

The Prevalence of Asthma Symptoms in Elementary and Middle School Students in Kurdistan Province, the West of Iran

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Abstract

Background

Asthma is one of the most important childhood diseases in developing countries. The prevalence, mortality, and economic burden of the disease have taken a rising trend since 1960, and this increase was more marked in children. The presents study aimed to assess the prevalence of asthma symptoms diagnosed by International Study of Asthma and Allergies in Childhood (ISAAC) questionnaire in Kurdistan province, Western Iran.

Materials and Methods

In a cross-sectional study, to collect the required data 4,000 questionnaires were distributed among student aged 6-7 years and 13-14 years; and the response rate was 97 percent. An ISAAC questionnaire was used to collect data on socio-demographic variables, past health history, and respiratory health. Descriptive statistics, logistic regression and Chi-square test were use for analysis.

Result.

The prevalence of asthma diagnosed by physician was 3.9%. The prevalence of wheezing was 26.5% in the province in the past 12 months. There was a large difference between different cities in terms of the prevalence rates, so that it varied from 1.7% in Dehgolan to 8% in Sarvabad; hence, the difference was statistically significant ($P < 0.05$).

Conclusion

There was a relatively high prevalence of wheezing in the past 12 months and previous diagnosis of asthma among the students in Kurdistan province which was higher than that in other similar studies.

Key Words: Asthma, Iran, Prevalence, Students.

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1-INTRODUCTION

Asthma is a respiratory airways disease, which intensifies the responses of tracheobronchial tract to different stimuli. Its three clinical symptoms are dyspnea, cough, and wheezing. Asthma attacks last from several minutes to several hours. Continuous asthma is the result of persistent obstruction of airways that will continue for days or weeks (1). About 235 million people are suffering from this disease. It is not only a public health problem in developed countries, but also it occurs in all countries regardless of the level of development. Over 80% of deaths caused by the disease occur in low and middle income countries(2).

The prevalence of disease, diagnosed by ISAAC questionnaire (which is a simple and standard questionnaire), has been reported differently in different parts of the world. According to a study, the self-reported 12-month prevalence of wheezing in children aged 13-14 years varied from 2.1% in Indonesia to 32.2% in the UK; moreover, among children aged 6-7 years old was 4.1% in Indonesia and 18.4% in Costa Rica (3). In a study conducted in Syria, the prevalence of disease, diagnosed on the basis of the presence of wheezing in the past 12 months, was 4.7% to 5.7% in children aged 6-7 years old, while it was between 3.9% to 6.5% in those aged 13-14 years old (4).

According to previous studies in Iran, the prevalence of asthma, diagnosed by ISAAC questionnaire, have been reported to be from 2.1% to 20.3% among children aged 13-14 years old(5-9).

ISAAC Phase 1 is a simple method to measure the prevalence of childhood asthma; its results can be used to compare the trends globally, in different geographical regions, with different languages. The results of the present study pave the way for further studies conducted among populations with different environmental

conditions. The results can be utilized as a guide to understanding the etiology of asthma and allergic disorders. Kurdistan province with a population of 1,560,000 people is located in the western part of Iran and affects of hot and humid Mediterranean climate (Figure.1). The present study aimed to determine the prevalence of asthma symptoms among a target group of children aged 6-7 and 13-14 years old; also, aimed to study and identify the etiology and the methods to control the disease in the region.

2-MATERIALS AND METHODS

This study was a cross-sectional study during September 2013 to June 2014, which was conducted after obtaining permission from the Education Administration Office. A total of 4,000 questionnaires were distributed in elementary and junior high schools in Kurdistan province, of which 3,890 questionnaires were completed; in view of that, the survey response rate was 97%.



Fig.1: Kurdistan province, western Iran

2-1. Subjects

Given a prevalence of approximately 12% (13) confidence interval of 95%, an accuracy of 1%, the minimum sample size, calculated to be 4,000 people. The study included 1,768 subjects aged 6-7 years old and 2,122 subjects aged 13-14 years old;

they were, respectively, selected from among elementary and junior high schools students. The sample size was in proportion to the number of students in each city, gender group, and educational grade. The different categories of students selected in way that they would be representative of the population of the same age groups in the Kurdistan province. The survey response rate was about 97%. The sampling method was a combination of cluster sampling (city) and classification (gender, and educational grade); the subjects, were selected randomly, to use the table of random numbers and 8-digit codes, which are assigned to every student in SANAD portal (electronic registration system for students). Visiting the selected schools, a trained interviewer completed the questionnaires based on ISAAC protocol. For the age group 6-7 years the parents completed the questionnaire, while the students in the age group 13-14 years completed the questionnaire by themselves. After distributing the questionnaire, each question explained by a trained interviewer as defined by the ISSAC protocol. This study was the result of a research project, which approved by the Research deputy of Kurdistan University of Medical Sciences and approved by the Ethics Committee (ID number: MUK.REC.1394.16).

