ORIGINAL ARTICLE

Health-related quality of life in ankylosing spondylitis, fibromyalgia syndrome, and rheumatoid arthritis: a comparison with a selected sample of healthy ındividuals

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Abstract In this study, we compared health-related quality of life (HRQoL) scores of patients with rheumatoid arthritis (RA), fibromyalgia syndrome (FS), or ankylosing spondylitis (AS), with those of a selected sample of healthy individuals. The study group comprised 530 patients (264 with RA, 149 with FS, and 117 with AS). Three hundred fifteen healthy controls were used for comparison. HRQoL scores were obtained using the Short-Form (SF)-36 Health Survey. Frequency, mean, correlation, and multiple regression analyses were performed; in addition to the Student's t test, one-way ANOVA test, Kruskal–Wallis test, and chi-square test. The average physical component summary (PCS) and mental component summary (MCS) scores of patients in the RA, FS, and AS groups were much lower than those in the control group ($p<0.05$). In all three patient groups, the lowest PCS score was found in the RA group, and the lowest MCS score was found in the FS group. The PCS scores of RA patients with disease-related changes in daily activities and the MCS scores of FS patients were lower ($p<0.05$). In the three patient groups, the quality of life (QoL) of university graduates and those with a high level of income was good, whereas the QoL of patients who lacked information about the disease was poor. This study shows that AS, FS, and RA have a negative impact on HRQoL. Evaluating the HRQoL of patients with these conditions may provide guidance on their treatment and care.

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Introduction

Musculoskeletal disorders are among the most common reasons for hospital admissions. They are also the most frequent cause of severe long-term pain and physical disability, with consequent deterioration in HRQoL. To improve the HRQoL of patients with musculoskeletal disorders, the World Health Organization (WHO) proclaimed 2000–2010 the Bone and Joint Decade. Musculoskeletal disorders such as AS, FS, and RA constitute an important group of chronic diseases [1–4].

AS is a systemic chronic inflammatory disease that primarily affects the axial skeleton. The prevalence of AS in the population ranges between 0.2% and 1.0%. Pain and stiffness are the most important symptoms [1, 5, 6]. Patients with AS experience chronic pain and stiffness, which limits their ability to perform various daily activities The disease may also compromise a patient's ability to sleep, thus, impairing the patient's mood and the performance of daily tasks. Consequently, AS adversely affect HRQoL indicators [7].

FS is a common musculoskeletal syndrome with a prevalence of 2–4% in the general population [8–10]. In common with other chronic conditions, FS adversely affects HRQoL and functional status. FS often results in disability and profoundly affects the performance of daily activities, both at work and at home [11]. The characteristics of FS are widespread pain and high tender point counts. Other important features include sleep disturbance, fatigue, headache, irritable bowel syndrome, and paresthesias in the

extremities. The syndrome is most common among women aged between 20 and 45 years [2, 9, 10, 12–15].

RA is a systemic, chronic, unpredictable, inflammatory disease that results in pain and reduced functional capacity and autonomy; it also impact on a patient's HRQoL [16, 17]. The prevalence of RA in the population ranges between 0.5% and 2%, and age at onset is 15 years and above [9, 18]. Patients with RA who have significant functional disability have a 3-fold increased risk of mortality compared with that of the general population [19]. Daily pain, stiffness, fatigue, and physical disability are common features of RA. RA is usually viewed as having a major impact on all aspects of HRQoL [3].

Advanced medical technology has improved mean life expectancies, leading to an increase in the number of patients with chronic diseases [2, 5, 7, 9, 11]. Health professionals worldwide have, therefore, been forced to work toward improving patients' functional outcomes and HRQoL. Chronic disease–associated deterioration in physical function, health status, and mood has a negative effect on patients' HRQoL. The main goal of treatment, therefore, should be to enhance the patient's HRQoL, in addition to improving the medical status [1, 9, 20].

QoL has been defined as living a life with a high quality [21, 22]. QoL is a subjective concept, which not only encompasses the symptoms but also the consequences of the disease, such as impairment in the performance of daily activities. QoL, therefore, includes life satisfaction, happiness, and the overall value placed on life at any given time. HRQoL has been defined as the extent to which one's usual or expected physical, emotional, and social well-being are affected by a medical condition or its treatment [5].

