ORIGINAL REPORT

Prevalence, Risk Factors and Severity of Asthma Symptoms in Children of Kermanshah, IRAN: ISAAC Phase I, II

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Abstract- Asthma is the most common chronic disorder of school-age children and youth, with rising prevalence in all over the world. By attention to the geographic area there is considerable difference in the prevalence of asthma. The International Study of Asthma and Allergies in Childhood (ISAAC), was founded to maximize the value of epidemiological research into asthma and allergic disease by establishing a standardized methodology and facilitating international collaboration. To determine the prevalence of asthma and related symptoms in Kermanshah (a city in west of IRAN) schoolchildren and also identifying the related variables that increased asthma risk using the ISAAC protocols. This descriptive analytic study was done by the ISAAC written questionnaire and additional questions about family number, demographic and socio-economic characteristics of two groups of first and second grade of primary and guidance schools (6-7 y, 13-14 y). Suggested sample size were applied and selected randomly. Results were analyzed by SPSS soft ware by 95% confidence interval. The ISAAC-written questionnaire was completed by a total of 6236 (48.7% were 6-7 and 51/3% were 13-14 years old) schoolchildren. 50.4% of students were girls and 49/6% were boys. The prevalence of diseases and symptoms were as follows: 20.6% had ever wheezing (27.4% in 13-14 years old and 13.4% in 6-7 years old children and it was 21.6% in girls and 19.5% in boys). Among which the estimated mean national 12-month prevalence of wheeze (current wheeze), speech limiting wheeze , exercise wheeze, night cough and physician diagnosed asthma (ever asthma) were respectively 30.1%, 5.4%, 9.4%, 7.3% and 3.3% for the 6–7 year age group and 44.2%, 13.5%, 28.9% , 17.4% and 2.1% for the 13–14 year age group. Current wheeze was higher in Childs and adolescents with family history of smoking and in higher family number. Comparing with regional study the results of this epidemiological survey of asthma in Kermanshah indicate that asthma is more common here, more prevalent in girls than boys and is higher in 13-14 years old than 6-7 years old but sever asthma is much less common. The results may be due to better diagnosis and better control of disease.

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Introduction

Asthma, a chronic inflammatory disease of the airways, is the most common chronic illness of school-age children and youth and one with a very high socio-economic cost (1- 3). Asthma prevalence, morbidity and mortality in childhood are all increasing worldwide for instance in the United States the percentage of individuals of all ages with asthma increased 75% between 1980 and 1994 (4-8). In the Middle East, asthma prevalence is reported to be lower than in developed countries and there is wide variability in prevalence between populations (7, 9, 10). It appears that differences in asthma prevalence between population groups are due to differential exposure to environmental factors; genetic variation alone could not account for the rise in the prevalence of disease over a few decades (11, 12). International Study of Asthma and Allergies in Childhood (ISAAC) carried out systematic, standardized approaches for comparisons of the prevalence of asthma and allergies and has attracted large-scale participation from all parts of the world (13).

The present study was performed in two groups of first and second grade of primary and guidance schools

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(6-7 y, 13-14 y) in Kermanshah (a city in west of IRAN) to determine the prevalence and severity of asthma, its related symptoms and some of its possible risk factors.

Patients and Methods

This descriptive analytic study is a part of the International Study of Asthma and Allergies in Childhood (ISAAC) which was performed in Kermanshah city during May and December 2007. 74 primary and preparatory schools were selected by simple random sampling with a uniform distribution throughout of 3 area divisions.

To achieve a final total sample size of 6,000 children (3,000 in each age group), a total of 7480 copies of Persian translated of asthma section of ISSAC questionnaire were distributed. Questionnaire was completed by the parents of the 6–7 year age group which was underwent an interview by medical students and by the children themselves in the 13–14 age groups. In addition the risk factors which could influence asthma, such as sex, smoking at home, number of people living in the house, determined and recorded. 6236 standard ISAAC questionnaires were completed and descriptive analysis was performed with the SPSS for Windows (version 10). Statistical significance of differences was assessed by the chi-square test and odds ratios (ORs) were calculated to evaluate the various independent variables.95% confidence interval calculated and p-value of <0.05 was considered statistically significant.

Results

The ISAAC questionnaire was completed by a total of 6236 students in which, 50.4% were girls, 49.6% were boys and also %48.7 in 6–7 years and 51.3 % in 13–14 years old group.

