

The prevalence of asthma and allergic diseases among adults 30-49 years of age in Bolu, Western Black Sea Region of Turkey

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Abstract

Aim. To determine the prevalence of asthma, asthma-like symptoms and allergic diseases among adults 30-49 years of age in regions of Bolu.

Materials and Methods. A questionnaire was given to families of students in schools in different areas of Bolu, Turkey. The European Community Respiratory Health Survey (ECRHS) and a questionnaire, including questions about the socioeconomic status and demographic characteristics of the participants, were responded to by 1403 people.

Results. The prevalence of symptoms and diseases were as follows: wheezing in the last year 12.0% (n=168), asthma 8.7% (n=121), doctor-diagnosed asthma 3.6% (n=50), currently taking drugs for asthma 1.2% (n=17), allergic rhinitis 16.5% (n=230), and eczema 9.6% (n=134). The risk factors for each symptom or disease were as follows: for wheezing: smoking in the house (odds ratio [OR]=2.43 and 95% Confidence Limits [95%CL]=1.53–3.86), living in a non-concrete building (OR=2.17, 95%CL=1.27–3.69); for asthma: mold in the house (OR=1.70, 95%CL=1.05–2.76), living in a shanty (OR=2.76, 95%CL=1.30–5.85), smoking in the house (OR=1.51, 95%CL=1.02–2.22); for allergic rhinitis: being female (OR=1.55, 95%CL=1.08–2.24), living in a shanty (OR=5.81, 95%CL=2.06–16.39), a monthly income below \$300 (OR=1.74, 95%CL=1.13–2.69).

Conclusions. A high rate of undiagnosed and untreated people with asthma among adults 30–49 years of age is present in Bolu. Especially, while a low socioeconomic level was observed to increase the risk of asthma and allergic rhinitis, risk of wheeze and asthma was found to be elevated by smoking in house. *Clin Ter 2014; 165(1):e59-63. doi: 10.7471/CT.2014.1673*

Key words: adulthood, asthma, prevalence

Introduction

Bronchial asthma is a chronic inflammatory disease of the airways that can cause serious morbidity and mortality (1). A difference in the prevalence of asthma and allergic diseases has been reported from countries close to each other (2) and even from different regions of a country (3). The effect of various factors such as socioeconomic level (4) and environmental allergens (5) that may affect the prevalence

of asthma and allergic diseases were studied. Studies have been performed which concentrate on the prevalence of asthma and allergic diseases in children (6) and adults (7) in different regions of Turkey. Bolu province is located in the Western Black Sea region of Turkey, surrounded by forests harboring a diverse flora, and having both rural and urban areas. The prevalence of asthma and allergic diseases among adults in this region is not yet known. The aim of this study was to investigate the prevalence of asthma and allergic diseases among adults 30-49 years of age, living in rural and urban areas, and the factors that could be causing these results.

Materials and Methods

Study population

This study was designed to determine the prevalence of asthma, asthma symptoms, allergic rhinitis, and eczema presented among adults 30-49 years of age living in rural and urban areas of the Bolu province. Bolu is a residential province of Turkey, situated in the Western Black Sea region with a population of 300,000 people. There were 70,000 people between the ages of 30-49 in this region 38,000 people in the 30-39 and 32,000 people between the ages of 40 and 49). In order to reach the data, schools with students in classes 1-11 were picked out. Five schools were chosen from rural and urban areas and each used for this randomized study. However, certain factors were taken into account while choosing the appropriate schools. Four of the schools representing urban areas were picked from the central district of Bolu and one from an urban district with the highest population. Urban schools were chosen from quarters with different socioeconomic levels. Students from rural areas were transported to those schools from various neighborhoods. Rural schools were picked out from different regions of Bolu. Two schools were chosen from a district close to the central district, one school was chosen from western districts, one school was chosen from eastern districts, and one school was chosen from the southern districts. This study was approved by Izzet Baysal University Faculty of

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Medicine Ethical Committee.

Questionnaire

The European Community Respiratory Health Survey (ESRCH) was used to determine the prevalence of asthma, allergic rhinitis, and asthma-like symptoms (8). Eczema status questions were added to the survey. Furthermore, the following questions were added to the questionnaire as well: age, education, occupation, smoking status of people in the household belonging to 30-49 age group, total population of the household, total number of children, monthly income of the family, the status of the house (apartment, detached house, or shanty), heating mode, fat type used in foods, number of days in a month with meals containing meat, presence of animals or plants in the house, and smoking within the house. The relativity of the family members to the student was as follows: mother, father, big brother, elder sister, uncle, mother's sister, father's sister, mother's brother, grandfather, and grandmother.