In this study, we compared the HRQoL scores of AS, FS, and RA patients with those of control subjects and assessed the impact of these three musculoskeletal disorders on various components of HRQoL using the SF-36 Health Survey.

Materials and methods

This was a descriptive, cross-sectional analytical study, which comprised patients who were admitted to the Rheumatology Outpatient Department of Gaziantep University between June 2007 and August 2008. Patients in the study group had previously received a diagnosis of AS, FS, or RA by a rheumatologist. The diagnosis of AS was made according to the modified New York criteria [23]. FS and RA diagnoses were based on the criteria of the American College of Rheumatology (ACR) [24, 25]. Patients were selected consecutively. Thirty-eight patients and 27 healthy individuals refused to participate in the study. The final study group comprised 530 patients (117 in the AS group, 264 in the RA group, and 149 in the FS group) and 315 controls with similar demographic properties who had not sought any medical treatment in the past 3 months. The control group was mainly made up of unemployed housewives. Exclusion criteria included the presence of other known rheumatic and systemic diseases, malignancy or infectious disease, severe somatic or psychiatric disorders, and painful or disabling medical conditions. Informed consent was obtained from all the participants. All the participants had sufficient intellectual capacity to fill out the HRQoL questionnaires.

The questionnaire used to collect the data comprised 13 questions related to age, gender, educational level, marital status, place of residence, profession, monthly income, smoking status, alcohol consumption, disease-related changes in daily life, problems caused by these changes, knowledge about the disease, and the duration of the disease. All the data were obtained via face-to-face interviews. If a patient gave an affirmative answer to the question "Has your disease caused any changes in your daily life?," the researcher then posed the open-ended question "Would you please list the problem/problems that have caused these changes?" Patients were also asked whether they had knowledge of the disease. In addition, all the participants completed the Turkish version of the SF-36 Health Survey.

Evaluation of HRQoL

The Turkish version of SF-36 (20) is composed of 36 items; it measures eight dimensions of HRQoL and yields scores for each of these. There are eight domains (subscales) in the form. These are physical functioning (PF) or health problems that limit physical activities; role-physical (RP) or physical disability that limits usual activities; bodily pain (BP) or daily activities influenced by pain; general health (GH) or self-perception of general health; vitality (VT) or overall energy levels; role-emotional (RE) or emotional problems that limit role activities; mental health (MH) or psychological well-being and stress; social functioning (SF) or physical and emotional problems that limit social activities. The scale's score may vary from 0—worst possible health status or quality of life—to 100—best possible health status or quality of life. The SF-36 survey yields two comprehensive HRQoL indexes: the PCS (the first four domains) and the MCS (the last four domains). Pinar previously validated the use of the SF-36 survey in Turkish patients with diabetes, chronic renal failure, and cardiovascular disease. In the study, the test–retest correlation was 0.94 and the Cronbach alpha value was 0.92 [26].

Ethical considerations

Permission to conduct the study was obtained from the director of the hospital. The patients and the controls were assured of confidentiality, anonymity, and data protection. Informed consent was obtained in writing, and participation in the study was voluntary.

Statistical analysis

The data were recorded and analyzed using the Statistical Programme for Social Sciences version 13.0 for Windows (SPSS, Chicago, IL, US). Mean ± standard deviation notation was used for the descriptive data. Chi-square analysis was performed for age, gender, educational level,

Table 1 Characteristics of patients with rheumatoid arthritis, ankylosing spondylitis, fibromyalgia syndrome, and the healthy group

