

Prevalence of Asthma Symptoms among Secondary School Students (Aged 11-16 Years) in the City of Mashhad (Northeast of Iran)

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• Abstract

Background—Few data exists on the prevalence of the symptoms of asthma among young adults. The prevalence of this common disease among this age group in Iran is not known.

Methods—We studied the prevalence of asthma among secondary school students (aged 11-16 years) in the city of Mashhad using a standard questionnaire. Trained medical students interviewed a total of 5,534 students (in 55 schools), including 3,038 males and 2,496 females. The following symptoms were used as asthma symptoms: Recurrent wheeze, recurrent cough or tightness in the chest at rest, wheeze, cough or tightness in the chest during the night and early morning and wheeze or cough during exercise. Students with one or two symptoms were considered as suspected asthmatics and those with three or more symptoms, or having been previously diagnosed with asthma, as probable asthmatics and students in any of these two groups were defined as symptomatic subjects.

Results—Results showed that 232 students (4.19%) including 115 males (3.78%) and 117 females (4.69%) had probable asthma. Family history of asthma (39.2%), history of allergy (55.2%) and smoking habit of parents of asthmatic students (49.1%) were significantly higher than normal students (in all cases $p < 0.0001$). Only 35.17% of these students had been previously diagnosed and were under treatment. However, most students with treatment history have used only bronchodilator drugs (51.8% of treated students); and 13.23% of them had anti-inflammatory drugs in their treatment regimen. In addition 969 students (17.5%) had suspected asthma including 468 males (15.4%) and 501 females (20.1%).

Conclusion—These results indicated a relatively high prevalence of asthma among secondary school students in the city of Mashhad, for which most of them had not been diagnosed and were not under treatment.

Keywords • Asthma prevalence • young adults • family history • allergy

Introduction

There is an increasing evidence of a worldwide rise in the prevalence¹⁻³ of asthma and the morbidity and mortality due to it.⁴ Although changes in medical practice, diagnostic labeling, and public awareness could have influenced this trend, it is suggested that the increase is authentic.³ The cause of this apparent increase in prevalence is unclear, but environmental factors such as air pollution due to sulphur dioxide, nitrogen oxide, ozone, or vehicle exhausts are important.⁵ Thus, there is considerable interest in the international comparison of the prevalence of asthma. Prevalence data obtained with standard methods might then be used as a basis for testing hypothesis relating the nature and causes of asthma.

The prevalence of asthma cannot be measured accurately because there is no clear definition of the condition and no standardized criteria that allows an objective measurement to be made. In general two methods have been used to assess the prevalence of asthma. Historically this has been done most often by asking questions about a diagnosis of asthma or about any history of asthma symptoms, specially wheezing.⁶ However, questionnaire responses are both subjective and influenced by a wide variety of cultural, psychologic, sociologic factors and having access to and using health care.⁷ Bronchial hyperresponsiveness is recognized as a characteristic feature of asthma.⁸ This provides an

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objective measure of airway abnormality, but used alone, is neither sensitive nor specific as a test for asthma.⁹ In addition, these tests are expensive and very difficult to use in surveys with a large and widespread population. Most estimates of asthma have been based on data from questionnaires which inquire about symptoms or previous diagnosis of asthma.

The prevalence of this common disease in Iran is not known. Therefore, in the present study, the prevalence of asthma symptoms among secondary school students (aged 11-16 year) was studied in the city of Mashhad (north east of Iran) using a standard questionnaire.

Methods

Study area and population

The study area was the city of Mashhad (north east of Iran) which has moderate industry and heavy traffic. At the time of the study, this city had 597 secondary schools with a total of 181,010 students.

Protocol

A questionnaire was designed based on questionnaires previously designed by expert groups for similar studies.¹¹⁻²¹ The questionnaire was designed to be short, simple, unambiguous and based on the culture of the studied population. It contained four sections including; characteristics of subjects, asthma symptoms, frequency of occurrence of asthma symptoms, and supplementary questions such as family history of asthma, history of previous treatment and atopy. The following symptoms were used as asthma symptoms in the questionnaire: Recurrent wheeze, recurrent cough or tightness in the chest at rest, wheeze, cough or tightness in the chest during the night or early morning and wheeze or cough during exercise. Students with one or two symptoms were considered as suspected asthmatics and those with three or more symptoms, or having been previously diagnosed with asthma as probable asthmatics and students in any of these two groups were defined as symptomatic subjects.

A total of 5,534 secondary school students, including 3,038 males and 2,496 females in 55 schools were interviewed by trained medical students and different sections of the questionnaire were completed.

Data analysis

Based on the results of a pilot study which indicated a prevalence of about 3.5% asthmatics among students in the city of Mashhad, using the PPS sampling method, it was calculated that 5,500 young students would be needed to detect a 5% difference in the prevalence of asthma with an error of 5% and a power of 80%. The difference of family history of asthma, allergy, and smoking habit of parents between asthmatic and normal students was tested by chi-square testing on 2x2 contingency tables.

