

Childhood allergic disorders in Samsun, Turkey: discrepancy between reported and diagnosed

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Schoolchildren ($n = 1310$) randomly selected from 32 schools in Samsun, Northern Turkey, were screened using the International Study of Asthma and Allergies in Childhood questionnaire. The prevalence of wheezing and current (last 12 months) wheezing were 21% and 14%, respectively; 2.3% of this group had received the diagnosis of asthma by a physician. Allergic skin rash was described in 17.3% and rhinitis in 44.7%, while 2.6% had been diagnosed with eczema and 10.5%, with allergic rhinitis. Respiratory symptoms were more common among 6–7-yr-old children compared with those aged 13–14 yr, and tended to be more prevalent in urban and coastal regions. The discrepancy between the rate of allergic symptoms and diagnosed allergic disorders may indicate a need for increased public and professional awareness and screening for allergic disorders in this area.

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Asthma is one of the most common disorders in childhood. Its prevalence, morbidity and hospital admissions increased in many countries in the last decades for various reasons including lifestyle and environment (1). Increased morbidity may be because of delays in diagnosis and treatment in certain regions. A high (27%) overall prevalence for allergic disorders has been reported in Northern Turkey (2). Because studies using standard questionnaires were lacking in this region, we investigated the reported and physician-diagnosed prevalence, associations, and possible regional risk factors of asthma and other allergic disorders in Samsun and its surroundings, using the International Study of Asthma and Allergies in Childhood (ISAAC) criteria (3). The location on the Black Sea and the geographical properties of the region allowed comparison of environmental effects such as altitude and humidity within the same province.

Method

Schoolchildren from 32 schools in the city of Samsun and surrounding rural area were screened. The list of all urban and rural schools was obtained from the Samsun department of national education. Schools, 14 urban and 18 rural, and four classrooms in Grades 1 and 8 from each school, were selected from this list using the table of random numbers. The 6–7-yr-old group was chosen to reflect early childhood and the 13–14-yr-old group, to represent an age of high asthma-related morbidity. The school administration was contacted personally and informed consent of the school administration and parents were obtained. Parents were given the Screening Questionnaire for Asthma and Allergic disorders (3) in Turkish with the request of return within 2 wk. The questionnaire contains demographic data on the child and family, and inquires about manifestations of allergic

disorders and related diagnoses received in the past. The validity of the translation has been confirmed in previous studies in Turkey (4, 5). Data were collected in 3 months and analysed in 4 months.

Descriptive statistics, prevalence per 100, and comparison between age groups and rural-urban using chi-square test were performed on SPSS (SPSS Inc., Chicago, IL, USA) for Windows.

Results

There were 1310 children aged 5–16 yr, 661 girls (50.4%) and 649 boys (49.6%). The area of residence was rural in 23.3% and urban in 76.7%. The highest educational institution attended by parents was grade school in 88.5% of mothers and 73.5% of fathers. Low-income families, defined according to the criteria of the Turkish Institute of Statistics, constituted 73% of the group. The questionnaire was filled out by mothers in 47.4%, fathers in 39.7%, and jointly in the rest of the families.

The prevalence of respiratory, nasal, and skin symptoms in the two populations are shown in Table 1, along with comparison to other studies in Turkey. Wheezing was reported in 21.3% of children: 2.3% had received the diagnosis of asthma and the rest, bronchitis or other diagnoses. Symptoms of allergic rhinitis were reported in 44.7% and eczema, in 17.3%: 10.5% and 2.6%, respectively had been diagnosed with these disorders.

The comparison of main age groups, 6–7 yr old ($n = 386$) and 13–14 yr old ($n = 493$) is summarized in Table 2. Eight of 11 respiratory

symptoms and signs, and nasal and skin symptoms were more frequent in 6–7-yr-old children while the symptoms and diagnosis of eczema did not differ between age groups and rhinoconjunctivitis was more frequent in 13–14 yr olds.

Urban residence was significantly associated with higher frequency of 'wheezing ever' and most respiratory symptoms. Recent, frequent, or severe wheezing among those who had ever wheezed was not different between urban and rural residents. Urban children were more likely to have received the diagnosis of allergic bronchitis and bronchitis. Rhinoconjunctivitis was more frequent in rural children (Table 2).

Seasonal variation was reported for nasal allergy but not for asthma and other allergic disorders. Nasal symptoms increased in rural, but not urban, areas in spring and summer months. Wheezing, allergic bronchitis, and dry night cough were more frequent in coastal residents; only conjunctivitis was higher in inland villages.

Discussion

This study showed a high prevalence of reported allergic symptoms but a considerably lower rate of diagnosis, suggesting the presence of underdiagnosed allergies in this region. The prevalence of current respiratory allergy assessed by wheezing in the last 12 months was 22% in 6–7 yr olds and 7.7% in adolescents: this is higher than in many European and Asian countries investigated with ISAAC criteria, such as 5.3% and 3.3%, respectively in Spain, and 7.7% in 6–7 yr olds in Italy (8). As reviewed by Miralles-Lopez et al. (8), the frequency of respiratory allergy varies between 3.8% and 17% for wheezing in the last 12 months, 3.4–26.8% for wheezing ever, and 1–19.6% for medically diagnosed asthma as assessed by ISAAC and other methodology. We compared our results with those of two recent reports in ethnically similar Southern Turkish populations (Table 1): although studies based on questionnaires are limited by recall bias, the questionnaire, parents' educational level, and children's ages are similar in these series (6, 7). While the prevalence of most symptoms are comparable, the rates of doctor-diagnosed asthma and eczema are lower in our population. This may be related to lack of awareness among parents and professionals, or limited availability of primary and specialty medical care.