Parameters	Diseases				
	Rheumatoid arthritis n (%)	Fibromyalgia syndrome n (%)	Ankylosing spondylitis n (%)	Healthy group n (%)	Significance
Age groups					
20–34	77 (29.2)	44 (29.5)	35 (29.9)	113 (35.9)	
35–49	86 (32.6)	48 (32.2)	39 (33.3)	119 (37.8)	
50–64	90 (34.1)	44 (29.5)	33 (28.2)	75 (23.8)	$p=0.014$
65 ve ↑	11 (4.2)	13 (8.7)	10 (8.5)	8 (2.5)	
Gender					
Female	190 (72.0)	109 (73.2)	57 (48.7)	180 (57.1)	
Male	74 (28.0)	40 (26.8)	60 (51.3)	135 (42.9)	$p<0.000$
Education level					
Illiterate	52 (19.7)	30 (20.1)	21 (17.9)	57 (18.1)	
Primary school	149 (56.4)	83 (55.7)	63 (53.8)	176 (55.9)	
High school	47 (17.8)	30 (20.1)	25 (21.4)	66 (21.0)	$p=0.978$
University	16 (6.1)	6 (4.0)	8 (6.8)	16 (5.1)	
Marital status					
Married	222 (84.1)	129 (86.6)	89 (76.1)	258 (81.9)	
Single	42 (15.9)	20 (13.4)	28 (23.9)	57 (18.1)	$p=0.131$
Place of residence					
Rural	57 (21.6)	27 (18.1)	26 (22.2)	67 (21.3)	
Urban	207 (78.4)	122 (81.9)	91 (77.8)	248 (78.7)	$p=0.821$
Profession					
Unemployed	181 (68.6)	93 (62.4)	68 (58.1)	183 (58.1)	
Employee	32 (12.1)	23 (15.4)	13 (11.1)	44 (14.0)	
Independent business	29 (11.0)	18 (12.1)	25 (21.4)	54 (17.1)	$p=0.163$
Other	22 (8.3)	15 (10.1)	11 (9.4)	34 (10.8)	
Monthly income					
High income	43 (16.3)	24 (16.1)	24 (20.5)	56 (17.8)	
Moderate income	190 (72.0)	105 (70.5)	80 (68.4)	223 (70.8)	$p=0.954$
Low income	31 (11.7)	20 (13.4)	13 (11.1)	36 (11.4)	
Smoking status					
Yes	18 (6.8)	13 (8.7)	16 (13.7)	72 (22.9)	
No	246 (93.2)	136 (91.3)	101 (86.3)	243 (77.1)	$p<0.000$
Alcohol consumption					
Yes	4 (1.5)	3 (2.0)	4 (3.4)	19 (6.0)	
No	260 (98.5)	146 (98.0)	113 (96.6)	296 (94.0)	$p=0.020$
Total	264 (31.2)	149 (17.6)	117 (13.8)	315 (37.3)	

n number

marital status, place of residence, profession, monthly income, smoking status, and alcohol consumption. Chi-square analysis was also performed to determine the relationship between AS, FS, RA, and the control groups and to determine disease-related changes in daily life, problems caused by these changes, knowledge about the disease, and the relationship between the AS, FS, and RA groups. Age, gender, educational level, marital status, place of residence, profession, monthly income, smoking status, alcohol consumption, and the relationship between the PCS and MCS scores of the AS, FS, and RA groups and the control group were analyzed using the Student's t test, ANOVA test, Mann–Whitney U test, and Kruskal–Wallis test. The Student's t test, Mann–Whitney U test, and Kruskal–Wallis test were performed to determine disease-related changes in daily life, problems caused by these changes, knowledge about the disease, and the relationship between the PCS and MCS scores of the AS, FS, and RA groups. The relationship between age, disease duration, PCS, and MCS scores of the patients was determined by correlation analysis. Multiple regression analysis was used to analyze the relationship between variables and HRQoL. A p value of <0.05 was considered significant.

Results

The average disease duration was 6.0±5.5 years in the RA group, 5.7±4.6 years in the FS group, and 5.5±6.1 years in the AS group. The demographic characteristics of the patients and the control group are shown in Table 1.

Patients with RA, FS, and AS constituted 31.2%, 17.6%, and 13.8% of the study group, respectively. The controls accounted for 37.3% of the study group. Patients in the RA group were older, whereas those in the FS, AS, and control groups were younger. Significant differences were found between the ages ($p<0.05$). Patients in the RA and FS groups and the control group were predominantly female, whereas those in the AS group were predominantly male ($p<0.05$). The majority of those in the RA, FS, AS and control groups were primary school graduates and married, lived in urban areas, did not have a regular job, and had a moderate level of income. There was no statistically significant difference between the groups in terms of these characteristics ($p>0.05$). Levels of alcohol consumption and smoking were greater in the control group compared with the RA, FS, and AS groups, and this finding was statistically significant ($p<0.05$).

