The prevalence of asthma and allergic diseases in children of school age in Adana in Southern Turkey

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SUMMARY: Bayram İ, Güneşer-Kendirli S, Yılmaz M, Altıntaş DU, Alparslan N, Bingöl-Karakoç G. The prevalence of asthma and allergic diseases in children of school age in Adana in Southern Turkey. Turk J Pediatr 2004; 46: 221-225.

The aim of this study was to determine the prevalence of asthma and other allergic disorders as well as the factors affecting these disorders in school-children in Adana. This cross-sectional population-based study using the International Study of Asthma and Allergies in Childhood (ISAAC) protocol was carried out on 3164 school-children aged between 6-18 years during March to June 1997. There were 1521 (48.1%) boys and 1643 (51.9%) girls. The prevalence of asthma, allergic rhinitis and eczema in the 6-18 year-old children was found to be 12.6%, 13.6% and 8.3%, respectively. The prevalence of asthma was highest in 6-10 year-old school-children (14.7%), and lowest (6.0%) in 15-18 year-old children. The prevalence of asthma diagnosed by a doctor was 5.0%. The cumulative and current prevalences of wheezing were found to be 19.0% and 13.5%, respectively. The cumulative prevalence of allergic disorders was found to be 23.4%. The presence of domestic animals at home and dampness of the home were found to be important risk factors for asthma. Family histories of asthma, eczema, and diagnosis made by a doctor, and history of frequent sinusitis were found to be significantly higher in asthmatics.

In conclusion, asthma is an important chronic disease of childhood in Adana in southern Turkey.

Key words: prevalence of asthma, prevalence of asthma in childhood.

Asthma and wheezy respiratory illnesses are the most common acute and chronic illnesses in childhood[1]. Current surveys from many countries have shown a steady increase in the prevalence of atopic disease[2,3]. The causes of this increase are unclear but it may result from an increase in recognition of the diseases or a true increase in the prevalence of the diseases[4]. The comparison of prevalence studies in different geographical areas is difficult because of differences in terminology and in methodology. The protocol of the International Study of Asthma and Allergies in Childhood (ISAAC) has been prepared for assessment of the prevalence, and it standardizes methods and terminologies[5].

The aim of this study was to determine the prevalence of asthma and other allergic disorders in school-children in Adana and the related factors using a modified ISAAC protocol. Adana is the largest city in the southern part of Turkey, located in the Çukurova area, which has a typical Mediterranean climate.

Material and Methods

This cross-sectional population-based study was carried out on 3164 school-children aged between 6-18 years living in Adana. The schools were randomly chosen from different areas of Adana. The questions were based on ISAAC questionnaires. Additional questions dealing with the factors affecting allergic diseases (such as heating systems, dampness, type of residence, the number of people living in the home, annual family income, and domestic animals in the home) were included (appendix and addendum). The questionnaires were completed by the parents of children younger than 12 years old, and by the students themselves if older than 12 years. The study was conducted between March and June 1997.

The questionnaire included questions regarding presence of wheezing, eczema, and hay fever in the children. The prevalence of asthma was diagnosed if the child fulfilled the following

criteria: Presence of an attack of breathless wheezing ever in life, and within the last 12 months; asthma diagnosed by a physician; or presence of three or more episodes of bronchitis (generally the terms such as allergic bronchitis, bronchitis, chronic bronchitis, and spastic bronchitis are used instead of asthma) (Fig. 1). The statistical analyses was done using the SPSS-X version 9.0 for Windows and the Epi info 6.0, and prevalence, relative risks, and their 95% confidence intervals and logistic regression were calculated.

Results

A total of 3485 questionnaires were sent to the families of which 3164 were returned (90.8%). A total of 1521 (48.1%) boys and 1643 (51.9%) girls were included in this study (Table I). The prevalence of asthma in children between 6-18 years old was found to be 12.6% for Adana. The prevalence of asthma was higher in children between 6-10 years old (14.7%) and lower (6.0%) in those between 15-18 years old (Table II). The prevalence of asthma and related symptoms are shown in Table III. The cumulative and current prevalences of wheezing were found to be 19.0% and 13.5%, respectively. The cumulative prevalence of allergic disorders was found to be 23.4%.

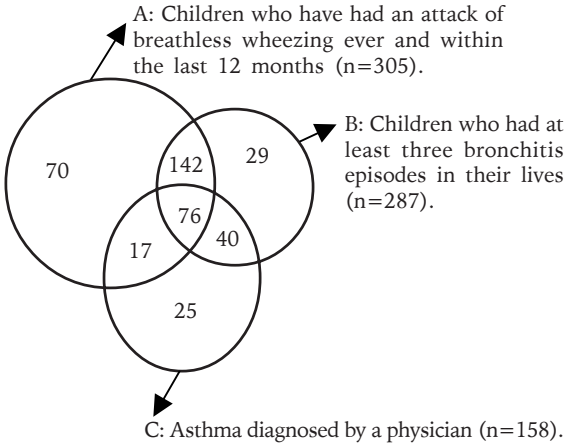

Fig. 1. Criteria for prevalence of asthma.