In our study inhabitants at sea level were more likely to have respiratory symptoms than those at higher altitudes and dryer climate. Indoor humidity has indeed been associated with asthma

Table 1. Prevalence of symptoms and diagnoses of allergic disorders in the study population with comparison to other studies

Symptom	Prevalence (%)		
	Present study	Bayram et al. (6)	Ece et al. (7)
Wheezing ever	21.3	19.0	22.4
Wheezing in the last 12 months	14.1	13.5	14.7
Asthma diagnosed by medical doctor	2.3	5.0	5.4
Allergic bronchitis diagnosed by medical doctor	6.0		5.8
Bronchitis diagnosed by medical doctor	18.2		
Exercise-induced wheezing	13.7	9.7	14.1
Rhinitis symptoms	44.7	13.6	50.6
(other than 'cold' or 'flu') ever			
Rhinitis symptoms (other than 'cold' or 'flu') in the last 12 months	38.8	11.0	39.9
Rhinitis associated with itchy, watery eyes	20.2		18.9
Hay fever diagnosed by doctor	10.5		12.0
Recurrent itching >6 months	17.3		14.4
Chronic rash with atopic distribution	12.6		9.7
Eczema diagnosed by doctor	2.6	8.3	7.8

Table 2. Comparison of urban vs. rural and age groups. Significant p-values are printed in bold

	Overall	Urban	Rural	p<	Age 6–7	Age 13–14	p<
Wheezing ever heard?	21.3	38.2	16.2	0.001	32.1	14.4	0.001
Wheezing in the last 12 months*	66	61.2	69.7	0.13	69.3	53.5	0.01
Wheezing >4 times in the last 12 months*	46	51.5	42.7	ns	52.3	24.9	0.01
Wheezing impairing speech in the last 12 months*	32	29.6	38	ns	34.6	5.6	0.02
Diagnosis of asthma	2.3	3	1.9	ns	3.6	1.01	0.05
Diagnosis of allergic bronchitis	6.0	10.5	4.5	0.001	8.8	3.2	0.01
Diagnosis of bronchitis	18.2	21.7	17.1	0.06	23.3	16.2	0.008
Diagnosis of asthmatic bronchitis	2.7	3.6	3.3	ns	3.8	2.3	ns
Exercise-induced wheezing in the last year	13.7	17.2	12.8	0.05	17.8	10.1	0.003
Dry night cough in the last year	36.5	43.9	34.5	0.003	46.1	29.6	0.001
Nasal obstruction, discharge, sneezing	44.7	51.5	42.7	0.007	48.2	41.4	0.04
Diagnosis of all rhinitis	10.5	12.2	9.8	ns	9.5	8.7	ns
Itchy, recurrent lesion >6 months	17.3	18.5	17.1	ns	20.9	13.4	0.002
Diagnosis of eczema	2.6	2.3	2.6	ns	2.3	2.7	ns

ns: not significant.

*Per cent of those under the heading above.

symptoms (9). In contrast with rhinitis, rhinoconjunctivitis was more frequent inland, suggesting a possible role of local flora and fauna in conjunctival allergy.

Respiratory symptoms were more frequent in the urban group, reflecting the possible effects of air pollution, indoor allergens, household chemicals, or smoke associated with urban location (10, 11). Also, more frequent infections and infestations in early life might be protective for rural children, although the effect of farm living on the development of asthma is controversial (12). On the other hand, skin symptoms were not associated with any residence area.

The annual distribution of rhinitis showed increased frequency in spring and summer months, as expected in hay fever. The effect of age on respiratory allergy was significant, older children having fewer symptoms. This can be because of remissions occurring during late childhood, or to parents' reporting of transient wheezing associated with viral infections in young children. Skin allergy was also more frequent in young children. On the other hand, symptoms of allergic rhinitis changed less between age groups, and rhinoconjunctivitis increased with age, as reported in certain other studies and suggesting an effect of longer or later exposure in the pathogenesis of this disorder (13).

Epidemiological knowledge is sparse for hand eczema and allergic contact dermatitis in children. According to the ISAAC, the prevalence of symptoms of atopic dermatitis in 6–7-yr-old children during 12 months varied between 2% in Iran and China to 20% in Australia, England, and Scandinavia (14). The rate of 16% in our series is in the upper range. The prevalence of asthma in patients with rhinitis was higher

compared with those without nasal complaints. According to the World Health Initiative on Allergic Rhinitis and its effect on Asthma, asthma and rhinitis are common co-morbidities (15). This suggests similar etiologic or triggering factors and similar responses in upper and lower airways: the term allergic rhinobronchitis has been proposed for this association. On the other hand skin allergy was not associated with respiratory allergy. Atopy and airway hyper-reactivity may be inherited independently (16).

This study comprising a large hinterland with geographical and climatic variation allowed an estimation of certain environmental effects in an ethnically homogenous population. The absence of environmental facilitators might delay but not prevent the onset of wheeze in children with atopic heredity (17). Therefore, studies at later ages or adulthood might show smaller differences between urban and rural, or sea level and inland populations. The discrepancy between the rate of reported and diagnosed symptoms indicates the importance of focusing on doctor and patient education and awareness of allergic disorders in children.

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