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ORIGINAL ARTICLE

The Prevalence of Asthma Diagnosis and Symptoms is Still Increasing in Early Adolescents in Turkey

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ABSTRACT

Background: This study was performed to evaluate the time trends in prevalence of asthma and related factors in Denizli, Turkey.

Methods: Two cross-sectional surveys were performed, 6 years apart (2002 and 2008) using the ISAAC protocol, in the 13-14 age groups and comparisons were made between the results.

Results: Lifetime prevalence of wheeze, 12 month prevalence of wheeze, and the prevalence of wheeze after exercise in the previous 12 months were significantly increased respectively from 10.2% to 13.4% (POR = 1.37, 95%CI = 1.18-1.58, $p < 0.001$), from 5.0% to 6.2% (POR = 1.26, 95%CI = 1.02-1.55, $p = 0.016$) and from 9% to 10.2% (POR = 1.15, 95%CI = 0.98-1.35, $p = 0.046$) in 2008 study. Doctor diagnosed asthma prevalence also increased significantly from 2.1% to 12.9 (POR = 6.80, 95%CI = 5.22-8.85, $p < 0.001$). Prevalence of sleep disturbed by wheeze in the last 12 months; but, never woken with wheezing (POR = 1.62, 95%CI = 1.26-2.09, $p = < 0.001$) and less than one night per week (POR = 1.58, 95%CI = 1.06-2.36, $p = 0.013$) were significantly increased in 2008 study. Severe attacks of wheeze limiting speech in the last year was increased from 1.3% to 2.2% (POR = 1.67, 95%CI = 1.14-2.43, $p = 0.004$). The number of wheeze attacks in the previous 12 months was increased significantly for 4-to-12 attacks (POR = 1.54, 95%CI = 1.03-2.32, $p = 0.02$) in 2008 study. However, prevalence of waking with cough in the last 12 months did not change.

While history of family atopy and domestic animal at home were found as significant risk factors for asthma in 2002 study, male gender, history of family atopy and stuffed toys were found significant in 2008.

Conclusions: The prevalence of asthma symptoms were increased in Denizli. History of family atopy, male gender and stuffed toys were important risk factors for asthma in 2008.

KEY WORDS

adolescents, asthma, children, prevalence, risk factor

INTRODUCTION

Asthma is the most common chronic disorder of school-age children and youth, with an increasing prevalence all around the world.[1-4] But in a few studies there were different results about prevalence.[5,6] This inconsistency between studies may be due to the use of different methodologies and diagnostic changes.[7] The aims of the International Study of Asthma and Allergies in Childhood (ISAAC) phase I were to describe the prevalence and severity of the symptoms of asthma and other allergic diseases in children living in different parts of the world and to make comparisons between them.[8] ISAAC phase III was used to examine time trends in the prevalence of asthma and other allergic diseases in centers and countries that participated in ISAAC phase I. The time period between ISAAC phase I and phase III must be at least 5 years.[8]

The first study was conducted on 13-14 years old school children in 2002 using the ISAAC phase I methodology.[9] The lifetime prevalence of wheeze and wheeze in the last 12 months were found to be 10.2% and 5% respectively. In this study, family history of

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atopy and presence of domestic animal at home were found as important risk factors in the asthma symptoms. The aims of current study were determine the change in the prevalence of asthma and to see potential risk factors for asthma. Results were compared with the results of 2002 study.

METHODS

PLACE OF STUDY

Denizli is a developing industrial city in the Southwestern part of Turkey, in the country's Aegean Region.[10] Aegean Region has very hot summers, and a mild fall, winter and spring time. However, climate of Denizli does not have same features of Aegean climate because of the fact that, the city is located between seaside and inland areas; so, it has some differences. In the center, a terrestrial climate may be felt while the inland area is cooler. In addition, the land is open to winds coming from the sea. Furthermore, the winters are generally mild; but, it may be rarely very cold that is the temperature may be felt under 0 centigrade in spite of the high temperature of summers that sometimes may reach over 40 centigrade. Denizli is generally rainy in winters while dry in summers. Some years, snow can be observed in the urban areas. Springs and autumns are rainy, mild climate, warm.[10] The average annual rainfall is 551.1 mm. The amount of rain is changeable in the city that is the average amount of rainfall in the winters is 78.53 mm while in the summers it is 16.76 mm. Then, 51.9 mm is the average amount of rainfall during springs while in the autumns it is 36.5 mm.[11]

STUDY POPULATION

The current study was performed in 13-to-14 years old children, in the same schools of 2002 study with 5427 questionnaires. For the participation to the study a consent form was signed and confirmed by the children or their parents. The study was conducted between April 2008 and June 2008.

QUESTIONNAIRE

The standardized core symptom questionnaire of ISAAC for 13-14 years old children was composed of eight questions related with asthma symptoms.[8,9]

The definition of asthma was accepted as self-reporting of diagnosed asthma with a physician's confirmation.[12] Turkish doctors usually use the terms allergic bronchitis or spastic bronchitis instead of asthma.[13] We used the Turkish translation of original ISAAC questionnaire; however, for only question 6 (Have you ever had asthma), we have added "with doctor's confirmation (spastic bronchitis, allergic bronchitis)". The sentence was revised and the modified version of ISAAC added to the text. There have been many studies conducted in Turkey using this modified version of ISAAC questionnaire[13-15] therefore it is well known and used in Turkish studies.

Table 1 Demographic data in the 2002 and 2008 surveys

		2002 survey (phase I)	2008 survey (phase III)
Sex	Male (*n*%)	1505 (50.1)	2175 (53.3)
	Female (*n*%)	1499 (49.9)	1903 (46.7)
Age (year)		13-14	13-14
Race		Caucasian	Caucasian
Number of schools		16	16

The schools were visited after 2 weeks to fill in questionnaires by formerly absent children. An additional questionnaire which was identical to that of 2002 study (include: sex; atopic family history; passive and active smoking at home; presence of domestic animals, cats, dogs, birds; stuffed toys; socioeconomic status, education level of mother and father; number of people living at home; sharing bedroom; heating system and bathed in sunlight house) was also prepared to assess potential risk factors for asthma symptoms. The study was approved by the ethics committee of Pamukkale University, School of Medicine.

DATA ANALYSIS AND DEFINITIONS

Statistical analysis included percentages, odds ratios (OR), 95% confidence interval (95% CI) and chi-squared test. Prevalence estimates were calculated by dividing positive responses to the given question by the total number of completed questionnaires. The 95% CI of these prevalence rates was also calculated. According to ISAAC policy, missing and inconsistent responses were included in the denominator for the prevalence calculations, but excluded from subsequent bivariate analysis.[1,4] To compare the differences in prevalent rates between the two studies, chi-squared test and prevalence odds ratios (POR) with 95% CI were performed. The relation between risk factors and doctor diagnosed asthma prevalence was performed by univariate analysis using chi squared tests and univariate odds ratio (uOR) and its 95% CI. $P < 0.05$ was considered significant. Then, risk factors were taken into multivariate logistic regression analysis to assess the independent effects of risk factors on doctor diagnosed asthma with adjusted odds ratio (aOR) and its 95% CI. The SPSS software package version 12 for Windows (SPSS, Chicago, IL, USA) was used for all statistical analyses.

RESULTS

In the 2002 study, of 3200 children, 196 children were not included to the study. Because 156 of them were not in the age group, 21 of them did not accept participating and 19 of them were absent. Three thousand and four questionnaires were completed with an overall 93.8% response. In the 2008 study, of 5427 questionnaires, 4078 questionnaires were completed