Respiratory Medicine (2015) 109, 308–311

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/rmed

The prevalence of asthma and atopy in schoolchildren from Porto Alegre, Brazil, has plateaued

Camila Schuh [a], Leandro Genehr Fritscher [a], Kenneth R. Chapman [b], Carlos Cezar Fritscher [a,*]

[a] Faculty of Medicine, Pontific Catholic University (PUCRS), Ipiranga Av. 6690, Porto Alegre, RS, Brazil
[b] Asthma and Airway Centre, University Health Network, University of Toronto, Toronto Western Hospital, 399 Bathurst St., Toronto, ON M5T 2S8, Canada

Received 5 August 2014; accepted 24 January 2015
Available online 31 January 2015

KEYWORDS
Epidemiology;
Asthma;
Atopy;
Prevalence;
Children;
Skin test

Summary
Objective: A significant increase in the prevalence of asthma and atopy was observed in epidemiological studies conducted in 1980, 1989 and 1998, with schoolchildren of Porto Alegre. The present study aims to determine changes in the prevalence of symptoms of current and lifetime asthma and also to document the prevalence of atopy in schoolchildren from a region of Porto Alegre.
Methods: This was a cross-sectional study in which schoolchildren from 5th to 8th grade (10–18 years), from four schools located in the same geographic area were interviewed. The questionnaire covered symptoms suggestive of lifetime or current asthma (at some point in life or in the last twelve months, respectively). In addition, skin tests were performed in a subset of 241 schoolchildren.
Results: 964 students were interviewed from a total of 1195 registered. The prevalence of lifetime asthma symptoms was found to be 41.7%, symptoms of current asthma 14.9% and atopy 52.7%. Compared to previous studies, the prevalence of lifetime asthma and atopy has stabilized while the prevalence of current asthma fell from 22% to 14.9% ($P < 0.001$).
Conclusions: In the last decade the prevalence of atopy and lifetime asthma has plateaued, while the prevalence of current asthma fell.

* Corresponding author. Ipiranga Av. 6690/501, Porto Alegre, RS 90610-000, Brazil. Tel.: +55 51 3320 3457.
E-mail address: ccfritscher@pucrs.br (C.C. Fritscher).

http://dx.doi.org/10.1016/j.rmed.2015.01.014
0954-6111/

Introduction

Asthma is marked by geographical variations in prevalence; the reason for these changes in different regions remains unknown, although several factors may be involved in each region. Currently, it is estimated that 300 million people suffer from asthma worldwide [1].

A worldwide increase in the prevalence of asthma and atopy has been observed in many countries, including Brazil [2–5]. In the city of Porto Alegre, Rio Grande do Sul, Brazil, three similar epidemiological studies of asthma in children and adolescents were performed. The first, conducted in 1980, showed a prevalence of lifetime asthma (defined as symptoms sometime in the past or present) of 6.7% and atopy, determined by skin tests, of 15.8% [6]. In the second study nine years later, conducted in the same schools and with the same methodology, the percentage of lifetime asthma had increased significantly to 16.5%. The prevalence of current asthma (symptoms in the last 12 months) was 10.9% [7]. In the third study, conducted in 2000 in the same schools, the prevalence of lifetime asthma, current asthma and atopy was 42.5%, 22% and 50.1%, respectively [8].

The aim of this study was to verify and update the latest changes in the prevalence of symptoms of current and lifetime asthma and atopy in schoolchildren from a region of Porto Alegre, Brazil.

Materials and methods

This is a cross-sectional study in which 964 children from 5th to 8th grade (10–18 years), from four schools located in the same geographic area from Porto Alegre – RS, Brazil, were interviewed in the period of March–June of 2013. These schools were the same that participated in the three earlier studies.

Initially, a questionnaire was performed that included questions covering demographic data, smoking, symptoms suggestive of asthma, such as shortness of breath and wheezing at some point in life (considered as lifetime asthma) or in the last 12 months (considered as current asthma), symptoms following exercise, family history of asthma and medications used. The questionnaire was the same used in earlier studies [6–8]. Study participants who answered positively to question number 2 (Have you had this kind of problem in the past twelve months?) underwent a second interview with the ACT questionnaire (Asthma Control Test), which has five items that relate to symptoms, use of rescue medication and effect of asthma on daily activities. The score is calculated from the sum of the values of each question, which are worth one to five points, so the score ranges from 5 to 25 points, allowing classifying asthma in uncontrolled when <20 points and controlled when greater than or equal to 20 points [9].

The second stage of the research was to perform skin tests for investigation of allergic reaction. The method of puncture ("prick-test") was chosen because it is considered to be secure, easy to use, and has good sensitivity, specificity and reproducibility. A random sample of 241 students had prick-tests, which was performed on the ventral side of the right forearm, with readings after 15 min, using two allergens: mites and grass. A negative control with diluent and a positive control with histamine were used. We used mites and grass because they are the two most prevalent allergens in the south of Brazil, and were the same used in the three previous studies. A diameter of greater than 2 mm was considered as positive and was measured with a ruler.

Sample size calculation was performed to estimate the number of students to perform the skin test; assuming a prevalence of atopy in the order of 50%, with a margin of error of 6.5%, 228 students were estimated. Differences in proportion were tested using the chi-square test. We compared the prevalence of current asthma and lifetime asthma between the periods 1998 and 2013 by testing for the difference between two proportions.

The level of significance in this study was $\alpha = 0.05$. Data were analyzed with SPSS, version 17.0 (Statistical Package for Social Sciences – SPSS, Inc, Chicago, IL, USA) and Minitab version 16.

This study was approved by the Ethics Committee in Research of the Pontifical Catholic University of Rio Grande do Sul – PUCRS.

Results

964 individuals were interviewed, 502 females (52%). Smoking prevalence was 1.5%. Lifetime asthma symptoms were identified in 402 students (41.7%); there were no significant differences between genders. The sample was divided into three groups: 10–12 years, 13–15 years and 16–18 years, and the prevalence of lifetime asthma and current asthma were similar in the three groups as shown in Table 1. A positive family history was reported by 54.7% of students with lifetime asthma symptoms. Symptoms of current asthma were identified in 144 (14.9%) of students, with a prevalence of 18% in girls, significantly higher than the 11.7% found in boys ($P < 0.05$). Atopy was identified in 52.7% of the tested students, and was higher in males (64.2% vs. 43.2%; $P < 0.001$). Information about prevalence of asthma and atopy are found in Table 1.

The results of the present study were compared to those obtained in previous surveys from 1980, 1989 and 1998, as shown in Table 2. It appears that there had been an increase in the lifetime prevalence of asthma from 1980 to 1989, 1989 to 1998, but stabilization from 1998 to 2013 (Fig. 1). The prevalence of current asthma increased between 1989 and 1998 and decreased significantly between 1998 and 2013 ($P < 0.001$), as shown in Fig. 2. The prevalence of atopy had tripled between 1980 and 1998 and stabilized between 1998 and 2013 (Fig. 3).

Of the 144 students who had symptoms of current asthma who responded ACT questionnaire, 68.1% were uncontrolled. Among students with symptoms of current asthma 52.1% were using medication. The most commonly used medications were: short-acting beta2 agonist (32.6%), inhaled corticosteroids (7.7%), oral corticosteroids (4.9%), combination of inhaled corticosteroids and long-acting beta2 agonist (4.2%) and 2.7% unknown.

Discussion

Our study shows stabilization of asthma and atopy prevalence in a region from Brazil. Recent studies have shown