

# The Prevalence of Ankylosing Spondylitis in The Eastern Black Sea Region of Turkey



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## ABSTRACT

**Aim:** The aim of this study was to estimate the prevalence of ankylosing spondylitis (AS) in the Eastern Black Sea region of Turkey.

**Method:** The study was conducted by The Department of Physical Medicine and Rehabilitation, Karadeniz Technical University Medical Faculty, in the urban area in the Eastern Black Sea region of Turkey, which has a population of 459,021 (according to the 2000 national census). A total of 4031 subjects over 20 years-old were enrolled, using the sampling method; 2025 (50.7 %) men and 2006 (49.3 %) women were included in the study. A survey consistent with Modified New York Criteria 1987 was used to diagnose AS in patients. The survey was applied and evaluated by two physical medicine residents and 8 trained medical students. Suspected cases were invited to our clinic.

**Result:** Forty one out of fifty patients suspected with AS attended our out-patient clinic. Following physical examination, laboratory tests and radiological investigations of those individuals with suspected AS, 10 ones were diagnosed as AS. 9 of 10 patients were male and 1 patient was female. Patients' mean age was  $40.5 \pm 8.4$  years. The prevalence was estimated to be 0.25 % (95% CI: 0.09 %-0.40 %). It was 0.44 % in men (95 % CI: 0.15-0.73) and 0.05 % in women (95 % CI: 0.0-0.15) according to gender distribution.

**Conclusion:** The study had value of regional features for evaluating for epidemiology of AS in Turkey. The prevalence of AS was found to be as 0.25 %. A male predominance was noted among AS patients in the study.

**Key words:** Ankylosing spondylitis, prevalence, Turkey

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## Türkiye’de Doğu Karadeniz Bölgesinde Ankilozan Spondilit (AS) Prevalansı

**Amaç:** Bu çalışmanın amacı Türkiye’de Doğu Karadeniz Bölgesinde Ankilozan Spondilit (AS) prevalansını araştırmak idi.

**Metod:** Çalışma Karadeniz Teknik Üniversitesi Fizik Tedavi ve Rehabilitasyon Anabilim dalı tarafından yürütüldü. Çalışma Doğu Karadeniz Bölgesinde 2000 yılı nüfus sayımına göre 459,021 kişilik popülasyona sahip kent merkezlerinde gerçekleştirildi. Örneklem metodu ile 20 yaşın üzerinde 4031 kişi 2025 (%50.7) erkek ve 2006 (%49.3) kadın çalışmaya dahil edildi. Hastalarda AS tanısı koymak için Modifiye New York (1987) kriterlerine uygun anket formları kullanıldı. Anket formları ve değerlendirmeler 2 araştırma görevlisi ve eğitim verilmiş 8 tıp fakültesi öğrencisi tarafından yapıldı. Şüpheli olgular kliniğimize davet edildi.

**Bulgular:** Kliniğe davet edilen şüpheli 55 AS vakasından 41 kliniğimize başvurdu. Ayrıntılı fizik muayene, laboratuvar ve röntgen bulguları sonrası, 10 hastaya AS tanısı konuldu. Hastaların 9’u erkek 1’i kadın idi. Hastaların ortalama yaşı  $40.5 \pm 8.4$  yıl idi. AS prevalansı %0.25 (95% CI: 0.09-0.40) olarak tespit edildi. Cinsiyete dağılımına göre prevalans değerleri erkeklerde %0.44 (95% CI: 0.15-0.73) kadınlarda %0.05 (95% CI: 0.0-0.15) idi.

**Sonuç:** Çalışmamızın, ülkemizdeki AS prevalansını değerlendirmede, bölgesel niteliği bulunmaktadır. AS prevalansı %0.25 olarak bulundu. Çalışmadaki AS hastaları arasında erkek yoğunluğu tespit edildi.

**Anahtar kelimeler:** Ankilozan spondilit, prevalans, Türkiye

## INTRODUCTION

Ankylosing spondylitis (AS) is a chronic inflammatory disease usually affecting young adults and characterized by an inflammatory enthesiopathy progressing towards ossification and ankylosis. AS is mainly a disease of the spondyloarthropathy (SpA) group. Women are not as commonly affected as men. The prevalence of AS has been determined at between 0.1 % and 1 % in the white population that is usually studied. There are wide variations among different ethnical and racial groups (1-2). The distribution of the HLA B 27 antigen in the population seems to run parallel to that of HLA-B 27 related diseases (3-4). The reported prevalence of HLA-B27 in our country varies between 6.8 % and 8 % (5). Determination of the frequency of AS is important for both the detecting epidemiological data of the disease and providing the information about the number of patients who should receive new drugs, which are highly effective but costly.