Statistical analysis

The Chi-square test was used to compare groups, and the t test and ANOVA test were used to analyze numerical variables. Logistic regression was used to investigate the association of two or more independent or predictor variables with a two-category (binary) outcome variable. A *p* value ≤ 0.05 were considered to be statistically significant.

Results

Demographic characteristics and overall prevalence of the responders

Eighty nine percent of 1,570 questionnaires were returned. The mean age and standard deviation (SD) of the study population was 39.1 ± 5.0 (Table 1).

Table 1. Demographic characteristics of the study population.

Parameters	Rural area	Urban area	Total
Median age and SD	38.8 ± 5.1	39.4 ± 4.8	39.1 ± 5.0
	Number of examinees		
Age group			
30–39	353	405	758
40–49	279	366	645
Gender			
Males	322	383	705
Females	309	389	698
Graduate			
Illiterate	29	19	48
Primary school	445	292	737
Secondary school	74	91	165
High school	61	203	264
University	22	167	189
Smoking status			
Never smoker	322	353	675
Occasionally smoker	13	31	44
Regular smoker	225	289	514
Former smoker	69	99	168
Total	632	771	1403

The prevalence of symptoms and diseases were as follows: wheeze in the past year was noticed in 168 patients (12.0%), asthma in 121 patients (8.7%), and asthma diagnosed by a doctor in 50 patients (3.6%), drugs for asthma currently took 17 patients (1.2%), allergic rhinitis in 230 patients (16.5%), and eczema in 134 patients (9.6%) examinees. Prevalence of wheezing with breathlessness in the past year, asthma, and allergic rhinitis were higher in the rural group than in the urban group ($p < 0.05$) (Table 2). Prevalence of allergic rhinitis was higher in female than in male subjects ($p < 0.05$).

Table 2. The prevalence of asthma, allergic rhinitis, eczema, and asthma-like symptoms in the study population.

Symptomatology	Percentage of examinees		
	Urban area	Rural area	Total
For wheeze (in the past year)			
Wheeze	77 (12.2)	92 (11.9)	169 (12.0)
Wheeze with breathlessness	53 (8.4)	90 (11.7*)	143 (9.9)
Wheeze without cold	38 (6.0)	52 (7.6)	90 (6.7)
Wheeze after exercise	49 (7.8)	79 (10.3)	128 (8.9)
Waking up by breathlessness	42 (6.7)	57 (7.4)	99 (7.1)
Waking up by an cough	189 (29.9)	25 (32.3)	214 (31.0)
For asthma			
Asthma diagnosis	45 (7.1)	82 (10.6*)	127 (8.7)
Asthma diagnosed by a doctor	18 (2.8)	34 (4.4)	52 (3.6)
Asthma attack in the past year	3 (0.4)	4 (0.5)	7 (0.4)
Currently taking drugs for asthma	6 (1.0)	11 (1.4)	17 (1.2)
Allergic rhinitis	92 (14.5)	147 (19.0*)	239 (16.5)
Eczema	58 (9.2)	77 (10.0)	135 (9.6)

Table 3. Factors affecting the prevalence of wheezing, asthma, allergic rhinitis, and eczema in the study population.