The comparison of disease-related changes in daily activities and of individual knowledge about the respective diseases in RA, AS, and FS patients are shown in Table 2. Overall, 92.8%, 94.0%, and 88.0% of RA, FS, and AS patients, respectively, had experienced disease-related changes in their daily lives ($p>0.05$). The primary disease-related change in daily activities in the RA and AS groups was physical disability, whereas fatigue, anxiety, physical disability, and pain were the primary problems experienced by those in the FS group ($p>0.05$). Among the groups, knowledge about the disease was the highest in the AS group and lowest in the RA group ($p>0.05$).

The relationship between sociodemographic characteristics, average physical QoL scores, and average mental

Table 2 The comparison of disease-related changes in daily life and the knowledge about disease in patients with rheumatoid arthritis, ankylosing spondylitis, and fibromyalgia syndrome

Parameters	Diseases			
	Rheumatoid arthritis n (%)	Fibromyalgia syndrome n (%)	Ankylosing spondylitis n (%)	Significance
Disease-related changes in daily life				
Yes	245 (92.8)	140 (94.0)	103 (88.0)	
No	19 (7.2)	9 (6.0)	14 (12.0)	$p=0.171$
Problems caused by these changes ($n=488$)				
Fatigue	19 (7.8)	16 (11.4)	6 (5.8)	
Anxiety	11 (4.5)	6 (4.3)	10 (9.7)	
Physical disability	90 (36.7)	44 (31.4)	38 (36.9)	$p=0.407$
Pain	42 (17.1)	22 (15.7)	14 (13.6)	
Total	83 (33.9)	52 (37.1)	35 (34.0)	
Knowledge about disease				
Yes	40 (15.2)	25 (16.8)	29 (24.8)	
No	224 (84.8)	124 (83.2)	88 (75.2)	$p=0.071$
Total	264 (49.8)	149 (28.1)	117 (22.1)	

Table 3 The relation between the sociodemographic characteristics, and physical and mental quality of life score averages of patients in the healthy group and patients with rheumatoid arthritis, ankylosing spondylitis, and fibromyalgia syndrome