The prevalence of AS was determined as 0.14 % in a study performed among military personnel in Turkey (6). In another study, the prevalence of AS in an adult urban population from western Turkey reported as 0.49 % (5). However, there is a lack of satisfactory data regarding the prevalence of AS in the general Turkish population. The aim of this study was to investigate the prevalence of AS in the Eastern Black Sea region of Turkey.

## MATERIALS AND METHODS

The was a cross sectional study carried out between March 2002 and June 2004 by the Karadeniz Technical University Medical Faculty Department of Physical

Medicine and Rehabilitation in the Eastern Black Sea region of Turkey, including the cities of Gumushane, Trabzon, Rize, Artvin and Giresun. The population of the region was determined as 459,021 in the 2000 census.

The sample size was calculated based on a 1% prevalence (P) of AS with a 0.5 % uncertainty level (d), using the formula  $n = pq / (E/1.96)^2$  (n: at least sample size; p: expected at highest prevalence-%; q:100-p; E: sampling error-%) (7). We estimated that this would necessitate at least 3746 participants. However, that figure was increased by a further 10 % because of possible reductions in the number of subjects available, due to absence from home or a failure to give informed consent to participation in the study. Subjects were chosen at random from five cities using primary health center household registration records. Of these (n: 4120), 4031 subjects, which is aged 20 years and over, took part in the study, a participation rate of 97.8 %. The examinations were carried out by research physicians in two main phases, a screening phase (almost 15 months) and a main examination (scrutinizing) phase (ten months). These phases were performed by a physician specializing in physical medicine (HC), two physical medicine residents (MK and EC) and eight pollsters (medical student) educated. Informed consent was obtained before the survey, and approval for the study was granted by the university’s local ethical committee.

### Phase 1: The Screening Survey

Data were collected using the face-to-face questionnaire method. Subjects screened positive if they reported chronic inflammatory back pain (8). Chronic inflam-

**Table 1.** Prevalence of AS and distribution of participations in study according to age and gender

Age group	Male			Female			Total		
	n	AS (n)	Prevalence	n	AS (n)	Prevalence	n	AS (n)	Prevalence
20-29	629	1	0.16 (0.0-0.47)	631	0	0	1270	1	0.08 (0.0-0.23)
30-39	541	4	0.74 (0.02-1.46)	547	0	0	1068	4	0.66 (0.17-1.14)
40-49	298	3	1.01 (0.0-2.14)	442	0	0	850	3	0.12 (0.0-0.35)
50-59	194	1	0.52 (0.0-1.52)	207	1	0.48 (0.0-1.43)	401	2	0.25 (0.0-0.74)
60-69	79	0	0	129	0	0	278	0	0
70-79	87	0	0	56	0	0	143	0	0
80+	27	0	0	13	0	0	40	0	0
Total	2025	9	0.44 (0.15-0.73)	2006	1	0.05 (0.0-0.15)	4031	10	0.25 (0.09-0.40)

matory back pain was regarded as the basic indication in deciding whether suspected subjects should be enrolled (Questionnaire form 7 and 8,). One of these question, have you ever had back pain and back stiffness on awakening, which lasted over a period of at least 3 months? Other, does your back pain and stiffness improve by exercise? Additionally, questions exploring back movement limitation, buttock pain and arthritis related questions were also included in the questionnaire (Appendix 1, Turkish version). Medical doctors contacted again by a phone call with suspected subjects. Questionnaire information was confirmed. Survey information is not correctly detected 6 subjects were excluded studies. Fifty-five subjects initially suspected of having AS were invited to our out-patient clinic. Fourteen of these failed to attend.

