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Original Article

Relationship Between Clinical Findings, Quality of Life and Functional Disability Related to Disease Activity in Patients with Ankylosing Spondylitis

Ankilozan Spondilitli Hastalarda Hastalık Aktivitesiyle İlişkili Fonksiyonel Disabilite, Yaşam Kalitesi ve Klinik Bulgular Arasındaki İlişki

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Objectives: In this study we evaluated the relationships between clinical findings, quality of life and functional disability related to disease activity in patients with ankylosing spondylitis (AS).

Patients and methods: Seventy-three patients diagnosed with AS (62 males, 11 females; mean age 33.3±9.5 years; range 17 to 60 years) who fulfilled the modified New York criteria were included in this study. The mean age for female patients was 29.2±7.3 years and for males 34.0±9.7 years. The demographic data of the patients were recorded. The disease activity was assessed using the Bath ankylosing spondylitis disease activity index (BASDAI). The functional disability was evaluated using the Bath ankylosing spondylitis functional index (BASFI). The clinical status was evaluated with the Bath ankylosing spondylitis metrology index (BASMI) and the quality of life was assessed with the Short Form 36 (SF-36).

Results: The patients were divided into two groups: patients having a BASDAI score of less than four (BASDAI <4) with mildly active disease (n=34) and patients having a BASDAI score of four or higher (BASDAI ≥4) with moderate-severe disease activity (n=39). The BASFI and BASMI scores were higher in patients with high disease activity ($p<0.05$), and a significant correlation was found between the BASDAI total score and the BASFI and BASMI scores ($p<0.05$). Patients with a BASDAI score of <4 had a lower finger floor distance, a higher cervical rotation and modified Schober's measurement values compared with patients with a BASDAI score of ≥4. There was a significant correlation between the BASDAI score and SF-36 subscores of physical function, physical role, bodily pain and emotional role ($p<0.05$).

Conclusion: Clinical findings, functional disability, metrological measurements and quality of life are adversely affected by disease activity in AS. The subgroups of SF-36 subscores related to physical health show a more significant relationship with the disease activity in AS.

Key words: Ankylosing spondylitis; disease activity; quality of life; functional disability.

Amaç: Bu çalışmada ankilozan spondilitli (AS) hastalarda hastalık aktivitesiyle ilişkili fonksiyonel disabilite, yaşam kalitesi ve klinik bulgular arasındaki ilişkiler değerlendirildi.

Hastalar ve yöntemler: Ankilozan spondilit tanısı konulan ve modifiye New York kriterlerine uyan 73 hasta (62 erkek, 11 kadın; ort. yaş 33.3±9.5 yıl; dağılım 17-60 yıl) çalışmaya alındı. Kadın hastaların yaş ortalaması 29.2±7.3, erkek hastaların yaş ortalaması ise 34.0±9.7 yıl idi. Hastaların demografik verileri kaydedildi. Hastalık aktivitesi, Bath ankilozan spondilit hastalık aktivitesi indeksi (BASDAI) kullanılarak değerlendirildi. Fonksiyonel disabilite, Bath ankilozan spondilit fonksiyonel indeksi (BASFI) kullanılarak değerlendirildi. Klinik durum Bath ankilozan spondilit metroloji indeksi (BASMI) ve yaşam kalitesi ise Short Form 36 (KF-36) ile değerlendirildi.

Bulgular: Hastalar BASDAI puanı dörtten düşük (BASDAI <4) olan ve hafif hastalık aktivitesi gösteren hastalar (n=34) ve BASDAI skoru dört ya da daha yüksek (BASDAI ≥4) olan ve orta seviyeli ila ağır hastalık aktivitesi gösteren hastalar (n=39) olarak iki gruba ayrıldı. BASFI ve BASMI skoru ağır hastalık aktivitesine sahip hastalarda daha yüksekti ($p<0.05$) ve total BASDAI skoru ile BASFI ve BASMI skorları arasında anlamlı ilişki bulundu ($p<0.05$). BASDAI puanı <4 olan hastalar BASDAI puanı ≥4 olan hastalarla karşılaştırıldığında daha düşük el parmak zemin mesafesine ve daha yüksek servikal rotasyon ve modifiye Shober ölçüm değerlerine sahipti. BASDAI skoru ile fiziksel fonksiyon, fiziksel rol, vücut ağrısı ve emosyonel rolün SF-36 subskorları arasında anlamlı bir ilişki vardı ($p<0.05$).

