



The prevalence of allergic rhinitis in Iranian children: A systematic review and descriptive meta-analysis

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ABSTRACT

Allergic rhinitis is a very common disorder that affects children. To determine the national prevalence of allergic rhinitis symptoms in Iranian children, we conducted a systematic review and meta-analysis.

We conducted a literature search by using the Google Scholar from 1992 until 2012. The search terms were included: Allergic rhinitis, ISAAC and Iran. All the selected studies on children were performed by the International Study of Asthma and Allergies in Childhood protocol. By following the criteria, we gathered 436 articles. The required information from each study includes the authors, date, city, number of children in age groups 6-7 and 13-14. The information was recorded on particularly designed sheets. The data were analyzed by STATA 11.

In this study, we analyzed 13 studies. 20668 children were in 6-7 years age group and 22920 were in 13-14 years age group. The pooled prevalence of allergic rhinitis in children 6-7 years of age was 11.9% and in children aged 13-14 was 21.2%.

The result shows that the prevalence of allergic rhinitis in Iranian children is high. This information can be used to help allergic rhinitis control.

Introduction

Allergic rhinitis is a very common disorder that affects people of all ages, peaking in the teenage years. It is frequently ignored, under

diagnosed, misdiagnosed, and mistreated, which is not only detrimental to health but also has societal costs.¹ Allergic rhinitis has traditionally

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been classified as perennial or seasonal, but the guidelines of Allergic Rhinitis and its Impact on Asthma (ARIA) group classified it to intermittent (less than 4 days per week and for less than 4 weeks) and persistent (more than 4 days per week or lasting more than 4 weeks regardless of the number of days per week).^{2,3} Allergic rhinitis is a type I allergic disease of the nasal mucosa, characterized by paroxysmal repetitive sneezing, watery rhinorrhea, and nasal blockage.

Allergic rhinitis is classified into perennial and seasonal.⁴ Although allergic rhinitis is not a serious illness, it is clinically relevant because it underlies many complications. It is a major risk factor for poor asthma control and affects the quality of life and productivity at work or school.¹ The prevalence of allergic diseases including allergic rhinitis has been increasing all over the world since about the middle of the past century.⁵

The prevalence of allergic rhinitis differs between countries and even between areas within countries.⁶ These differences may partly be due to different definitions and methods used.⁷ The ISAAC (International Study of Asthma and Allergies in Childhood) program is a worldwide plan for determining the prevalence of asthma, allergic rhinitis and eczema in industrial as well as the developing countries.⁸

This program provides a simple and unique method for evaluating asthma, allergic rhinitis and eczema prevalence in childhood.⁹ It has also facilitated an assessment and judgment of the prevalence of asthma, allergic rhinitis and eczema by using a standard questionnaire for data collection.⁸ There were several reports about allergic rhinitis in Iran and the aim of this review was to summarize the prevalence of allergic rhinitis in Iran.

Material and Methods

This is a systematic review and meta-analysis on the prevalence of allergic rhinitis by ISAAC protocol in Iran. We conducted a literature search by using the Google Scholar from 1992 until 2012. We used Google Scholar because this database includes local and international journals. The search terms included Allergic rhinitis, International Study of Asthma and Allergies in Childhood (ISAAC) and Iran. By following the criteria, we gathered 436 articles. Two independent authors checked all the studies. The evaluation was done first on the title and abstracts for the selection of studies. All original studies conducted on children were included in the study.

The data extraction was performed on full text articles. The required information from each study include the authors, date, city, number of children in age groups 6-7 and 13-14 according to ISAAC protocol and the prevalence of allergic rhinitis in these age groups were extracted by two individuals. The information was recorded on particularly designed sheets. The data were analyzed by STATA 11 and Funnel diagrams were plotted and output table were extracted.

Result

Finally, we reviewed 13 studies.¹⁰⁻²² Four studies were performed in both age groups according to ISAAC protocol and 9 studies were performed in two age groups, 6-7 years or 13-14 years. 20668 children were in 6-7 years age group and 22920 children were in 13-14 years age group.

As shown in table 1, the prevalence of allergic rhinitis in children 6-7 years of age was 11.9%. In this age group, the lowest prevalence of allergic rhinitis was 5.2% in Shiraz and the highest was 17% in Sari.