Table I. Distribution of Age and Gender

Age (in years)	Girls n	Girls %	Boys n	Boys %	Total n	Total %
6-10	834	50.0	835	50.0	1669	52.7
11-14	462	53.3	405	46.7	867	27.5
15-18	347	55.2	281	44.8	628	19.8
Total	1643	51.9	1521	48.1	3164	100.0

Table II. Prevalence of Asthma Allergic Rhinitis and Eczema According to Age and Gender

Age	Asthma n	Asthma %	Allergic Rhinitis n	Allergic Rhinitis %	Eczema n	Eczema %
6-10	245	14.7	256	15.3	153	9.2
11-14	111	12.8	124	14.3	72	8.3
15-18	43	6.8	51	8.1	43	6.8
Male	191	6.0	188	5.9	129	4.1
Female	208	6.6	243	7.7	134	4.2
Total	399	12.6	431	13.6	263	8.3

Table III. Prevalence of Asthma and Allergic Diseases

	n	Prevalence (%)	95% CI
Wheezing	602	19	17.6-20.4
Symptoms of wheezing in past 12 months	426	13.5	12.3-14.6
Breathlessness and wheezing	541	17.1	13.8-18.4
Symptoms of breathless wheezing in past 12 months	305	9.6	8.6-10.7
Prevalence of asthma	399	12.6	11.4-13.8
Asthma diagnosed by a physician	158	5.0	4.2-5.8
Attacks of asthma in past 12 months	109	3.4	2.8-4.1
•1-2	68	2.1	1.6-2.7
•3-4	29	0.9	0.6-1.3
>4	12	0.4	0.2-0.6
Sleep disturbed by wheezing in the last year	189	6.0	5.1-6.9
Wheezing after exercise in the last year	306	9.7	8.6-10.7
Severe attacks of wheezing limiting speech in the last year	115	3.6	3.0-4.3
Allergic rhinitis	431	13.6	12.4-14.8
Symptoms of allergic rhinitis in past 12 months	347	11.0	10.0-12.2
Rhinitis symptoms	2306	72.9	71.3-74.5
Symptoms of rhinitis in past 12 months	1964	62.1	60.4-63.8
Sinusitis diagnosed by a doctor	489	15.5	14.2-16.8
Sinusitis diagnosed in past 12 months	351	11.1	10.03-12.3
Eczema	263	8.3	6.4-10.2
Cumulative allergic disease	741	23.4	21.9-24.9

CI: confidence interval.

We found that there is a significant difference between the prevalence of asthma and ages of the children. Gender, passive smoking, paternal smoking habit, maternal smoking habit, one or more packs per day of cigarette smoking, residence, heating system, rhinitis history, allergic rhinitis and toys made of feathers were not important risk factors for asthma ($p>0.05$). The presence of domestic animals at home and dampness of the home were found to be important risk factors for asthma ($p<0.05$). Family histories of asthma, eczema, diagnois by a doctor and a history of frequent sinusitis were found to be significantly higher in asthmatics ($p<0.05$). The effects of some personal and environmental risk factors on the prevalence of asthma are shown in Tables IV and V.

Discussion

Asthma is a serious health problem in Turkey, as in the rest of the world. We investigated 3164 school-children living in randomly selected regions of Adana. The overall prevalence of asthma diagnosed by a doctor was 5.0%. Using the ISAAC method, we found the prevalence of asthma among 6-18 year-old children in Adanan to be 12.6%. In 1994, using a different method. Kendirli et al.[6] found the prevalence

Table IV. Personal Risk Factors Affecting Prevalence of Asthma

Factors	Asthmatics (n=399)	OR	95% CI		Logistic regression	P
Age (years): •6-10	245	2.34	1.57-2.92	1.68	1.06-2.66	S
•11-14	111	2.00	1.34-2.62	1.70	1.11-2.59	S
•15-18	43	1.00				
Gender: male/female	191/208	1.01	0.84-1.21			NS
Familial atopy	247	4.54	3.02-4.39	1.55	1.13-2.14	S
Eczema	185	29.78	8.20-11.09	14.93	10.39-21.45	S
Sinusitis history	124	2.96	2.04-2.98	1.71	1.22-2.38	S
Rhinitis history	367	4.89	3.00-6.07	0.99	0.55-1.79	NS
Allergic rhinitis	124	3.61	2.37-3.44	0.94	0.65-1.37	NS
Bronchitis	374	32.80	15.58-34.58	18.16	11.99-28.13	S

S: Significant ($p<0.05$), NS: Not significant ($p>0.05$), OR: Odds ratio, CI: Confidence interval.