Sonuç: Ankilozan spondilitte hastalık aktivitesi; yaşam kalitesi, klinik bulgular, fonksiyonel disabilite ve metrolojik ölçümleri olumsuz etkilemektedir. Short form-36 ölçeğinin alt fiziksel sağlık ile ilgili alt puanları AS hastalık aktivitesi ile daha anlamlı ilişki göstermektedir.

Anahtar sözcükler: Ankilozan spondilit; hastalık aktivitesi; yaşam kalitesi; fonksiyonel disabilite.

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Ankylosing spondylitis (AS) is a chronic progressive, inflammatory disease predominantly affecting the sacroiliac joints and spine with possible involvement of other joints, entheses, and extra-articular structures. The pain, limitation of function and presence of organ involvement all contribute to the worsening of the patients' quality of life (QoL).[1]

Ankylosing spondylitis has considerable effect on the individual's QoL. In contrast to other rheumatic diseases, the consequences of AS on QoL is less defined.[2,3] The burden of illness in AS results from pain, reduced function and impaired well-being.[2,3] The determination of disability and QoL in AS can help to assess illness-related suffering and to develop management strategies. Quality of life measurements objectively reflect the actual effect of the disease on an individual and the extent of suffering.[2,4] Some patients reportedly develop functional disorders which have a negative impact on the QoL.[5]

The Bath ankylosing spondylitis disease activity index (BASDAI) is widely used as a subjective measure to assess disease activity and has proved to be valid, reproducible and responsive to change.[6] The value of combined instruments, such as the Bath ankylosing spondylitis metrology index (BASMI) and BASDAI should be investigated because the combined instruments might not have the same validity in all types of the disease.[6,7] The rate at which functional disability worsens during the lifetime of a given patient with AS fluctuates, and there is a significant variability of the progression rate between affected individuals as well.[1,8-10]

There is a need to investigate the influence of disease activity on health related QoL along with the clinical and functional condition in patients with AS in order to assess disease management approaches. The aim of the present study was to evaluate the association between clinical findings, QoL and functional disability in relation to disease activity in patients with AS.

PATIENTS AND METHODS

Seventy-three patients with AS (62 males, 11 females; mean age 33.3±9.5 years; range 17 to 60 years) who fulfilled the modified New York criteria[11] were included in this study. The mean age for female patients was 29.2±7.3 years and for males 34.0±9.7 years. The demographic data of patients including age, sex, marital status, education and duration of the disease, drug intake and peripheral involvement were recorded. The same physician evaluated all patients. All patients gave informed consent for participating except for one patient who was 17 year old. For this patient, permission was obtained from his parents.

The Bath ankylosing spondylitis metrology index was applied to all patients.[12-14] This index assesses cervical rotation, tragus to wall distance, lumbar side flexion, lumbar flexion (modified Schober's test) and intermalleolar distance. The modified lumbar and dorsal Schober's test, chest expansion, finger-to-floor distance, occiput-to-wall distance, and cervical flexion and extention, and chin-to-chest distance were evaluated. Chest expansion was measured circumferentially around the chest wall at the level of the fourth intercostal space with the subject standing with hands on head and arms flexed in the frontal plane. Chest expansion was recorded in centimeters. The total range of thoracolumbar movement in the sagittal plane was evaluated by the modified Schober's test and finger-to-floor distance.