Table 2 shows that the prevalence of allergic rhinitis in children ages 13-14 were 21.2%. In this age group, the lowest prevalence of allergic

Table 1. The separate and pooled prevalence of allergic rhinitis in 6-7 years old Iranian children

Author (Center)	Date	Number	Prevalence	Weight %
Gharagouzlou (Kashan) ¹⁴	2003	3000	14.7	7.55
Ayatollahi (Shiraz) ¹¹	2004	2228	5.2	13.69
AbbasiRanjbar (Rasht) ¹⁰	2005	3059	14.3	7.26
Mohammadzadeh (Babol) ¹⁷	2008	3240	14.5	6.47
Rahimi Rad (Urmia) ¹⁸	2008	2999	9.8	7.55
Karimi (Yazd) ¹⁶	2011	2768	15.5	8.87
Shakurnia (Ahvaz) ⁸	2011	1556	9	28.06
Ghaffari (Sari) ¹³	2012	1818	17	20.55
pooled ES			11.932	100
Heterogeneity			chi-squared = 0.00	df= 7 p = 0.998 I ² =0.0

Table 2. The separate and pooled prevalence of allergic rhinitis in 13-14 years old Iranian children

Author (Center)	Date	Number	Prevalence	Weight %
Gharagouzlou (Kashan) ¹⁴	2003	3000	29.6	5.86
AbbasiRanjbar (Rasht) ¹⁰	2005	3001	28.2	5.86
Bazzazi (Gorgan) ¹²	2007	2800	35.3	6.73
Rahimi Rad (Urmia) ¹⁸	2007	3000	23.6	5.86
Mohammadzadeh (Babol) ¹⁷	2008	3254	19.9	4.98
Safari (Hamedan) ²⁰	2008	1600	17.7	20.6
Karimi (Yazd) ¹⁶	2011	3201	42.7	4.15
Sahebi (Tabriz) ²¹	2011	1508	17.1	23.19
Shakurnia (Ahvaz) ⁸	2011	1556	15.4	21.78
pooled ES			21.298	100
Heterogeneity			chi-squared = 0.00	df= 8 p = 0.997 I ² =0.0

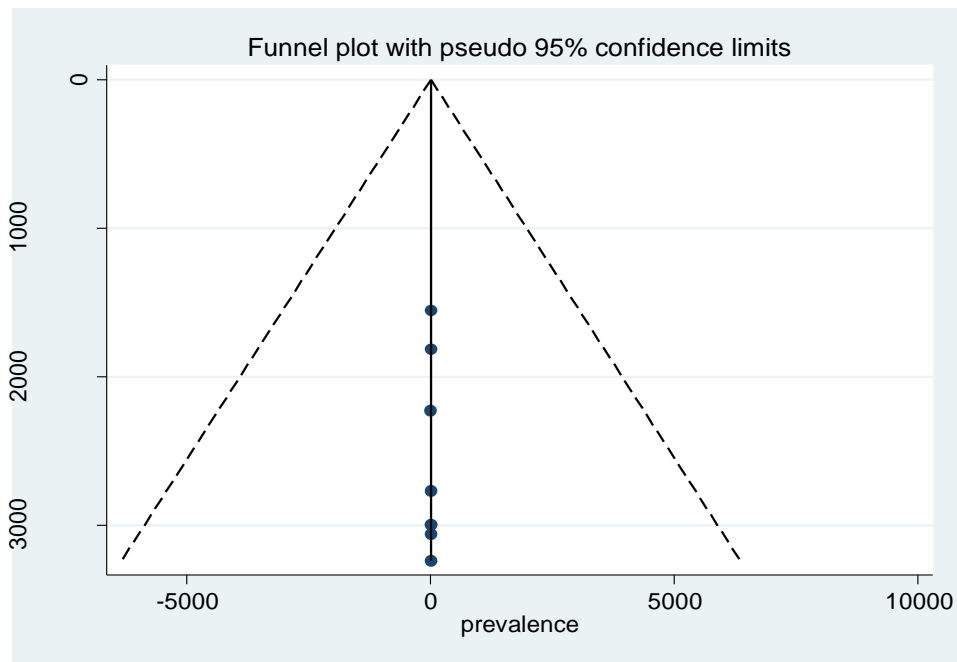


Figure 1. The funnel plot of study about allergic rhinitis in 6-7 years old Iranian children