There was no statistical difference between these two groups according to age and sex.

The reported prevalence of asthma, respiratory symptoms based on the ISAAC questionnaire is summarized in Table 1.

Total of1284 (20.6%)of all children had a positive history of wheezing throughout their lives(Ever wheezing) with relative number of 27.4% in 13-14 years old and 13.4% in 6-7 years old children and it was 21.6% in girls and 19.5% in boys(P<0.005).

In 13-14 years old groups the relative number of wheezy girls (7.3%) was higher than boys (6.7%) (P= 0.02).

The prevalence of physician diagnosed asthma was 1% in 13-14 years old and 1.5% in 6-7 years old children (P= 0.000).

Exercise induced wheezing was positive in 19.4%including 6.5%boys and 12.9% girls, and 14/8%in 13-14 years old groups versus 4/5%in 6-7 years old children (P= 0.000).

The question about dry night cough was positively replied by 779(12.5%) of the cases including 18.7%boys and 6.4% girls, and 12.5% in 13-14 years old groups versus 7.3% in 6-7 years old children (P= 0.000).

Table 1. Frequency of self-reported asthma related symptoms in children of Kermanshah by age and sex: ISAAC Phase I

Gender	Girls			Boys			Total	
	6-7y	13-14y	Total	6-7y	13-14y	total	6-7y	13-14y
Symptom								
Ever wheezing	221(13/7%)	458(30%)	679(21/6%)	605(13%)	187(25%)	418(19/5%)	408(13.4%)	876(27.4%)
Current wheezing	63(1%)	198(3/1%)	261(4/1%)	60(0/9%)	189(3%)	249(3/9%)	387(6/2%)	123(1/97%)
Severe wheeze: Speech limited by wheeze in the last 12 months	15(0/2%)	48(0/7%)	63(1%)	7(0/1%)	70(1/1%)	77(1/2%)	118(1/8%)	22(0/35%)
Physician diagnosed asthma	63(1%)	47(0/75%)	110(1/7%)	36(0/57%)	16(0/25%)	52(0/83%)	63(1%)	99(1/5%)
Night cough	59(0/94%)	141(2/2%)	200(3/2%)	162(2/5%)	417(6/6%)	579(9/2%)	558(8/9%)	221(3/5%)
Exercise wheeze	805(2/8%)	628(10%)	177(12/9%)	405(1/8%)	297(4/7%)	108(6/4%)	925(14/8%)	285(4/5%)

Table 2. Frequency of sleep disturbance and wheezing attacks in the last 12 months

Symptom	Number %
Sleep disturbed by wheezing in the last 12 months	
<1/ week	152 (2.4%)
>1/ week	54 (0/86%)
Wheezing attacks in the last 12 months	
1-3 time	240 (3/8%)
4-12 time	152 (2/4%)
>12time	111 (1/7%)

Speech limitation due to wheezing was seen in 10.9% of wheezy children with 9.3% of girls and1.27%of boys (P=0.000) and 13.5% in 13-14 years, 5.4%in 6-7 years age groups (P=0.000).

Considering current wheezing (12-month period prevalence of any wheeze) it was shown that39.7%of children with wheezing history including 30.1% of 6-7 year olds versus 44.2% of 13-14 year olds had this symptom during the past 12 months(P=0.000) .

The number of attacks was 1-3 per week in 18.7%, 4 -12 in 11.8% and more than 12 in 8.6% of the study population with positive response to "wheeze ever" with no significant difference among the two sexes or the two age groups.

Regarding the number of sleep disturbances observed during the past 12 months, (16%) of children with wheezing history reported to have night awakening with (11.8%) having this problem one night per week, and (4.2%) reported more than one episode of sleep disturbance throughout a week with no significant difference among the two sexes or the two age groups (Table 2).

As indicated in Table 3, the living conditions like smoking and household number affecting the prevalence of asthma. Ever wheezing was seen in 30% of children with Parent smoker versus 18.6% of children without Parent smoker (P<0.001).with rising household number >4 , prevalence of ever wheezing reach 33.6% in spite of 16.2% in family with ≤4 number of household (P<0.001).

Discussion

This study was carried out base on phase I, II ISAAC program. ISAAC Phase one has provided an excellent opportunity to determine and compare the prevalence of asthma and other allergic conditions in different populations of the world (14).

