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ORIGINAL ARTICLE

Assessment of sexual dysfunction in male patients with Ankylosing Spondylitis

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Abstract We evaluated sexual dysfunction in male patients with ankylosing spondylitis (AS) using the Brief Male Sexual Function Inventory (BMSFI). We assessed sexual dysfunction using the BMSFI in male patients with AS followed at the outpatient clinic and compared results with those in healthy controls. Depression status was measured by the Beck Depression Inventory in AS patient and control group. The Bath AS functional index was used to measure functional status, the Bath AS metrology index was used to measure joint mobility, and the Bath AS disease activity index was used to evaluate disease activity in AS cases. Compared to healthy controls patients with AS had significantly lower sexual drive, erection, problem assessment and overall satisfaction scores according to the BMSFI. Ejaculation scores were also lower but not statistically significant. According to the Beck Depression Inventory, AS patients had higher scores than healthy controls (14.9 ± 9.4 and 10.3 ± 11.8, $P = 0.026$, respectively). As for the relation between the BMSFI domains and BDI scores, relation was found only in the domains of problem assessment and overall satisfaction ($P < 0.05$). The incidence rate of sexual dysfunction is higher in patients with AS, when compared to the healthy people. In patients with AS, sexual dysfunction was associated with depression and limited joint mobility.

Keywords Ankylosing spondylitis · Sexual dysfunction · Depression · Sexuality

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Introduction

Ankylosing spondylitis (AS) is a systemic chronic inflammatory disease affecting primarily the axial skeleton. Sacroiliitis is the most characteristic finding complicated by involvement of the entire vertebral column as well as pelvic and shoulder girdle joints. This disease-related disability is mostly a consequence of the inflammatory lesions of the aforementioned structures [1]. Pain (especially backaches), stiffness, and physical restrictions are essential complaints in AS.

AS commonly starts in the second or third decade of life [2, 3]. Female-to-male ratio is 1:2 [4]. The spine and pelvis are most commonly affected in men, with some involvement of the chest wall, hips, shoulders, and feet. In contrast, women have less severe involvement of the spine, with more symptoms in knees, wrists, ankles, hips, and pelvis. Disease also tends to be more severe in men [5–7].

Sexuality has been described as an essential part of the whole person, an integral part of being human, including one's total sense of self [8], and is linked to the quality of life of the individual [9]. Sexuality is a complex aspect of human life, comprising much more than the act of sexual intercourse. Normal sexual functioning consists of sexual activity with transition through the phases from arousal to relaxation with no problems, and with a feeling of pleasure, fulfillment and satisfaction.

Materials and methods

Our study consisted of 65 male patients 20–60 years old (mean age 32.9 ± 11.0) who met modified NY criteria for diagnosis of AS. All patients and healthy controls who had an active sexual life were included in the study. Subjects with pulmonary, hepatic, hematological or renal disease, endocrine diseases such as diabetes mellitus, thyroid function disorder, systemic disorders that may affect male sexual function, such as hormonal, musculogenic, neurogenic and cardiovascular diseases, hip osteoarthritis and a history of psychological disorders were excluded from study. All the patients and 45 healthy male persons who formed the control group completed questionnaires of The Brief Male Sexual Function Inventory (BMSFI) and Beck Depression Inventory (BDI) [10]. All subjects and the control group were informed about the objective and purpose this study.

The BMSFI was published by O'Leary et al. [11] in 1995 to provide a self-reported measure of current sexual functioning. The BMSFI was designed to be brief, self-administered, and clinically useful. It covers three functional domains, i.e. sexual drive, erectile function and ejaculatory function as well as problem assessment of these functional domains, and overall satisfaction.

The details of patients' age, functional status, disease activity status, disease duration, morning stiffness were obtained. The Bath ankylosing spondylitis disease activity index (BASDAI) was used to measure disease activity status of patients with AS. BASDAI, a self-administered questionnaire, has been developed for this purpose [12]. It is quick and simple to complete and has good reproducibility, validity, and sensitivity to change. This questionnaire includes the entire spectrum of AS symptoms related to fatigue, pain, swelling, and morning stiffness. The functional status of the patients was assessed by using the Turkish version of the BASFI [13]. The BASFI consists of eight questions relating to the functional anatomy of the patients and two additional questions that assess the patients' ability to cope with everyday life. Bath ankylosing spondylitis metrology index (BASMI) and Bath ankylosing spondylitis patient global index were also assessed.

Patients' psychological status was measured by Beck Depression Inventory (BDI). The BDI is a self-reported questionnaire with 21 items assessing the current levels of symptomatic depression. The total score is obtained by adding the highest score circled for each of the 21 items. The BDI is a reliable and valid measure of depression symptom severity with scores of 0–63 with higher scores representing more severe symptoms.

