

# The Prevalence of Allergy symptoms in Students in Rural Area

## Original Article

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## Abstract

**Background:** Asthma, allergic rhinitis and eczema as a common disorder in childhood, has many epidemiologic variations in different geographic areas. This study aimed at determining the prevalence of pediatric allergic disease in rural area of Babol.

**Methods:** This analytical-cross sectional study was performed in 2012 by random sampling on 2 groups of children; the first group aged 6-7 years (n=1735) and the second group aged 12-14 years (n=2080) during 2012. Data was collected by ISAAC first phase questionnaire and analyzed by SPSS 17 and Chi square test.

**Results:** The prevalence of asthma in elementary school was 19% and in guidance school was 29.9% (p=0.000). The prevalence of allergic rhinitis in primary school in guidance school was 9.9% and 18.1%, respectively (p=0.000). There was no significant difference (p=0.223) between Elementary school (6.1%) and Guidance school (5.5%) in terms of prevalence of eczema.

**Conclusions:** The results showed that the prevalence of asthma and allergic rhinitis in the rural area of Babol was remarkable that was high in older age group and needs to more attention in health program for decreasing this prevalence.

**Keywords:** Asthma, Allergic rhinitis, Eczema, Rural Area

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## Introduction

Asthma, allergic rhinitis and eczema as a chronic disease are common in children <sup>[1]</sup>. The prevalence of these diseases has considerably increased all over the world in recent years <sup>[2]</sup>. This increase has been observed in different age groups in different populations over the past several decades <sup>[1]</sup>. The prevalence of asthma symptoms in Iran is higher than that estimated in the international reports, a systematic review and meta-analysis from Iran showed that the lowest prevalence of asthma symptoms was 2.7% in Kerman and the highest was 35.4% in Tehran. The overall prevalence of asthma symptoms at a national level was estimated as 13.14% (95% CI: 9.97–16.3%) <sup>[3]</sup>. Information about the prevalence of allergic diseases should be effective on its prevention strategies. Genetic and environmental factors are effective on disease prevalence. Different prevalence between regions observed in the past can be recognized at least in part to the use of different survey questionnaire. In recent years, more validate data have been obtained with the International Study of Asthma and Allergy in Childhood (ISAAC) form <sup>[4]</sup>. The prevalence of allergic diseases was different between countries and sometimes even between regions in the same geographical area <sup>[5-7]</sup>. Several international studies were done in urban, but studies in rural areas are limited <sup>[4-7]</sup>. Therefore, the aim of this study was to determine the prevalence of pediatric allergic disease in rural area of Babol.

## Methods

This study was a cross-sectional study, which has been carried out in 6-7 and 12-14 year-old students in a rural area of the North of Iran in 2012. Our sample size based on  $p=0.045$ ,  $\alpha=0.05$  and  $d=0.01$  and related formula was calculated 1650 in younger group (6-7 years old) and 1650 in oldest group (12-14 years old). Standard ISAAC questionnaire was used for wheezing, rhinitis and eczema<sup>[1]</sup>.

The exclusion criteria in this study were mentally retarded children. All schools in rural areas of Babol were studied. Each school was a cluster and the students were randomly selected from these schools. The students of elementary school and their parents answered the questions and the students of Guidance school completed the answer sheet alone. Asthma, allergic rhinitis and eczema symptoms, sex and age group were recorded for students.

The study was approved by the Ethic Committee of Babol University of Medical Sciences. Data were analyzed with SPSS 17 and Chi-Square test and odds ratio was calculated. P value less than 0.05 was statistically significant.

## Results

The study was performed on 1735 Elementary school children (6 to 7 years) and 2080 guidance school students (12 to 14 years). In Elementary school, 889 (51.2%) and 846 (48.8%) students were female and male, respectively. In guidance school 1015 (48.8%) students were female and 1065 (51.2%) were male.

Frequency distribution of asthma symptoms in children was shown in table 1 and as shown in the table, the distribution of symptoms for ever or current in guidance school students was significantly higher than elementary School. Frequency distribution of allergic rhinitis symptoms in children was indicated in table 2 and is shown as the rate of rhinitis symptoms for ever ( $p=0.000$ ), symptoms of rhinitis in the current year ( $p=0.000$ ) and doctor-diagnosed rhinitis ( $p=0.000$ ) in the Guidance school students were significantly more than the elementary School. Frequency of eczema symptoms was shown in table 3. As shown in the table, the symptoms of eczema ( $p=0.001$ ) in current years in Guidance school students were significantly lower than elementary school.