2-2. Instrument

ISAAC consists of 3 phases; phase I (which used as the basis of the present study) includes simple methods to measure the prevalence of asthma in children and adolescents. It is suitable for making comparisons globally at different geographical areas with different languages(10) . Several studies have shown that after translating ISSAC questionnaire from English to other languages, it has had an appropriate level of repeatability. Using the ISSAC questionnaire, 8- questions, were about

asthma symptoms. The questions were about the presence of wheezing at 12 past months, history of asthma, sleep disorder due to wheezing, speech limitation due to wheezing in the past 12 months, wheezing due to exercise in the past 12 months, and nocturnal cough in the past 12 months.

2-3. Statistical analysis

Data collected by ISSAC were entered two separate sheets by two persons and were analyzed using SPSS- 19 statistical software. The first, we used univariate analysis descriptive statistics- performed to investigate the relationship between symptoms of asthma with gender and educational grade. Given a confidence interval of 95%, the odds ratio (OR) was calculated by Chi- square test. Based on ISSAC protocol, two age groups of 6-7 and 13-14 years old people were- separately analyzed. The prevalence of asthma in each city, was calculated via dividing the number of positive responses to each question by the number of completed questionnaires.

3- RESULTS

Number of the students surveyed in this study was in proportion to the number of students in each city, gender group, and educational grade. Overall, 17% of elementary students and 7.3% of junior high school students in the Kurdistan- province entered at this study. Of all, 26.4% of respondents reported the previous history of wheezing or shortness of breath in the past. (Table. 1 and 2). The prevalence of asthma, as previously diagnosed by physicians, was 3.9%; to be 3.5% and 4.5% in elementary and junior high school students, respectively. There was a statistically significant difference between the gender in the age group 6-7 years old ($P < 0.001$). The prevalence in the province of 2.2% in Qorveh to 8% in Sarvabad varies and statistically significant ($P < 0.035$) (Figures. 1, 2).

Table 1: Prevalence of asthma symptoms in students about the age groups and gender

Variables		N (%)	OR	SE	CI	P value
Boy		1815(46.6%)				
Girl		2075(53.4%)				
Elementary (6-7 years)		1768(45.5%)				
Junior high school (13-14 years)		2122(54.5%)				
Wheezing at 12 past months		26.5%				
(6-7 years old)	Boy	24.2(%)	0.769	0.74-1.24	.127	0.96
(13-14 years old)	Girl	25.1(%)				
History of asthma		3.9(%)				
(6-7 years old)	Boy	5.6 (%)	0.0001	1.61-4.76	.766	2.7
(13-14 years old)	Girl	2.1(%)				
Sleep disorder		10(%)				
Elementary	Boy	10(%)	0.731	.633-1.378	.185	.934
	Girl	10.7(%)				
Junior high school	Boy	10.9(%)	0.115	.933-1.89	.239	1.32
	Girl	8.4(%)				
Wheezing due to exercise		22.9(%)				
Elementary	Boy	23.7(%)	0.265	0.19 -1.44	.137	1.14
	Girl	21.4(%)				
Junior high school	Boy	23.8(%)	0.636	0.852-1.29	.113	1.05
	Girl	22.9(%)				
Nocturnal cough		16(%)				
Elementary	Boy	15.3(%)	0.468	0.83-1.46	.157	1.1
	Girl	14.1(%)				
Junior high school	Boy	17.6(%)	0.567	0.84-1.35	.13	1.07
	Girl	16.6(%)				

OR: Odds ratio; SE: standard error, CI: confidence interval.

Table 2: Distribution of wheezing attacks and related sleep disorders in the populations under the study

Variables		6-7 years old		13-14 years old	
		Boy	Girl	Boy	Girl
Number of wheezing attacks in the past 12 months	1-3 times	119 (77.2%)	138(77.2%)	187(78.2%)	171(80.6%)
	4- 12 times	28 (18%)	37(20.6%)	39(16.3%)	31(14.6%)
	More than 12 times	7 (4.8%)	4(2.2%)	13(5.5%)	10(4.8%)
Number of sleep disorders due to wheezing during a week	Less than 1 time	65	101	106	114
	More than 1 time	37	51	68	59