Results

Prevalence of asthma symptoms

The prevalence of asthma symptoms among students of secondary school in this study was 21.70% (1,201 students) including 583 males (19.9%) and 618 females (24.76%). Two-hundred and thirty-two of the symptomatic students (4.19% of studied population) including 115 males (3.78%) and 117 females (4.69%) had probable asthma (reported more than two symptoms or had been previously diagnosed with asthma). The remaining symptomatic students (969 subjects or 17.50% of studied population) including 468 males (15.40%) and 501 females (20.10%) had suspected asthma (reported one or two symptoms). The prevalence of asthma symptoms among different age groups

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was fairly similar. The prevalence of probable asthma was higher among 12-year old as compared to 15-year-old students; the number of 16-year-old students was also low ([Table 1](#)). The most frequent symptom reported by symptomatic students was exercise cough.

History

Family history of asthma among probable and suspected asthmatics (39.2% and 25.0% respectively) was significantly higher than that of normal students (16.3%). In addition, there were significantly more probable and suspected asthmatics with allergy (55.2% and 40.5% respectively) than normal students (23.7%). The smoking habit among parents of students with probable and suspected asthma (49.1% and 40.2% respectively) were also significantly higher than normal students (32.9%), ([Table 2](#)). The family history of asthma, history of allergy, and smoking habit among parents of male and female students with probable and suspected asthma were similar to those of total probable and suspected asthmatic students except smoking habit of parents of male students which was not significantly different between suspected asthmatics with those of probable asthmatics and normal students. History of allergy was also not significantly different between suspected and probable male asthmatics ([Table 2](#)).

Drug treatment

Only 35.17% of these students had been previously diagnosed and were under treatment. However, most students with history of treatment have used only bronchodilator drugs (51.8% of treated students) and 13.23% of them had anti-inflammatory drugs in their treatment regimen. In addition, only 13.25% of the treated asthmatic students used inhaler bronchodilator, 2.4% inhaler corticosteroid, and 1.2% sodium cromoglycate ([Table 3](#)).

Discussion

The results of the present study, which was performed on a relatively large population of young students (aged 11-16 years), showed that the prevalence of probable asthma among this age group is 4.19% (3.78% in male and 4.69% in female students). According to the response of students to section three of the questionnaire, approximately 3.13% of students (2.73% in males and 3.6% in females) had current asthma, although the questionnaire used in our study did not allow the precise separation between current and cumulative asthma. In addition 17.5% of students had suspected asthma (15.4% in male and 20.1% in female students).

The methods for measuring the prevalence of asthma used in this study were very similar to the study of Shaw et al.¹⁶ They studied the prevalence of asthma in New Zealand in the same age group using both video and written questionnaires with very similar questions as the present study and they had divided their studied population into three different groups (as the present study): Students with no positive response, students with one or two responses and those with three or more responses. The results of their study with video questionnaire showed that 31% of students have one or two positive responses and 19% have three or more responses while the results of written questionnaire were 24% and 48% for the two groups respectively.

The method of the present study was more similar to the video questionnaire. In our study the questions of asthma symptoms were first explained to the students under study and then were asked from them. However, results of the present study showed lower values for the prevalence of asthma as compared to the results of the study conducted by Shaw et al, (17.51% for students with one or two responses and 4.19% for those with three or more responses or having previously diagnosed as asthma), because the prevalence of asthma in countries of our region is less than New Zealand (in Turkey 2.1%, in India 1.2%, and in New Zealand 25.3%).²² Aryes et al¹¹, using a similar questionnaire as in the present study, also recognized subjects as having probable asthma either if they had previously diagnosed as asthma or had positive responses to three or more of the symptom

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Using a similar method for the same age group in south China, results showed that 12.9% of students had asthma symptoms, which was fairly similar to our results.¹⁵

Results of the present study also showed that family history of asthma, history of allergy, and smoking habit of parents among probable and suspected asthmatic students were significantly higher than normal students. In addition, these parameters were significantly higher in probable asthmatic students than suspected asthmatics.

These results indicated that family history of asthma and atopy as risk factors may affect the incidence of asthma. It could also be concluded that exposure to tobacco smoking (one environmental factor), may also influence the incidence of asthma.

The treatment history among probable asthmatic students showed that about one-third of them (35.17%) were diagnosed to be asthmatics and had a history of treatment. In addition, most students with history of treatment have used only bronchodilators, mostly in oral form. Only 13.23% of students with history of treatment had anti-inflammatory drugs in their treatment regimen and just three students (3.5% of all treated asthmatics) have used steroid inhaler or sodium cromoglycate. On the other hand, most of these students were not treated on a regular base.

In conclusion, the results of this study showed a relatively high prevalence of asthma symptoms among young students in the city of Mashhad. Furthermore, most of these students were not previously diagnosed and were not under treatment. Results also indicated that family history of asthma, atopy and exposure to cigarette smoke could be risk factors for the incidence of asthma.

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