ANKİLOZAN SPONDİLİTLİ HASTALARDA HASTALIĞA İLİŞKİN BİLGİ DÜZEYİ İLE HASTALIK AKTİVİTESİ, FONKSİYON, YAŞAM KALİTESİ, KORKU, DUYGUSAL DURUM VE ÖZ-YETERLİLİK ARASINDAKİ İLİŞKİ: KESİTSEL BİR ÇALIŞMA

Nurten Gizem TORE*[1], Gamze Gülsün PALA[2], Selin BAYRAM[3], Derya YILDIRIM[4], Deran OSKAY[1]

[1] Gazi University, Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation, Ankara, Turkey
0000-0002-9935-3564
0000-0002-2217-076X

[2] Amasya University, Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation, Amasya, Turkey
0000-0003-4861-3204

[3] Eskişehir Osmangazi University, Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation, Eskişehir, Turkey
0000-0003-3481-2763

[4] Division of Rheumatology, Department of Internal Medicine, Faculty of Medicine, Gazi University, Ankara, Turkey
0000-0003-2771-7725

ÖZ

Giriş: Hastalığa ilişkin bilgi, kronik inflamatuar romatizmal hastalıklarda öz-yönetimi destekleyebilir. **Amaç:** Bu çalışma, ankilozan spondilitli (AS) hastalarda hastalığa ilişkin bilgi ile klinik ve psikososyal sonuçlar arasındaki ilişkileri incelemiştir. **Yöntem:** Bu tek merkezli kesitsel çalışmaya 139 AS hastası dahil edildi. Hastalığa ilişkin bilgi AS Bilgi Anketi ile değerlendirildi. Hastalık aktivitesi, fonksiyon, hastalığa özgü yaşam kalitesi, hastalıkla ilişkili korku, anksiyete, depresyon ve öz-yeterlilik ile ilişkiler; eğitim düzeyi, yaş, cinsiyet, hastalık süresi, düzenli ilaç kullanımı, düzenli egzersiz ve hastalık aktivitesi kontrol edilerek Pearson ve düzeltilmiş kısmi korelasyonlarla incelendi. Bonferroni düzeltmesi, her iki analizde önceden belirlenen yedi ilişkiye ayrı ayrı uygulandı. **Bulgular:** Yaş ortalaması 43,1 ± 12,1 yıl olup katılımcıların %54.0'ı erkekti; hastalığa ilişkin bilgi puanı ortalaması 16,2 ± 4,5 idi. Düzeltme sonrasında hastalığa ilişkin bilgi; hastalık aktivitesi ile zayıf negatif (kısmi r = -0,34), fonksiyonel kısıtlılık (kısmi r = 0,40), daha kötü hastalığa özgü yaşam kalitesi (kısmi r = 0,42) ve öz-yeterlilik (kısmi r = 0,53) ile orta düzeyde pozitif, depresyon ile orta düzeyde negatif (kısmi r = -0,50) korelasyon gösterdi; tümü p <0.007 düzeyinde anlamlı kaldı. Hastalıkla ilişkili korku ve anksiyete ile ilişkiler düzeltme sonrasında anlamlı değildi. **Sonuç:** Daha yüksek hastalığa ilişkin bilgi; daha düşük hastalık aktivitesi, daha az depresif belirti ve daha yüksek öz-yeterlilik ile, ancak aynı zamanda daha fazla fonksiyonel kısıtlılık ve daha kötü hastalığa özgü yaşam kalitesi ile ilişkiliydi.

Anahtar kelimeler: Ankilozan spondilit, hastalığa ilişkin bilgi, yaşam kalitesi, öz-yeterlilik, depresyon

THE RELATIONSHIP BETWEEN DISEASE-RELATED KNOWLEDGE AND DISEASE ACTIVITY, FUNCTION, QUALITY OF LIFE, FEAR, EMOTIONAL STATUS, AND SELF-EFFICACY IN PATIENTS WITH ANKYLOSING SPONDYLITIS: A CROSS-SECTIONAL STUDY

ABSTRACT

Background: Disease-related knowledge may support self-management in chronic inflammatory rheumatic diseases. **Aim:** This study examined associations between disease-related knowledge and clinical and psychosocial outcomes in patients with ankylosing spondylitis (AS). **Method:** This single-center cross-sectional study included 139 patients with AS. Disease-related knowledge was assessed using the AS Knowledge Questionnaire. Associations were examined using Pearson correlations and adjusted partial correlations. Partial correlations controlled for educational level, age, sex, disease duration, regular medication use, regular exercise, and disease activity, except when disease activity was the outcome. Bonferroni correction was applied separately to seven prespecified associations in both analyses. **Results:** Mean age was 43.1 ± 12.1 years; 54.0% were male, and the mean disease-related knowledge score was 16.2 ± 4.5. After adjustment, disease-related knowledge was weakly and negatively correlated with disease activity (partial r = -0.34), moderately and positively correlated with functional impairment (partial r = 0.40), poorer disease-specific quality of life (partial r = 0.42), and self-efficacy (partial r = 0.53), and moderately and negatively correlated with depression (partial r = -0.50); all remained significant at p < 0.007. Associations with disease-related fear and anxiety were not significant after correction.
Conclusion: Greater disease-related knowledge was associated with lower disease activity, fewer depressive symptoms, and higher self-efficacy, but also with greater functional impairment and poorer disease-specific quality of life.

Keywords: Ankylosing spondylitis, disease-related knowledge, quality of life, self-efficacy, depression

İletişim/Correspondence
Nurten Gizem TORE
Gazi University, Faculty of Health Sciences,
Department of Physiotherapy and Rehabilitation, Ankara, Turkey
E-posta: gizemtore@hotmail.com
Geliş tarihi/Received: 13.06.2026
Kabul tarihi/Accepted: 26.08.2026
DOI: 10.52881/gsbdergi.1970286

INTRODUCTION

Ankylosing spondylitis (AS) is a chronic, inflammatory rheumatic disease belonging to the spondyloarthritis group that predominantly affects the sacroiliac joints and the axial skeleton and, less frequently, the peripheral joints (1). The disease typically begins in early adulthood and follows a fluctuating course characterized by recurrent flares (2). During disease flares, inflammatory markers such as C-reactive protein and the erythrocyte sedimentation rate may increase, and patients experience pain, stiffness, loss of function, joint swelling, and fatigue (2). These symptoms negatively affect the physical and emotional condition of patients and reduce their quality of life (3,4).

Beyond its physical consequences, AS imposes a considerable psychosocial burden. Sleep disturbance, psychological distress, and impaired quality of life are common concerns in patients with AS and are associated with disease-related factors (4-6). Anxiety and depressive symptoms are closely linked to disease activity and impaired quality of life (4,6). Disease-related fear has also been identified as a relevant patient-reported concern in axial spondyloarthritis and has been associated with disease activity and poorer quality of life in AS (7,8).

Patient education is regarded as a cornerstone of the long-term management of inflammatory arthritis, and the European Alliance of Associations for Rheumatology recommends that structured education be offered to all patients with inflammatory arthritis as an integral component of care (9). In rheumatoid arthritis and other rheumatic conditions, greater disease-related knowledge has been reported to support disease management by promoting appropriate health behaviors, adherence to exercise, and correct medication use (10).

To facilitate standardized assessment of disease-related knowledge in AS, Lubrano et al. developed the self-administered, multiple-choice AS Knowledge Questionnaire (11). Studies using this instrument have reported heterogeneous findings, with relatively high disease-related knowledge scores in British and Brazilian populations (11,12) and lower scores in French and Iraqi populations (13,14). Although disease-related knowledge has been assessed in several settings, few studies have examined its relationships with indicators of disease control. A previous study found that disease-related knowledge in AS was associated with educational level but not with function, symptom severity, or quality of life (15).

Previous studies have primarily described disease-related knowledge or examined its association with a limited range of demographic and clinical outcomes. In particular, disease-related fear, anxiety, depression, and self-efficacy have not been evaluated concurrently with disease activity, physical function, and quality of life in relation to disease-related knowledge. Consequently, the multidimensional clinical and psychosocial correlates of disease-related knowledge in AS remain insufficiently characterized. By assessing these domains concurrently, the present study provides a more integrated evaluation of the relationship between disease-related knowledge and the broader clinical and psychosocial burden of AS. Therefore, this study aimed to investigate the relationships between disease-related

knowledge and disease activity, function, quality of life, disease-related fear, emotional status, and self-efficacy in patients with AS.

METHOD

Study Design and Participants

This study was designed as a single-center, cross-sectional study. Consecutive sampling was used, and eligible patients presenting to the rheumatology outpatient clinic between May 2023 and May 2026 were consecutively invited to participate. Individuals aged 18 years and older with a diagnosis of AS confirmed by a rheumatologist according to the modified New York criteria (16) were eligible for inclusion. Patients who were unable to read and write and those who were unwilling to participate were excluded.

Based on an a priori power analysis, a minimum of 123 participants was required to detect a clinically meaningful correlation with a statistical power of 80% and a type I error rate of 5%. This was calculated using G*Power (version 3.1) for a two-tailed Pearson correlation, assuming a minimum detectable correlation coefficient of r = 0.25.

Procedure

After the study had been explained to them, eligible individuals read and signed an informed consent form. Their socio-demographic and clinical characteristics were then recorded on a case report form, after which the assessment questionnaires were administered. The data collection instruments are described below.

Assessment Instruments

Disease-related knowledge: Disease-related knowledge was assessed using the Turkish version of the AS Knowledge Questionnaire, originally developed by Lubrano et al. (11) and adapted and validated in Turkish by Alkan et al. (15). The Turkish version demonstrated good internal consistency and excellent test-retest reliability (Cronbach's alpha >0.70; intraclass correlation coefficient >0.90) (15). This self-administered instrument contains 14 multiple-choice questions covering the pathogenesis, diagnosis, and treatment of AS. Across the questions, there are 25 correct response options; one point is awarded for each correct response, yielding a total score ranging from 0 to 25, with higher scores indicating greater disease-related knowledge (11).

Disease activity: Disease activity was evaluated using the validated Turkish version of the Bath Ankylosing Spondylitis Disease Activity Index (BASDAI), originally developed by Garrett et al. and subsequently validated in Turkish (17,18). The Turkish version has demonstrated reliability, construct validity, and sensitivity to change (17). This patient-completed index comprises six questions assessing fatigue, axial involvement, peripheral joint involvement, enthesitis, and the severity and duration of morning stiffness. The final score ranges from 0 to 10, with higher scores indicating greater disease activity.

Function: Function was assessed using the validated Turkish version of the Bath Ankylosing Spondylitis Functional Index (BASFI), originally developed by Calin et al. and subsequently validated in Turkish (19,20). The Turkish version has demonstrated reliability, construct validity, and sensitivity to change (19). This patient-completed index consists of ten items that evaluate how easily patients can perform ten functional activities, producing a score

from 0 to 10, with higher scores indicating poorer function.

Quality of life*:* Disease-specific quality of life was assessed using the validated Turkish version of the Ankylosing Spondylitis Quality of Life (ASQoL) questionnaire, originally developed by Doward et al. and subsequently validated in Turkish (21,22). The Turkish version demonstrated excellent test-retest reliability (r = 0.96), as well as convergent and discriminative validity (21). This instrument contains 18 items with a dichotomous yes/no response format, addressing factors that may have affected quality of life over the preceding week. The total score ranges from 0 to 18, with higher scores indicating poorer quality of life.

Disease-related fear: Disease-related fear was assessed using the validated Turkish version of the Fear Assessment in Inflammatory Rheumatic diseases (FAIR) questionnaire, originally developed by Gossec et al. and cross-culturally adapted and validated in Turkish by Küçükakkaş et al. (7,23). The Turkish adaptation demonstrated satisfactory reliability and validity in patients with chronic inflammatory rheumatic diseases (23). The FAIR comprises ten items that evaluate patients' fears regarding the course and consequences of their disease and their fears related to treatment, each rated on a 0-10 numerical scale, producing a total score from 0 to 100, with higher scores indicating greater disease-related fear.

Emotional status: Emotional status was assessed using the validated Turkish version of the Hospital Anxiety and Depression Scale (HADS), originally developed by Zigmond and Snaith and subsequently validated in Turkish (24,25). The Turkish version demonstrated good internal consistency, with Cronbach's alpha coefficients of 0.85 for anxiety and 0.78 for depression, and evidence of concurrent and construct validity (24). This self-report scale contains 14 items, 7 assessing anxiety and 7 assessing depressive symptoms, each scored from 0 to 3, producing subscale scores ranging from 0 to 21. The scale is not intended to establish a diagnosis but to screen for and identify patients at risk.

Self-efficacy: Self-efficacy was assessed using the modified Arthritis Self-Efficacy Scale (modified ASES), an eight-item modification of the original Arthritis Self-Efficacy Scale. The modified ASES incorporates minor wording modifications to make the items specific to AS (26); the Arthritis Self-Efficacy Scale was originally developed by Lorig et al. (27). Each item is rated from 1 (very uncertain) to 10 (very certain), and the scale score is calculated as the mean of the completed items, with at least six items required to obtain a score; higher scores indicate greater self-efficacy (26). In the original English-language UK validation study, the modified ASES demonstrated high internal consistency (Cronbach's alpha = 0.93), acceptable test-retest reliability (intraclass correlation coefficient = 0.77), construct validity, and responsiveness in patients with AS (26). A formally validated Turkish version of the modified ASES was not available. Therefore, for the present study, the English-language modified ASES items were translated into Turkish by the research team. The translation was intended to preserve the conceptual meaning and AS-specific wording of the original items. This researcher-translated version was used for data collection.

Ethical Considerations

The study was conducted in accordance with the principles of the Declaration of Helsinki and was approved by the Research Ethics Committee of Gazi University (date: 21.02.2023, number: 2023-392). Written informed consent was obtained from all participants prior to enrolment.

Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics for Windows, version 17.0 (SPSS Inc., Chicago, IL, USA). Normality was assessed using the Shapiro-Wilk test and visual inspection of histograms and detrended Q-Q plots. Descriptive statistics were presented as mean and standard deviation for continuous variables and as frequencies and percentages for categorical variables. The relationships between disease-related knowledge and the other parameters were examined using the Pearson correlation coefficient. The absolute values of the correlation coefficients were interpreted as very weak (0–0.19), weak (0.20–0.39), moderate (0.40–0.59), strong (0.60–0.79), and very strong (0.80–1.00). The Bonferroni-adjusted threshold was applied separately to the seven prespecified outcome associations in the Pearson and adjusted partial correlation analyses, resulting in a significance threshold of $p < 0.007$ (0.05/7) for each analysis family. All tests were two-sided. Adjusted partial correlation analyses were performed to evaluate the relationships between disease-related knowledge and each clinical or psychosocial outcome while controlling for educational level, age, sex, disease duration, regular medication use, regular exercise, and disease activity (BASDAI). For the analysis in which BASDAI was the outcome, disease activity was not included as a covariate. Two-sided p values for the partial correlations were calculated using the partial-correlation t statistic, with 131 degrees of freedom for BASDAI and 130 degrees of freedom for the remaining outcomes. Approximate 95% confidence intervals for partial correlations were calculated using Fisher's z transformation.

The linearity assumption was evaluated by visual inspection of bivariate scatterplots between the disease-related knowledge score and each continuous clinical or psychosocial outcome. Univariate outliers were screened using boxplots; observations located more than three interquartile ranges below the first quartile or above the third quartile were considered extreme. Potential bivariate outliers were additionally examined using squared Mahalanobis distances for each variable pair. The Mahalanobis D^2 values were compared with the chi-square critical value for two degrees of freedom at $p < 0.001$ ($\chi^2[2] = 13.82$).

RESULTS

Socio-demographic and Clinical Characteristics

Of 161 patients assessed for eligibility, 18 declined to participate and four were excluded because they were unable to read and write. No participants were excluded after enrolment or from the analysis; therefore, 139 participants completed the study and were included in the final analysis. The mean age of the participants was 43.1 ± 12.1 years, and the mean disease duration was 10.9 ± 9.0 years. Of the participants, 75 (54.0%) were male and 57 (41.0%) had a university degree. The socio-demographic and clinical characteristics of the participants are presented in Table 1.

Table 1. Socio-demographic and clinical characteristics of the participants

Characteristic	N = 139
Age (years), mean ± SD	43.1 ± 12.1
Disease duration (years), mean ± SD	10.9 ± 9.0
Height (cm), mean ± SD	166.5 ± 8.6
Weight (kg), mean ± SD	76.3 ± 18.3
Body mass index (kg/m²), mean ± SD	27.1 ± 5.8
Sex, n (%)	
Male	75 (54.0)
Female	64 (46.0)
Educational level, n (%)	
Primary school	24 (17.3)
Secondary school	11 (7.9)
High school	43 (30.9)
University	57 (41.0)
Postgraduate	4 (2.9)
Family history of rheumatic disease, n (%)	81 (58.3)
Regular medication use, n (%)	132 (95.0)
Regular exercise, n (%)	56 (40.3)
Current smoker, n (%)	60 (43.2)
Employed, n (%)	80 (57.6)

SD: standard deviation; cm: centimeter; kg: kilogram; m: meter; N/n: number.

Disease-related Knowledge and Scale Scores

The mean disease-related knowledge score of the participants was 16.2 ± 4.5. The mean BASDAI score was 3.9 ± 2.1, the mean BASFI score was 2.3 ± 2.2, and the mean ASQoL score was 6.5 ± 5.2. The mean FAIR score was 50.8 ± 31.0, and the mean HADS anxiety and depression subscale scores were 7.6 ± 5.1 and 5.7 ± 4.0, respectively. The mean modified ASES score was 7.4 ± 1.4. The descriptive values for all scales are presented in Table 2.

Correlations of Disease-Related Knowledge with Clinical Parameters

The Shapiro-Wilk test and visual inspection did not indicate substantial departures from normality; the Pearson correlation coefficient was therefore used for all correlation analyses. Disease-related knowledge showed a moderate negative correlation with the BASDAI score ($r = -0.40$, $p < 0.001$) and moderate positive correlations with the BASFI score ($r = 0.43$, $p < 0.001$) and the ASQoL score ($r = 0.46$, $p < 0.001$). All three correlations were statistically significant and are presented in Table 3. After adjustment for educational level, age, sex, disease duration, regular medication use, and regular exercise, disease-related knowledge retained a weak negative partial correlation with the BASDAI score (partial $r = -0.34$, $p < 0.001$). After additional adjustment for disease activity, it retained moderate positive partial correlations with the BASFI score (partial $r = 0.40$, $p < 0.001$) and the ASQoL score (partial $r = 0.42$, $p < 0.001$), indicating persistent associations with greater functional limitation and poorer disease-specific quality of life.

Table 2. Descriptive values of the disease-related knowledge score and the clinical and psychosocial scales

Scale (possible range)	Mean ± SD
AS Knowledge (0-25)	16.2 ± 4.5
BASDAI (0-10)	3.9 ± 2.1
BASFI (0-10)	2.3 ± 2.2
ASQoL (0-18)	6.5 ± 5.2
FAIR (0-100)	50.8 ± 31.0
HADS - anxiety (0-21)	7.6 ± 5.1
HADS - depression (0-21)	5.7 ± 4.0
Self-efficacy score (1-10)	7.4 ± 1.4

SD: standard deviation; BASDAI: Bath Ankylosing Spondylitis Disease Activity Index; BASFI: Bath Ankylosing Spondylitis Functional Index; ASQoL: Ankylosing Spondylitis Quality of Life; FAIR: Fear Assessment in Inflammatory Rheumatic diseases; HADS: Hospital Anxiety and Depression Scale

Visual inspection of the scatterplots indicated approximately linear relationships between disease-related knowledge and each continuous outcome. The boxplots did not identify any extreme univariate outliers, and no observation exceeded the prespecified Mahalanobis distance threshold ($D^2 > 13.82$, $p < 0.001$). Therefore, no marked nonlinearity or extreme bivariate outlier likely to distort the Pearson correlation estimates was identified.

Correlations of Disease-Related Knowledge with Psychosocial Parameters

Disease-related knowledge showed a statistically significant, weak positive correlation with disease-related fear (FAIR; $r = 0.23$, $p = 0.006$) and a statistically significant, weak positive correlation with anxiety (HADS anxiety subscale; $r = 0.27$, $p = 0.001$). Disease-related knowledge also showed a statistically significant, moderate negative correlation with depression (HADS depression subscale; $r = -0.55$, $p < 0.001$) and a statistically significant, moderate positive correlation with self-efficacy ($r = 0.56$, $p < 0.001$). The correlations of disease-related knowledge with disease-related fear, emotional status, and self-efficacy are summarized in Table 3. After adjustment for educational level, age, sex, disease duration, regular medication use, regular exercise, and disease activity, disease-related knowledge showed weak positive partial correlations with disease-related fear (partial $r = 0.21$, $p = 0.016$) and anxiety (partial $r = 0.23$, $p = 0.008$), a moderate negative partial correlation with depression (partial $r = -0.50$, $p < 0.001$), and a moderate positive partial correlation with self-efficacy (partial $r = 0.53$, $p < 0.001$). At the Bonferroni-adjusted significance threshold of $p < 0.007$, the weak positive adjusted associations with disease-related fear and anxiety were not statistically significant, whereas the moderate adjusted associations with depression and self-efficacy remained significant.

Table 3. Pearson and adjusted partial correlations of disease-related knowledge with BASDAI, BASFI, ASQoL, FAIR, HADS, and self-efficacy scores

Variable	Pearson r	95% CI	p	Adjusted partial r	95% CI	p
BASDAI score	-0.40	-0.53 to -0.25	< 0.001	-0.34	-0.48 to -0.18	< 0.001
BASFI score	0.43	0.28 to 0.56	< 0.001	0.40	0.25 to 0.53	< 0.001
ASQoL score	0.46	0.32 to 0.58	< 0.001	0.42	0.27 to 0.55	< 0.001
FAIR score	0.23	0.07 to 0.38	0.006	0.21	0.04 to 0.37	0.016
HADS - anxiety score	0.27	0.11 to 0.42	0.001	0.23	0.06 to 0.39	0.008
HADS - depression score	-0.55	-0.66 to -0.42	< 0.001	-0.50	-0.62 to -0.36	< 0.001
Modified ASES score	0.56	0.43 to 0.66	< 0.001	0.53	0.39 to 0.64	< 0.001

r: Pearson correlation coefficient; CI: confidence interval; BASDAI: Bath Ankylosing Spondylitis Disease Activity Index; BASFI: Bath Ankylosing Spondylitis Functional Index; ASQoL: Ankylosing Spondylitis Quality of Life; FAIR: Fear Assessment in Inflammatory Rheumatic diseases; HADS: Hospital Anxiety and Depression Scale Approximate 95% CIs for adjusted partial r were calculated using Fisher's z transformation. The reported 95% confidence intervals are unadjusted for multiple comparisons; statistical significance was evaluated using the Bonferroni-adjusted threshold of $p < 0.007$. The Bonferroni-adjusted threshold was applied separately to the seven prespecified outcome associations in the Pearson and adjusted partial correlation analyses. Adjusted partial r values control for educational level, age, sex, disease duration, regular medication use, regular exercise, and BASDAI; BASDAI was omitted from the covariate set when BASDAI was the outcome. There were no missing data, and all analyses were based on the same 139 participants.

DISCUSSION

This cross-sectional study examined the relationship between disease-related knowledge and a broad set of clinical and psychosocial parameters in patients with AS. Disease-related knowledge showed moderate negative correlations with BASDAI score and depressive symptoms, moderate positive correlations with the BASFI and ASQoL scores and self-efficacy, and weak positive correlations with disease-related fear and anxiety. Following adjustment, the associations with BASDAI, BASFI, ASQoL, depression, and self-efficacy remained statistically significant after Bonferroni correction, whereas the adjusted associations with disease-related fear and anxiety did not. Thus, greater disease-related knowledge was associated with lower BASDAI score and fewer depressive symptoms, but also with higher BASFI and ASQoL scores, corresponding to greater functional impairment and poorer disease-specific quality of life.

In the present sample, the mean disease-related knowledge score was 16.2. This score was broadly comparable to, although slightly lower than, the relatively high scores reported by Lubrano et al. in British patients and da Rocha Lopes et al. in Brazilian patients (11,12), and higher than those reported in French and Iraqi populations (13,14). Differences in educational attainment, access to structured patient education, disease duration, and healthcare-system characteristics may contribute to variation in disease-related knowledge across populations.

With regard to clinical parameters, greater disease-related knowledge was associated with a lower BASDAI score but higher BASFI and ASQoL scores. Given the scoring direction of these instruments, the positive associations with the BASFI and ASQoL scores corresponded to greater functional impairment and poorer disease-specific quality of life, respectively. This discordant pattern suggests that disease-related knowledge may relate differently to distinct aspects of disease burden. Patients with higher BASFI or ASQoL scores may have more frequent contact with healthcare services and, consequently, greater exposure to disease-related information, whereas lower current BASDAI scores may coexist with greater disease-related knowledge. These interpretations remain hypothetical because the cross-sectional design does not establish the temporal direction of the associations. The findings differ from those of Alkan et al., who reported that disease-related knowledge was associated with educational level but not with the BASFI score, symptom severity, or the ASQoL score (15). Differences in sample characteristics, educational attainment, disease severity, and access to patient education may explain the variation between studies. Longitudinal studies are needed to determine whether changes in disease-related knowledge precede or follow changes in BASDAI, BASFI, and ASQoL scores.

With regard to psychosocial parameters, disease-related knowledge retained a moderate positive partial correlation with self-efficacy and a moderate negative partial correlation with depressive symptoms after adjustment. Thus, patients with greater disease-related knowledge reported higher self-efficacy and fewer depressive symptoms. These findings indicate associations rather than causal effects; the present data do not demonstrate

that greater disease-related knowledge increases self-efficacy or reduces depression. Reverse or bidirectional relationships are also possible, as individuals with higher self-efficacy or fewer depressive symptoms may be more able or willing to obtain and use disease-related information. By contrast, the adjusted associations with disease-related fear and anxiety did not meet the Bonferroni-corrected significance threshold, suggesting that these weak bivariate relationships may have been influenced by demographic or clinical covariates.

Taken together, the findings indicate that disease-related knowledge is associated with both clinical and psychosocial characteristics in patients with AS, although the direction and magnitude of these associations vary across outcomes. Greater disease-related knowledge was associated with lower BASDAI and HADS depression scores and higher self-efficacy scores, but also with higher BASFI and ASQoL scores. These results support the clinical relevance of assessing disease-related knowledge alongside BASDAI, BASFI, ASQoL, and psychosocial scale scores. However, they do not establish that increasing disease-related knowledge would improve these outcomes. Prospective and interventional studies are needed to determine the temporal sequence of the observed relationships and to evaluate whether structured patient education changes disease-related knowledge and subsequent clinical or psychosocial outcomes.

Strengths and Limitations

This study has several limitations that should be considered when interpreting the findings. First, the cross-sectional design captures associations at a single point in time and does not allow conclusions regarding causality or the temporal direction of the observed relationships. Second, the study was conducted in a single rheumatology center using a consecutive sample, which may limit the generalizability of the findings to the broader population of patients with AS. Third, the clinical and psychosocial outcomes were assessed using self-report instruments and may therefore be affected by recall and response bias. Fourth, the modified ASES was administered using a researcher-translated Turkish version that has not undergone formal psychometric validation in Turkish-speaking patients with AS; therefore, measurement properties of this translation remain uncertain. Fifth, several factors that could influence the observed relationships were not assessed and consequently could not be included in the adjusted analyses. These factors included previous physiotherapy treatment, socioeconomic status, prior receipt of patient education, and objective indicators of inflammation such as C-reactive protein and erythrocyte sedimentation rate. Residual confounding related to these unmeasured factors therefore cannot be excluded. The main strength of the study is the simultaneous evaluation of disease-related knowledge alongside a comprehensive set of clinical and psychosocial parameters, including disease-related fear and self-efficacy, which have rarely been examined together in AS.

CONCLUSION AND RECOMMENDATIONS

Greater disease-related knowledge was associated with lower disease activity, fewer depressive symptoms, and higher self-efficacy, but also with greater

functional impairment and poorer disease-specific quality of life. These associations should not be interpreted as evidence that greater disease-related knowledge worsens function or quality of life. The cross-sectional findings do not establish causality or temporal direction. Longitudinal and interventional studies are needed to clarify the direction of these associations and to determine whether structured patient-education programs influence disease-related knowledge and subsequent clinical and psychosocial outcomes.

AUTHORS' CONTRIBUTIONS

N.G.T.: Conceptualization, design, supervision, analysis, interpretation, literature review, manuscript writing, editing. G.G.P.: Design, literature review, critical review. S.B.: Design, literature review, critical review. D.Y.: Literature review, critical review. D.O.: Literature review, critical review.

FUNDING

None.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ETHICAL APPROVAL AND CONSENT TO PARTICIPATE

This study was conducted in accordance with the principles of the Declaration of Helsinki and approved by the Research Ethics Committee of Gazi University (Approval Date: 21.02.2023; Number: 2023-392). Written informed consent was obtained from all participants.

REFERENCES

1. Sieper J, Poddubnyy D. Axial spondyloarthritis. Lancet. 2017;390(10089):73-84. doi: 10.1016/S0140-6736(16)31591-4
2. Braun J, Sieper J. Ankylosing spondylitis. Lancet. 2007;369(9570):1379-90. doi: 10.1016/S0140-6736(07)60635-7
3. Ward MM. Quality of life in patients with ankylosing spondylitis. Rheum Dis Clin North Am. 1998;24(4):815-27. doi: 10.1016/S0889-857X(05)70043-0
4. Bostan EE, Borman P, Bodur H, Barça N. Functional disability and quality of life in patients with ankylosing spondylitis. Rheumatol Int. 2003;23(3):121-6. doi: 10.1007/s00296-002-0261-4
5. Hakkou J, Rostom S, Mengat M, Aissaoui N, Bahiri R, Hajjaj-Hassouni N. Sleep disturbance in Moroccan patients with ankylosing spondylitis: prevalence and relationships with disease-specific variables, psychological status and quality of life. Rheumatol Int. 2013;33(2):285-90. doi: 10.1007/s00296-012-2376-6
6. Martindale J, Smith J, Sutton CJ, Grennan D, Goodacre L, Goodacre JA. Disease and psychological status in ankylosing spondylitis. Rheumatology (Oxford). 2006;45(10):1288-93. doi: 10.1093/rheumatology/kel115
7. Gossec L, Chauvin P, Saraux A, Hudry C, Cukierman G, de Chalus T, et al. Development and psychometric validation of a patient-reported outcome measure to assess fears in rheumatoid arthritis and axial spondyloarthritis: the Fear Assessment in Inflammatory Rheumatic diseases (FAIR) questionnaire. Ann Rheum Dis. 2018;77(2):258-63. doi: 10.1136/annrheumdis-2017-212000
8. Keleşoğlu Dinçer AB, Sezer S. Association of Fear Assessment in Inflammatory Rheumatic diseases

(FAIR) questionnaire with ankylosing spondylitis quality of life and disease activity in patients with ankylosing spondylitis. J Surg Med. 2022;6(7):679-83. doi: 10.28982/josam.1119839
9. Zangi HA, Ndosi M, Adams J, Andersen L, Bode C, Boström C, et al. EULAR recommendations for patient education for people with inflammatory arthritis. Ann Rheum Dis. 2015;74(6):954-62. doi: 10.1136/annrheumdis-2014-206807
10. Ramos-Remus C, Salcedo-Rocha AL, Prieto-Parra RE, Galvan-Villegas F. How important is patient education? Baillieres Best Pract Res Clin Rheumatol. 2000;14(4):689-703. doi: 10.1053/berh.2000.0107
11. Lubrano E, Helliwell P, Moreno P, Griffiths B, Emery P, Veale D. The assessment of knowledge in ankylosing spondylitis patients by a self-administered questionnaire. Br J Rheumatol. 1998;37(4):437-41. doi: 10.1093/rheumatology/37.4.437
12. da Rocha Lopes SM, Duarte JA, Mesquita CT. Cross-cultural adaptation and validation of the Portuguese version of "The assessment of knowledge in ankylosing spondylitis patients by a self-administered questionnaire". Rheumatol Int. 2016;36(4):515-9. doi: 10.1007/s00296-016-3434-2
13. Claudepierre P, Flipo RM, Sibilia J, Berthelot JM, Goupille P, Cortinovis S, et al. Patient knowledge of their disease: a French multicenter study in ankylosing spondylitis. Joint Bone Spine. 2004;71(6):550-6. doi: 10.1016/j.jbspin.2004.09.001
14. Jassim N, Majeed S. The assessment of knowledge in sample of Iraqi patients with ankylosing spondylitis. Rheumatology (Bulgaria). 2020;28(1):31-40. doi: 10.35465/28.1.2020.pp31-40
15. Alkan G, Akkoç Y, Zengin B, Keser G, Kabasakal Y, Akkoç N. The adaptation of the Turkish version of the Assessment of Knowledge in Ankylosing Spondylitis Patients by a Self-Administered Questionnaire. Turk J Phys Med Rehabil. 2020;66(3):299-306. doi: 10.5606/tftrd.2020.4013
16. van der Linden S, Valkenburg HA, Cats A. Evaluation of diagnostic criteria for ankylosing spondylitis: a proposal for modification of the New York criteria. Arthritis Rheum. 1984;27(4):361-8. doi: 10.1002/art.1780270401
17. Akkoç Y, