistent	Moderate Persistent	Severe Persistent	Asthma Total					
					+v	-v	0.66	0.2063-2.1414	0.47	0.4938
Male	19	07	06	06	38	07	47			
Female	18	05	17	09	49	06				
Total	37	12	23	15	87	13				

TABLE - II: ASSOCIATION OF ALLERGIC RHINITIS AND GENDER (n=56)

Gender	Allergic Rhinitis (n=56)						OR	95% CI	Chi Square	P-Value
	Mild Intermi-ttent	Mild Persistent	Moderate-Severe Intermittent	Moder-ate-Severe Persistent	Total AR					
					+ve	-ve	0.7434	0.3074-1.7977	0.4341	0.5105
Male	04	05	04	10	23	15				
Female	07	10	09	07	33	16				
Total	11	15	13	17	56	31				

TABLE - III: ASSOCIATION OF ALLERGIC RHINITIS WITH SMOKING (n=56)

AR	Smoking		OR	95% CI	P value	Chi Square
	Present	Absent				
Present	41	15	5.7400	2.2032-14.9544	0.0003	13.7986
Absent	10	21				

TABLE - IV: Risk factors for asthma and allergic Rhinitis (n=87)

Risk factors	Frequency	%
Sex		
Male	38	43.67
Female	49	56.32
Smoking		
Yes	51	58.62
No	36	41.37
Family H/O asthma/atopy		
Yes	61	70.11
No	26	29.88
BMI		
<20	15	17.24
20-25	17	19.54
25-30	32	36.78
>30	23	26.43
Urban Residence		
Yes	53	60.91
No	34	39.08
Working in the field		
Yes	27	31.03
No	60	68.96
Environmental Exposure		
Yes	66	75.86
No	21	24.13
Shared, ill ventilated rooms		
Yes	40	45.97
No	47	54.02
Over crowding		
Yes	60	68.96
No	27	31.03
Exposure to carpets		
Yes	20	22.98
No	67	77.01

Wood used for cooking/heating		
Yes	26	29.88
No	61	70.11
Exposure to pets		
Yes	13	14.94
No	74	85.05

causing serious implications to physical and mental health status of the individual sufferer¹³. A large percentage of children and adults with asthma also have allergic rhinitis¹⁴. The present study also confirmed the link between Bronchial Asthma and Allergic Rhinitis. We found that more than half of the patients of asthma also have allergic rhinitis (64.37%). The prevalence of allergic rhinitis in patients with bronchial asthma is different in different parts of the world. In U.S.A. this prevalence is 12.9¹⁵, in Africa 12.8%¹⁶, in Nigeria, 29.6%¹⁷, in Iraq 61.6%¹⁸ and in UAE 71%¹⁹. In a study done at Combined Military Hospital Chunian, it was found that 21% patients had both asthma and allergic rhinitis²⁰. The high prevalence of allergic rhinitis in patients with bronchial asthma looks to be a consequence of increased pollution in urban areas coupled with increased incidence of smoking habit in both genders. We found pollution, urbanization and smoking as important risk factors for this link. Smoking habit was prevalent in our study and surprisingly enough there were more female smokers (53.66%) than male smokers (46.34%). Most of the females in the current study were from rural areas in the suburbs of the cities where smoking is a norm in female population. In a study carried out in children, it was concluded that urban residence and family history of atopic disorders were important risk factors for bronchial asthma²¹. Family history of asthma, having atleast one smoker at home, room without windows and residence in area without sunlight were major risk factors for childhood asthma in a study carried out in Karachi²². Genetic, environmental factors and life style were found to be the major determinants of high prevalence and severity of allergic diseases including AR in a study carried out by Ahmad et al²³. Smoking was found to play a significant role in respiratory illnesses like AR, asthma and cough in a study done in Karachi²⁴. Results of our study showed that frequency of AR in both genders is significantly different and it was more common in females. Similar results were reported in other studies^{20,25,26}.

CONCLUSION

The frequency of allergic rhinitis is fairly high in patients with bronchial asthma. Urban residence, traffic pollution, overcrowding, small ill ventilated rooms and smoking were found responsible for this high prevalence.

RECOMMENDATIONS

There is a dire need to educate patients about the role of smoking, causal allergens and pollution in the development of asthma and allergic rhinitis to reduce the prevalence and

morbidity and improve quality of life.

