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Recurrent wheezing in infants: epidemiological changes

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Abstract

Objective: To determine epidemiological changes in recurrent wheezing among infants in Curitiba, Brazil.

Method: This cross-sectional study used the questionnaire Estudio Internacional de Sibilancias en Lactantes (EISL). Parents of infants aged 12 to 15 months completed the instrument from August 2005 to December 2006 (phase I) and from September 2009 to September 2010 (phase III).

Results: Parents of 3,003 infants participated in phase I, and 22.6% of the infants had recurrent wheezing (≥ 3 episodes). After 5 years, 1,003 parents completed the same questionnaire during phase III, and 19.8% of the infants had recurrent wheezing ($p = 0.1$). There was a reduction in symptom severity ($p = 0.001$) and number of emergency department visits ($p < 0.001$), but not in number of hospitalizations ($p = 0.12$). Physician-diagnosed asthma was more frequent in phase III ($p = 0.03$).

Conclusions: There were no changes in the prevalence of recurrent wheezing in infants, but there was an increase in physician-diagnosed asthma and a reduction in severity, which, however, did not affect the rate of hospitalizations.

J Pediatr (Rio J). 2011;87(6):547-50: Asthma, infant, prevalence, wheezing.

Introduction

The prevalence of allergic diseases in pediatric populations has been extensively studied in recent years. The comparison of phases I and III of the International Study of Asthma and Allergies in Childhood (ISAAC), conducted at intervals of at least 5 years between phases, revealed an increase in the prevalence of asthma among school-age children and adolescents in most centers included in the study.[1] Although Brazil has a high prevalence of asthma and associated symptoms, in ISAAC phase III most centers had a reduction of those indices among both children and adolescents, and the highest asthma prevalence rates were found in the centers closest to the equator.[2,3] In Curitiba no differences were found in the prevalence of asthma and probable asthma between phases I and III, which were conducted in 1995 and 2001.[4]

Despite extensive knowledge acquired about the epidemiology of asthma among school-age children and adolescents, there is scarce information for the pre-

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school age groups, particularly infants, for whom asthma diagnoses are more complex and may be confused with other diseases. Wheezing is common in asthma, as well as recurrent wheezing (3 or more wheezing episodes). The Estudio Internacional de Sibilancias en Lactantes (EISL) was created to determine its epidemiology, treatment and risk factors.[5]

A study with 30,093 infants aged 12 to 15 months in 17 centers in Latin America, Spain and the Netherlands found that the prevalence of at least one episode of wheezing was 45.2%, and of recurrent wheezing, 20.3%, with greater prevalence rates and severity in Latin American countries than in Europe. Therefore, some factors may be determinant for the development of wheezing in the different regions already evaluated.[6]

Different factors associated with recurrent wheezing have been identified,[7,8] but it is not possible to know if there have been changes in the epidemiology of wheezing in the different centers participating in previous studies.

This study evaluated period prevalence trends, symptom severity and physician-diagnosed asthma among infants in phases I and III of EISL in Curitiba, Brazil.

Methods

This cross-sectional study used phase III of a standardized and validated written questionnaire,[9] the EISL. Parents of infants aged 12 to15 months that presented at the health care units (HCU) of the Municipal Health Department of Curitiba for routine visits or vaccinations completed the 65-item questionnaire from August 2005 to December 2006 (EISL phase I) and from September 2009 to September 2010 (EISL phase III). In the two periods, the HCUs were selected randomly to obtain a homogeneous distribution of the population, and the questionnaire was applied by trained undergraduate medical students.

The following questions were included in the study to determine epidemiological changes between phases I and phase III: Did your baby have bronchitis or wheezing in the first 12 months of life? How many episodes of bronchitis or wheezing did your baby have in the first year of life? At what age did your baby have the first episode of wheezing (first bronchitis)? In the last 12 months, how many times did you wake up during the night because of your baby's cough or wheezing? In the last 12 months, was your baby's wheezing so severe that you had to take the baby to an emergency service (hospital, clinic or health care unit)? In the last 12 months, has your baby's wheezing ever been so severe that the baby had great breathing difficulty (shortness of breath)? Was your baby hospitalized due to bronchitis? Has any doctor ever told you that your baby has asthma?

This study was approved by the Ethics Committee for Research with Human Beings of the Hospital de Clínicas of the Universidade Federal do Paraná (UFPR), and all participants signed an informed consent term.

