The prevalence of allergic rhinitis in adults in Aydin, Turkey*

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SUMMARY

Background: Allergic rhinitis is the most common allergic disease in Turkey. Our objective was to determine the prevalence of allergic rhinitis among adults living in Aydın, Turkey.

Methods: *A population-based survey was undertaken among adults aged 16-64 years. Allergic rhinitis was confirmed in the subjects screened positive by the clinical examination and specific immunoglobulin E testing.*

Results: *A total of 465 interviews were conducted in spring 2005. The prevalence of allergic rhinitis in the past 12 months was 14.0%. The prevalence rate of clinically confirmable AR was computed as 11.4%. The prevalence was significantly higher among females and in urban areas. Specific IgE were detected for at least one of tested aeroallergens in 34.8% of the subjects with self-reported AR.*

Conclusion: *Our study revealed that the prevalence of allergic rhinitis among adults living in the city of Aydın was as high as the prevalence in other regions of Turkey but less than in Europe.*

Key words: Allergic rhinitis, prevalence, adults, Turkey

INTRODUCTION

Allergic rhinitis (AR) is a common condition worldwide affecting 5-40% of the general population, depending on the area and the age of the patients [1-8]. It represents an important social and medical problem in many industrialised and developing countries [8,9]. New national and multinational studies are rapidly improving epidemiological data with regards to its distribution, possible risk factors and natural history [8]. Although AR has a high prevalence, it remains largely undiagnosed [10]. The European Community Respiratory Health Survey (ECRHS) found that the overall prevalence of AR was 21% among adults in Europe [11]. In Western Europe, the prevalence of subjects with clinically confirmable allergic rhinitis ranged from 17% in Italy to 29% in Belgium, with an overall value of 23% [12]. Although there are some recent reports suggesting that the prevalence of AR has levelled off in some European countries [13], there is growing evidence that its prevalence is increasing [1,5,8,9,13].

Allergic rhinitis is the most common allergic disease in Turkey [14]. Most of the epidemiologic studies about AR prevalence in Turkey have been conducted among children and adolescents in the schools in recent years. The prevalence of AR among children and adolescents varies between 8% and 65% depending on the definition criteria, self-reported or current symptoms, and to the geographic regions of the country [6,9,15,16]. A few studies have shown a prevalence of 9-21% in adults in various parts of our country [17].

Our present knowledge of prevalence and risk factors for AR is based mainly on questionnaire data. Several validated written questionnaires have been used in epidemiological studies [18]. Although the International Study of Asthma and Allergies in Childhood (ISAAC) questionnaire for rhinitis has been used widely among children [18], it does not compute any quantitative score for AR. It has been shown that quantitative scores are more informative than dichotomous variables in characterization of the disease [19].

For this reason, a quantitative score for AR (SFAR) has been proposed that can be useful in estimating prevalence and to study causation of AR in population settings. The SFAR questionnaire includes a minimum list of reliable questions about AR (Table 1). Compared with the ISAAC questionnaire, the SFAR could compute a quantitative diagnostic criteria score for differentiation between AR and other nasal problems such as infectious, occupational, drug-induced, hormonal or idiopathic rhinitis in the absence of a doctor's diagnosis. It has been found that the SFAR has a higher positive predictive value, sensitivity and specificity than the ISAAC questionnaire on rhinitis [19].

Table 1. Prevalence of rhinitis and related symptoms among adults aged 16-64,
as determined by using the Score For Allergic Rhinitis (SFAR) questionnaire.

Question	Male (n=192)	Female (n=272)	All (n=464)
1. Nasal symptoms (blocked nose, runny nose, sneezing) in the past 12 months	25.0	42.3*	35.1
2. Nasal symptoms accompanied by itchy-watery eyes	15.1	26.8*	21.9
3. Months of the year:			
Perennial	17.1	24.3	21.3
Spring (pollen season)	8.8	18.8	14.6
Other (Winter, Summer and Autumn)	2.6	4.4	3.6
4. Trigger factors provoking or increasing nose problem			
(house dust, house dust mites, pollens, cat, dog etc.)	15.1	29.0*	23.3
5. Perceived allergic status	16.1	24.6*	21.1
7. Previous medical diagnosis of allergy	9.9	15.4	13.1
8. Family history of allergy	19.3	25.7	23.1
Global score (SFAR ≥ 7)†	8.8	17.6*	14.0

Data are expressed as the percentage of the total in each column. * Significantly higher comparing gender ($p < 0.05$; chi-squared test).
† Global score was obtained by summing each question score (see text).