The Bath ankylosing spondylitis functional index (BASFI) was used to assess the functional disability of the patients. The BASFI is comprised of 10 items based on the ability to perform and cope with activities of daily living. Each is scored on a 10 cm visual analog scale (VAS) reflecting status over the past month. The mean of the 10 scales generates the score, with 10 denoting the worst possible functional status.[15]

Disease activity was evaluated by the BASDAI and VAS. The BASDAI is a measurement of disease activity and consists of six questions related to the live symptoms of AS: fatigue, spinal pain, joint pain and swelling, areas of local tenderness and morning stiffness. A 10 cm VAS was used to measure the patient responses to each question. A score between 0 and 10 was obtained for each question and the mean of two questions related to morning stiffness was used. All measurements were performed at noontime, and the same clinician did all patient assessments.[16-18] We defined two score levels with a BASDAI score <4 as a mildly active disease (n=34), and a BASDAI score ≥4 indicating moderate-severe disease activity (n=39).[19]

Short Form-36 (SF-36) was used to assess health-related QoL. The SF-36 is a widely applied generic instrument for measuring health status and consists of eight dimensions: physical functioning, social functioning, physical role, emotional role, mental health, vitality, bodily pain and general health perceptions. Scores range from 0 (worst) to 100 (best) with higher scores indicating better health status.[20] Blood samples of the patients were taken to determine

hemoglobin (Hb), erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) levels which are considered important in evaluating disease activity. The ESR was assessed in mm/h using the Westergren method (normal range 0-20) and CRP in mg/I by the turbidimetric method (normal range 0-5).

Statistical analysis

Statistical package for social sciences software (SPSS Inc., Chicago, Illinois, USA), version 11.0 for windows was used for all statistical analysis. Baseline demographic and clinical characteristics of AS patients who had low and high disease activity were compared using independent samples t-test for parametric variables and Mann Whitney U-test for nonparametric variables. Pearson's and Spearman correlation analyses were used for assessing relationships between results of BASDAI and BASFI, BASMI, SF-36, and clinical and laboratory parameters according to normal or skewed distribution pattern of data respectively. Associations between two categorical variables were measured by Chi-square test. The level of significance was set at P value less than 0.05.

RESULTS

We defined two levels of disease activity. The mean ages of patients according to BASDAI <4 (30 males, 4 females) and BASDAI ≥4 (32 males, 7 females) were 34.4±8.9 (range 18 to 58), 31±10.1 (range 17 to 60) years respectively. The ratio of patients who retired from their jobs due to AS was 2.7%. There was hip involvement in 9.6% of the patients and peripheral arthritis in 20 patients (27.4.6%). Of the patients, 49.3% were smokers, and 13.7% had a history of alcohol intake. In addition, 2.7% of the patients had hip arthroplasty resulting from hip involvement related to AS.

The ratio of patients using nonsteroidal anti-inflammatory drugs (NSAIDs) was 43.8%. The ratio of patients taking rational disease-modifying anti-rheumatic drugs (DMARD) was 25.8%, and 12% were taking anti-tumor necrosis factor-alpha (TNF-α) agents. When we investigated the combination therapy, 56.7% of the patients were receiving an additional drug and 17.9% had two additional drugs in combination. The most commonly used DMARD was sulphasalazine (SLZ).

There was extra-articular involvement in 21.9% of the patients. The rate of ocular involvement was 5.61%, heart involvement 4.1%, gastrointestinal system involvement was 6.08% and thyroid disease was 2.7%. Patients' complaints on admission were low back pain (75.3%), peripheral arthritis (9.6%), low back pain and peripheral arthritis (4.1%), enthesopathy (5.5%) and extra-articular involvement (5.5%). Of all patients, 53.4%

Table 1. Clinical and laboratory findings in patients with ankylosing spondylitis (n=73)