Parameters	Diseases							
	Rheumatoid arthritis		Fibromyalgia syndrome		Ankylosing spondylitis		Healthy group	
	PCS	MCS	PCS	MCS	PCS	MCS	PCS	MCS
Age groups								
20–34	23.3±13.1	35.2±12.5	24.6±10.9	33.4±11.4	28.5±13.7	38.3±12.0	82.2±7.4	83.3±12.3
35–49	29.1±13.9	39.3±11.6	28.0±12.0	38.0±12.4	26.4±12.5	37.4±11.9	82.2±8.1	83.9±7.0
50–64	26.0±10.2	39.0±8.8	27.0±11.4	36.7±10.7	34.9±19.1	41.8±15.6	82.6±7.5	84.9±6.2
65 ve ↑	22.2±9.7	36.0±8.7	24.2±10.7	35.7±8.9	28.1±16.8	35.3±14.3	85.8±6.9	84.7±7.6
	p=0.003	p=0.011	p=0.527	p=0.820	p=0.315	p=0.450	p=0.733	p=0.835
Gender								
Female	25.8±11.9	38.2±11.0	26.9±10.8	37.7±11.1	33.1±16.7	40.6±14.2	82.7±7.7	84.2±8.9
Male	26.8±14.0	37.0±11.2	25.1±12.9	33.7±11.4	26.2±13.6	36.8±12.2	81.9±7.6	83.7±9.5
	p=0.585	p=0.402	p=0.388	p=0.058	p=0.017	p=0.126	p=0.343	p=0.606
Education level								
Illiterate	25.0±10.4	39.6±8.2	24.3±9.7	34.4±11.3	31.2±17.0	38.6±13.3	82.3±6.8	84.3±6.5
Primary school	26.1±13.1	37.0±12.2	26.1±11.8	37.0±12.0	25.3±12.5	35.6±11.8	82.3±7.3	83.4±10.7
High school	25.7±9.2	36.7±8.6	27.9±12.1	36.1±11.6	35.6±17.9	41.6±16.3	82.1±8.7	84.4±6.8
University	30.5±20.1	43.9±12.1	32.7±6.8	46.2±6.2	40.4±15.3	45.2±12.4	84.4±10.5	87.6±6.5
	p=0.827	p=0.043	p=0.262	p=0.069	p=0.003	p=0.038	p=0.826	p=0.376
Marital status								
Married	25.9±1.0	37.3±11.3	26.2±11.5	36.3±11.5	29.4±15.8	37.6±13.3	82.4±7.8	84.6±6.8
Single	27.0±9.4	40.8±9.2	28.0±10.7	38.8±10.2	30.1±14.7	42.0±13.0	82.2±6.9	81.0±15.6
	p=0.590	p=0.058	p=0.512	p=0.372	p=0.829	p=0.125	p=0.840	p=0.006
Place of residence								
Rural	26.1±10.4	38.2 ±11.7	26.0±9.9	38.6±11.4	28.8±14.5	37.9±13.2	82.5±6.6	83.7±11.7
Urban	26.1±13.1	37.8±10.9	26.5±11.7	36.2±11.3	29.8±15.9	38.8±13.4	82.3±7.9	84.1±8.3
	p=0.976	p=0.782	p=0.863	p=0.472	p=0.801	p=0.775	p=0.837	p=0.749
Profession								
Unemployed	20.5±12.3	32.2±10.6	26.2±11.4	33.8±10.6	26.1±17.0	32.8±14.6	82.3±8.0	85.0±6.9
Employee	26.3 ±16.6	38.9±11.3	29.3±8.3	39.7±9.5	27.2±13.8	33.8±12.7	81.1±6.7	83.6±6.2
Independent business	26.7±7.8	38.8±13.1	23.6±14.7	35.0±14.0	28.2±14.5	37.2±10.1	83.4±7.1	80.7±15.7
Other	26.7±11.6	39.7±10.4	26.3±11.0	41.5±12.9	30.0±9.6	43.7±10.3	82.7±8.1	83.9±7.8
	p=0.050	p=0.106	p=0.195	p=0.142	p=0.423	p=0.246	p=0.537	p=0.025
Monthly income								
High income	29.3±16.9	39.4±11.8	27.6±8.8	37.8±8.3	31.6±15.7	44.9±12.4	82.4±6.5	84.2±12.0
Moderate income	25.9±11.4	37.8±10.8	26.2±11.7	37.4±11.1	29.3±16.4	38.9±13.6	82.3±7.8	84.2±8.6
Low income	25.4±11.8	36.1±11.2	22.1±12.1	29.7±13.6	29.3±8.6	34.1±11.5	82.2±8.8	82.4±7.3
	p=0.185	p=0.445	p=0.130	p=0.019	p=0.457	p=0.139	p=0.929	p=0.632
Smoking status								
Yes	27.0±10.8	42.2±15.4	23.1±10.4	34.0±16.2	24.9±14.2	34.4 ±16.1	82.1±8.4	83.9±7.5
No	26.0±12.7	37.6±10.6	26.7±11.5	36.9±10.8	30.3±15.6	39.4±12.7	82.4±7.4	84.0±9.6
	p=0.513	p=0.242	p=0.270	p=0.366	p=0.181	p=0.195	p=0.770	p=0.935
Alcohol consumption								
Yes	20.1±4.2	27.2±6.7	23.1±6.1	36.1±14.6	34.1±21.2	32.7±16.9	82.2±7.4	85.4±7.9
No	26.2±12.6	38.0±11.0	26.5±11.5	36.7±11.3	29.4±15.4	38.8±13.2	82.4±7.7	83.9±9.2
	p=0.299	p=0.027	p=0.543	p=0.882	p=0.845	p=0.579	p=0.885	p=0.477
Total	26.1±12.5	37.9±11.0	26.4±11.4	36.6±11.3	29.6±15.5	38.6±13.3	82.4±7.7	84.0±9.1