In the present study, we have estimated the prevalence and some epidemiologic aspects of AR in adult people of the central region of the city of Aydın, Turkey.

MATERIAL AND METHODS

Study design
The study was cross-sectional and population-based. A random sample of 470 individuals aged 16-64 years, representing the general adult population of the central region of Aydın, Turkey was identified by using health centres as sampling units. Consent was obtained from the Aydın Provincial Department of Health. A standardized questionnaire, the Score For Allergic Rhinitis (SFAR), defined by Annesi-Maesano et al. [19] was used to estimate the prevalence of AR in spring 2005.

Appropriate methodology was applied to estimate the size of the sample. To obtain a sample representative of the general population, the persons to be interviewed were randomly selected according to household-based records of the health centres in the region. Within each household, a person was randomly selected according to a pre-set procedure. Besides, a substitute person was determined from the same or the next household for each person using the same method. When the person selected in the household was absent at home or his/her working place, the substitute person was interviewed.

Interviews took place typically during weekdays out of working hours and during the weekend. The defined individuals were visited at their homes or working places and invited to participate in the study. Five interviewers filled in the questionnaires. After completing the questionnaire, the interviewers attributed scores to the answers to each question and a global score was calculated for each subject. The SFAR ranged between 0 and 16. A total of 465 subjects responded. All subjects having SFAR ≥ 7 were invited to participate in a clinical investigation (65 individuals).

Clinical examination
An Ear-Nose-Throat (ENT) specialist (S.B) interviewed and examined all subjects who participated in the clinical study without knowing the questionnaire responses at the ENT department of Adnan Menderes University Hospital in Aydın. She was instructed to establish a clinical diagnosis according to her usual practice. The specialist prescribed serum immunoglobulin E (IgE) antibodies against common aeroallergens for all subjects. Blood samples were taken during the examination and sent to the central laboratory of the University Hospital for IgE testing. Subjects were not compensated for participating in the clinical study.

Specific IgE
The Allergie EUROLINE Inhalation (EUROIMMUN Medizinishe Labordiagnostika AG) was used to assay IgE antibodies against common airborne allergens – sweet vernal grass, cocksfoot, timothy grass, cultivated rye, alder, birch, hazel, oak, common ragweed, mugwort, plantain, D. Pteronyssinus, D. Farinae, cat, dog, horse, Cladosporium herbarum, Aspergillus fumigatus and Alternaria alternata. The test value greater than 0.35 kU/l was regarded as positive.

Statistics
In the study, Pearson chi-square test, McNemar test and student-t test were used and a p-value of < 0.05 was considered significant.

Ethics
The ethics committee of the Medical School of Adnan Menderes University approved the study. Informed consent was obtained from all subjects participating in the clinical study.

RESULTS
Information was obtained from 465 subjects aged 16-64 years, 58.5% of them women and 41.5% men. Among the 465 individ-

uals interviewed, 65 had a SFAR ≥ 7. The mean age of the subjects was 38.7 ± 12.9. There was no significant difference between the mean ages of individuals with AR and those without (37.9 ± 11.5 and 38.9 ± 13.1, respectively).

When considered a SFAR ≥ 7 as the cut-off value that optimally discriminated between individuals with AR and those without [16], estimated 12-month prevalence rate of AR was 14.0% [95%CI: 10.8-17.2]. The prevalence of AR was significantly higher among females, as compared with males (17.6% and 8.8%, respectively) ($\chi^2 = 7.335$, p = 0.007, Table 1). Of the 363 subjects living in urban areas 58 had positive questionnaires. The prevalence rate was 16.0% (58/363). In rural areas the prevalence of self reported AR was 6.9% [7/102]. The self reported AR was higher in urban areas ($\chi^2 = 5.50$, p = 0.019).

