
Prevalence of asthma and respiratory symptoms by age, gender and smoking behaviour in Samsun, North Anatolia Turkey

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ÖZET

Kuzey Anadolu'da bulunan Samsun'da sigara, cins ve yaşa göre solunumsal semptomlar ve astımın prevalansı

Astım, tüm dünyada olduğu gibi ülkemizde de bilinen önemli sağlık problemlerinden birisidir. Türkiye'nin Orta Karadeniz bölgesinin bir ili olan Samsun'da, yetişkinlerdeki astım prevalansını saptayan bir çalışma yapılmamıştır. Çalışmamızın amacı bölgemizdeki astım prevalansı, astım benzeri semptomlar, bunların yaş, cins ve sigara içme alışkanlıklarıyla ilişkilerini araştırmaktır. Kasım-Aralık 2002 tarihleri arasında "European Respiratory Community Health Survey (ERCHS)" sorularından yararlanılarak hazırladığımız anket formu, seçilen kişilere yüz-yüze görüşme metoduyla sağlık ocağı çalışanları tarafından uygulandı. Çalışma Samsun merkez ilçede yaşayan 15 yaş ve üstündeki 1916 kişiye uygulandı. Bunlardan 810 (%42.3)'u erkek, 1106 (%57.7)'si kadın idi. Çalışmaya katılanların yaş ortalaması 37.8 ± 15.5 yıl idi. Astım tanısı %2.7, astım için ilaç kullanımı %2.2, son 12 ay içinde wheezing %15.5, son 12 ay içinde nefessizlikle beraber wheezing oranı %11.6 olarak bulundu. Yaş grubu arttıkça semptom görülme oranları artmakta idi ($p < 0.0001$). Tanı konulmuş astım prevalansı, kadınlarda erkeklere göre daha yüksek ($\chi^2 = 5.16$ $p < 0.05$) idi. Sabah öksürüğü, gün boyu öksürük, kronik öksürük, balgamlı öksürük ve öksürükle uyanma erkeklerde daha fazla saptandı ($p < 0.01$). Astım semptomlarının görülme sıklığı, sigara içenlerde içmeyenlere göre anlamlı derecede yüksek bulundu ($p < 0.001$). Sonuç olarak çalışmamızda, astım tanısı ve tedavi prevalansının düşük olduğu ve astımla ilişkili semptomların fazla olduğu gözlemlendi. Sigara içiminin bu semptomları arttırdığı belirlendi.

Anahtar Kelimeler: Wheezing, öksürük, astım, prevalans, sigara, Türkiye.

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SUMMARY**Prevalence of asthma and respiratory symptoms by age, gender and smoking behaviour in Samsun, North Anatolia Turkey**Hasan HAMZAÇEBİ¹, Meftun ÜNSAL², Servet KAYHAN³, Salih BİLGİN³, Saliha ERCAN³¹ Department of Public Health, Hospital of Chest Diseases, Samsun, Turkey,² Department of Chest Diseases, Faculty of Medicine, Ondokuz Mayıs University, Samsun, Turkey,³ Hospital of Chest Diseases, Samsun, Turkey.

Asthma is a major health problem worldwide. This is the first study determining the prevalence of asthma among adults in Samsun which is situated in the centre of the Black Sea region of Turkey. The aim of our study was to assess the prevalence of asthma and asthmatic symptoms, and the relationships of these with age, gender and smoking behaviour in this region. A questionnaire interview adapted from the European Respiratory Community Health Survey (ERCHS) was performed by health centre officers with selected people between November-December, 2002. The study population included a total of 1.916 [810 men (42.3%) and 1.106 women (57.7%)] inhabitants of Samsun city center, aged 15 years of age or above. The mean age was 37.8 years \pm 15.5, the prevalence of asthma was 2.7%, receiving asthma medicine was 2.2%, the prevalence of wheezing in the last 12 months was 15.5% and shortness of breath with wheezing was 11.6%. The frequency of symptoms was higher among the elderly population when compared to other groups ($p < 0.0001$). Asthma diagnosis by a physician was more frequent among women ($\chi^2 = 5.16$, $p < 0.05$). Morning cough, day time cough, chronic cough, phlegmy cough and waking up with cough symptoms were more frequent among the smokers ($p < 0.001$). Asthma diagnosis and asthma treatment are at a very low level compared to reported asthma related symptoms.

Key Words: Wheezing, cough, asthma, prevalence, smoking, Turkey.

Bronchial asthma is a chronic disease which is commonly observed. The prevalence of this disease is increasing steadily, particularly in European countries (1,2). However, the occurrence of the disease may be stable in some countries (3). These differences among researchers may be due to methods of asthma diagnosis.