### Phase 2: Confirming or Excluding AS

The suspected cases were subjected to physical examination (the assessment of spinal mobility, chest expansion and sacroiliac compression), laboratory tests and standard antero-posterior pelvic radiographs for examination of the sacroiliac joints. Laboratory examinations were included in routine blood parameters, C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) Radiographs were graded and scored. A further imaging method was not used. In addition to already diagnosed cases, presumptive AS cases were also invited to undergo further investigation. AS was diagnosed if a subject fulfilled Modified New York criteria (1987) (9). The patients with AS who met the diagnostic criteria were performed HLA-B27 test.

The diagnosed patients were also investigated for previous treatment and laboratory findings. All these procedures were performed by a physician specializing in physical medicine and two physical medicine residents. Prevalence values are presented as percentages and 95 % CI, and mean age as arithmetic mean  $\pm$  standard deviation. The comparison of gender prevalence was done by the Chi-square test. A probability value of  $p < 0.05$  was considered statistically significant.

### RESULTS

Of the 4031 participants, 2025 (50.7 %) were men and 2006 (49.3 %) women. Their mean age was  $40.5 \pm 8.4$  years. Data related to age distribution and prevalence of AS are presented in Table 1. A total of 94 subjects with chronic inflammatory back pain were attempted to contact by a telephone and 61 subjects were reached. Fifty-five subjects initially suspected of having AS were invited to our out-patient clinic. Fourteen of these subjects did not come to our clinic. Ten of the remaining 41 subjects were diagnosed with AS according to the modified New York criteria. The prevalence of AS in the Eastern Black Sea region of Turkey was thus determined as 0.25 % (95% CI: 0.09-0.40%). The demographic characteristics of our patients are presented in Table 2. Nine of the patients diagnosed with AS were male and the other female. Gender-specific prevalence was 0.44 % (95% CI: 0.15-0.73%) and 0.05 % (95% CI: 0.0-0.15%) for males and females, respectively, and this difference is statistically significant ( $p=0.022$ ). The average values of CRP and ESR of patients with AS were  $3.3 \pm 1.2$  mg/

**Table 2.** Characteristics of laboratory, clinic and demographic data of AS cases

Subject	Sex	Current age	Age at disease onset	HLA- B27	Radiology	Uveitis	Arthritis	Inflammatory back pain
1	Male	43	32	+	Bilateral 4	+	+	+
2	Male	36	20	+	Bilateral 3-4	-	-	+
3	Male	31	28	+	Bilateral 2	-	-	+
4	Male	39	31	+	Unilateral 3-4	-	-	+
5	Male	27	25	-	Bilateral 2	-	-	+
6	Male	40	33	-	Bilateral 2	-	-	+
7	Male	38	26	+	Bilateral 3-4	+	+	+
8	Male	57	?	+	Bilateral 2	-	+	+
9	Male	45	30	+	Unilateral 4	-	+	+
10	Female	51	?	+	Bilateral 3-4	-	-	+

dl (normal range, 0-0.3 mg/dl) and 40±22 mm/h (normal range, 0-20 mm/h), respectively. Although HLA B27 tested negative in two cases, eight of the 10 cases were positive. Six patients with previously diagnosed were on disease-modifying anti-rheumatic drugs (DMARDs) and Non-steroidal anti-inflammatory drugs (NSAIDs). Four of the patients were newly diagnosed. All cases with AS have been following up for treatment.

## DISCUSSION

The worldwide epidemiology of AS is generating interest for two main reasons: firstly, epidemiological data may help to discriminate between the role of environmental and genetic factors affecting the pathogenesis of the disease, secondly, new drugs included in biologic agents have been introduced recently. These are effective but costly. The number of patients who should receive the new drugs needs to be estimated. Because of this situation, evaluating of AS prevalence is important. In the white population, which has been studied the most frequently,

an AS prevalence of between 0.5 % and 1 % has been determined. Prevalence of AS in different ethnic groups is shown in Table 3 (4, 6, 10-13). The general prevalence of AS was found to be as 0.25 % in our study. This figure is within the lower range of other such studies in European population. This status may be due to some factors such as genetic, environmental and the methodological differences of epidemiological studies.