We estimated some epidemiologic aspects of AR by using the qualitative questions in the SFAR questionnaire. The prevalence of nasal symptoms in the past 12 months was 35.1%. The prevalence was higher among females than among males ($\chi^2 = 14.74$, p < 0.001, Table 1). The prevalence of ocular symptoms associated with nasal symptoms was 21.9%. The prevalence among females was higher than among males ($\chi^2 = 9.03$, p = 0.003, Table 1).

Almost half of nasal symptoms was perennial and the highest frequency of seasonal nasal symptoms was found in the pollen months of the year, from March to May, with no difference according to gender (p > 0.01, Table 1).

Trigger factors provoking or increasing nose problem, such as house dust, house dust mites, pollens and epithelia were significantly more prevalent among females than among males ($\chi^2 = 12.24$, p < 0.001). Self-awareness of having allergy was reported by 21.1% of the subjects. The prevalence of self-awareness was significantly higher among females ($\chi^2 = 4.86$, p = 0.027). Sixty-two percent of the self-aware (13.1/21.1) reported having received a physician-based diagnosis of allergy (asthma, eczema or allergic rhinitis). Therefore the proportion of undiagnosed subjects with allergy was 38%. There were no significant differences in the reports of previous medical diagnosis of allergy and family history of allergy between two genders (p > 0.01, Table 1).

Comparing the answers given to the questions 1, 2 and 5 with the response to the question 'Has a doctor already diagnosed that you suffer/suffered from asthma, eczema or allergic rhinitis?', significant discordances were found for all questions (McNemar test, p < 0.05). Overall, it was more frequent to answer yes to the symptoms and to think being allergic than to be diagnosed as allergic (Table 2).

A total of 48 subjects having SFAR ≥ 7 participated in the clinical study. The specialist diagnosed AR in 39 of the 48 subjects (81.3%). The prevalence of subjects with clinically confirmable AR in the general population was estimated as the product of the proportion of subjects SFAR ≥ 7 (population study) by the proportion of subjects with SFAR ≥ 7 and a clinical diagnosis of AR (clinical study). Thus, the prevalence rate of clinically confirmable AR was computed as 11.4%.

Of 48 subjects having SFAR ≥ 7, 46 had specific IgE test against common aeroallergens following the specialist's request for allergic tests. Specific IgE were detected for at least one of tested aeroallergens in 34.8% of the subjects with self-reported AR [16/46]. The most frequently detected aeroallergens were cocksfoot and timothy grass (27.1% of the subjects participating in the clinical study and having IgE testing), followed by cultivated rye (22.9%) and sweet vernal grass (20.8%). The frequency of the common aeroallergens found in 46 subjects has been given in Table 3.

DISCUSSION

There were an excess number of females in the study sample. Although the sampling procedure defined before was deliberately applied, easy attainment to housewives at homes could have increased the number of females in the sample. Therefore, the results of the study should be interpreted by taking into consideration this situation.

In spite of standardized questions in the questionnaire, people's understanding of allergy is influenced by some particular characteristics of the population, including cultural aspects and use of different diagnostic terms. People living in the study area mostly tend to define itchy skin lesions as allergy. This understanding could have influenced their responses to some questions in the questionnaire.

Few standardized instruments have been developed to assess AR, and some of them are difficult to use in large populations [19]. ISAAC questions on nasal symptoms when the subjects did not have a cold or flu were found to have a positive predictive value of 80% in detecting rhinitis in adults aged 16-65 years [20]. The SFAR, which has been proposed as a useful instrument to estimate AR prevalence in population settings, seems to have

Table 2. Concordance frequency (%) between answers (positive or negative) to questions 1, 2, and 5, and global score, in relation to answers (positive or negative) to question number 7 ('Has a doctor already diagnosed that you suffer/suffered form asthma, eczema or allergic rhinitis?').

Question	Male	Female	All
1. Nasal symptoms in the past 12 months	52.6*	73.8*	67.2*
2. Nasal symptoms accompanied by itchy-watery eyes	36.8	47.6*	44.3*
5. Thinking to be allergic	52.6*	52.4*	52.5*
Global score	26.3	47.6	41.0

* Significant discordances (McNemar test, p<0.05).

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