



## Allergic Rhinitis in Children with Asthma: A Questionnaire Based Study in Lebanon

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### Authors' contributions

This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.

### Article Information

DOI: 10.9734/BJMMR/2015/17471

#### Editor(s):

- (1) Miles Weinberger, Department of Pediatrics, University of Iowa Cystic Fibrosis Center, USA.
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  - (2) Gauri Mankekar, ENT Department, P.D. Hinduja National Hospital and Medical Research Centre, India.
- Complete Peer review History: <http://sciencedomain.org/review-history/10169>

Original Research Article

Received 16<sup>th</sup> March 2015

Accepted 4<sup>th</sup> June 2015

Published 14<sup>th</sup> July 2015

### ABSTRACT

**Introduction:** Allergic rhinitis and asthma frequently coexist but has rarely been evaluated in Lebanese children.

**Aim:** This prospective study aimed to estimate the prevalence of allergic rhinitis in asthmatic children in Lebanon, and to ascertain whether allergic rhinitis is a risk factor for the severity of asthma.

**Patients and Methods:** Parents of 124 children aged 1-13 years admitted to the pediatric floor of the Makassed General Hospital between July 2008 and March 2009 and diagnosed as having asthma; parents were interviewed and followed up with a questionnaire concerning allergic rhinitis symptoms and signs with para-clinical data if available. The questionnaire was based on a study done in France by Hammouda et al. (2005). This was modified from an adult score for allergic rhinitis (SFAR).

**Results:** This well recognized score defines the association of allergic rhinitis and asthma in children. A score of  $\geq 9$  out of 17 total score corresponds to the presence of allergic rhinitis in asthmatic children. The prevalence of allergic rhinitis was recognized in 67 patients out of 124 (54%). This prevalence was evident mainly in the age group 3-5 years.

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**Conclusion:** Allergic rhinitis is prevalent in children of the Lebanese population, the severity of asthma was found to be clearly associated with allergic rhinitis. The SFAR modified for children was found to be a simple and reliable tool to detect allergic rhinitis in asthmatic children.

*Keywords: Allergic rhinitis; score for allergic rhinitis (SFAR); Makassed General Hospital (MGH); allergic rhinitis and impact on asthma (ARIA); global initiative for asthma (GINA).*

## 1. INTRODUCTION

The prevalence of allergic disorders, allergic rhinitis and asthma, have increased over the last decades [1-3].

These two conditions share the physiopathologic links that need to be clarified further.

The allergic rhinitis prevalence varies from one epidemiological study to another mainly because there is no standardized assessment of allergic rhinitis [4]. Furthermore, the actual distribution of allergic rhinitis in patients with asthma is not well defined.

Asthma and rhinitis are influenced by the inflammatory process taking place in the two parts of the respiratory tract, the upper and the lower respectively [5]. An alteration of the upper airway function could therefore affect the function of the lower airway. Improvement of allergic rhinitis symptoms can be associated with resolution of asthma symptoms. On the other hand, deterioration of allergic rhinitis symptoms may exacerbate asthma symptoms. Consequently, appropriate management of allergic rhinitis could decrease the risk of asthma developing or asthma exacerbations [6].

In order to ensure optimal management it is important for primary care physicians to recognize the presence of rhinitis in patients with asthma, similarly patients with rhinitis are evaluated for the presence of asthma.

### 1.1 Support from Guidelines

The concept of an inter-related relationship between asthma and allergic rhinitis is endorsed by the Allergic Rhinitis and its Impact on Asthma (ARIA) 2007 updated guidelines [7]. This ARIA Workshop Report was in collaboration with the World Health Organization (WHO), the Global Allergy, and the Asthma European Network (GALEN). The ARIA guidelines were published as a state-of-the-art reference for physicians to update their knowledge of allergic rhinitis and to

highlight the impact of Allergic Rhinitis on asthma [8]. The revised Global Initiative for Asthma (GINA) guidelines also recognizes rhinitis as a special consideration in managing asthma.

## 2. PATIENTS AND METHODS

### 2.1 Study Population and Questionnaire

This study has been approved by the Institutional Review Board (IRB). During the period of July 2008 and March 2009, 124 asthmatic children were studied prospectively, with age ranging from 1-13 years old. All parents were informed and aware of their children's participation in the following study, and they filled in questionnaires at pediatric floor in MGH.

The questionnaire was modified from the adult form of the score for the allergic rhinitis (SFAR). Each item was assigned a number of points. The final score ranged from 0 to 17 (Table 1).

Allergic rhinitis and asthma were classified according to ARIA and GINA 2004 recommendations, respectively.