MCS mental component summary, *PCS* physical component summary

QoL scores in the control group and the RA, AS, and FS groups is presented in Table 3. The average scores for both the PCS and the MCS in the RA, FS, and AS groups were much lower compared with those in the control group. In the RA, FS, and AS groups, the lowest PCS score was recorded in the RA group; the lowest MCS score was recorded in the FS group. In age comparisons among the patient groups, the lowest PCS score was recorded in the RA group ($p<0.05$); the highest PCS score was recorded in the AS group. The lowest and highest MCS scores according to age were recorded in the FS and AS groups, respectively. Males with FS had the lowest PCS and MCS scores ($p>0.05$), and the PCS scores of males with AS were much lower compared with females with AS ($p<0.05$). The lowest scores for PCS and MCS were recorded in illiterate patients with FS, and the highest PCS scores were recorded in university graduates with AS ($p<0.05$). The MCS scores for university graduates with FS were also the highest. The PCS scores for married patients in the RA group were the lowest; the MCS scores for married patients in the FS group were also the lowest. The PCS and MCS scores for unemployed individuals in the RA group were low ($p>0.05$), and the PCS and MCS scores for those with a low level of income were low in the FS group ($p<0.05$). The PCS and MCS scores for smokers in the FS group were low ($p>0.05$), and the MCS scores of patients in the RA group

who consumed alcohol were low; this finding was statistically significant ($p<0.05$).

The relationship between disease-related changes in daily activities, disease knowledge, average physical QoL scores, and average mental QoL scores in the RA, AS, and FS groups is shown in Table 4. The PCS scores for RA patients with disease-related changes in daily activities were lowest, but not significant. The MCS scores for patients in the RA and FS groups were lower ($p<0.05$). In the FS, AS, and RA groups, the PCS scores were quite low in patients who reported anxiety ($p>0.05$). The MCS scores were lowest in the FS group ($p<0.05$). The PCS scores were lowest in RA patients who reported no knowledge of the disease; the lowest MCS scores were recorded in the FS group ($p>0.05$).

In the correlation analysis, there was no significant relationship between the PCS and MCS scores and age and the disease duration of patients in the RA, FS, and AS groups ($p>0.05$).

Multiple regression analysis using the PCS domain as a dependent variable is presented in Table 5. Disease knowledge ($p<0.05$) was the only independent variable that had an effect on the PCS scores.

Multiple regression analysis using the MCS scores of the SF-36 survey as a dependent variable is presented in Table 6. Disease-related changes in daily activities ($p<0.001$) and problems associated with the disease ($p<0.05$) were indepen-

Table 4 The relation between disease-related changes in daily life and knowledge about disease, and physical and mental quality of life score averages in patients with rheumatoid arthritis, ankylosing spondylitis, and fibromyalgia syndrome

Parameters	Diseases					
	Rheumatoid arthritis		Fibromyalgia syndrome		Ankylosing spondylitis	
	PCS	MCS	PCS	MCS	PCS	MCS
Disease-related changes in daily life						
Yes	25.8±12.3	37.3±10.9	26.1±11.5	35.9±11.1	29.3±16.0	38.0±13.7
No	29.1±15.5	45.2±9.7	31.1±7.8	47.5±10.0	31.9±11.6	43.5±8.6
	$p=0.631$	$p=0.001$	$p=0.107$	$p=0.004$	$p=0.296$	$p=0.135$
Problems caused by these changes ($n=488$)						
Fatigue	29.9±13.3	37.9±15.0	31.2±11.3	42.1±9.0	27.3±11.3	40.2±3.3
Anxiety	23.1±6.6	39.2±2.8	21.4±5.6	25.2±7.3	22.4±12.4	34.2±13.3
Physical disability	26.9±10.6	38.7±8.9	27.4±10.0	36.8±10.2	31.8±13.9	41.9±12.5
Pain	24.7±9.6	36.7±9.8	26.3±14.2	39.2±9.5	31.8±14.6	38.3±8.3
Total	24.6±15.1	35.7±12.9	23.9±11.7	33.1±11.9	27.8±19.7	34.4±16.8
	$p=0.088$	$p=0.076$	$p=0.139$	$p=0.003$	$p=0.160$	$p=0.091$
Knowledge about disease						
Yes	29.3±17.1	39.8±12.2	27.4±12.9	36.7±12.5	31.8±20.6	40.7±16.0
No	25.9±11.5	37.5±10.8	26.2±11.1	36.6±11.1	28.8±13.5	37.9±12.3
	$p=0.083$	$p=0.226$	$p=0.780$	$p=0.941$	$p=0.832$	$p=0.700$
Total	26.1±12.5	37.9±11.0	26.4±11.4	36.6±11.3	29.6±15.5	38.6±13.3