Table V. Environmental Risk Factors Affecting Prevalence of Asthma

	Asthmatics (n=399)	OR	95% CI	Logistic regression		p
Smoking at home	300	1.53	1.23-1.90	1.34	0.98-1.83	NS
Paternal smoking habit	241	1.30	1.08-1.57	1.18	0.83-1.69	NS
Maternal smoking habit	95	1.07	0.83-1.38			NS
One more paks per day of cigarette smoking	237	1.51	1.21-1.88	0.88	0.63-1.22	NS
Dampness of home	136	2.19	1.81-2.64	1.56	1.14-2.12	S
Residence •Single house	235	1.33	1.10-1.60	0.98	0.75-1.30	NS
•Apartment	164	1.00				
Number of people living in home						
•6 or more	151	1.39	1.15-1.68	1.38	1.02-1.85	S
•5 or less	245	1.00				
Annual family income: •$3000 (USD)≤	234	1.57	1.26-1.95	1.40	1.06-1.85	S
•$3000 (USD)>	104	1.00				
Heating system						
•Stove (wood, oil, gas, or sawdust)	340	1.35	1.04-1.76	1.36	0.92-2.01	NS
•Central heating system						
•(Electrical air conditioning or furnace)	59	1.00				
Domestic animals at home	122	1.34	1.10-1.63	1.34	1.04-1.74	S
Toys made of feathers	107	1.18	0.92-1.50			NS

S: Signficant ($p<0.05$), NS: Not significant ($p>0.05$), OR: Odds ratio, CI: Confidence interval.

of asthma in Adana to be 12.9% in the 6-14 year-old age group. Kendirli et al. Previously reported the prevalences of asthma, rhino conjunctivitis, atopic dermatitis, and wheezing as 12.9%, 8.8%, 5.0%, and 8.4%, respectively. The rates of wheezing occasionally and during the previous year were found to be significantly higher than those in the studies conducted in Ankara and İstanbul[7,8]. The rate of asthma diagnosed by a doctor was found to be higher than that in a study made in Bochum[9] and lower than those determined in other studies[10,11], including those made in Ankara[7] and İstanbul[8]. Using the ISAAC method in İstanbul, in 1995, Öneş et al.[8] found the prevalence of asthma diagnosed by a doctor to be 9.8%; in 1996, Saraçlar et al., reported it as 8.1%. Our results showed that the rates of those children who had wheezed earlier and those who had wheezed during the last 12 months were found to be higher than those of other studies in Turkey that used the ISAAC method[7,8]. It was, however, found to be lower than those of the studies conducted in Germany, England, New Zealand and Australia[9].

Gender was not found to be an important risk factor for asthma in our study. But some studies have shown that being male was an important risk factor for asthma[10,12]. Age seems to be a significant risk factor in the development of asthma. We found that 6-10 year-old children had a higher prevalence of asthma than those of other ages and the risk was much less in 15-18 year-old children. The younger children are exposed to different allergens and infectious agents. Crain et al.[13] reported that 0-4 year-old children were at the highest risk for asthma. They were followed by the 12-17 year-old children and finally by the 5-11 year olds. On the other hand, Robertson et al.[14] showed that the risk of asthma decreased with age.

The presence of bronchitis, eczema, a family history of atopy, and sinusitis were also found to be significant risk factors affecting the prevalence of asthma. The role of the genetic factors in asthma is also important. Family histories of asthma, eczema, and diagnosis made by a doctor were found to be significantly higher in asthmatics. Passive smoking, parental smoking, and smoking more than one pack per day were not important factors. Keeping a domestic animal at home and dampness of home were found to be important risk factors for asthma as shown formerly by other studies[10]. Asthmatic patients, being prone to infections, are most likely to suffer from various respiratory diseases.

The socio-economic status of the family constituted a risk for asthma if the yearly income of the family was below $3000 (USD). Poor housing standard increased the risk of asthma if six or more people were living in cramped condition. We believe that a low socio-economic status affects a family by creating poor living conditions so that children may not be properly fed, receiving an insufficient and unbalanced diet. Furthermore, because treatment and follow-up are not available, infections may be frequent.

In conclusion, asthma is an important chronic disease of childhood. We believe that in order for a comparison of prevalence to be made between countries and regions, similar studies should be carried out. The role of genetic factors in the disease is known. Environmental factors are also important in the expression of asthma and asthmatic crises. With industrialization the world is being rapidly polluted. As the days go by, the importance and effects of these factors increase because of our increased exposure to industrial wastes and various chemical substances in our daily lives. We are of the opinion that the determination of these factors affecting the disease is important in raising the patient's quality of life.

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