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STUDY OF PREVALENCE AND SEVERITY OF ASTHMA SYMPTOMS IN SCHOOL-AGE CHILDREN IN RIMS RAIPUR

Medicine

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Dr.Inderjeet Singh Siddhu	Assistent Professor, Department of MEDICINE, Raipur Institute of Medical Sciences, Raipur, C.G.
Dr.SOMESH KUMAR PANDEY	Assistent Professor, Department of MEDICINE, Raipur Institute of Medical Sciences, Raipur, C.G.
Dr.Brajendra kumar	Professor, Department of Medicine, Teerthanker Mahaveer Medical College & Research Centre Moradabad, UP-244001

ABSTRACT

Asthma is considered the most common chronic childhood disease.Our study assess the prevalence and severity of asthma symptoms in school-age children and adolescents living in Raipur. Cross-sectional transversal study using the International Study of Asthma and Allergies in Childhood (ISAAC) questionnaire. The sample comprised students of 6, 7, 13 and 14 years of age. One group of 2335 students between the ages of 6 and 7 and another composed of 4042 students between the ages of 13 and 14 were evaluated. The prevalence of wheezing within the last 12 months in the younger children was 27.7%, vs. 19% among the adolescents (p < 0.0001). There was a predominance of males in the 6-7 age group (29.9% vs. 25.6%; p = 0.01) and of females in the 13-14 age group (21.9% vs. 15.8%; p< 0.0001). The proportion of previously diagnosed cases of asthma was similar (approximately 10%) for both age brackets. Wheezing upon physical exertion was more prevalent among the adolescents (21.4% vs. 7.8%; p < 0.0001). Symptom severity was higher among female adolescents (severe asthma: 6.6% vs. 4.4%; p = 0.001), although no differences among genders were seen in the 6-7 age group. Asthma prevalence Values are higher in the 6-7 age group, in which symptoms were seen predominantly in males. Among the adolescents, the prevalence and severity of symptoms were higher in females, a recent observation that seems to be a new epidemiological trend of asthma.

INTRODUCTION

Asthma is considered the most common chronic childhood disease. Various studies in developed western countries, such as Scotland and England, have shown that the prevalence of asthma has increased 1.5 to 3 times over the past four decades. Since such a large an increase over such a short time cannot be explained by genetic factors, this rapid expansion of asthma has been attributed to the action of environmental factors. Epidemiological studies of asthma in Brazil are still limited due to the territorial extension of the country, and the true dimension of the prevalence of the disease in the various regions is still unknown. Recent data from a study carried out in a few Brazilian cities using the International Study of Asthma and Allergies in Childhood (ISAAC)[8] revealed a mean cumulative prevalence of diagnosed cases of asthma to be 10.8% in the 6- to 7-year-old and 13- to 14-year-old age brackets. The objective of this study was to assess the prevalence and symptom severity in school-age children living in the city RAIPUR and to identify any correlations between these findings and variables such as gender, age group and type of school.

METHODS

A cross-sectional transversal study was carried out. The study sample comprised two groups of school children: 6- to 7-year-olds and 13- to 14-year-olds. We used the methodology developed by the ISAAC in order to determine the prevalence of symptoms related to asthma. The study population comprised school children within a specific geographic area, and two distinct age groups were selected: 6- to 7-year-olds and 13- to 14-year-olds. After defining the geographic area of the study, we established the number of schools in the area (a minimum of 10 schools or all schools in areas where there were less than 10 schools), which is necessary to form a representative sample. Of this total number of schools, we randomly selected those in which the study would be carried out, considering each school as a sample unit. The study sample comprised all students within one of the two study age brackets and enrolled in one of the selected schools. The suggested sample size for each age bracket is 3000 students. Our sample comprised 4,042 students between the ages of 13 and 14 and 2,335 students between the ages of 6 and 7.Data collection was based on asthma-related questions in the ISAAC questionnaire. Parents or guardians filled out the questionnaires for the 6-year-old and 7-year-old students. The Ethics Research Committee of the RIMS approved the protocol. The Epi Info 6 software program was used for the statistical analysis of data. Results were assessed based on the percentage of positive answers for each question. We used the chi-square test for the comparison of results. The level of significance was set at p < 0.05. For each case, we calculated the prevalence ratio (PR), which indicates the strength of a correlation between any two given results and the respective 95% confidence interval (CI).

RESULTS

The total number of students assessed in the study was 6377 and approximately 52% of the students in both age groups were female. The prevalence of a history of wheezing was significantly higher in the 6- to 7-year-old age group (p < 0.0001; PR = 1.33; 95% CI: 1.25 — 1.41), with higher prevalence in males (p = 0.05; PR = 1.09; 95% CI: 1.00 — 1.19). In the 13- to 14-year-old age group, a history of wheezing was more prevalent in females (p = 0.0001; PR = 1.26; 95% CI: 1.16 — 1.38).The prevalence of wheezing within the last 12 months was also higher in the younger children (p < 0.0001; PR= 1.46; 95% CI: 1.33 — 1.60). In the same age group, the prevalence of wheezing was higher in males (p = 0.01; PR = 1.17; 95% CI: 1.03 — 1.33), whereas it was higher in females among the adolescents (p < 0.0001; PR = 1.39; 95% CI: 1.22 — 1.58). Among children of the same gender, the prevalence of wheezing within the last 12 months was higher in the 6- to 7-year-old age group, both among boys (p < 0.0001) and among girls (p = 0.01).Analyzing the number of asthma attacks within the last 12 months, we found that the 6- to 7-year-old age group presented a higher prevalence, both in the "1 to 3 attacks" category (p < 0.0001; PR = 1.38; 95% CI: 1.24 — 1.54) and in the "4 to 12 attacks" category (p < 0.0001; PR = 2.09; 95% CI: 1.57 — 2.80). However, in the 13- to 14-year-old age group, the prevalence of "1 to 3 attacks" response was higher among females (p < 0.0001; PR = 1.46; 95% CI: 1.25 — 1.71). In the "more than 12 attacks within the last 12 months" category, no statistical differences were found between the two age groups.Sleep disturbance was more prevalent in the 6- to 7-year-old age group, despite the number of times during the week (p < 0.0001) and gender (p < 0.0001) considered. In the 13- to 14-year-old age group, sleep disturbance with a prevalence of less than once a week was more common in females (p = 0.001; PR = 1.55; 95%CI: 1.19 — 2.02).Limited speech was statistically more significant in the younger age group (p < 0.0001; PR = 1.80; 95% CI: 1.45 — 2.23), even when we studied the genders separately. Limited speech was more prevalent in females in the adolescent group (p = 0.0009; PR = 1.71; 95% CI: 1.24 —