MCS mental component summary, *PCS* physical component summary

Table 5 Multiple regression analysis with physical component summary domain of SF-36 as dependent variable

	PCS			
	β Coefficient	Standard error	95% CI	*p* value
Age group	0.007	0.413	−0.758 to 0.863	0.899
Gender	−0.053	0.666	−2.059 to 0.559	0.261
Education level	0.060	0.319	−0.283 to 0.970	0.282
Marital status	0.051	0.811	−0.699 to 2.487	0.271
Place of residence	0.59	0.751	−0.499 to 2.452	0.194
Profession	−0.026	0.311	−0.780 to 0.443	0.589
Monthly income	−0.78	0.557	−2.052 to 0.138	0.087
Duration of disease	0.044	0.057	−0.058 to 0.167	0.344
Diagnosis	0.055	0.366	−0.299 to 0.945	0.277
Knowledge about disease	−0.138	0.791	−3.952 to −0.842	0.003
Smoking status	0.064	1.084	−0.629 to 3.629	0.167
Alcohol consumption	0.003	2.091	−3.966 to 4.253	0.945
Disease-related changes in daily life	0.062	1.071	−0.570 to 3.638	0.153
Problems caused by these changes	−0.078	0.243	−0.898 to 0.056	0.083

dent variables that affected the MCS scores. None of the other independent variables had an effect on the MCS scores.

Discussion

With chronic diseases such as RA, AS, and FS, patients suffer deterioration in physical, psychological, and social well-being. Improving the HRQoL of such patients is as important as enhancing their medical status. Therefore, HRQoL measures have been increasingly used to determine resource allocation strategies and treatment plans. Although the clinical findings and pathophysiology of RA, AS, and FS are very different, studies have shown that the effect of these diseases on HRQoL is similar [1, 27].

Chronic rheumatic diseases affect the HRQoL of patients in myriad ways [28, 29]. Therefore, we used the SF-36 survey to determine the HRQoL of RA, FS, and AS patients and compared our findings with those of a healthy control group. Compared with other chronic conditions, several studies have shown that patients with musculoskeletal disorders have poorer HRQoL [30, 31]. The worst HRQoL has been reported among patients with rheumatic diseases [32]. Previous studies have reported that HRQoL was poor in patients with RA [2, 7, 19, 21, 33, 34], AS [7, 21, 28, 35–37], and FS [1, 2, 11, 12]. In our study, we

Table 6 Multiple regression analysis with mental component summary domain of SF-36 as dependent variable

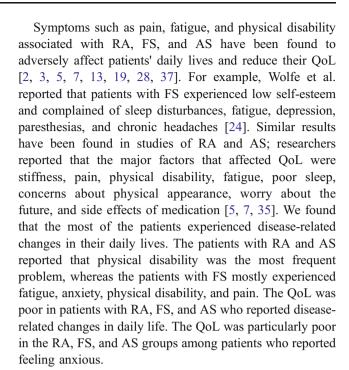|	MCS			
	β Coefficient	Standard error	95% CI	*p* value
Age group	−0.029	0.358	−0.884 to 0.522	0.613
Gender	−0.093	0.577	−2.281 to −0.012	0.048
Education level	0.096	0.276	−0.065 to 1.021	0.084
Marital status	0.100	0.703	0.146 to 2.909	0.030
Place of residence	0.020	0.651	−0.988 to 1.569	0.655
Profession	0.033	0.270	−0.342 to 0.718	0.487
Monthly income	−0.066	0.483	−1.649 to 0.250	0.148
Duration of disease	0.044	0.050	−0.050 to 0.145	0.340
Diagnosis	0.039	0.231	−0.258 to 0.649	0.397
Knowledge about disease	−0.090	0.686	−2.707 to −0.011	0.048
Smoking status	0.032	0.939	−1.190 to 2.502	0.485
Alcohol consumption	0.072	1.813	−0.763 to 6.363	0.123
Disease-related changes in daily life	0.180	0.921	2.056 to 5.675	<0.001
Problems caused by these changes	−0.124	0.209	−0.989 to −0.166	0.006