The epidemiological definition of asthma has not been updated recently. The methods of asthma diagnosis are: Questionnaire, peak expiratory flow measurements by physicians, bronchial provocation tests, hospital and Health Ministry registrations and mortality documents (3). Most researchers have used the "European Respiratory Community Health Survey (ERCHS)" questionnaire method to determine asthma prevalence (4-6). Generally, the prevalence of asthma differs among countries and in the regions of the same country. The factors causing regional differences include the climate, living conditions, air pollution and environmental factors. The prevalence of asthma has been investigated across

the world and in specific regions of Turkey among adults and children (7-12). Most of the studies used the wheezing symptom as an indicator of asthma. When we evaluate the studies according to asthma symptoms; wheezing prevalence in Norway is 36.1%, 2.7% in Chin, 39.1% in Ankara, Turkey and 11.2% in Trabzon, Turkey (6,10,11,13).

This study was planned to investigate the prevalence of asthma symptoms among the adult inhabitants of Samsun, a city situated on the central coast of Turkey's Black Sea region, as related to age, gender, and smoking habits.

MATERIALS and METHODS**Study Population and Study Region**

The study population included a sample of the inhabitants of Samsun, at or above 15 years of age. Samsun, with a current population of 462.000 has a mild climate. The population at 15 years and above in 2002 was 357.309 (14). The sample group included in the study was randomized according to the group sample method

with regard to age group and gender. Each regional primary healthcare center population was accepted as a single group. A total of 2.160 persons at or above 15 years of age participated in the ERCHS questionnaire.

Study Design

This was a cross-sectional study, including a short questionnaire adapted from ERCHS and given to interviewees between October and December 2002 by trained officers of a health care center in face to face interviews. From a total of 2160 forms, 1916 (88.7%) were answered. We then determined prevalence of asthmatic symptoms. Furthermore, smoking behaviour was typed as smoker, ex-smoker and non-smoker. Asthma symptoms were then compared with smoking behaviour, smoking frequency (number of cigarettes/day), age and gender.

Statistical Analysis

The Epi-Info Package programme was used during evaluation of the statistical results. Findings are stated as the mean \pm standard deviation. The Student's t-test and Chi-Square test were used to analyze results. At the 95% confident interval, a values of $p < 0.05$ was considered statistically significant. Persons excluded from the study were those who declined the interview or couldn't be found at their address during the study period.

RESULTS

The age range of 1916 people who participated in the study was 15-85 years, with a mean age of 37.8 years \pm 15.5. The number of the males was 810 (42.3%) and females was 1106 (57.7%). The age range of the male group was 15-78 years and that of the female group was

15-85 years, while the mean age of the male group was 38.5 years \pm 15.4 and females was 37.2 years \pm 15.5. There was no significant difference between male and female groups' ages ($t = 1.84$, $p > 0.05$). Also according to age groups, male and female distribution was not significant ($p > 0.05$)(Table 1).

Among the women, housewife as the occupation was 891(80.6%). Among the men, occupation included tradesman 276 (34.1%), retired 111 (13.7%), and government officer 108 (13.3%). None of the study group had an occupation which involved an asthma disease risk (Table 2).

Table 3 shows the asthma diagnosis in both genders, asthma in family members, use of medicine for asthma (oral, inhaler or parenteral) and frequency of respiratory symptoms.

Diagnosis of asthma disease, any asthma in family members, and use of medicine for asthma were 2.7%, 4.6% and 2.2%, respectively.

Morning cough, day time cough, chronic cough, phlegm cough and waking up with cough in the previous 12 months were 18.1%, 12.7%, 10.6%, 11.2%, and 10.5%, respectively.

Wheezing in the previous 12 months, wheezing with breathlessness in the last 12 months and waking up with shortness of breath in last 12 months were 15.5%, 11.6% and 11.2% respectively. Asthma diagnosis was significantly higher among women (3.4%) than men (1.7%) ($p < 0.05$).

There was no significant difference among gender, any asthma diagnosis of family members, use of medicine for asthma, wheezing in the last 12 months, wheezing with breathlessness, and waking up with shortness of breath in the last 12 months ($p > 0.05$).

Table 1. Distribution of studied persons by age group and gender.

Age groups	Men*		Women*		Total	
	n	%	n	%	n	%
15-29	275	33.9	430	38.9	705	36.8
30-49	334	41.2	431	38.9	765	39.9
50 and +	201	25.9	245	22.2	446	23.3
Total	810	42.3	1106	57.7	1916	100.0

* $\chi^2 = 5.11$, $p = 0.078$

Table 2. Occupational distribution of study group.