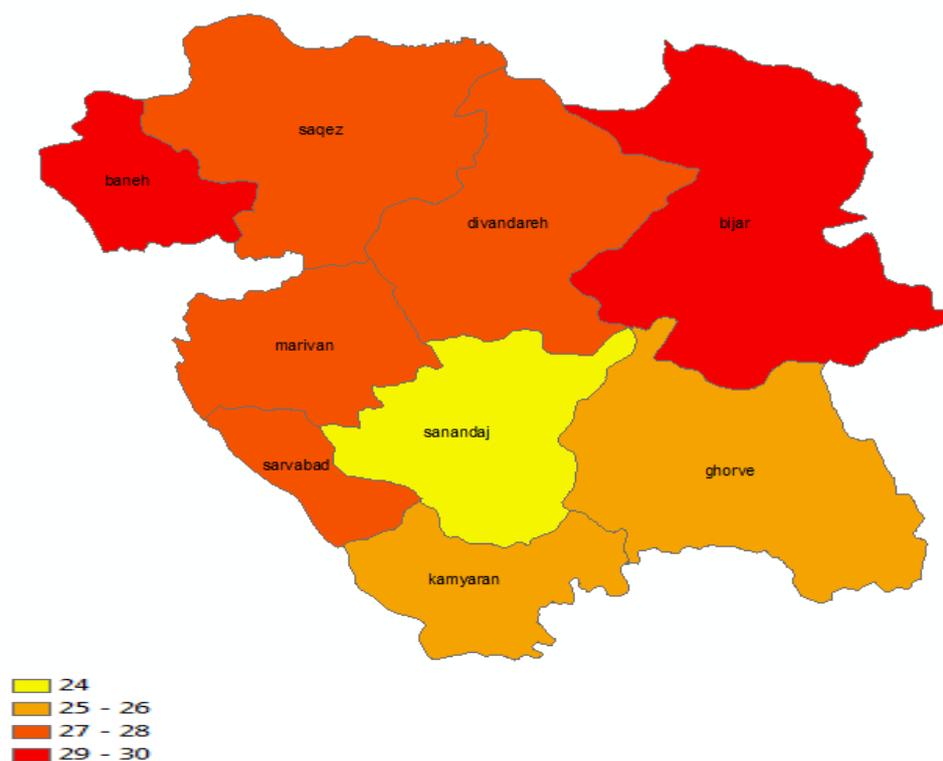


Fig. 1: Wheezing attacks in the past 12-month's prevalence in districts of Kurdistan province