Variable	Mean±SD	Median	Range
Age (years)	33.3±9.5	31	(17-60)
Pain	5.3±2.8	5	(0-10)
Patient's global assessment	5.2±2.9	50	(0-100)
Physician's global assessment	5.0 ±2.6	50	(0-100)
Morning stiffness	42.1±31.3	1	(0-101)
Diagnosis duration (years)	5.9±6.8	4	(0-40)
Bath ankylosing spondylitis functional index	4.1±2.7	4.3	(0-9.9)
Bath ankylosing spondylitis disease activity index	4.0±2.4	4.4	(0-9.2)
Bath ankylosing spondylitis metrology index	3.8±2.5	4	(0-9)
Tragus to wall	15.8±6.8	9	(9-50)
Cervical rotation	52.7±22.0	87.5	(2.5-90)
Lumbar flexion	3.6±2.6	12	(0-12)
Lumbar side flexion	9.9±10.0	61	(0-61)
Intermalleolar	94.4±26.6	149.40	(10.6-160)
Chest expansion, (cm)	3.4±1.7	9	(0-9)
Finger-to-floor distance, (cm)	21.6±16.7	64	(0-64)
Cervical flexion;			
Chin-to-chest distance, (cm)	2.9±2.3	11	(0-64)
Cervical extension, (cm)	6.9±7.6	48	(0-48)
Erythrocyte sedimentation rate (mm/Hg)	23.0±24.1	13	(2-89)
C-reactive protein (mg/L)	14.5±45	6.8	(1-87)
Hg (g/dl)	18.7±29.7	13.9	(9-233)

SD: Standard deviation; Hg: Hemoglobin.

Table 2. Characteristics of the patients according to Bath ankylosing spondylitis disease activity index scores

	BASDAI <4 (n=34)				BASDAI ≥4 (n=39)				*p*
	n	Mean±SD	Median	(min.-max.)	n	Mean±SD	Median	(min.-max.)	
Age		34.4±8.9	32	(18-58)		32.4±10.1	34	(17-60)	0.254
Sex									
Male	30				32				0.527
Female	4				7				0.527
ESR (mm/Hg)		16.0±17.8	12	(2-75)		29.7±27.5	16	(2-89)	0.197
C-reactive protein (mg/dl)		8.5±9.1	4.5	(1-38.4)		19.5±23.3	9.7	(1-87)	0.077
Hg (g/dl)		13.9±1.7	14	(9.3-16.4)		13.5±1.5	13.7	(9-16.7)	0.319
BASFI		2.7±2.4	2.15	(0-8.6)		5.4±2.4	5.5	(0.5-9.9)	0.000***
BASMI		3.1±2.5	3	(0-9)		4.3±2.3	5	(0-9)	0.039*
BASDAI		2.5±1.9	2.3	(0-7.6)		5.5±1.7	5.4	(1.4-9.2)	0.000***
Patient's global VAS		35.9±29.5	35	(0-100)		66.4±24.5	60	(0-100)	0.000***
Physician's global VAS		35.4±26.1	45	(0-90)		62.8±18.3	60	(0-100)	0.000***
Visual analog scale (pain)		41.0±2.8	40	(0-100)		63.1±24.5	60	(0-100)	0.001***
Onset of first symptom (year)		11.5±9.0	9.5	(2-40)		10.9±7.7	10	(1-34)	0.973
Duration since diagnosis (year)		6.7±8.4	4.5	(1-40)		5.2±5.1	3	(0-20)	0.699
Age at onset of inflammatory Back pain		22.1±6.9	21.5	(10-36)		20.6±6.9	20	(7-35)	0.355

BASDAI: Bath ankylosing spondylitis disease activity index; SD: Standard deviation; Min.: Minimum; Max.: Maximum; ESR: Erythrocyte sedimentation rate; BASFI: Bath ankylosing spondylitis functional index; BASMI: Bath ankylosing spondylitis metrology index; Hg: Hemoglobin. VAS: Visual analog scale; *: p<0.05; ***: p<0.001.

were employed, 26% were unemployed and 2.7% retired early.

The patients were divided into two groups according to disease activity by using BASDAI <4 and BASDAI ≥4 for classification. The clinical and laboratory findings of the patients are shown in table 1, and the characteristics of the patients according to BASDAI scores in table 2.

The correlation between disease activity level and some clinical, metrological, functional and laboratory parameters is seen in table 3. The BASDAI score was found to be significantly correlated with morning stiffness duration (r=0.609), VAS for pain (r=0.746), patient's global assessment (r=0.698), physician's global assessment (r=0.750), BASMI score (r=0.318), BASFI score (r=0.507), ESR (r=0.497) and CRP level (r=0.450). Age, disease duration and duration since diagnosis were not found to be associated with disease activity scores (p>0.05).