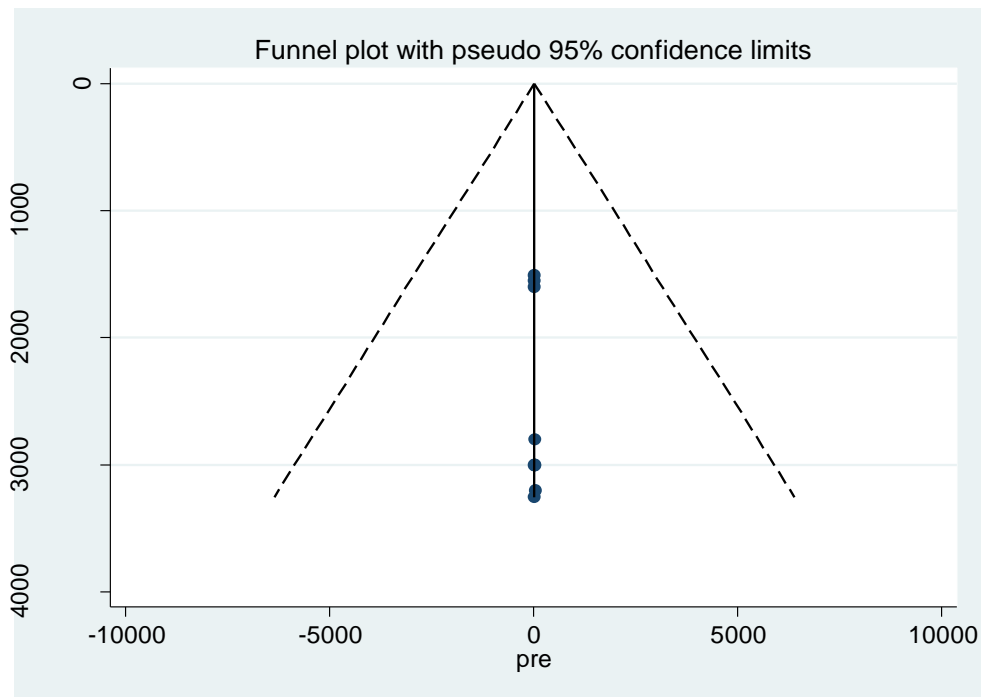


Figure 2. The funnel plot of study about allergic rhinitis in 13-14 years old Iranian children

rhinitis was 15.4% in Ahvaz and the highest was 42.7% in Yazd.

Figures 1 and 2 show publication bias in the studies, reviewing them was acceptable.

Discussion

Based on this meta-analysis, the pooled prevalence of allergic rhinitis in elementary and middle school children was 11.9% and 21.2%, respectively. This result indicates that the prevalence of allergic rhinitis in Iran is high. The first phase of ISAAC took place between 1992 and 1998. The prevalence of rhinitis with itchy watery eyes within the past year was 0.8–14.9% (median 6.9%) in children aged 6–7 years and 1.4–39.7% (median 13.6%) in 13–14 years. The lowest prevalence was in some parts of Eastern Europe and South and Central Asia.²³ The incidence of allergic rhinitis has been increasing for the last few decades in keeping with the rising incidence of atopy worldwide. This can have enormous negative consequences, particularly in children, since it is associated with numerous complications and comorbidities that have a significant health impact on the quality of life.²⁴ In fact; allergic rhinitis is considered to be a risk factor for asthma. There are numerous signs of allergic rhinitis, particularly in children that can alert an observant clinician to its presence. Children with severe allergic rhinitis often have facial manifestations of itching and obstructed breathing, including a gaping mouth, chapped lips, obstructive sleep apnea, mouth breathing, a long face, dental malocclusions and the allergic shiner, allergic salute, or allergic crease.^{24,25} There was not a systematic review about the prevalence of allergic rhinitis in local and international database, but in a systematic review by Entezari et al.²⁶ similar to our study, the prevalence of asthma symptoms in Iran is higher than that estimated in the international reports.

In conclusion, recent study showed that the prevalence of allergic rhinitis in Iranian children is high and more attention must be given to the control of allergic rhinitis in Iran.

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Conflict of Interest

None declared.

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References

- Greiner AN, Hellings PW, Rotiroti G, Scadding GK. Allergic rhinitis. *Lancet* 2011; 378 (9809): 2112-22.
- Alyasin S, Amin R. The evaluation of new classification of Allergic Rhinitis in patients referred to a clinic in the city of Shiraz. *Iran J Allergy Asthma Immunol* 2007; 6(1):27-31.
- Dhong HJ. Classification of Allergic Rhinitis: What is Most Suitable in Korea? *Allergy Asthma Immunol Res* 2013; 5(2):65-7.
- Okubo K, Kurono Y, Fujieda S, Ogino S, Uchio E, Odajima H, Takenaka H, Baba K; Japanese Society of Allergology. Japanese guideline for allergic rhinitis. *Allergol Int* 2011; 60(2):171-89.
- Bousquet J, Kauffmann F, Demoly P, Leynaert B, Bousquet PJ, Demenais F, et al. [GA2LEN (Global Allergy and Asthma European Network)]. *Rev Mal Respir* 2009; 26(6):577-86.
- Asher MI, Montefort S, Bjorksten B, Lai CK, Strachan DP, Weiland SK, et al. Worldwide time trends in the prevalence of symptoms of asthma, allergic rhinoconjunctivitis, and eczema in childhood: ISAAC Phases One and Three repeat multicountry cross-sectional surveys. *Lancet* 2006; 368(9537):733-43.
- Al-Riyami BM, Al-Rawas OA, Al-Riyami AA, Jasim LG, Mohammed AJ. A relatively high prevalence and severity of asthma, allergic rhinitis and atopic eczema in schoolchildren in the Sultanate of Oman. *Respirology* 2003; 8(1):69-76
- Shakurnia AH, Assar S, Afra M, Latifi M. Prevalence of asthma among schoolchildren in Ahvaz, Islamic