Occupation	Men		Women		Total	
	n	%	n	%	n	%
Housewife	-	-	891	80.6	891	46.5
Tradesman	276	34.1	20	1.8	296	15.4
Government officer	108	13.3	48	4.3	156	8.1
Worker	70	8.6	15	1.4	85	4.4
Retired	111	13.7	42	3.8	153	8.0
Unemployed	33	4.1	10	0.9	43	2.2
Farmer	44	5.4	11	1.0	55	2.9
Student	81	10.0	65	5.9	146	7.6
Other	87	10.7	4	0.4	91	4.7
Total	810	100.0	1106	100.0	1916	100.0

The symptoms of morning cough, day time cough, chronic cough, phlegm cough and waking up with cough in the last 12 months were higher among the men than women. This was statistically significant ($p < 0.01$) (Table 3).

When symptoms were analysed according to age groups, the ratio of asthma diagnosis, use of medicine for asthma, morning cough, day time cough, chronic cough, phlegm cough waking up with cough in the previous 12 months, wheezing

Table 3. Distribution of symptoms according to gender.

Symptoms	Men (n= 810)	Women (n= 1106)	Total (n= 1916)	χ^2	p	OR (95% CI)*
Asthma diagnosis	14 (1.7%)	38 (3.4%)	52 (2.7%)	5.16	< 0.05	0.49 (0.25-0.95)
Asthma in family members	35 (4.3%)	53 (4.8%)	88 (4.6%)	0.24	> 0.05	0.90 (0.57-1.42)
Use of medicine for asthma	12 (1.5%)	30 (2.7%)	42 (2.2%)	3.30	> 0.05	0.54 (0.26-1.10)
Morning cough	192 (23.7%)	155 (14.0%)	347 (18.1%)	29.6	< 0.001	1.91 (1.50-2.43)
Daytime cough	135 (16.7%)	109 (9.9%)	244 (12.7%)	19.5	< 0.001	1.83 (1.38-2.42)
Chronic cough	105 (13.0%)	99 (8.9%)	204 (10.6%)	7.9	< 0.01	1.51 (1.12-2.05)
Phlegm cough	131 (16.2%)	83 (7.5%)	214 (11.2%)	35.4	< 0.001	2.38 (1.76-3.22)
Waking up with cough in the last 12 months	103 (12.7%)	98 (8.9%)	201 (10.5%)	7.4	< 0.01	1.5 (1.11-2.03)
Wheezing in the last 12 months	130 (16.0%)	167 (15.1%)	297 (15.5%)	0.32	> 0.05	1.07 (0.83-1.39)
Wheezing with breathlessness in the last 12 months	91 (11.2%)	132 (11.9%)	223 (11.6%)	0.22	> 0.05	0.93 (0.70-1.25)
Waking up with shortness of breath in the last 12 months	78 (9.6%)	137 (12.4%)	215 (11.2%)	3.57	> 0.05	0.75 (0.56-1.02)

* OR= Odds ratio, CI= Confidence interval.

in the previous 12 months, wheezing with breathlessness in the last 12 months, waking up with shortness of breath in the last 12 months, all increased when correlated with increasing age groups. The symptoms were most common among the group older than 50 years of age. This difference was highly significant ($p < 0.0001$) (Table 4). However according to the age groups the ratio of asthmatic family members was not significantly different ($p > 0.05$) (Table 4).

Table 5 shows, the distribution of asthma diagnosis according to smoking habits, the ratio of asthma in family members, use of medicine for asthma and respiratory symptoms. The incidence of the following were higher among the ex-smoker group than non-smokers: asthma diagnosis, use of medicine for asthma, wheezing in the last 12 months, wheezing with breathlessness in the last 12 months, and waking up with shortness of breath in the last 12 months. The differences were statistically significant. The incidence of morning

cough, daytime cough, chronic cough, phlegm cough, and waking up with cough in the last 12 months were higher among the smokers than non-smokers. The results were highly significant ($p < 0.0001$) (Table 5).

Table 6 illustrates the frequency of symptoms according to the number of cigarettes smoked by smokers in the study group. The incidence of morning cough, daytime cough, chronic cough, phlegm cough, waking up with cough in the 12 months, wheezing in the last 12 months, and wheezing with breathlessness in the last 12 months was higher among the 20 + cigarettes /day group than the other (1-9, 10-19) groups. An increase in the number of cigarettes smoked /day resulted in an increase in symptoms and this was highly significant ($p < 0.001$). The symptom of waking up with shortness of breath in the last 12 months was higher among the 20+ cigarettes/day group than the other (1-9, 10-19) groups cigarette ($p < 0.05$) (Table 6).