found that the QoL of those in the RA, FS, and AS groups were much poorer compared with that of the control group. We detected the lowest PCS and MCS scores in the RA and FS groups, respectively. Walker et al. previously used the SF-36 survey to compare the QoL of RA and FS patients; they reported significantly lower scores in all SF-36 parameters in FS patients except physical functioning [38]. This study supports our findings. However, other studies have found that both PCS and MCS scores were lower in RA patients compared with FS patients [1, 39]. In our study, the PCS and MCS scores for AS patients were higher than those of RA patients. Chorus et al., who compared the QoL of RA and AS patients, also found that PCS scores for AS patients were higher than those of RA [3]. Given these findings, evaluating physical and mental health problems that may occur during treatment and care and drawing up specific patient plans to improve QoL should be considered a priority. In particular, the patient's emotional state and potential problems that he/she may encounter in daily activities should be monitored carefully, and their effect on QoL should be evaluated.

HRQoL may be affected by educational level, family support, employment status, disease duration and treatment, and coping strategies [5]. Several studies have found an association between sociodemographic characteristics and health outcomes. According to some studies, low educational levels, normally associated with a lower economic status, are a risk factor for poorer functional status in patients with RA, and higher educational level and young age seem to be associated with a greater capacity to cope with very active disease [35, 40–43]. In our study, in all three patient groups, the QoL of university graduates and who had a high level of income was high, whereas the QoL of unemployed patients was low. These results clearly point to a positive effect of higher education and income level on QoL. Given that unemployment and economic difficulties appear to be commonly associated with rheumatologic diseases, it is very important that socioeconomic characteristics are evaluated during treatment. Adopting this approach will help diminish the socioeconomic burden of rheumatologic diseases on the individual and society.

Educating the patient about the disease may decrease negative feelings, enhance coping strategies, and improve HRQoL [5]. We found that patients who were knowledgeable about their disease had better QoL; however, most patients lacked sufficient knowledge. This finding suggests that nurses and physicians need to educate patients and advise them on coping strategies.

Disease duration is an important factor affecting HRQoL [38, 44]. However, we found no correlation between disease duration and the SF-36 PCS and MCS scores in the RA, FS, and AS groups. Bedi et al. reported a similar finding [45].

Symptoms such as pain, fatigue, and physical disability associated with RA, FS, and AS have been found to adversely affect patients' daily lives and reduce their QoL [2, 3, 5, 7, 13, 19, 28, 37]. For example, Wolfe et al. reported that patients with FS experienced low self-esteem and complained of sleep disturbances, fatigue, depression, paresthesias, and chronic headaches [24]. Similar results have been found in studies of RA and AS; researchers reported that the major factors that affected QoL were stiffness, pain, physical disability, fatigue, poor sleep, concerns about physical appearance, worry about the future, and side effects of medication [5, 7, 35]. We found that the most of the patients experienced disease-related changes in their daily lives. The patients with RA and AS reported that physical disability was the most frequent problem, whereas the patients with FS mostly experienced fatigue, anxiety, physical disability, and pain. The QoL was poor in patients with RA, FS, and AS who reported disease-related changes in daily life. The QoL was particularly poor in the RA, FS, and AS groups among patients who reported feeling anxious.

Conclusion

In conclusion, our study shows that FS, AS, RA, and associated changes in daily activities have a negative impact on patients' QoL. Patients with RA had the poorest physical QoL, and those with FS had the poorest mental health. Patients with FS, AS, and RA experienced disease-related problems in daily activities, and the QoL of those who reported feeling anxious was poorer. A low level of education and income, unemployment, and lack of knowledge about the disease had negative impacts on the QoL of FS, AS, and RA patients. The findings suggest that health care providers should address disease-related changes in physical and mental functioning that may affect patients' QoL, improve patients' level of awareness about their disease, and provide patients with the necessary support structures to help them cope with their disease.

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