2.37).Wheezing upon physical exertion was more prevalent among the adolescents ($p < 0.0001$; PR = 2.75; 95% CI: 2.36 — 3.19), and, within this age group, it was more prevalent in females ($p = 0.0002$; PR = 1.25; 95% CI: 1.11 — 1.41).

DISCUSSION

Among the standardized tools for data collection in epidemiological surveys, questionnaires have been the most widely used due to their ease of use, low cost and good acceptability. In addition, questionnaires are relatively independent of immediate circumstances, such as climatic factors and the incidence of respiratory infections. Although the ISAAC questionnaire is simple, is standardized and has been validated in various international studies, it is not free from possible biases that may influence the results to varying degrees. For example, the questionnaire has been translated into various languages and some languages do not have a word that conveys the idea expressed by the English word "wheezing", and the word chosen may not carry the same meaning as that understood by English-speaking populations. The high prevalence of asthma in English-speaking countries, especially in those where the word "wheezing" is commonly used in medical studies, suggests that there might be some language biases associated with the questionnaire or that those populations are more aware of and know more about the disease. On the other hand, the higher prevalence may be correlated with environmental factors related to the lifestyle of the population in these western countries. High prevalence of asthma has also been observed in Raipur. It is also possible that individuals who have are not familiar with asthmatic patients misinterpret other types of sensations or respiratory sounds as wheezing.

A source of error to be taken into consideration in our area is the fact that the population commonly referred to the disease as "bronchitis" since, in the popular imagination, the word "asthma" is associated with an extremely severe, stigmatized disease. It is important to emphasize that many physicians continue to use the terms "asthma" and "bronchitis" as synonyms, which makes the correct diagnosis of the disease difficult. Another difficulty is the sensitivity and specificity of symptoms, which are referred to in the questionnaire in order to identify children with specific diseases such as asthma. This can represent a confounding factor since the prevalence of infectious diseases presenting wheezing is high in some countries.The method of selecting the sample may be another source of error since a sample based on children of 6, 7, 13 and 14 years of age enrolled in school may, due to absenteeism, not be representative of the population of children in these age groups in certain communities. These aspects must be taken into consideration in the assessment of the national and international patterns of the prevalence of asthma symptoms established by ISAAC. The return rate for the questionnaires distributed in the 13- to 14-year-old age group was 99.4%. This rate was lower (51.5%) in the younger age group. The return rate for the questionnaires distributed worldwide during the first phase of ISAAC ranged from 60% to 100%, and it was higher among the adolescents. Errors induced by the process of completing the questionnaire may occur if there are wide variations in the return rates and if the participation is correlated with the presence of symptoms (those who have the symptoms are more interested in completing the questionnaire than those who do not).Approximately 52% of the participants in both age groups were female. The prevalence of a history of wheezing was significantly higher in the 6- to 7-year-old age group, with a higher incidence among the males. In the 13- to 14-year-old age group, a history of wheezing was more prevalent in females. Asthma is more common in boys than in girls. This is probably due to differences in the anatomy of the lower respiratory tract since, for any given lung volume, the lower airways tend to be smaller in males than in females. Other factors associated with the persistence of asthma are family history, environmental exposure and severity of symptoms. An alternative explanation for this finding is related to the fact that, during adolescence, boys tend to underestimate and girls tend to overestimate symptoms. When the severity of wheezing was evaluated based on the number of attacks and on the frequency of sleep disturbance, we found that, among 6-year-olds and 7-year-olds, 5.4% reported wheezing within the last 12 months and having had more than 12 asthma attacks, and 28.5% reported wheezing within the last 12 months and sleep disturbance more than once a week. Among the adolescents, these values were 5.2% and 15.8%, respectively. These data suggest that, despite the availability of efficacious asthma therapy, asthma has not been properly managed in a great number of school-age children. In developed countries, the severity of the attacks tends to decrease as asthma treatment improves. Based on the results of the present study, we can conclude that the prevalence of asthma in school-age children was high (27.7% and 19%, respectively, in the 6- to 7-year-old and 13- to 14-year-old age groups). The prevalence was higher in the younger group, regardless of gender. Asthma was more prevalent in female adolescents. Asthma symptom severity was higher in the 6- to 7-year-old age group, regardless of gender. Among the adolescents, it was significantly higher in females.

CONCLUSION.

Asthma prevalence Values are higher in the 6-7 age group, in which symptoms were seen predominantly in males. Among the adolescents, the prevalence and severity of symptoms were higher in females, a recent observation that seems to be a new epidemiological trend of asthma.

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