Table 4. Distribution of the symptoms according to age groups.

Symptoms	Age groups			Total (n= 1916)	χ^2 (p)
	15-29 (n= 705)	30-49 (n= 765)	50+ (n= 446)		
Asthma diagnosis	7 (1.0%)	20 (2.6%)	25 (5.6%)	52 (2.7%)	25.62 (0.00000)
Asthma in family members	28 (3.9%)	39 (5.1%)	21 (4.7%)	88 (4.6%)	1.08 (0.583)
Use of medicine for asthma	7 (1.0%)	14 (1.8%)	21 (4.7%)	42 (2.2%)	18.37 (0.0001)
Morning cough	78 (11.1%)	143 (18.7%)	126 (28.3%)	347 (18.1%)	54.70 (0.00000)
Daytime cough	60 (8.5%)	96 (12.5%)	88 (19.7%)	244 (12.7%)	30.99 (0.00000)
Chronic cough	43 (6.1%)	76 (9.9%)	85 (19.1%)	204 (10.6%)	48.9 (0.00000)
Phlegm cough	42 (5.9%)	92 (12.0%)	80 (17.9%)	214 (11.2%)	40.46 (0.00000)
Waking up with cough in the last 12 months	47 (6.7%)	81 (10.6%)	73 (16.4%)	201 (10.5%)	27.39 (0.00000)
Wheezing in the last 12 months	69 (9.8%)	117 (15.3%)	111 (24.9%)	297 (15.5%)	47.6 (0.00000)
Wheezing with breathlessness in the last 12 months	51 (7.2%)	83 (10.8%)	89 (19.9%)	223 (11.6%)	43.76 (0.00000)
Waking up with shortness of breath in the last 12 months	37 (5.2%)	92 (12.0%)	86 (19.3%)	215 (11.2%)	54.84 (0.00000)

Table 5. Distribution of respiratory symptoms in the study population according to their smoking behaviour.

Symptoms	Smoking behavior			χ^2 (p)
	Non-smoker (n= 1120)	Ex-smoker (n= 184)	Smoker (n= 612)	
Asthma diagnosis	28 (2.5%)	12 (6.5%)	12 (1.9%)	11.61 (0.003)
Asthma any family members	50 (4.5%)	10 (5.4%)	28 (4.6%)	0.34 (0.843)
Use of medicine for asthma	26 (2.3%)	8 (4.3%)	8 (1.3%)	6.31 (0.0426)
Morning cough	124 (11.1%)	28 (15.2%)	195 (31.9%)	116.501 (0.0000)
Daytime cough	86 (7.7%)	27 (14.7%)	131 (21.4%)	67.79 (0.0000)
Chronic cough	78 (6.9%)	17 (9.2%)	109 (17.8%)	49.36 (0.0000)
Phlegm cough	72 (6.4%)	19 (10.3%)	123 (20.1%)	74.68 (0.0000)
Waking up with cough in the last 12 months	80 (7.1%)	15 (8.1%)	106 (17.3%)	44.84 (0.000)
Wheezing in the last 12 months	128 (11.4%)	42 (22.8%)	127 (20.7%)	34.60 (0.0000)
Wheezing with breathlessness in the last 12 months	107 (9.6%)	31 (16.8%)	85 (13.9%)	12.60 (0.0018)
Waking up with shortness of breath in the last 12 months	120 (10.7%)	33 (17.9%)	62 (10.1%)	9.34 (0.0093)

Table 6. Distribution of respiratory symptoms in the study population according to the number of cigarette smoked/day in smoker group.

Symptoms	Cigarette number/day			Total (n= 524)	χ^2 (p)
	1-9 (n= 163)	10-19 (n= 106)	20+ (n= 255)		
Morning cough	23 (14.1%)	29 (27.4%)	106 (41.6%)	158 (30.2%)	36.09 (0.00000)
Daytime cough	18 (11.0%)	18 (17.0%)	75 (29.4%)	111 (21.2%)	21.50 (0.00002)
Chronic cough	15 (9.2%)	15 (14.2%)	64 (25.1%)	94 (17.9%)	18.36 (0.0001)
Phlegm cough	16 (9.8%)	13 (12.3%)	73 (28.6%)	102 (19.5%)	26.84 (0.00000)
Waking up with cough in the last 12 months	16 (9.8%)	12 (11.3%)	58 (22.7%)	86 (16.4%)	14.63 (0.00067)
Wheezing in the last 12 months	22 (13.5%)	14 (13.2%)	73 (28.6%)	109 (20.8%)	18.47 (0.00009)
Wheezing with breathlessness in the last 12 months	15 (9.2%)	6 (5.7%)	52 (20.4%)	73 (13.9%)	17.96 (0.00012)
Waking up with shortness of breath in the last 12 months	12 (7.4%)	6 (5.7%)	33 (12.9%)	51 (9.7%)	6.03 (0.04900)