Erythrocyte sedimentation rate (ESR) and serum C-reactive protein (CRP) were used to assess laboratory activity in the patients with AS. Data were analyzed on a personal computer using Statistical Package for the Social Sciences software (SPSS, Chicago, IL). The independent sample test was used for intergroup comparisons with 2-tailed $P < 0.05$ considered statistically significant. Correlations between sexual dysfunction, depression status, fatigue, joint stiffness, pain, and AS indexes were investigated by the Pearson correlation as appropriate with $P < 0.05$ considered statistically significant.

Results

The mean age of participating patients in this study was 32.9 ± 11.0 and the control groups' was 30.1 ± 6.24. The difference was not statistically significant ($P = 0.120$). Clinical and demographic characteristics of the patients and healthy controls are listed in Table 1. Table 2 shows the mean scores of the patients and controls for the BMSFI domains. The patients with AS had significantly lower sexual drive, problem assessment, erection and overall satisfaction scores compared with the healthy control group based on BMSFI. The difference in mean BMSFI scores, except ejaculation domain, were statistically significant ($P < 0.05$). Ejaculation scores were also lower but not significant ($P > 0.05$).

We used the overall sexual satisfaction domain to determine the proportion of subject who were not sexual satisfied and have sexual dysfunction (those who were very dissatisfied or mostly dissatisfied with their sexual life). AS patients ($n = 14$) were significantly more likely to report that they were not sexual satisfied than control ($n = 4$) subject (20.5 vs 8.8%, respectively, $P < 0.05$). All patients were evaluated according to

Table 1 Clinical and demographic characteristics of 68 patients and 45 healthy controls

Variables	Patients ($n = 68$)	Controls ($n = 45$)	P value
Mean age	32.9 ± 11.0	30.1 ± 6.24	0.120
BDI	14.9 ± 9.4	10.3 ± 11.8	0.026
BASFI	4.3 ± 2.2	–	
BASDAI	4.9 ± 2.2	–	
BMSFI	28.9 ± 8.4	33.3 ± 7.6	0.006
CRP (mg/dl)	21.5 ± 30.0	–	
ESR (mm/h)	24.1 ± 21.6	–	
Morning stiffness	54.1 ± 42.5	–	
Lumbar schober	3.0 ± 1.5	–	
BASGI	5.4 ± 2.7	–	
BASMI	2.6 ± 2.1	–	

Table 2 Domain scores in 68 patients with AS and 45 healthy controls

	Score range	Mean ± SD patients	Mean ± SD controls	*P*
Sexual drive	0–8	4.3 ± 1.7	5.6 ± 1.7	**0.001**
Erection	0–12	7.8 ± 2.6	8.8 ± 2.6	**0.040**
Ejaculation	0–8	5.8 ± 2.1	6.3 ± 2.0	0.260
Problem assessment	0–12	8.1 ± 3.3	9.7 ± 2.6	**0.011**
Overall satisfaction	0–4	2.5 ± 0.8	2.8 ± 0.8	**0.044**

BASFI, BASDAI, BASMI, BASGI, CRP, ESR, morning stiffness and modified lumbar schober. No statistically significant relation ($P > 0.05$) was found with BASFI and BASDAI, when total scores of AS indexes and BMSFI were compared. No significant relation was detected between BASFI and BASDAI. However there was statistically significant relation between BASMI total scores and BMSFI ($P < 0.05$). Modified lumbar schober and intermalleolar distance which are parts of BASMI are correlated with BMSFI ($P = 0.008$ and $P = 0.022$), but cervical rotation, tragus to wall distance and lateral lumbar flexion are not correlated ($P > 0.05$).

Compared with healthy controls, AS patients had significantly higher BDI scores ($P = 0.026$). However, there was a statistically significant relation between total BMSFI scores and BDI scores of both AS patients and controls ($P < 0.05$). When BDI scores were compared with BMSFI domains in AS patient group, there was a significant relation in the problem assessment and overall satisfaction domains ($P = 0.004$, $P = 0.012$; respectively). We also evaluated the relation of BDI with morning stiffness, pain, fatigue, and functional limitation in AS patient. Although significant relation was detected between BDI scores of the patients with AS and fatigue and limited function ($P = 0.001$, $P < 0.001$), there was no significant relation between these clinical characteristics and BMSFI scores. In 10 patients with AS, there was severe depression scores (mean scores = 31.2 ± 5.6) and their BMSFI scores were lower than the mean scores (mean scores = 27.2 ± 6.4). However, no significant relation was detected between BMSFI sub-domains despite the severe depression scores according to BDI ($P > 0.05$). The patients who had high degree morning stiffness (120 min and more) had lower BMSFI scores than the patients with low degree morning stiffness (lower than 120 min), but this difference was not statistically significant (27.8 ± 7.4, 29.0 ± 8.6; respectively, $P = 0.724$). CRP, ESR and lumbar schober were not related with BMSFI total scores. But modified lumbar schober was statistically significant with BMSFI. Table 3 compares BMSFI and other quantities.