The correlation between disease activity level and SF-36 subscores in patients with AS is given in table 4. There was a significant relationship between BASDAI score and physical function (r=–0.788), physical role (r=–0.593), bodily pain (r=–0.634) and emotional role (r=–0.581).

Comparisons of metrological measurements of patients' subgroups having BASDAI score <4 and BASDAI score ≥4 are seen in table 5. No significant differences were found in tragus to wall distance, lumbar Schober's measurement, lumbar side flexion, intermalleolar distance, chest expansion, cervical flexion and cervical extension between patients with BASDAI scores <4 and ≥4 (p>0.05). However, patients with BASDAI score<4 had lower finger-to-floor distance, and higher cervical rotation and modified Schober's measurement compared with patients having BASDAI score ≥4 (p<0.05; Table 5).

Comparison of clinical parameters according to BASDAI score (<4, ≥4) in patients with AS is shown in table 6. Daily low back pain complaint (p=0.026), improved low back pain with rest (p=0.008) and awakening at night because of pain (p=0.008) were significantly higher in patients having BASDAI scores ≥4 (p<0.05; Table 6).

DISCUSSION

The recent development of valid and reliable outcome measures for AS disease activity, functional impairment and metrology has improved the assessment of disease status.[21,22] These outcome measurements not only provide excellent tools for AS research, but they also present the opportunity to enhance health status assessment and patient care in the clinical setting.[23]

The patient-based instruments (like BASDAI) have been accepted as the gold standard in assessment of disease activity in recent years.[24-26] We also used BASDAI as a disease activity parameter. We divided

the patients into two groups according to disease activity: a mildly active group BASDAI <4 and a moderate-severe disease group BASDAI ≥4.[1,2,27,28] Bodur et al.[24] reported that the disease activity rate of patients with BASDAI ≥4 was 52.4%. Forejtová et al.[1] and Oniankitan et al.[27] reported that the activity rate of patients with BASDAI ≥4 was 57% and 53% respectively. The authors emphasized that these patients could be candidates for biologic therapies.[24,27] In our assessment, the activity rate of patients with BASDAI ≥4 was 53.4%. Thus, the disease was active in more than half of the cases. Therefore, the high disease activity of patients with AS would be useful in the determination of potential candidates for the new biological treatment.

Table 3. Correlation between disease activity level and some clinical, metrological, functional and laboratory parameters

	BASDAI total score
Age	
r	−0.100
p	0.400
Duration of first symptom onset	
r	0.007
p	0.950
Duration since diagnosis	
r	0.076
p	0.530
Morning stiffness duration	
r	0.609**
p	0.000
Visual analog scale (pain)	
r	0.746**
p	0.000
Patient's global visual analog scale	
r	0.698**
p	0.000
Physician's global visual analog scale	
r	0.750**
p	0.000
BASMI	
r	0.318**
p	0.006
BASFI	
r	0.597**
p	0.000
Erythrocyte sedimentation rate	
r	0.497**
p	0.000
C-reactive protein	
r	0.450**
p	0.000

BASMI: Bath ankylosing spondylitis metrology index; BASFI: Bath ankylosing spondylitis functional index; Pearson's correlation analysis. *: p<0.05; **: p<0.01.

Ankylosing spondylitis generally affects younger patients. The male to female ratio was reported as 2:1, 3:1 and 2.5:1 in different studies, but our determined ratio was 5.6:1. The male to female ratio has been reported to be higher (7.2:1 and 9.2:1) in Asian countries.[23,24,29]

Ankylosing spondylitis is known to affect working ability which leads to disability in affected patients. Zink et al.[3] estimated 8.7% unemployment and 10.4% early retirement in AS patients from the German database.[2,3] In a study assessing the working ability of AS patients, only 30% were found to be unable to work at all.[2] Dalyan et al.[30] concluded that 73% of AS patients were still in gainful employment and 15% were unemployed.[2,30] In this study, the results of our data were similar to those of previous studies in which 53.4% of the patients were employed and the rates of unemployed and early retirement were estimated at 26% and 2.7% respectively. Employed patients mostly had BASDAI <4 (61.7%), whereas unemployed patients had BASDAI ≥4 (30.7%). This can be explained by severe disease activity, and, in part, by the education, socioeconomic factors and various work-related factors that substantially contributed to withdrawal from the labor force in AS patients.