DISCUSSION

The prevalence of asthma with respect to respiratory symptoms has been investigated frequently in both childhood and adulthood periods. There is as yet no consensus about a standard method to detect the prevalence of asthma. Consequently, the comparison of different countries' data about prevalence of asthma is difficult. To obtain standardised information about

asthma prevalence, two epidemiological studies which included many countries were undertaken. These were the "International Study of Asthma and Allergies in Childhood Health Survey (ISAAC)" for children and ERCHS for adults. The results of these two studies were announced a short time ago (15). The questionnaire for this study which was adapted from ERCHS, has been used in many studies and has differences

with regard to application in various countries. These differences originate from the social, cultural and educational levels of the studied persons and also from the different persons applying this questionnaire.

The authors view is that the training of interviewers and application of the questionnaire as a face-to-face interview would decrease these differences slightly. It was also understood that using symptoms in asthma diagnosis without including objective criteria would cause confusion in diagnosis (16).

The prevalence of asthma in Western European countries varies between 10 to 20% and it is gradually increasing (17). In Turkey, this percentage varies between 1.5 and 5.1% (18). In this study, asthma related respiratory symptoms were higher among the 50 years of age and older group than the others. This was highly significant ($p < 0.0001$) (Table 4). This result may be attributable to degenerative changes of the respiratory tract through aging and the comorbidity of chronic pulmonary diseases and heart failure in geriatrics (19). Asthma was diagnosed in 2.7% of the study population, and it was lower among males (1.7%) than females (3.4%). This result is supported by the higher prevalence of asthma in adult females than males (17,20).

This study determined the respiratory symptoms of wheezing in the last 12 months (15.5%), and wheezing with breathlessness in the last 12 months (11.6%). Akkurt et al. study found that wheezing in the last 12 months was 20.9% and wheezing with breathlessness in the last 12 months was 15.2% (12). In reference studies, the symptom of wheezing with breathlessness in the last 12 months was determined to be from 20.9 to 26% (5,9,12,21).

According to this study, the frequency of morning cough, daytime cough, chronic cough, phlegmy cough, waking up with cough in the last 12 months, and waking up with shortness of breath in the last 12 months were 18.1, 12.7, 10.6, 11.2, 10.5, and 11.2% respectively. Eagan et al. study stated morning cough, daytime cough, chronic cough and phlegm cough to be 24.9, 15.1, 12.2 and 23.6%, respectively (13).

The study showed the prevalence of asthma in adults was similar in both current smokers and the general population. Asthma prevalence was 17-35%, the symptoms of asthma were more severe and asthma attacks were much more frequent among current smokers (22,23). In smokers, asthma was diagnosed at 1.9%, wheezing in the last 12 months (20.7%), and wheezing with breathlessness in the last 12 months (13.9%). Morning cough, daytime cough, chronic cough and phlegm cough were 31.9, 21.4, 17.8 and 20.1%, respectively. In ex-smokers asthma diagnosis was 6.5%, wheezing in the last 12 months was 22.8% and wheezing with breathlessness in the last 12 months was 16.8%. These findings were higher than for current smokers and non-smokers (Table 5).

A higher prevalence of asthma among ex-smokers has been found in several studies (22,24). However, current smoking involves an important risk which could lead to asthma in future. It is likely that subjects perceive chronic obstructive pulmonary disease as asthma, hence the relationship between smoking cessation and asthma might be due to misclassification rather than causality (25).

The frequency of symptoms in those smoking 20 cigarettes or more/day were wheezing in the last 12 (28.6%) months, wheezing with breathlessness in the last 12 (20.4%) months, morning cough (41.6%), daytime cough (29.4%), chronic cough (25.1%), phlegm cough (28.6%), and waking up with cough in the last 12 (22.7%) months. This study determined more respiratory symptoms in relation to increasing number of cigarettes smoked (Table 6). It was stated that the frequency of asthma, dyspnea and wheezing attacks related with asthma appeared to increase with the cumulative number of cigarettes per day (17).

Many studies have stated that smoking increases severity of airway inflammation and related respiratory system complaints in asthmatics, as well as in normal people (6,13). In this study, it was observed that asthma diagnosis and subsequent asthma therapy were low compared to the high prevalence of asthma related symptoms. Furthermore, when the symptoms of asthma are evaluated, smoking behaviour is highly relevant.

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