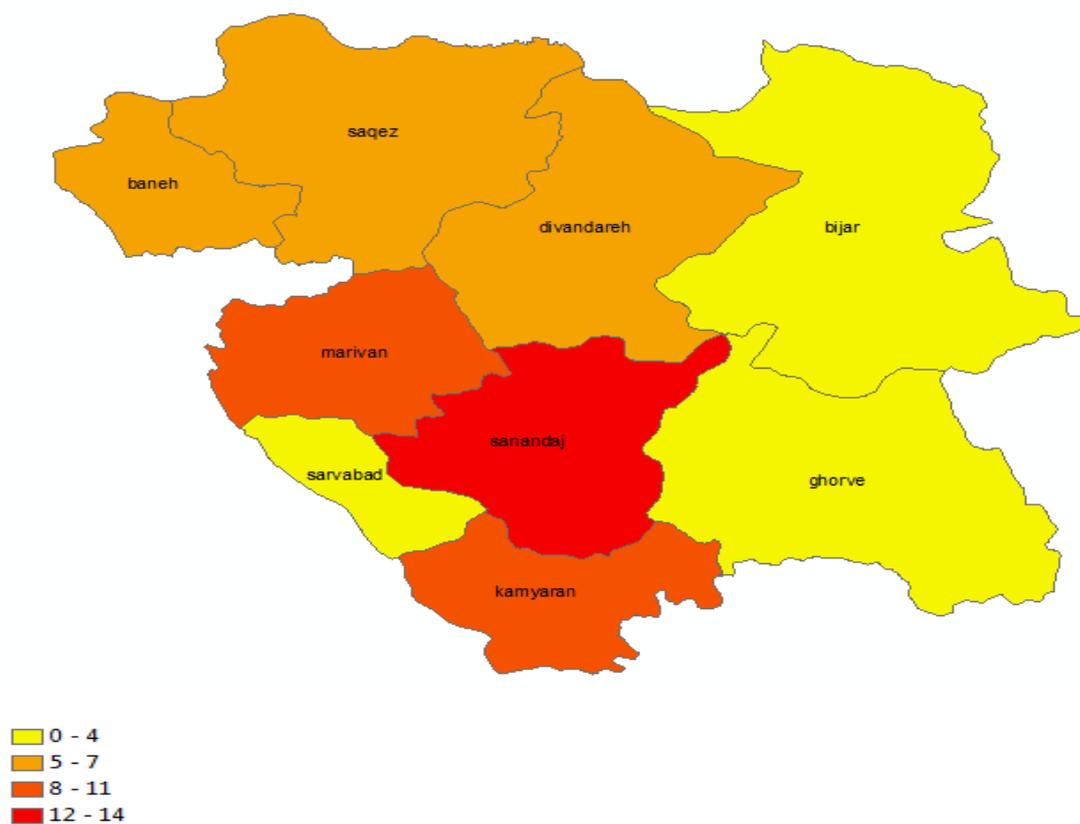


Fig. 2: History of asthma prevalence in districts of Kurdistan province

4-DISCUSSION

In this study, the prevalence of wheezing in the past 12 months in the age groups 6-7 and 13-14 years old was 24% and 27%, respectively; there was no significant difference between the gender in the two age groups. In Masjedi et al.'s study the same items were reported to be, respectively, 57.8% and 52.8% in Tehran(the capital of Iran) and 19.6% and 24.2% in Rasht(North of Iran)(11). In Bazazi's study which was conducted in Gorgan the prevalence was 8.5%(12) . In Zobiri's study in Kermanshah(West of Iran)which similarly included people aged 6-7 and 13-14 years old, the prevalence was 1.5% and 1%, respectively(13).

Additionally, in a study in Brazil the prevalence was 12.4%(14). In a study conducted in Syria, the prevalence of wheezing in the past 12 months was 4.7% - 5.7% among children aged 6-7 and 3.9% - 6.5% among those aged 13-14 years old(4). In an ISSAC international study, the prevalence of wheezing in the past 12 months in the Middle East and in the world was 6.8% and 11.8% in the age group 6-7 years old and 10.7% and 13.8% in the age group 14-13 years old, respectively(3). Additionally, in a meta-analysis that was conducted in Iran the prevalence of wheezing was from 3.8% to 28.8%, respectively(15). The prevalence of disease among students aged 13-14 years old, living in other cities of Iran, had been reported to be from 2.1% to 20.3% (5-9). Comparing these data with the results of the current study, show that the prevalence of wheezing in students who were living in Kurdistan province at the previous 12 months is relatively high.

In this study, the previous history of asthma in the age groups 6-7 and 13-14 years old was 3.4% and 4.3%, respectively, which was higher than that reported by Masjedi et al.'s study (3% and 2.7%, respectively) (11).

The prevalence of asthma in age group 6-7 years, in different regions varied from 2 to 10 % (16-21).

However, in compared with international studies conducted in the Middle East and the World, the prevalence was lower in our study (3).

According to previous studies, which had used a written questionnaire, the prevalence of asthma diagnosed by ISAAC questionnaire among Iranian children, has been estimated between 5% to 11%. The lowest level of prevalence was observed in girls aged 6-7 and boys aged 13-14 years old; it is consistent with the fact that, the prevalence of disease among girls increases as they reach puberty age(15). In an international ISAAC study, the prevalence of diagnosed asthma was 11.3% in the world, 10.7% in the Eastern Mediterranean region, and 2.7% in Iran(3). Despite the fact that, Kurdistan is a non-industrial province, different factors like air pollution caused by fine dusts, as well as the dry cold air trigger asthma; additionally, wide vegetation in the province can increase the risk of allergies and asthma. Considering the multiyear time interval between current study and previous studies, the higher prevalence of diagnosed asthma can attributed to numerous educational programs, which carried out to enhance the awareness of community and physicians.

The results of logistic regression analysis with regard to the relationship between the two gender showed that the chances of developing asthma in primary school boys is 2.77 times more than that in girls ($P < 0.05$); however, no significant relationship was observed between the two gender in junior high school ($P > 0.05$).

Based on previous studies, the prevalence of asthma was significantly higher in boys than girls (22). Also, the prevalence of asthma and atopic conditions was significantly higher before puberty in boys

and after puberty in girls (23, 24). The exact mechanism of the difference is not well known, but it seems that the smaller airways of the lung in boys to girls is an effective factor (25). The current study, shown there was a significant difference in the prevalence rates observed in different cities, which varied from 2.2% in Ghorveh to 8% in Sarvabad. It seems, the difference in the prevalence of disease in various populations, is the result of different levels of exposure to environmental and genetic factors (26, 27). The differences observed in the cities of the Kurdistan province can attributed to the topographic features of the region, the forest and grasslands in Sarvabad, being closer to the country border and consequently being more susceptible to contamination.

5- CONCLUSION

According our findings, in both gender and age groups 7-6 and 14-13 years, risk of asthma diagnosis was 3.926 folds higher between children with wheezing against without wheezing.

6- CONFLICT OF INTEREST: None.

7- ACKNOWLEDGMENTS

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