**Table 1. Distribution of asthma symptoms in children**

Asthma symptom		Primary school students N (%)	Guidance school students N (%)	Odds Ratio (CI95%)	p-value
Current year	No	1438 (82.9)	1502 (72.2)	1.86 (1.5-2.1)	0.000
	Yes	297 (17.1)	578 (27.8)		
For ever	No	1406 (81)	1458 (70.1)	1.82 (1.5-2.1)	0.000
	Yes	329 (19)	622 (29.9)		
Doctor-diagnosed	No	1621 (93.4)	1926 (92.6)	1.13 (0.8-1.4)	0.174
	Yes	114 (6.6)	154 (7.4)		

**Table 2. Distribution of allergic rhinitis symptoms in children**

Allergic rhinitis symptom		Primary school students N (%)	Guidance school students N (%)	Odds Ratio (CI95%)	p-value
current year	No	1596 (92)	1789 (86)	2.1 (1.9-2.7)	0.000
	Yes	139 (8)	291 (14)		
For ever	No	1564 (90.1)	1704 (81.9)	2 (1.6-2.4)	0.000
	Yes	171 (9.9)	376 (18.1)		
Doctor-diagnosed	No	1657 (95.5)	1843 (88.6)	2.7 (2-3.5)	0.000
	Yes	78 (4.5)	237 (11.4)		

**Table 3. Distribution of atopic eczema symptoms in children**

Atopic eczema symptoms		Primary school students N (%)	Guidance school students N (%)	Odds Ratio (CI95%)	p-value
current year	No	1632 (94.1)	1976 (95)	1.2 (1.1-1.9)	0.001
	Yes	103 (5.9)	104 (5)		
At least 6 month for ever	No	1629 (93.9)	1966 (94.5)	0.89 (0.6-1.1)	0.223
	Yes	106 (6.1)	114 (5.5)		
Doctor-diagnosed	No	1671 (96.3)	1980 (95.2)	1.3 (0.9-1.8)	0.052
	Yes	64 (3.7)	100 (4.8)		

## Discussion

According to this study, prevalence of asthma symptoms in primary school students and Guidance school was 19% and 29.9%, respectively ( $p=0.000$ ). In a study performed in Korea by Suh et al.'s the prevalence of asthma was 4.8 % and the prevalence rate was statistically significant between urban and rural areas <sup>[8]</sup>. In another study conducted by Guner et al.'s. in Turkey, the prevalence of asthma was 11.5%, but this rate was not significantly different between urban and rural areas <sup>[4]</sup>. Also, in Ma et al.'s the prevalence of asthma in rural areas (1%) was significantly lower than urban areas (7.2%) in China <sup>[9]</sup>. Shakurnia et al.'s showed the prevalence of asthma in the 13-14-year-old students was 14.1% in Ahwaz of Iran <sup>[10]</sup>. Our previous study in urban area of Babol showed that the prevalence of wheezing in the last 12 months in elementary and guidance school was 16.8% and 21.7%, respectively <sup>[11]</sup>. Comparative studies show that the prevalence of asthma symptoms in Iran was higher than in other countries and in our region was higher than other regions of Iran. These differences may due to genetic and geographic distribution.

In the present study, the prevalence of allergic rhinitis symptoms in children of elementary and guidance school was 9.9% and 18.1%, respectively ( $p=0.000$ ). In Suh et al.'s study in Korea, the prevalence of allergic rhinitis was 32.9% and this rate was significant difference between urban and rural areas <sup>[8]</sup>. In Guner et al.'s study in Turkey in 2011, the prevalence of allergic rhinitis was 22.1% and this rate was not significant difference between urban and rural areas <sup>[4]</sup>. Also, in a study which was performed by Ogorodova et al.'s in Russia, the prevalence of allergic rhinitis in rural areas was 38.9% <sup>[12]</sup> that was higher than the present study. Nevertheless, in Ma et al.'s study in China, the prevalence of allergic rhinitis in rural areas (1.1%) was significantly ( $P<0.05$ ) lower than urban area (6.3%) <sup>[9]</sup>. In Shakurnia et al.'s study in Ahvaz in Southwest of Iran, the prevalence of allergic rhinitis in guidance school was 18.2% <sup>[10]</sup>. Also, the prevalence of allergic rhinitis symptoms in the last 12 months in elementary and guidance school in our previous study was 16.8% and 21.7%, respectively, in urban area of Babol <sup>[11]</sup>. Results our findings showed that the prevalence of allergic rhinitis symptoms in rural areas was similar to in urban of our region. Nevertheless, the differences between different regions could be due to ethnic differences and the influence of geographical environment.

According to the results of the present study, the prevalence of eczema symptoms among elementary (6.1%) and guidance school children (5.5%) was not significantly difference ( $P=0.223$ ). Our previous study in urban area of Babol showed that the prevalence of eczema in elementary and guidance school was 4.5% and 8.2%, respectively <sup>[11]</sup>. In a study by Hogewoning et al.'s in Ghana, Gabon and Rwanda, the prevalence of eczema had no significant difference in urban and rural areas. The point prevalence of eczema in Ghana was 1.5 to 1.6% in Gabon 4% and in Rwanda 0.8% <sup>[13]</sup>. In another study was performed in Turkey that eczema prevalence rate was 10.7% and there were no significant differences between urban and rural areas <sup>[4]</sup>. Comparing the results of these studies indicated that the prevalence of eczema in different areas was equal and there was significant difference between geographic areas in terms of asthma.

Finally, compared with national and international studies, the results of this study showed that the prevalence of allergic disease in our area was higher than other regions. This difference may be due to moderately hot and humid climate of the region or to the greater use of domestic animals and poultry in rural areas and forest cover in some rural areas of our region.

In conclusion, the results showed that the prevalence of asthma and allergic rhinitis which was high in older age group was remarkable in the rural area of Babol and needs to more attention in health program for decreasing this prevalence.

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**Conflict of interest:** There was no conflict of interest.

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