Table 4. Correlation between disease activity level and Short Form-36 subscores in patients with ankylosing spondylitis

	BASDAI
Physical function†	
r	−0.788**
p	0.002
Physical role†	
r	−0.593*
p	0.042
Vitality†	
r	−0.072
p	0.823
General health†	
r	−0.237
p	0.457
Bodily pain†	
r	−0.634*
p	0.027
Social functional†	
r	−0.380
p	0.223
Emotional role‡	
r	−0.581*
p	0.048
Mental health†	
r	0.309
p	0.328

†; With Pearson's correlation analysis; ‡; With Spearman correlation analysis; *: p<0.05; **: p<0.01.

Table 5. Differences in disease activity indices and metrological measurements between patients with BASDAI <4 and BASDAI ≥4 scores

	BASDAI <4	BASDAI ≥4	*p*
Tragus to wall	14.6±4.7	16.7±8.2	>0.05**
Cervical rotation	60.5±21.9	48.3±20.3	0.019*
Lumbar Schober's	2.8±2.3	2.10±1.9	>0.05**
Lumbar side flexion	9.8±5.8	10.5±12.7	>0.05**
Intermalleolar	97.1±28.9	90.4±25.3	>0.05*
Modified Schober's	4.7±3	2.8±2.1	0.003*
Chest expansion, (cm)	3.8±1.9	3.1±1.6	>0.05*
Finger floor distance, (cm)	16.6±14.6	24.9±17.8	0.042*
Cervical flexion, (cm) (Chin-manibrium sterni distance)	2.4±2.3	3.2±2.0	>0.05*
Cervikal extention, (cm)	5.2±5.2	8.2±9.1	>0.05**

BASDAI: Bath ankylosing spondylitis disease activity index; *: With Student's t-test; **: With Mann Whitney U-test.

Dalyan et al.[30] reported spinal mobility indices were the most powerful predictors of functional loss in AS patients,[2,28] whereas disease activity and metrologic index scores (particularly the modified Schober test) were the strongest variables predicting functional disability.[2] The correlation between BASDAI and BASMI was poor in a Swedish study. These findings may be due to the fact that disease activity and range of motion are different variables which necessitate a separate evaluation. Therefore, the authors considered that disease activity has great importance for the patient's well-being.[28] However, both BASDAI and BASMI showed significant improvement after eight weeks of a home exercise program. Kaan and Ferda,[31] showed correlations between BASDAI total score and chest expansion, wall-occiput distance, chin-manubrium distance and lumbar Schober's. In the present study, disease activity showed significant association with BASMI scores, patient and physician global assessment. In addition, BASMI, finger-to-floor distance, chronic low back pain, patient's global VAS and physician global VAS measurements were

Table 6. Comparison of clinical parameters according to disease activity score Bath ankylosing spondylitis disease activity index (<4, ≥4) in patients with ankylosing spondylitis

Clinical parameters	BASDAI <4	BASDAI ≥4	*p*
Chronic back pain			0.069
Yes	20	32	
No	14	7	
Daily low back pain complaint			**0.026***
Yes	21	33	
No	13	6	
Improved low back pain with exercise			0.957
Yes	22	25	
No	12	14	
Improved low back pain with rest			**0.008****
Yes	15	29	
No	19	10	
Awakening at night because of pain			**0.008****
Yes	18	32	
No	16	7	
Peripheral arthritis			0.460
Yes	12	17	
No	22	22	
Gluteal pain			0.305
Yes	17	26	
No	17	9	

BASDAI: Bath ankylosing spondylitis disease activity index; Statistical analysis by chi-square test. *: p<0.05; **: p<0.01.

statistically higher, and modified Schober's and cervical rotation measurements were lower in the group with BASDAI ≥4 scores. High disease activity seems to be an important factor which affects spinal mobility parameters and patients' general well-being. This is important both for daily life and working ability.