Furthermore, the onset ages of allergic rhinitis and asthma, the treatment of allergic rhinitis were also recorded. Associations with other allergic conditions as well also recorded such as: Atopic dermatitis, conjunctivitis and / or food allergy.

The diagnosis of allergic rhinitis was based on a pediatric questionnaire taken from a study done at FRANCE (with the association with Paris Descart University Necker Hospital and public assistance of Paris Hospitals), this was approved to be valid against medical diagnosis by comparison of calculations for sensitivity, specificity and positive and negative predictive values for each score.

A total questionnaire score ( $\geq 9$ ) was a diagnostic threshold for allergic rhinitis. The corresponding sensitivity was 91.1%, specificity 95.2%, PPV 96.4%, and the NPP 88.3%.

Asthma severity was assessed according to GINA guidelines.

**Table 1. Modified SFAR form for children. The questionnaire was modified from the adult form of the score for the allergic rhinitis (SFAR). each item was assigned a number of points. The final score ranged from 0 to 17**

Items	Attributed points
Q1: Nasal symptoms (Blocked nose, Runny nose, Itching, Sn)	0-4 (0-1 for Each symptom)
Q2: Itchy, watery eyes	0-2 (2 if Yes)
Q3: Months of the year	0-2 (1 if Specific period)
Q4 :Trigger factors	0-2 (2 of House Dust mite/pollens)
Q5: Parents' perception of allergy	0-2 (2 if Yes)
Q6: Previous positive allergy test	0-2 (2 if Yes)
Q7: Previous medical diagnosis of allergy	0-2 (2 if Yes)
Q8: Family history of allergy	0-2 (2 if Yes)
Total points	17

### 2.2 Statistical Analysis

Statistical analysis was performed with the use of sigma stat software (SPSS Inc) version 13.0. For comparison of categorical data, chi-square.

### 3. RESULTS

A total of 124 patients were admitted to MGH with the diagnosis of asthma during the study period. All patients were between 1 and 13 years. No exclusion criteria.

The prevalence of allergic rhinitis in asthmatic patients studied was found to be 54% (67/124 patients).

The higher prevalence has found to be between 3 and 5 years 31 patients (46.3%) (Table 2).

Males were more commonly affected with a sex ratio of 2.35 (Table 3).

The main manifestations of allergic rhinitis were: sneezing 61.19%, runny nose 56.7%, nasal itching 56.7%, eye symptoms 53.7%, and blocked nose 31.34% (Table 4).

Severity of asthma was classified in our patients as mild intermittent 40.3%, mild persistent 52.4%, and moderate to severe 7.25% (Table 5).

Allergic rhinitis was highly correlated to asthma severity in our study which revealed 20%, 74%, and 100% in mild intermittent, mild persistent, and moderate to severe groups respectively (Fig.1).

Allergic rhinitis was mostly stimulated by house dust mites (51, 3%) and 43% of children having both asthma and allergic rhinitis had a third disease atopic dermatitis (37%).

Skin prick test was performed in 36 patients (29%), but the results could not be collected because most were lost by parents. Parents' perception of allergy was very high 103/124 (83.1%) at the same time a strong family history of allergy found to be as high as 109/124 (87.9%).

**Table 2. Prevalence of allergic rhinitis in asthmatic patients by age group**

Age group	Allergic rhinitis	
	Number	Percentage
(1-2)	15	22.4
(3-5)	31	46.3
(6-11)	18	26.9
(12-18)	3	4.5
Total	67	100

**Table 3. Gender of allergic rhinitis in asthmatic patients**

Gender	Allergic rhinitis	
	Number	Percentage
Male	47	70
Female	20	30
Total	67	100

**Table 4. Manifestations of allergic rhinitis in asthmatic patients**

	Allergic rhinitis	
	Number = 67	Percentage %
Sneezing	41	61.19%
Runny nose	38	56.7%
Nasal itching	38	56.7%
Eye symptoms	36	53.7%
Blocked nose	21	31.34%