CONTRIBUTION OF AUTHORS

Shaikh MS: Conceived Idea, Designed Research Methodology, Manuscript Writing

Ghouri A: Manuscript Writing, Manuscript final reading and approval

Aslam S: Data Interpretation, Statistical Analysis

Hanif R: Data Collection, Literature Search

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REFERENCES

- Feng CH, Miller MD, Simon RA. The united allergic airway: Connections between allergic rhinitis, asthma, and chronic sinusitis. *Am J Rhinol Allergy*. 2012; 26(3): 187–90.
- FitzGerald JM, Bateman ED, Boulet LP, Cruz AA, Haahtela T, Levy ML, et al. Global Strategy for Asthma Management and Prevention. (GINA). Initiative World Health Organization. WHO. Updated 2015. Website [http://www.ginasthma.org]
- Khan AA, Tanzil S, Jamil T, Shahid A, Naeem S, Sahito A, et al. Burden of asthma among children in a developing mega city. *J asthma* 2014. 5(9): 891-9
- Bousquet J, Khaltaev N, Cruz AA, Denburg J, Fokkens WJ, Togias A et al. Allergic Rhinitis and its Impact on Asthma (ARIA) 2008 update (in collaboration with World Health Organization, GA(2)LEN and AllerGen. *Allergy* 2008; 63: 8-160.
- Bousquet J, Schunemann HJ, Samolinski B, Demoly P, Baena-Cagnani CE, Bachert C et al. Allergic Rhinitis and its Impact on Asthma (ARIA). Achievements in 10 years and future needs. *J Allergy Clin Immunol* 2012; 130(5):1049-62
- Kim H, Bouchard J, Renzi PM. The link between allergic rhinitis and asthma: A role for antileukotriens? *Can Resp J* 2008; 15(2):91-97.
- Kim HH. Allergic Rhinitis, Sinusitis and asthma-evidence for respiratory system integration. *Korean J Pediatr*. 2007;50(4):335-39.
- Egan M, Bunyavanich S. Allergic rhinitis: the “ghost diagnosis” in asthma. *Asthma Res Prac*. 2015; 1:8.
- Simons FE. Allergic Rhinobronchitis. The Asthma-Allergic Rhinitis Link. *J Allergy Clin Immunol* 1999;104(3):534-40.
- J Elena, U Ruxandra. Links between allergic rhinitis and asthma: *Rom j rhinol*. 2013; 3 (9): 39-44.
- Burgeron C, Hamid Q. Relationship between Asthma and Rhinitis: Epidemiologic, Pathophysiologic and Therapeutic aspects. *Allergy, Asthma & Clinical Immunology*. 2005; 1(2):81-87.
- Settipane RA, Charnock DR. Epidemiology of rhinitis: allergic and non allergic. *Clin Allergy Immunol* 2007;19(1):23-34.c
- Asha'ari ZA, Yusof S, Ismail R, Che Hussin CM. Clinical features of Allergic Rhinitis and Skin Prick test analysis based on the ARIA Classification: A preliminary study in Malaysia. *Ann Acad Med Singapore* 2010; 39(8):619-24.
- Ko FW, Ip MS, Chu CM, So LK, Lam DC, Hui DS. Prevalence of allergic rhinitis and its associated morbidity in adults with asthma: a multicenter study. *Hong Kong Med J* 2010; 16(5):354-61.
- Nix M. Asthma prevalence: a new study challenges conventional wisdom. *Am J Nurs* 2015; 115(4):17
- Adeloye d, Chan k y, Rudan I, Cambell H. An estimate of asthma prevalence in Africa: a systemic analysis. *croat med j*. 2013; 54(6):519-31.
- Desalu OO, Salami AK, Iseh KR, Oluboyo PO. Prevalence of self reported allergic rhinitis and its relationship with asthma among adult Nigerians. *J investing Allergol Clin Immunol* 2009; 19(6):474-80.
- Alsamarai AM, Alwan AM, Ahmed AH, Salih MA, Salih JA, Aldabagh MA, et al. The relationship between asthma and allergic rhinitis in the Iraqi population. *Allergol Intl* 2009; 58(4):549-55.
- Asad F, Fernandez A R, Kumar A, Shoaib M A. Co-existence of Asthma with Allergic Rhinitis and Common Allergens in Al Ain, UAE: A Cross-Sectional Study. *Ann Abbasi Shaheed Hosp Karachi Med Dent Coll*. 2015;20(2):137-41.
- Khan M, Muhammad, Khan A, Shabbir F, Rajput T A. Association of allergic rhinitis with gender and asthma. *J Ayub Med Coll*. 2013;25(1-2):120-22.
- Majeed R, Rajar U D M, Shaikh N, Majeed F, Arain A A. Risk Factors Associated with Childhood Asthma. *J Coll Physicians Surg Pak*. 2008;18(5): 299-302.
- Kamran A, Hanif S, Murtaza G. Risk factors of childhood asthma in children attending Lyari general hospital. 2015; *J Pak Med Assoc* 65(6):647-50.
- Ahmad F, Yousuf F, Asif S. Prevalence of allergic disease and related allergens in Pakistan in 2007. *J Postgrad Med Inst* 2011; 95(1):14-23.
- Habibullah S, Soomro IBM. Effect of smoking on the health of family members in district south Karachi *Pak j med res* 2009;48(2):44-7.
- Barrenas F, Andersson B, Cardell LO, Langston M, Mobini R, Perkins A, et al. Gender differences in inflammatory proteins an pathways in seasonal allergic rhinitis. *Cytokine* 2008;42(3):325–29.
- Osman M, Hansell AL, Simpson CR, Hollowell J, Helms PJ. Gender-specific presentations for asthma, allergic rhinitis and eczema in primary care. *Prim Care Respir J* 2007;16(1):28–35.