There is some evidence for an association of ESR and CRP with disease activity in AS.[2] Some authors stated that CRP and ESR have no predictive value in determining the disease activity of AS patients who have peripheral arthritis.[32] Spoorenberg et al.[33] concluded that ESR and CRP did not play a role in the evaluation of the disease activity in AS patients with and without peripheral arthritis. In that study, BASDAI was also used as an indicator of disease activity.[32,33] Levels of acute-phase reactants (ESR and CRP level) are elevated in only a limited number of patients with AS. A normal value for acute phase reactants does not rule out active disease. The discriminative power of ESR and CRP does not comprehensively represent the disease process in AS. However, there was some evidence for an association of ESR and CRP with disease activity in AS.[34] Clinical measures of disease activity and functional disability correlated more with CRP than with ESR.[2,34] In the present study, patients with BASDAI ≥4 had higher ESR and CRP levels (p=0.001) compared with patients who had BASDAI <4 score. ESR and CRP levels were significantly correlated with disease activity in patients with AS. Dougados et al.[35] suggested increased CRP levels in AS patients with axial involvement and[2] a correlation with clinical severity of the disease.[2] This supports the view that acute phase parameters would be useful to reveal the disease activity.

Brandt et al.[36] found a significant correlation between BASDAI and BASFI. Bodur et al.[24] reported significantly higher BASFI scores in the patients with high BASDAI scores (>4) compared with low BASDAI score (<4). Physical functional outcome is related to both disease activity and resulting damage.[31] Zhao et al.[34] showed that functional disability had a correlation with disease activity. In our study, BASFI score was higher in the group with BASDAI ≥4, and BASDAI total score was significantly correlated with BASFI score.

Patients suffering from chronic pain syndromes may have distress, negative feelings and dissatisfaction in many aspects of life. These patients typically have poor QoL status as is mostly found with RA patients.[2] The QoL has been determined as the perception of the individual of his or her situation in the current culture and value system. While health situation and functional situation are predominantly related to the physical condition, the term 'quality of life' includes the wishes, expectations and emotional responses of the individual related to his/her health.[5,37] Individuals with chronic diseases cannot perform their daily living activities sufficiently. Owing to the combination of all these factors, the QoL of the individuals may be affected negatively.[5] There are still no standard recommendations about QoL instruments for AS.[28] Bostan et al.[2] showed that patients with AS had poorer QoL. The most important determinants in self-reported QoL were the levels of functional disability and disease activity.[2] Turan et al.[5] found no significant correlation between BASDAI and subgroups of SF-36 (except general health).[2] Vesović-Potić et al.[28] showed no significant differences in spinal mobility measures and the SF-36 subscore scores between the education level group although some studies indicate that a low education level is associated with worse QoL. Zhao et al.[34] showed that QoL did not have any correlation with disease activity. Quality of life takes into account the effect of impairments and disability on the patient in addition to other influences including personality, social and physical environment, economic resources, and culture.[33] In the present study, there were significant correlations between disease activity and subscores of SF-36 physical function, physical role, bodily pain and emotional role. It is concluded that disease activity causes poorer QoL and particularly affects physical health subscores of general health quality.

Finally, the limitations of this study are a lack of patient follow up and also a lack of evaluation of the physical component summary (PCS) and mental component summary (MCS) of SF-36. Thus, there is a need to design larger studies for the reliability and validity of the summary component of SF-36 which has not yet been studied for a Turkish version. Further prospective longitudinal studies are needed to establish the definitive relationships between clinical findings, functional disability and QoL related with disease activity in patients with AS.

In conclusion, this study showed that disease activity is associated with functional disability, clinical findings and QoL in AS. High disease activity seems to be an important factor which affects spinal mobility parameters and the patients' general well-being. Short Form-36 subscore can be used to evaluate general body health, particularly physical health dimensions. There is a need to design further studies to define the effect

of disease activity on body health. The recognition of complicated relationships between clinical findings, QoL and functional disability, and disease activity in patients with AS will help us to develop further management strategies to reduce disease activity and to improve their functional status.

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