

## Evaluation of Sexual Dysfunction in Females With Ankylosing Spondylitis

Halil Ekrem AKKURT,<sup>1</sup> Halim YILMAZ,<sup>1</sup> Sema YILMAZ,<sup>2</sup> Lütüfiye PARLAK,<sup>1</sup>  
Banu ORDAHAN,<sup>3</sup> Ali SALLI<sup>4</sup>

<sup>1</sup>Department of Physical Medicine and Rehabilitation, Konya Training and Research Hospital, Konya, Turkey

<sup>2</sup>Department of Midwifery, Selçuk University Health Science Faculty, Konya, Turkey

<sup>3</sup>Department of Physical Medicine and Rehabilitation, Beyhekim State Hospital, Konya, Turkey

<sup>4</sup>Department of Physical Medicine and Rehabilitation, Necmettin Erbakan University Meram Medical Faculty, Konya, Turkey

### ABSTRACT

**Objectives:** This study aims to evaluate sexual function in females with ankylosing spondylitis (AS), compare them with healthy controls, and demonstrate the effects of AS on female sexual functions.

**Patients and methods:** Fifty-four AS patients (mean age 39.33±8.57 years; range 20 to 55 years) and 56 similar aged healthy controls were included in the study. Depression levels and sexual functions of all participants were evaluated by the Beck Depression Inventory and Female Sexual Function Index (FSFI), respectively. Other assessment methods included the visual analog scale for pain, fatigue, and importance of sexual life; Bath Ankylosing Spondylitis Disease Activity Index for disease activity, Bath Ankylosing Spondylitis Functional Index for functionality, Bath Ankylosing Spondylitis Metrology Index for spinal mobility, and Short Form-36 (SF-36) for quality of life.

**Results:** Total FSFI and all FSFI subscale scores and number of weekly sexual intercourse were significantly lower while Beck Depression Inventory score was significantly higher in females with AS when compared to controls. In AS patients with depression, total FSFI score and FSFI subscales scores of desire and arousal were significantly lower than those without depression. In females with AS, there were negative correlations between total FSFI score and duration of complaint, Beck Depression Inventory score, Bath Ankylosing Spondylitis Metrology Index score, visual analog scale score, age, and duration of marriage while positive correlations existed between total FSFI score and visual analog scale importance of sexual life score and number of weekly sexual intercourse, SF-36 fatigue, SF-36 social function, SF-36 pain, and SF-36 mental component scores.

**Conclusion:** Sexual dysfunction was more common in female AS patients without marked impairment in body image and hip involvement when compared to normal population. Sexual problems which are generally neglected should be handled regardless of disease activity when evaluating patients with AS and establishing a treatment plan.

**Keywords:** Ankylosing spondylitis; chronic disease; depression; females; quality of life; sexual dysfunction.

Ankylosing spondylitis (AS) is a chronic, systemic inflammatory disease that primarily affects sacroiliac joints and spine. It causes limitation of movement, particularly in axial joints, due to afflicted periarticular structures. Although AS primarily involves axial skeleton, it also affects peripheral joints such as shoulder and hip joints. Patients may experience difficulty in daily activities due to limitations in musculoskeletal system.<sup>1,2</sup>

Female sexual function is a complex process influenced by psychological, physiological, and individual factors. Female sexual functions may be affected by disorders or disabilities. Female sexual dysfunction may reduce quality of life (QoL) by causing stress and affecting family relationships. Sexual dysfunction can manifest as sexual unwillingness, arousal and orgasm disorders and pain during sexual intercourse.<sup>3,4</sup> Although female sexual dysfunction is common

**Received:** July 03, 2015 **Accepted:** July 26, 2015 **Published online:** November 26, 2015

**Correspondence:** Halil Ekrem Akkurt, MD. Konya Eğitim ve Araştırma Hastanesi Fiziksel Tıp ve Rehabilitasyon Kliniği, 42090 Meram, Konya, Turkey.