Parameters	Number of examinees	Wheeze No (%)	p values	Asthma No (%)	p values -	Allergic rhinitis (%)	p values -	Eczema No (%)	p values
Overall	1403	168(12.0)		122(8.7)		232(16.5)		135(9.6)	
Females	705	78(11.0)	>0.05	65(9.2)	>0.05	135(19.1)	0.012	68(9.7)	>0.05
Males	698	91(13.0)		57(8.2)		98(14.0)		66(9.4)	
Age									
30-39	758	76(10.0)	0.009	66(8.7)	>0.05	130(17.2)	>0.05	71(9.4)	>0.05
40-49	645	98(15.2)		56(8.7)		98(15.2)		61(9.5)	
Smoking in the house									
Absent	682	58(8.5)	<0.001	47(6.9)	0.018	111(16.2)	>0.05	60(8.8)	>0.05
Present	716	111(15.5)		75(10.5)		121(16.9)		70(9.8)	
Graduate									
Illiterate	48	11(22.9)	>0.05	6(12.5)	>0.05	17(35.4)	<0.001	10(20.8)	0.004
Primary	737	89(12.1)		72(9.8)		137(18.6)		81(11.0)	
Secondary	165	17(10.3)		15(9.1)		17(10.3)		16(9.7)	
High University	264	31(11.7)		15(5.7)		39(14.8)		16(6.1)	
	189	21(11.1)		14(7.4)		22(11.6)		11(5.8)	
Smoking status									
Never	675	62.1(9.2)	0.004	54(8.0)	>0.05	124(18.4)	>0.05	61(9.0)	0.02
Former	168	21(12.5)		9(5.4)		25(14.9)		26(15.5)	
Current	558	86(15.4)		59(10.6)		83(14.9)		47(8.4)	
Housetype									
Non-	1353	317(23.4)	0.015	345(25.5)	<0.001	576(42.6)	<0.001	130(9.6)	>0.05
Shanty	47	6(11.7)		4(8.1)		7(15.7)		3(6.4)	
Building type									
Concrete	1118	119(10.6)	0.001	88(7.9)	0.037	163(14.6)	<0.001	95(8.5)	0.01
Non-	280	50(17.9)		33(11.8)		69(24.6)		38(13.6)	
Mould in the house									
No	1208	135(11.2)	0.01	95(7.9)	0.011	187(15.5)	0.006	114(9.4)	>0.05
Yes	192	34(17.7)		26(13.5)		45(23.4)		19(9.9)	
Fuel source									
Wood	326	40(12.3)	>0.05	40(12.3)	0.005	77(23.6)	<0.001	43(13.2)	0.008
Coal	1063	125(11.8)		79(7.4)		153(14.4)		88(8.3)	
Income (monthly / \$)									
< 300	277	49(17.7)	0.001	29(10.5)	>0.05	73(26.4)	<0.001	37(13.4)	0.009
≥ 300	784	79(10.1)		65(8.3)		106(13.5)		63(8.0)	
Amount of meat consumption (monthly/daytime)									
< 6	527	81(15.4)	0.005	53(10.1)	>0.05	119(22.6)	<0.001	59(11.2)	>0.05
≥ 6	672	68(10.1)		56(8.3)		87(13.0)		60(8.9)	
Having stable beside the house									
No	975	115(11.8)	>0.05	97(9.9)	>0.05	201(20.6)	0.009	127(13.0)	0.003
Yes	423	51(12.0)		35(8.2)		63(14.9)		34(8.0)	

#p<0.05

The association between allergic diseases and potential risk factors

Living in a shanty and mould in the house were significantly associated with wheeze, asthma, and allergic rhinitis. A monthly income below \$300 and monthly meat consumption over six days were significantly associated with wheeze and allergic rhinitis. Having stable beside the house and being illiterate were associated with allergic rhinitis and eczema. Smoking in the house was significantly associated with wheeze and asthma, current smoking was associated with wheeze, and former smoking was associated with eczema. Using wood for heating was significantly associa-

ted with asthma, allergic rhinitis, and eczema. Living in a non-concrete building was associated with wheeze, asthma, allergic rhinitis, and eczema (Table 3).

The multiple logistic regression analyses for allergic diseases

The multiple logistic regression analyses were revealed risks factors for asthma and allergic diseases. For wheezing: smoking in the house (odds ratio [OR] = 2.43 and 95% Confidence Limits [95%CL] = 1.53–3.86), living in a non-concrete building (OR = 2.17, 95%CL = 1.27–3.69); for asthma: mold in the house (OR = 1.70, 95%CL = 1.05–2.76), living in a shanty (OR = 2.76, 95% CI =

Table 4. Multiple logistic regression analysis of risk factors for wheeze, asthma, allergic rhinitis, and eczema in the study population.