Table 3 Correlations between BMSFI and AS indexes, and some other parameters

Variable	Correlation coefficient	*P*
BMSFI		
BDI	**−0.405**	**0.001**
BASFI	−0.199	0.103
BASDAI	−0.010	0.935
BASGI	0.061	0.620
BASMI	**−0.413**	**0.001**
CRP (mg/dl)	0.033	0.808
ESR (mm/h)	0.013	0.924
Morning stiffness	0.058	0.637
M. Lumbar schober	**0.321**	**0.008**

The 52 of 68 AS patients had not peripheral joint involvement, but 16 of them had. Of 16 patients, 5 ankle, 4 knee, 2 elbow, 2 bilateral shoulder and 3 unilateral shoulder involvement were observed. The patients who had peripheral joint involvement had lower BMSFI scores, but it was not statistically significant ($P > 0.05$). All of the patients were questioned for only use of anti-rheumatic drugs, but not for the use of anti-depressant and anti-hypertensive drugs. The drugs (medications) and number of patients were as follows; 32 patients sulfasalazine plus NSAIDs, 14 patients NSAIDs, 5 patients metotrexate plus NSAIDs and 2 patients anti TNF.

Discussion

AS is a chronic systemic disease, that has the potential to affect all aspects of patients' lives including their sexual activities and relationships. Only few studies were performed to show relationship between AS and sexual dysfunction. Loss of physical function, fatigue and pain has been shown to interfere with sexual pleasure [14–17]. Physical function has been identified as the main outcome domain in AS, and it deteriorates due to the disease activity and damage of axial and peripheral joints [18, 19]. We do not expect to see sexual dysfunction with organic origin in our patients. However, we excluded chronic and systemic diseases which may lead to sexual dysfunction with organic origin (including hypertension, diabetes, severe infections, established erectile dysfunction etc) in this study. Our emphasis was on the extent to which the functional capacity loss, joint stiffness and depression caused by the nature of AS affect the quality of sexual life.

Sexual dysfunction is typically influenced by a variety of predisposing, precipitating, maintaining and contextual factors [20]. The high prevalence of depressive symptoms in patients with AS and disability due to

joint stiffness make for a complex interplay of psychological, physical and interpersonal factors [21]. Monga et al. investigated the relationship between sexual function and physiological measures in 70 patients with chronic pain and reported that sexual problems are common in patients with chronic pain and in those with symptoms of distress and depression [22]. Barlow et al. [23] showed that approximately one third of the AS patients reported a high level of depressive symptoms and that women reported more depression than men in a cross sectional study of 177 patients. In our study, the findings obtained with BDI in the AS group is higher than the controls. As for the relation between the BMSFI domains and BDI scores, relation was found only in the domains of problem assessment and overall satisfaction ($P < 0.05$). These findings are in line with those of the study conducted by Pirildar et al. In this study, erectile function scores of the patients who display severe depression scores according to BDI was lower than those of the patients who display lower erectile scores according to BDI. However, this difference was not statistically significant [24]. The findings indicate that the patients with AS receive worse results in nearly all domains on BMSFI and that the contribution of depression is lower than expected. It is generally agreed that the relationship between depressive mood and sexual dysfunction is bidirectional and further complicated by the sexual side-effects of antidepressants [25]. In contrary, a study of sexual problems in patients with fibromyalgia which has distinct sexual dysfunction showed that depression has no additional negative effect on sexual function [26]. A limitation of our study was that the patients were not asked whether they use antidepressants or not.

Authors found that the erectile function scores, orgasmic function, intercourse satisfaction and overall satisfaction scores of the patients who suffer from morning stiffness lasting 4 h or longer were significantly lower than those suffering morning stiffness lasting 2 h according to international index of erectile functions. These findings are in confliction with ours. However, the means morning stiffness of our patients was very low and no patient reported a morning stiffness lasting 4 h [24]. These results were only associated with morning stiffness, unlike our study. This was caused by methodological difference. However, we considered a morning stiffness lasting 2 h as a severe stiffness and we could not find a significant relation.