A sample of at least 1,000 infants is enough to detect a 5% prevalence of recurrent wheezing between two centers when one has a prevalence of about 20% at a 95% confidence interval and 80% power.[10] A chi-square test was used for categorical variables, described as proportions, and the Student *t* test, for continuous variables, presented as means ± standard deviation. The level of significance was set at $\alpha < 0.05$.

Results

The questionnaire was completed by 3,003 parents of infants (50.7% male infants) in phase I; 45.4% of the infants had at least one wheezing episode, and 22.6% had recurrent wheezing (≥ 3 episodes) with the first episode at 5.5 ± 3.1 months. After 5 years, 1,003 parents completed the same questionnaire in phase III, and 40.6% of the infants (51.1% male infants) had at least one wheezing episode ($p = 0.46$), 19.8% had recurrent wheezing ($p = 0.1$) with the first episode at 6.1 ± 3 months ($p = 0.06$). Changes in severity and physician-diagnosed asthma comparing EISL phases I and III are shown in Table 1.

Discussion

The repeated use of the same questionnaire to determine period changes in the point prevalence of asthma all over the world has yielded widely varying results. Most regions have seen an increase in prevalence, whereas others had stable rates or even reductions.[1-3] However, no similar trend has been reported for recurrent wheezing in infants, and one of the few studies that used the same method to determine the epidemiology of wheezing in this population published its results only recently.[6]

In our population, wheezing prevalence in EISL phase I was high and infants often had severe symptoms in their first year of life.[11] Of the other six Brazilian cities where the EISL phase I was used, Porto Alegre and Belo Horizonte had the greatest prevalence of recurrent wheezing and symptom severity.[6] Factors that are inherent to each population or environment promote differences in the factors associated with recurrent wheezing documented in Curitiba, Porto Alegre and São Paulo.[7,12,13] If there are differences in the epidemiology of infant wheezing between centers, what is the likelihood of finding changes in results some time after the application of the study in the same center? Which factors might affect these results? At the time of the study, we did not plan to answer the latter question, and the fact that it was not one of our objectives is one of the limitations of this study.

In our population, recurrent wheezing prevalence after 5 years remained stable. In large surveys, such as the ISAAC,

Table 1 - Comparison between severity and physician-diagnosed asthma in infants with recurrent wheezing in 2005-2006 and 2009-2010

	≥ 3 wheezing episodes		
Variables	**EISL phase I, n (%) n = 678**	**EISL phase II, n (%) n = 200**	**p**
Nocturnal symptoms			
Never/rare	182 (26,8)	66 (37,5)	0,03
Some times/often	495 (73)	123 (61,5)	0,001
Severe symptoms	402 (59,3)	84 (42)	0,001
Emergency department visits	470 (69,3)	83 (41,5)	< 0,001
Hospitalization due to wheezing	116 (17,1)	25 (12,5)	0,12
Physician-diagnosed asthma	110 (16,2)	46 (23)	0,03

EISL = Estudio Internacional de Sibilancias en Lactantes.

mean interval between phase I and III was 7 years[1]; in our center, the time interval between phases was shorter, and this may explain why our prevalence rate remained stable. However, there was a significant reduction in the severity of symptoms of recurrent wheezing, confirmed by a reduction in nocturnal symptoms, severe symptoms and emergency department visits, but there was no reduction in hospitalizations due to wheezing.

The drugs available for asthma treatment in the public health care system may have affected the severity of symptoms. Physician-diagnosed asthma has increased in the last 5 years, which, when associated with greater treatment availability, may have affected our results. The comparison of EISL phase I in Curitiba and São Paulo revealed that the use of antiasthma medications both for infants with fewer than three wheezing episodes and infants with recurrent wheezing was greater in Curitiba, and the severity of wheezing symptoms was greater in São Paulo.[14]

We concluded that the prevalence of recurrent wheezing remained high and stable in Curitiba; these rates are lower than those found in some centers, but higher than those of many other cities participating in EISL. There was a significant reduction in wheezing severity among our population, but not in the rate of hospitalizations. These findings should be further investigated and compared with other cities participating in the survey.

The considerable increase in the number of children with physician-diagnosed asthma suggests that, in primary care, the term "asthma" has been used more often because the disease has been more identified, which may lead to better treatments and a reduction in the morbidity rates of this disease.

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