	Wheeze	Asthma	Allergic rhinitis
Parameters	OR (95%CL)	OR (95%CL)	OR (95%CL)
Gender			
Male	1.00	1.00	1.00
Female	0.91 (0.54-1.52)	1.40 (0.81-2.43)	1.55 (1.08-2.24)
Smoking in the house			
No	1.00	1.00	1.00
Yes	2.43 (1.53-3.86)	1.51 (1.02-2.22)	1.19 (0.81-1.78)
House type			
No shanty	1.00	1.00	1.00
Shanty	2.10 (0.70-6.02)	2.76 (1.30-5.85)	5.81 (2.06-16.39)
Building type			
Concrete	1.00	1.00	1.00
Non-concrete	2.17 (1.27-3.69)	1.12 (0.69-1.84)	1.39 (0.86-2.24)
Mold in the house			
No	1.00	1.00	1.00
Yes	1.51 (0.91-2.51)	1.70 (1.05-2.76)	1.24 (0.77-1.97)
Income (monthly)			
<300 dollars	1.49 (0.89-2.50)	1.19 (0.70-2.10)	1.74 (1.13-2.69)
≥300 dollars	1.00	1.00	1.00

95%CL = 95% Confidence Limits

1.30–5.85), smoking in the house (OR = 1.51, 95%CL = 1.02–2.22); for allergic rhinitis: being female (OR = 1.55, 95% CL=1.08–2.24), living in a shanty (OR = 5.81, 95%CL = 2.06–16.39), a monthly income below \$300 (OR = 1.74, 95%CL = 1.13–2.69) (Table 4).

Discussion

In the present study, the prevalence of asthma, asthma diagnosed by a doctor, and currently taking drugs for asthma were 8.7%, 3.6% and 1.2% respectively. The prevalence of allergic rhinitis and eczema was 15.8% and 9.6% respectively. A significant difference between prevalence of wheezing and asthma was reported by studies carried out on the adult population of Turkey in the province Manisa in the western region (7), Samsun in the Northern regions (9), Ankara (10) and Sivas (11) in the Central Anatolia region, and in study carried out by Emri et al. (12) over central districts of five provinces. These results had been interpreted as the presence of a high rate of undiagnosed and untreated asthma patients among adults. While the wheezing prevalence was higher Emri et al. (12) study than that of this study, asthma prevalence was lower. In a study carried out in the eastern provinces of the country, the prevalence of asthma and asthma-like symptoms were reported to be close to each other and our study gave a similar result. The prevalence of asthma and allergic symptoms were reported to be higher in people living in urban areas (13). However, on the contrary, our study showed a higher prevalence of asthma and allergic rhinitis in people who live in urban areas than the rural people. This difference may be due to differences between the two regions in terms of geographical conditions, climate, and socioeconomic status. In Antalya, a coastal city in the

southern region of the country, allergic rhinitis prevalence was significantly high (1). According to this study, prevalence of allergic rhinitis in Bolu was low, and prevalence of asthma was at the same level. In our study, the difference between the prevalence of wheeze and asthma was lower than all these studies. However, prevalence of asthma was more than two-fold of the prevalence of asthma diagnosed by a doctor, and the prevalence of people currently using asthma drugs was significantly low. We believe that the prevalence of undiagnosed and untreated asthma in our region is high, although it is lower than those of other regions in Turkey.

According to multivariate analysis; risk of wheeze was elevated in people who live in buildings made of non-concrete. Risk of allergic rhinitis and asthma was increased in people who live in a shanty; risk of asthma was increased in people whose houses contain mold, and risk of allergic rhinitis was increased in people with low monthly income. All those factors were an indicator of a low socioeconomic status. Asthma and allergic rhinitis occur commonly in people with a low socioeconomic level. In a study conducted by Basagana et al. comprising 32 areas in 15 countries, mostly European, higher prevalence of asthma was reported in people with low socioeconomic status (4). Salmond et al. reported an association between increased asthma prevalence and area deprivation (14). The result of our study had results similar to those two studies. Another risk factor in our study was smoking. Smoking in the house was determined to be a risk factor for wheeze and asthma. Morfin-Maciel et al. reported parents smoke in the house as a risk factor for exposed children and adolescents to suffer from wheezing (15). In another study, risk of wheeze was reported to be increased in children and adolescents exposed to smoking in the house (16). In agreement with those two

studies, our study showed that risk of wheeze was elevated due to smoking in the house in adults ages 30-49, as well.

In conclusion, prevalence of allergic rhinitis among adults 30-49 years of age was high in our province. Compared to other similar studies, the prevalence of asthma, asthma-like symptoms, and eczema were at a moderate level. A significant difference in the prevalence of asthma, asthma diagnosed by a doctor, and currently taking drugs for asthma probably indicates the presence of undiagnosed and untreated asthma patients. The results of this study also indicate that a low socioeconomic level increases the risk of asthma and allergic rhinitis, and smoking in the house elevates the risk of wheeze.

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