Pain, morning stiffness, fatigue, functional impairment, which are most commonly complaints of AS [27–29] were associated with sexual dysfunction, depression and anxiety. Forty eight patients with AS in the working group reported that they suffered the problem of fatigue. In BMSFI domains of these patients, excluding ejaculation domain, the scores were low. However, there was significant relation only in the problem assessment between the domains of BMSFI and fatigue ($P = 0.019$). There is not close relation between fatigue and sexual dysfunction. However, it may be a contributing factor.

One study of patients enrolled in chronic pain treatment programs in England found that 73% of the patients had pain-related sexual problems [30]. Approximately two-thirds of patients in another study reported reduced frequency in their sexual relations as a result of chronic pain [22]. In this study, 55 (84%) of the patients suffered chronic back pain and 57 (87%) suffered pains on muscles and joints. The scores of these patients were low in all BMSFI domains. However, this difference was not statistically significant ($P > 0.05$). This may be due to the methodological and regional differences.

There is a high prevalence of sexual difficulties in patients with chronic pain and these difficulties are not simply related to mood or disability [30]. Specific effects of pain on sexual interest and function are difficult to identify given the possible direct effects on sexual activity of disabilities or pathologies and psychological distress [31]. Our findings indicate that the possibility that back, joint and muscle pains in the patients constitutes only a contributing factor, but not the primary cause of the sexual dysfunction in the patients with AS, which is supported by the findings of Pirildar et al. This may be due to the anxiety of the patients who fear that the sexual drive or sexual activity will bring the back pain.

Loss of functional capacity is related to severe problems in the sexual life. AS is a restrictive disease in mobility of the axial skeleton, especially lower back. It can cause a decrease in physical activity during sexual intercourse and may contribute to intercourse dissatisfaction in men with AS. For this reason, we came to the conclusion that there may be a relation between BASFI scores and BMSFI scores. But there was not relation between functional status and sexual function in AS patients. Similarly, there was not significant association between disease activity and sexual dysfunction scores. Interestingly, BASMI was related to all BMSFI domains. Stiffness in the intervertebral and peripheral joint causes mobility constraints as well as body image disturbances. It is because the stiffness may cause a decrease in the sexual drive. A study of sexual problems in patients with RA showed that sexual problems were related to fatigue (97%), pain (94%), decreased satisfaction or body image disturbances (71%) [32]. This may cause a decrease in the sexual drive, fulfill-

ment and problem perception. A possible explanation for this situation is that patients with stiffness in their hips and shoulders may experience difficulty in reaching a total intercourse and selection of the right position. There is not consensus about the relationship between pain and sexual dysfunction, but there is consensus that arthritis can interfere with sexual functioning. In addition, this situation may put the patient into a difficult position in eye of his partner and this anxiety may explain the decrease in all domains.

Elst et al. reported that AS patients did not score differently from the healthy population, unlike our results [14]. But in this study, scores on the sexual motivation scale (which measures the tendency to engage in sexual interaction versus the tendency to be averse to sexual interaction) were determined only by interview in AS. Any sexual function scale which evaluates the sexual life domains was not used.

Rheumatic diseases may significantly affect a person's sexual life, as can the confounding effects of medications frequently used to treat these chronic illnesses. Loss of self-esteem, depression, and perception of self by others may also contribute to sexual dysfunction [14, 33]. Literature regarding sexual dysfunction of people with rheumatic diseases is insufficient. A recent review noted that only 10 studies adequately assessed sexual function in rheumatic disease patients. Even these few studies were limited by not having definitions, indices, or validated methods for evaluating sexual difficulties in people with rheumatic disease [19].

The limitations of this study include some deficiencies. For example, we had no data on smoking intensity or duration, antidepressant usage, and lipid profile. On the other hand, we didn't investigate the endothelin-1 levels in all subjects enrolled in this study. The idea that increased levels of endothelin 1 might be involved in the pathophysiology of erectile dysfunction is exciting and biologically plausible [21]. Furthermore, this study was not donated with the methodological features needed to find out whether sexual dysfunction causes depression or depression causes dysfunction.

Conclusion

The incidence rate of sexual dysfunction is higher in patients with AS, when compared to the healthy people. In our patients, sexual dysfunction was associated with depression and limited joint mobility (BASMI). Contrary to our expectations, no significant relation was found between the patients' sexual dysfunction and any of the parameters such as BASFI, BASDAI, CRP, ESR. This situation indicates that nature of the sexual dysfunction in patients with AS is complicated and multi-factorial. It is a fact that the patients with AS suffer sexual dysfunction. However, the available data is insufficient to explain this situation.

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