Asthma questionnaire of ISAAC consists of three groups of asthma-related symptom inquires. First, the existence of asthma symptoms, second the severity of asthma symptoms and third the existence of asthma variants (night coughs, and exercise induced dyspnea). Over all prevalence of ever wheeze as a main symptoms of asthma was 20.6% despite of 2.1%-20.3% in recent seven years of regional study (15). These and the worldwide variations, and partly the variations seen within some countries in rates of asthma suggest that environmental (in their broadest sense) as well as genetic factors (predominantly atopy and parental history of asthma) may play a critical role in the development of asthma in childhood (14). In many study the prevalence of asthma symptoms and allergy in different country continue to raise so higher prevalence from this region can be explained.

Table 3. Prevalence of asthma risk factors in groups with and without ever wheezes

Symptom / risk factor	With ever wheeze	Without ever wheeze	Total number	OR	*P*
Positive history of Parent smoking	325 (30%)	759 (70%)	1084	1.87	<0.001
negative history of Parent smoking	959 (18.6%)	4193 (81.4)	5152		
number of household					
4≤	758 (16.2%)	3912 (83.8%)	4670	5.42	<0.001
>4	526 (33.6%)	1040 (66.4%)	1566		
Total number	1284 (20/5%)	4952 (79/4%)	6236		

Higher prevalence of asthma in girls and in adolescents is evidently distinctly in contrast to what is expected according to the current literature and previous studies; that the prevalence of asthma in children before the adolescence is higher in boys and male sex was reported as a risk factor of asthma in childhood (16 ,17 ,18). We believe that this difference may be explained partly by an oversensitivity of girls to their symptoms and therefore, their higher rate of expression of complaints to parents.

Question from current wheeze decrease recall bias and determine that asthma rate not depend on season or month of questioning. Over all prevalence of current wheeze was lesser than regional study (4.08%vs 9.6-10%) (15-19-20). Current wheeze was more common in adolescents than in children who are in contrast to the most reported clinical studies.

Thus childhood symptom continued up to adolescent or with time more new cases were developed than relieved one. Severity of symptoms was assessed by questioning about the number of attack, night awakening and speech limitation due to wheezing in the past 12 months. Average prevalence of sever asthma was 7.9% of children with ever wheeze without significant difference among the two sexes or the two age groups which is much lower in other regional study that was between17%-24 % (15-19). With regarding to 65.4% of children without past 12 months attack, inaccurate response or persistent asthma without attack must be considered.

Lower rate of sever asthma despite higher prevalence of ever wheezing than regional study may be due to better parent knowledge and on time diagnose and treatment of children in recent years.

Prevalence of speech limitation by wheeze was10.9% with significant, higher rate in 13-14 year olds compared to 6-7 year old group (13.5% vs5.4%) and in boy than in girls (12.7% vs. 9.3%). This may be de to higher rate of anxiety in older age group.

As determined in the previous studies the living conditions affecting the prevalence of asthma which include family history of asthma and smoking, frequent chest colds, low socio-economic level, exposure to animals, or eating in the kitchen, working for wages and poor water sources that increase the risk of asthma and other allergic diseases in children (21-22-23).

Higher Prevalence of wheeze in children with parent smoker (30%) versus (18.6%) in children without smoking parent was confirmed etiologic role of smoking in childhood asthma (21).

Family size was not a risk factor of childhood asthma or inverse relationship between family number and asthma reported (23, 24, 25, and 26). In this study lower prevalence of asthma ever in children with household number of ≤ 4 (16.2%) in contrast with >4 (33.6%) detected. It may be due to higher prevalence of lower respiratory infection with crowding and symptoms interaction (24).

Physician diagnosed asthma was 2.6% which is similar to regional reports (1.75%-2.4%) but higher prevalence in girls in 6-7 year olds age groups is in obvious contrast to what is generally cited in the literature. Because of the wide variation of criteria for making a diagnosis of asthma, it is not commonly advisable to rely on physicians' diagnosis of asthma as a gold standard in epidemiological studies

Unusual symptoms of asthma include night cough and exercise induced wheeze (Asthma Variant) were significantly higher in older age group. This finding was similar to the findings in previously reported studies which illustrate change in asthma pattern with advancing age (19, 20).

Night cough due to common cold or other pulmonary infection can be misinterpreted as asthma variant.

Based on ISAAC phase I prevalence of asthma symptom in Kermanshah was higher but severity of symptom was lower than similar study in this region which can explained by better diagnosis, suitable treatment and rising parent knowledge.

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