- Republic of Iran. *East Mediterr Health J* 2010;16(6):651-6.
9. The International Study of Asthma and Allergies in Childhood (ISAAC) Screening Committee. Worldwide variations in the prevalence of asthma symptoms: the International Study of Asthma and Allergies in Childhood (ISAAC). *Eur Respir J* 1998; 12(2):315-35.
 10. AbbasiRanjbar Z. Prevalence of allergic rhinitis among children in Rasht. *Journal of Medical Faculty Guilan University of Medical Sciences* 2005 14(53): 62-56.
 11. Ayatollahi SMT, Ghaem H. Prevalence of Atopic diseases (Allergic rhinitis, Urticaria, Eczema) and its correlations in primary school children, Shiraz, Iran. *J Gorgan Univ Med Sci* 2004; 6(1): 29-34. [In Persian]
 12. Bazzazi H, Gharagozlou M, Kassaiee M, Parsikia A, Zahmatkesh H. The prevalence of asthma and allergic disorders among school children in Gorgan. *J Res Med Sci* 2007; 12(1): 28-33.
 13. Ghaffari J, Mohammadzadeh I, Khalilian A, Rafatpanah H, Mohammadjafari H, Davoudi A. Prevalence of asthma, allergic rhinitis and eczema in elementary schools in Sari (Iran). *Caspian J Intern Med* 2012; 3(1): 372-376.
 14. Gharagouzlou M, Khalili S, Hallaj-Mofrad M, Karimi B, Honarmand M, Jafari M, et al. Asthma, Allergic Rhinitis and Atopic Eczema in School Children Kashan (1998-1999). *Tehran Univ Med J* 2003; 61(1): 24-30. [In Persian]
 15. Gharagozlou M, Khalili S, HallajMofrad HR, Mohammadzadeh R, Karimi B, Honarmand M, et al. Prevalence of symptoms of asthma, allergic rhinitis and atopic eczema in school children of Kashan (an ISAAC study). *Daneshvar Medicine* 2003; 11(47): 49-56. [In Persian]
 16. Karimi M, Mirzaeei M, Akhondi R. Food Consumption and Prevalence of Asthma & Allergies Symptoms in Children. *J Shaheed Sadoughi Univ Med Sci* 2011; 19(1): 35-44. [In Persian]
 17. Mohammadzadeh I, Ghafari J, BarariSavadkoohi R, Tamaddoni A, Esmaeili DMR, Alizadeh NR. The prevalence of asthma, allergic rhinitis and eczema in north of Iran. *Iran J Ped* 2008. 18(2):117-122.
 18. Rad MH, Hamzezadeh A. Allergic disease in 6-7-year-old schoolchildren in Urmia, Islamic Republic of Iran. *East Mediterr Health J* 2008; 14(5): 1044-53.
 19. Rahimi Rad MH, Hejazi ME, Behrouzian R. Asthma and other allergic diseases in 13-14-year-old schoolchildren in Urmia: an ISAAC study. *East Mediterr Health J* 2007; 13(5): 1005-1016.
 20. Safari M, Jari M. Prevalence of allergic rhinitis in 13-14 year old school children in Hamedan. *Iran J Ped* 2008; 18(Suppl 1): 41-46.
 21. Sahebi L, SadeghiShabestary M. The prevalence of asthma, allergic rhinitis, and eczema among middle school students in Tabriz (northwestern Iran). *Turk J Med Sci* 2011; 41 (5): 927-938.
 22. Shakurnia A, Assar S, Afra M, Latifi M. Prevalence of Symptoms of Asthma, Allergic Rhinitis and Eczema in 6-7 and 13-14 years old Ahvazian School children. *Sci Med J Ahwaz Univ Med Sci* 2011; 9(6): 592-603. [In Persian]
 23. Bjorksten B, Clayton T, Ellwood P, Stewart A, Strachan D. The ISAAC Phase III Study Group. Worldwide time trends for symptoms of rhinitis and conjunctivitis: phase III of the International Study of Asthma and Allergies in Childhood. *Pediatr Allergy Immunol* 2008; 19(2): 110-24.
 24. Berger WE. Allergic rhinitis in children: diagnosis and management strategies. *Paediatr Drugs* 2004; 6(4):233-50.
 25. SacreHazouri JA. Allergic rhinitis. Coexistent diseases and complications. A review and analysis *Rev AlergMex* 2006; 53(1):9-29.
 26. Entezari A, Mehrabi Y, Varesvazirian M, Pourpak Z, Moin M. A systematic review of recent asthma symptom surveys in Iranian children. *Chron Respir Dis* 2009; 6(2):109-14.