The first relevant study in Turkey cited in the literature was performed by Yenil et al. They determined an AS prevalence of 0.14% in a military population consisting of 1436 participants, representing prevalence specified to gender (6). It also involved certain specific age groups (20-22 years). Regarding age of onset of the disease, the study contains limited information with which to evaluate the prevalence of AS in the Turkish population. In A recently study of adults aged 20 and above in an urban area of Izmir, in Turkey, prevalence of AS was reported to be 0.49 %. It found that the prevalence of AS among women was close to that in men (female/male =0.82/1). It was a striking finding. The male prevalence of AS in

**Table 3.** Prevalence of AS in various populations worldwide

Region	AS prevalence (%)			Number of AS found	Number of subjects studied	Age range
	Women	Men	Total			
Canada (Indian) <sup>10</sup>	-	6.20	-	13	209	-
Hungary <sup>4</sup>	0.08	0.40	0.23	15	6469	-
Turkey (Military) <sup>6</sup>	-	0.14	-	-	1436	20-22
Turkey (Izmir) <sup>5</sup>	0.44	0.54	0.49	14	2887	20+over
Greece <sup>11</sup>	-	-	0.24	19	8740	19+over
Italian <sup>12</sup>	-	-	0.37	8	3664	18 + over
Northern Norway <sup>13</sup>	0.60	2.20	1.10-1.40	27	2907	20-54
Turkey (present study)	0.05	0.44	0.25	10	4031	20 + over

our study was higher than those in epidemiological studies (male/female = 8.8). There are many factors that may contribute to genetic and the social culture characteristics of women populations in the study area. In addition, the disease may be slowly progressive and atypical in patients women with AS. In studies, AS was determined to be 2 to 3 times more frequent in men than in women (5). Boyer et al. determined a prevalence of AS of 0.4 % among Alaskan Eskimos (14). Alexeeva et al. determined an AS prevalence of 1.1 % and an HLA B 27 incidence of 34 % in the Chukhsa population in Russia. Considering that the incidence of HLA B 27 is 25-40 % among Eskimos, this level is much lower compared with that of other ethnic groups that have a high HLA B 27 prevalence (15). This indicates that other factors such as genetic, environmental and infectious elements, in addition to HLA B 27, play a role in its pathogenesis.

Saraux et al. investigated SpA prevalence in France in 2001 a study involving 9395 subjects and conducted over the telephone. They determined a SpA prevalence level of 0.30 %, which is with no difference between women and men, as a result of their study of already diagnosed and suspected subjects. It was detected that AS and psoriatic arthritis were the most common disease included in SpA groups. Prevalence was 0.19 % for psoriatic arthritis and 0.08 % for AS (16). AS is seen in the second and third decades, mostly in males, and to be associated with HLA B 27 in 90-95 % of patients (17). Nine of our 10 patients were male, and age of onset was  $28.1 \pm 4.3$  y. HLA B 27 was positive in eight patients (80 %). HLA B 27 prevalence is about 8 % in the general white population (of Western European extraction), with somewhat higher frequencies in the Scandinavian and some Eastern European populations (10-16%) (18). The prevalence of HLA B 27 in the healthy population in Turkey is between 6.8 % and 8 % (5).

One limitation of this study is that 14 out of the 55 individuals suspected with AS as a result of the questionnaire failed to attend our out-patient clinic, despite being invited two times to do so. There is a possibility of new AS cases arising from among these individuals. In addition, it may be difficult to determine AS cases following a mild course using the questionnaire method. Our study was a cross-sectional one and the fact that it was performed in five cities in Eastern Black Sea region represents an important source of data for Turkey. It is the first study of AS prevalence of in population from northern Turkey.

Our epidemiological study of adults of 20 and above in the Eastern Black Sea region of Turkey determined to be 0.25 % prevalence of AS. Men show clearly predominance among AS patients. Further studies are now needed to elucidate the epidemiological data from other locations in Turkey in order to further our understanding of the most effective ways to improve the health of the Turkish population.

#### Appendix 1. Screening form for ankylosing spondylitis

1. Name-Surname:  
Phone:
2. Your Address:
3. Age:
4. Gender: a) Male b) Female
5. Occupation: Education level:
6. Marital Status: a) Married b) single c) widowed
7. Have you ever had low back pain or back stiffness on awakening, which lasted over a period of at least 3 months?  
a) Yes b) No  
(If your answer is "yes" for 7.th question)
8. Does your back pain and stiffness improve by exercise?  
a) Yes b) No
9. Have you had limited back movement limitation?  
a) Yes b) No
10. Do you suffer from unilateral or bilateral hip/buttock pain?  
a) Yes b) No

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