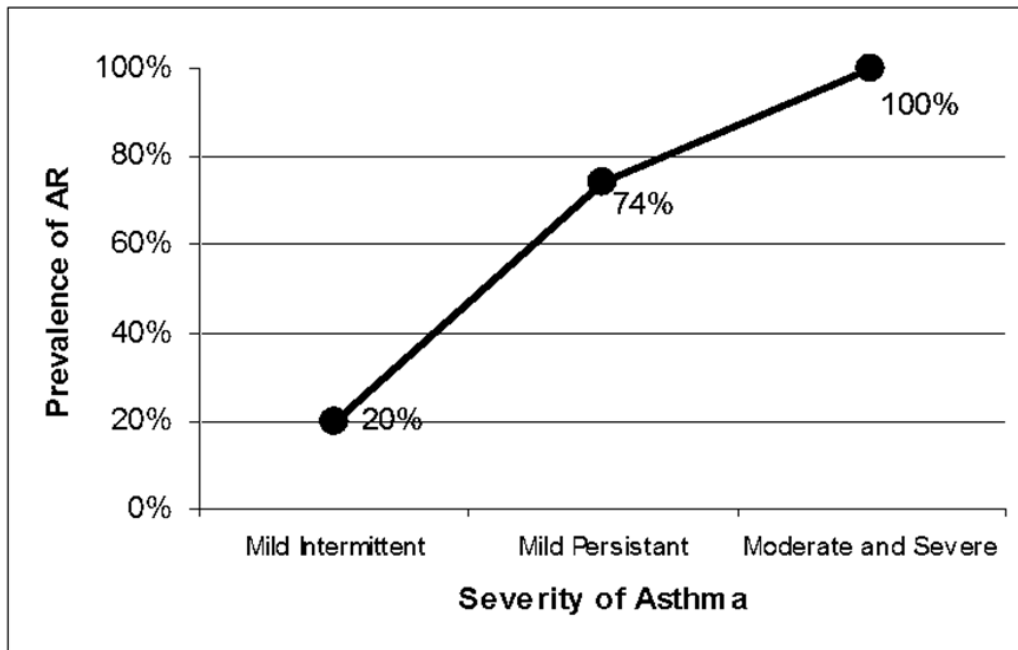


Fig. 1. Correlation between asthma severity and allergic rhinitis

#### 4. DISCUSSION

These findings clearly contribute to further understanding of the association between AR and asthma in childhood. This study assessed the prevalence of AR in asthmatic children through a specific questionnaire.

A pediatric score cutoff value  $\geq 9$  allowed optimum discrimination between children with AR and those without [4] and therefore, this can be used in daily basis at all asthma Lebanese clinics.

This score was studied by Hammouda et al. and published in the journal of compilation done in FRANCE (with the association with Paris Descart University Necker Hospital and Public Assistance of Paris Hospitals) and was approved to be valid for medical diagnosis by comparison of calculations for sensitivity, specificity and positive and negative predictive values for each score.

Our study provides additional information regarding the clinical signs and the burden of allergic rhinitis on the asthmatic child. In contrast to the study done by Lack [9], who suggested that children with allergic rhinitis rarely complain of nasal stuffiness, we found that the main manifestations of allergic rhinitis were sneezing

(61,19%), runny nose (56,7%), nasal itching (56,7%), and blocked nose (31,34%).

Table 5. Asthma severity according to GINA guidelines

Severity of asthma	Number = 124	Percentage
Mild intermittent	50	40.3
Mild persistent	65	52.4
Moderate to severe persistent	9	7.25

We observed that the higher prevalence of allergic rhinitis in our population is between 3 and 5 years of age. Furthermore, it could manifest early at a younger age groups, as found in our study beginning from 1 year of age as compared to Hammouda study starting from 3 years of age.

As asthma was more severe as allergic rhinitis was highly correlated demonstrated by our study 20%, 74%, and 100% in mild intermittent, mild persistent, and moderate to severe groups respectively. Thus in order to ensure optimal management it is important for primary care physicians to recognize the presence of rhinitis in

patients with asthma; similarly patients with rhinitis are evaluated for the presence of asthma. A high percentage rate of perception of allergy is related to strong family history of the same disease.

As asthmatic patients do not overtly complain about nasal symptoms and / or these symptoms are not routinely sought by doctors, the allergic rhinitis frequency is underestimated in this group [10]. A retrospective study in Italy found that children complaining of persistent wheezing were 10 times more likely to have a personal history of allergic rhinitis than the control group [11].

Allergic rhinitis is not an independent risk factor for the severity of asthma as found in our study that 43% of children having both asthma and allergic Rhinitis had a third disease, atopic dermatitis (37%).

Sole et al. reported that 12.8% of children 6-7 years with both asthma and AR had associated eczema [12,13,14-25].

Our study may add a new simple score to Lebanese children that could be attached to asthma chart, being the two diseases are highly correlated in this population.

## 5. STUDY LIMITATIONS

Because of limited time the treatment measure and follow up of these patients were lost.

## 6. CONCLUSION

Allergic rhinitis and asthma are frequently associated (54%), in children in the Lebanese population. The severity of asthma was found to be positively correlated with that of AR. In this study, allergic rhinitis was found to be manifested in the early age group of children 1-2 years of age. The SFAR modified for children was found to be a simple and reliable tool to detect allergic rhinitis in asthmatic children.

## CONSENT

It is not applicable.

## ETHICAL APPROVAL

It is not applicable.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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