Tel: +90 332 - 221 00 00 e-mail: ekremakkurt@yahoo.com

©2016 Turkish League Against Rheumatism. All rights reserved.

in the community, it is generally neglected in both social life and medical practice, as some disciplines being exception. Sexual dysfunction may both be seen during active and advanced phases of disease where disability develops.<sup>5</sup> In rheumatoid disorders, sexual dysfunction can be related to several factors. It has been proposed that these factors include pain, weakness, fatigue, stiffness, functional failure, depression, anxiety, negative body image, decreased libido, hormonal insufficiency, and drug use.<sup>6-9</sup> Sexuality is generally not questioned since it is perceived a taboo in Turkey. In addition, studies on sexual problems were predominantly conducted on male patients or with limited number of female patients.<sup>10-13</sup> Although female sexual dysfunction is common in patients with AS, studies focusing on this subject are limited. Therefore, in this study, we aimed to evaluate sexual function in females with AS, compare them with healthy controls, and demonstrate the effects of AS on female sexual functions.

## PATIENTS AND METHODS

Fifty-four sexually active premenopausal female patients (mean age  $39.33 \pm 8.57$  years; range 20 to 55 years) with AS who were diagnosed according to modified New York criteria (Assessment of SpondyloArthritis International Society 2009 criteria) (patient group) and 56 sexually active, premenopausal, and similar aged healthy females (control group) were included.

Exclusion criteria included having communication disorders, pregnancy, sexually transmitted diseases, history of hysterectomy or vaginal surgery, cardiovascular, pulmonary, hepatic, renal, hematological and gynecological diseases, endocrine disorders such as diabetes mellitus or thyroid dysfunction, major psychiatric disorder, extra-articular involvement (enthesitis, uveitis), arthritis, limited hip and knee movements, abnormal laboratory results, receiving antihypertensive, antidepressant, anxiolytic and antiepileptic agents and oral or vaginal estrogen therapy, smoking and alcohol consumption. The study was approved by local ethics committee and written informed consent was obtained from all participants.

The patient and control groups were taken into a room where there was only a female doctor so that they could answer the questions without being shy. They were assured that their answers would be kept confidential. Only the questions not understood by participants were explained by paying attention not to affect their answers.

Socio-demographic characteristics of all participants including date of birth, marital status, residence, education level, employment status, family structure and income, body mass index (BMI) were recorded. In group 1, assessments were performed by using 10 cm visual analog scale (VAS) for pain and fatigue levels, Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) for disease activity, Bath Ankylosing Spondylitis Functional Index (BASFI) for functionality in daily activities, Bath Ankylosing Spondylitis Metrology Index (BASMI) for spinal mobility, and Short Form-36 (SF-36) for QoL. Beck Depression Inventory (BDI), 0-10 cm VAS, and Female Sexual Function Index (FSFI) were used to assess depression, importance of sexual life, and sexual functions, respectively, in both groups.

Bath Ankylosing Spondylitis Disease Activity Index determines disease activity by questioning fatigue, spinal pain, peripheral arthritis, enthesitis, and severity and duration of morning stiffness.<sup>14</sup> Patients answered the questions on a 10 cm VAS. The individual scores are assessed on a 0-10 scale, with lower scores indicating less active disease.<sup>15</sup>

The BASFI consists of 10 questions eight of which are on daily activities and two on patients' ability to cope with everyday life. All items are assessed with a 10 cm VAS and the mean of the scale gives the BASFI score (0-10), with higher scores indicating more severe impairment.<sup>16,17</sup> BASMI includes five clinical measurements representing axial mobility to assess spinal mobility. BASMI comprises five measurements: cervical rotation, tragus-to-wall distance, lateral flexion, modified Schober's distance, and intermalleolar distance. Each measurement indicates either 0 (mild disease involvement), 1 (moderate disease involvement) or 2 (severe disease involvement) points, resulting in a total BASMI score of 0-10.<sup>18</sup>

Short Form-36 is a self-report questionnaire consisting 36 items of which reliability and validity were proven in patients with musculoskeletal system disorder. SF-36 involves eight health-related domains including physical functioning, social functioning, physical role functioning, emotional role functioning, mental health, vitality, bodily pain, and general health perception. In all domains, items are rated from 0 (worst health status) to 100 (best health status). SF-36 has two summary scales including physical component and mental component summaries.<sup>19</sup>

Beck Depression Inventory is a 21-item self-reported assessment scale evaluating depressive mood with shown reliability and validity. The items are rated from 0 to 3 according to severity of symptom. Higher BDI scores indicate more severe depression. BDI scores  $\geq 17$  indicate minimal to mild depression.<sup>5,20,21</sup>

Female Sexual Function Index is a 19-item, multi-dimensional, self-rating, short questionnaire developed to assess basic dimensions of female sexual functions including desire, arousal, lubrication, orgasm, satisfaction, and pain. Besides the total score, it comprises scores for six sub-scales including sexual desire, arousal, lubrication, orgasm, satisfaction, and dyspareunia. Higher scores indicate better sexual function while 0 indicates lack of sexual intercourse in the past month.<sup>22,23</sup>

### Statistical analysis

Statistical analyses were performed by using IBM SPSS for Windows version 21.0 software program (IBM Corporation, Armonk, New York, USA). Data were expressed as mean  $\pm$  standard deviation. Parametric data were compared by using Student's t test, non parametrical data were compared by Mann Whitney U test, and categorical data were analyzed by Chi-square test. Skewed data were analyzed by using Mann Whitney U test. A *p* value of  $<0.05$  was considered to be statistically significant.

In the patient group, relationships between FSFI scores and clinical parameters (BASDAI, BASFI, BASMI, VAS, BDI scores, fatigue, SF-36, BMI, and complaints) were assessed by using Spearman's correlation analysis. Correlation coefficients were defined as follows: 0-0.25, no

correlation; 0.25-0.50, weak-medium correlation; 0.50-0.75, strong correlation; and 0.75-1.00, very strong correlation.

## RESULTS

All subjects in both patient and control groups were married. Both groups were comparable regarding age, BMI, educational level, occupational status, number of children, family structure, and duration of marriage ( $p>0.05$ ) (Table 1). Mean duration of AS was  $8.52\pm 5.13$  years. Table 1 presents BMI, VAS importance of sexual life scores, number of weekly sexual intercourse, and scores of BDI, BASDAI, BASFI, BASMI, and VAS. FSFI score and number of weekly sexual intercourse were significantly lower while BDI score was significantly higher in patient group compared to controls ( $p<0.001$ ) (Table 1).

According to BDI score  $\geq 17$  was considered to be in favor of depressive mood, depression was detected in 44.4% of patient group and in 7.1% of controls. Total FSFI and all FSFI subscale scores (desire, arousal, orgasm, lubrication, satisfaction, pain) were significantly lower in patient group compared to controls ( $p<0.001$ ) (Table 2). In AS patients with depression, total FSFI score and FSFI subscale scores of desire and arousal were significantly lower than those without depression ( $p<0.05$ ) (Table 2).

In patient group, there were negative correlations between total FSFI score and duration of disease, BDI score, BASMI score, VAS pain score, age and duration of marriage while positive correlations existed between total FSFI score and VAS importance of sexual life score and number of weekly sexual intercourse, SF-36 fatigue, SF-36 social function, SF-36 pain, SF-36 role limitations due to emotional health, and SF-36 mental component scores (Table 3). In patient group, no correlation was detected between total FSFI score and monthly income, number of living children, fatigue level, BMI, BASDAI, BASFI, SF-36 physical function, SF-36 mental health, SF-36 role limitations due to physical health, SF-36 general health status, and SF-36 physical component scores ( $p>0.05$ ).

**Table 1.** Characteristics of patients with ankylosing spondylitis and controls

	Patient group (n=54)			Control group (n=56)			p
	n	%	Mean±SD	n	%	Mean±SD	
Age (year)			39.33±8.57			37.63±9.60	0.327
Body Mass Index (kg/m <sup>2</sup> )			28.53±5.26			28.50±6.19	0.976
Duration of marriage (year)			19.38±10.93			17.13±9.41	0.250
Number of living children			2.57±1.24			2.53±1.31	0.875
Beck Depression Inventory score			15.11±8.44			7.68±4.99	<0.001
Importance of sexual life score			5.07±2.14			7.91±2.00	<0.001
Number of weekly sexual intercourse			1.63±0.59			2.57±0.63	<0.001
Bath Ankylosing Spondylitis Disease Activity Index score			5.78±1.66				
Bath Ankylosing Spondylitis Functional Index score			5.88±1.29				
Bath Ankylosing Spondylitis Metrology Index score			7.81±1.72				
Visual Analog Scale pain score			6.38±2.05				
Visual Analog Scale fatigue score			6.12±2.24				
Short Form-36 physical component			46.98±22.47				
Short Form-36 mental component			54.72±21.95				
Employment status							
Employed	9	16.7		10	17.9		} 0.535
Unemployed	45	83.3		46	82.1		
Family structure							
Elementary family	46	85.2		40	71.4		} 0.640
Extended family	8	14.8		16	28.6		
Education							
Primary school (≤8 y)	46	86.1		47	83.9		} 0.313
High school (11 y)	1	1.9		5	8.9		
College (≥12 y)	7	13.0		4	7.1		

SD: Standard deviation.

## DISCUSSION

Sexual problems are quite common in females. It has been reported that approximately 40% of healthy females are affected by sexual problems.<sup>24</sup> In previous studies, sexual problems were more frequently observed in rheumatoid diseases accompanied by varying degrees of pain, limited movements, morning stiffness, concerns regarding partner's commitment, and deterioration of the body image. Thus, it has been concluded that sexual dysfunction may be seen in rheumatoid diseases such as AS with pain, limitation of

movements, and negative effects on QoL.<sup>6,24,25</sup> However, studies on sexual problems in patients with AS are both limited and controversial.<sup>26</sup> In our study, sexual dysfunction was assessed by FSFI, which revealed that sexual dysfunction was higher in AS patients than controls.

It has been reported that 71% of AS patients experience sexual problems in three categories: medical, psychological, and social. While medical reasons can easily be recognized, psychological and social factors are often overlooked. In AS, physical and emotional disorders caused by the disease may lead to

**Table 2.** Assessment of female Sexual Function Index scores (total and sub-scales) according to depressive symptoms in patients with ankylosing spondylitis

Patients with AS	AS		Control		p	BDI score ≥17 with AS			BDI score <17 with AS			p
	n	Mean±SD	n	Mean±SD		n	%	Mean±SD	n	%	Mean±SD	
Subject	54		56			24	44.4		30	55.6		
FSFI												
Total		22.06±5.49		31.40±2.98	0.000			20.32±5.47			23.46±5.18	0.037
Desire		2.76±1.04		4.58±0.83	0.000			2.43±1.04			3.04±0.98	0.032
Orgasm		3.79±1.19		5.37±0.79	0.000			3.46±1.27			4.05±1.08	0.079
Arousal		3.16±1.12		4.89±0.74	0.000			2.69±1.11			3.54±1.01	0.005
Lubrication		3.97±1.25		5.53±0.85	0.000			3.72±1.17			4.17±1.31	0.194
Satisfaction		3.85±1.33		5.44±0.76	0.000			3.46±1.39			4.17±1.23	0.057
Pain		4.51±1.19		5.57±0.76	0.000			4.55±1.19			4.48±1.23	0.833

AS: Ankylosing spondylitis; BDI: Beck Depression Inventory; SD: Standard deviation; FSFI: Female Sexual Function Index.

**Table 3.** Correlations with total Female Sexual Function Index

	r	p
Negative correlations with total FSFI		
Duration of complaint	-0.441	0.001
Beck Depression Inventory score	-0.431	0.001
BASMI	-0.422	0.001
VAS (pain)	-0.521	0.000
Age	-0.341	0.012
Duration of marriage	-0.313	0.021
Positive correlations with total FSFI		
VAS importance of sexual life score	0.525	0.000
Number of weekly sexual intercourse	0.347	0.010
Short Form-36 fatigue	0.298	0.028
Short Form-36 social function	0.357	0.008
Short Form-36 pain	0.321	0.018
Short Form-36 mental component	0.293	0.032
Short Form-36 emotional health	0.286	0.036

FSFI: Female Sexual Function Index; BASMI: Bath Ankylosing Spondylitis Metrology Index; VAS: Visual Analog Scale.

sexual dysfunction. Although Elst et al.<sup>12</sup> failed to demonstrate any difference in sexual function between AS patients and healthy volunteers, subsequent studies reported higher rates of sexual dysfunction in AS patients. It was also shown that sexual dysfunction was associated with joint range of motion limitations and depression.<sup>13,27</sup>

Depression affects sexual life significantly. As AS is a chronic and progressive disease, it may cause some psychiatric symptoms, the most common ones being anxiety and depression.<sup>28</sup> In our study, 44.4% of the patients were in depressive mood. Similarly, a great number of studies have shown a correlation between sexual dysfunction and depression in AS patients.<sup>11,29,30</sup> Therefore, we think that considering depression in the treatment of AS patients may not only improve patients' psychological status but also improve their sexual function.

In patients with AS, mobility problems in joints, mainly hip joint and spine, resulting in difficulty for certain positions may cause sexual dysfunction. In this study, mobility was assessed by BASMI. In the literature, studies evaluating the relationship between BASMI and sexual dysfunction in AS patients reported controversial results. While some studies showed that joint mobility affects sexual function in AS patients,<sup>10,31</sup> others found no correlation between BASMI and sexual dysfunction.<sup>30,32</sup> Although the AS patients in our study had no

hip or knee involvement, a correlation between BASMI and FSFI scores was observed. This suggests that limited mobility may cause sexual dysfunction in female AS patients even without hip or knee involvement.

Furthermore, pain was shown to have negative effects on sexual function in females.<sup>6,12,33-35</sup> In various studies on rheumatoid disorders, it was reported that pain may decrease sexual desire, sexual satisfaction, and number of sexual intercourse. The fear of increasing pain may cause sexual intercourse avoidance and/or shorten duration of sexual intercourse.<sup>12,36</sup> In studies on female AS patients, pain was assessed as a disease activity rather than an individual parameter. However, in a study by Demir et al.,<sup>31</sup> in which pain was assessed as a distinct parameter, a correlation was found between pain and sexual dysfunction, while Saryıldız et al.<sup>[30]</sup> reported no such correlation. In our study, a correlation between VAS score and sexual dysfunction was detected. These findings suggest that effective pain control is important to improve sexual function in females with AS.

Pain or limitation caused by disease and sexual dysfunction may impact QoL negatively. In female AS patients, QoL is strongly correlated with sexual function.<sup>37</sup> There are limited numbers of studies evaluating the effects of QoL on sexual function in AS patients. In a study by Saryıldız et al.,<sup>30</sup> a correlation between sexual function and QoL was reported. Demir et al.<sup>31</sup> found that total FSFI scores were correlated with SF-36 subscales including general health, vitality, emotional role, and mental health. In our study, QoL was assessed with SF-36, and sexual dysfunction was shown to be correlated with mental component, social functioning, pain, fatigue, and mental health scores, whereas there was no correlation between physical component, physical functioning, physical role functioning, emotional role functioning, and general health scores. In some studies, a mild correlation was determined between sexual dysfunction and disease activity in male and female AS patients, while a strong correlation was found in others.<sup>11,29,30</sup>

Unlike the literature, we detected no correlation between sexual dysfunction and BASDAI, likely due to our small sample size excluding patients with extra articular involvement and arthritis.

Thus, further studies with larger sample size are required on female AS patients for more definitive results.

Moreover, fatigue was reported to be more common in AS patients compared to controls<sup>38</sup> and affect sexual health negatively.<sup>39</sup> However, fatigue has many different forms; thus, discrimination may be challenging. Mental or physical fatigue may be reported despite lack of any underlying reason. It was reported that experience of fatigue varies with respect to age, sex, emotions, and daily roles. Nikolous et al.<sup>40</sup> showed that effects and experiences of fatigue vary individually. Particularly, young females with multiple daily roles have greater tendency to experience negative effects of fatigue.<sup>41</sup> In our study, no correlation was detected between fatigue level and sexual dysfunction. We think that this was due to the difficulty in determining fatigue levels as there are many parameters influencing fatigue.

Our study has several limitations including enrollment of subjects from a single center, not questioning whether patients' partners had sexual dysfunction and problems/questions related with their sexual life, not questioning whether drugs known to affect sexual dysfunction (H<sub>2</sub> receptor antagonists, proton pump inhibitors) were used, and lack of assessment of QoL in control group. Also, patients were not questioned for any factors accompanying AS such as stiffness, sleep disorders, and those affecting sexual life such as body image, stress, coping abilities, sexual attractiveness, and skills of the partner which may influence sexual function.

In conclusion, we demonstrated that sexual dysfunction was more common in female AS patients without marked impairment in body image and hip involvement compared to normal population. Sexual dysfunction was correlated to pain, depressive mood and mobility, while uncorrelated to BASDAI which is a primary marker of disease activity. Thus, we think that depression and sexual problems which are generally neglected should be handled regardless of disease activity when evaluating patients with AS and establishing a treatment plan. In addition, further studies are needed for better understanding of sexual problems in female AS patients.

### Declaration of conflicting interests

The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

### Funding

The authors received no financial support for the research and/or authorship of this article.

## REFERENCES

1. Arnett FC. Ankylosing spondylitis. In Kopman WJ, editor. *Arthritis and allied conditions*. 14th ed. Philadelphia: Lippincot, Williams & Williams; 2001. p. 311-23.
2. Ward MM. Health-related quality of life in ankylosing spondylitis: a survey of 175 patients. *Arthritis Care Res* 1999;12:247-55.
3. Tikiz C, Muezzinoglu T, Pirildar T, Taskn EO, Frat A, Tuzun C. Sexual dysfunction in female subjects with fibromyalgia *J Urol* 2005;174:620-3.
4. Bronner G, Elran E, Golomb J, Korczyn AD. Female sexuality in multiple sclerosis: the multidimensional nature of the problem and the intervention. *Acta Neurol Scand* 2010;121:289-301.
5. Peker F, Taşkınatan MA, Özgül A, Kalyon TA. ankilozan spondilitin cinsel ve çalışma yaşamına etkisi. *Turk J Rheumatol* 2006;21:100-4.
6. Yılmaz H, Yılmaz SD, Polat HA, Salli A, Erkin G, Ugurlu H. The effects of fibromyalgia syndrome on female sexuality: a controlled study. *J Sex Med* 2012;9:779-85.
7. Blake DJ, Maisiak R, Alarcon GS, Holley HL, Brown S. Sexual quality-of-life of patients with arthritis compared to arthritis-free controls. *J Rheumatol* 1987;14:570-6.
8. Pigg JS, Schroeder PM. Frequently occurring problems of patients with rheumatic diseases. The ANA outcome standards for rheumatology nursing practice. *Nurs Clin North Am* 1984;19:697-708.
9. Lipe H, Longstreth WT Jr, Bird TD, Linde M. Sexual function in married men with Parkinson's disease compared to married men with arthritis. *Neurology* 1990;40:1347-9.
10. Cakar E, Dincer U, Kiralp MZ, Taskaynatan MA, Yasar E, Bayman EO, et al. Sexual problems in male ankylosing spondylitis patients: relationship with functionality, disease activity, quality of life, and emotional status. *Clin Rheumatol* 2007;26:1607-13.
11. Ozkorumak E, Karkucak M, Civil F, Tiryaki A, Ozden G. Sexual function in male patients with ankylosing spondylitis. *Int J Impot Res* 2011;23:262-7.
12. Elst P, Sybesma T, van der Stadt RJ, Prins AP, Muller WH, den Butter A. Sexual problems in rheumatoid arthritis and ankylosing spondylitis. *Arthritis Rheum* 1984;27:217-20.

13. Pirildar T, Müezzinoğlu T, Pirildar S. Sexual function in ankylosing spondylitis: a study of 65 men. *J Urol* 2004;171:1598-600.
14. Akkoc Y, Karatepe AG, Akar S, Kirazli Y, Akkoc N. A Turkish version of the Bath Ankylosing Spondylitis Disease Activity Index: reliability and validity. *Rheumatol Int* 2005;25:280-4.
15. Garrett S, Jenkinson T, Kennedy LG, Whitelock H, Gaisford P, Calin A. A new approach to defining disease status in ankylosing spondylitis: the Bath Ankylosing Spondylitis Disease Activity Index. *J Rheumatol* 1994;21:2286-91.
16. Ozer HT, Sarpel T, Gulek B, Alparslan ZN, Erken E. The Turkish version of the Bath Ankylosing Spondylitis Functional Index: reliability and validity. *Clin Rheumatol* 2005;24:123-8.
17. Calin A, Garrett S, Whitelock H, Kennedy LG, O'Hea J, Mallorie P, et al. A new approach to defining functional ability in ankylosing spondylitis: the development of the Bath Ankylosing Spondylitis Functional Index. *J Rheumatol* 1994;21:2281-5.
18. Jenkinson TR, Mallorie PA, Whitelock HC, Kennedy LG, Garrett SL, Calin A. Defining spinal mobility in ankylosing spondylitis (AS). The Bath AS Metrology Index. *J Rheumatol* 1994;21:1694-8.
19. Ware JE Jr. SF-36 health survey update. *Spine (Phila Pa 1976)* 2000;25:3130-9.
20. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. *Arch Gen Psychiatry* 1961;4:561-71.
21. Hisli N. Beck depresyon envanteri'nin geçerliği üzerine bir çalışma. *Türk Psikoloji Dergisi* 1988;6:118-26.
22. Rosen R, Brown C, Heiman J, Leiblum S, Meston C, Shabsigh R, et al. The Female Sexual Function Index (FSFI): a multidimensional self-report instrument for the assessment of female sexual function. *J Sex Marital Ther* 2000;26:191-208.
23. Aygin D, Eti Aslan F. The Turkish adaptation of the female sexual function index. *Turkiye Klinikleri J Med Sci* 2005;25:393-9.
24. Kingsberg S, Althof SE. Evaluation and treatment of female sexual disorders. *Int Urogynecol J Pelvic Floor Dysfunct* 2009;20:33-43.
25. Yilmaz H, Polat HA, Yilmaz SD, Erkin G, Kucuksen S, Salli A, et al. Evaluation of sexual dysfunction in women with rheumatoid arthritis: a controlled study. *J Sex Med* 2012;9:2664-70.
26. Tristano AG. The impact of rheumatic diseases on sexual function. *Rheumatol Int* 2009;29:853-60.
27. Britto MT, Rosenthal SL, Taylor J, Passo MH. Improving rheumatologists' screening for alcohol use and sexual activity. *Arch Pediatr Adolesc Med* 2000;154:478-83.
28. Skopouli FN, Papanikolaou S, Malamou-Mitsi V, Papanikolaou N, Moutsopoulos HM. Obstetric and gynaecological profile in patients with primary Sjögren's syndrome. *Ann Rheum Dis* 1994;53:569-73.
29. Sariyildiz MA, Batmaz I, Dilek B, Inanir A, Bez Y, Tahtasiz M, et al. Relationship of the sexual functions with the clinical parameters, radiological scores and the quality of life in male patients with ankylosing spondylitis. *Rheumatol Int* 2013;33:623-9.
30. Sariyildiz MA, Batmaz I, Inanir A, Dilek B, Bozkurt M, Bez Y, et al. The impact of ankylosing spondylitis on female sexual functions. *Int J Impot Res* 2013;25:104-8.
31. Demir SE, Rezvani A, Ok S. Assessment of sexual functions in female patients with ankylosing spondylitis compared with healthy controls. *Rheumatol Int* 2013;33:57-63.
32. Bal S, Bal K, Turan Y, Deniz G, Gürkan A, Berkit IK, et al. Sexual functions in ankylosing spondylitis. *Rheumatol Int* 2011;31:889-94.
33. Aydemir K, Tok F, Peker F, Safaz I, Taskaynatan MA, Ozgul A. The effects of balneotherapy on disease activity, functional status, pulmonary function and quality of life in patients with ankylosing spondylitis. *Acta Reumatol Port* 2010;35:441-6.
34. Rkain H, Allali F, Jroundi I, Hajjaj-Hassouni N. Socioeconomic impact of rheumatoid arthritis in Morocco. *Joint Bone Spine* 2006;73:278-83.
35. Kraaimaat FW, Bakker AH, Janssen E, Bijlsma JW. Intrusiveness of rheumatoid arthritis on sexuality in male and female patients living with a spouse. *Arthritis Care Res* 1996;9:120-5.
36. Yoshino S, Fujimori J, Morishige T, Uchida S. Bilateral joint replacement of hip and knee joints in patients with rheumatoid arthritis. *Arch Orthop Trauma Surg* 1984;103:1-4.
37. Abdel-Nasser AM, Ali EI. Determinants of sexual disability and dissatisfaction in female patients with rheumatoid arthritis. *Clin Rheumatol* 2006;25:822-30.
38. Davis SR, Jane F. Sex and perimenopause. *Aust Fam Physician* 2011;40:274-8.
39. Schneeberger EE, Marengo MF, Dal Pra F, Maldonado Cocco JA, Citera G. Fatigue assessment and its impact in the quality of life of patients with ankylosing spondylitis. *Clin Rheumatol* 2015;34:497-501.
40. Nikolaus S, Bode C, Taal E, van de Laar MA. New insights into the experience of fatigue among patients with rheumatoid arthritis: a qualitative study. *Ann Rheum Dis* 2010;69:895-7.
41. Aguiar R, Ambrósio C, Cunha I, Barcelos A. Sexuality in spondyloarthritis--the impact of the disease. *Acta Reumatol Port* 2014;39:152-7.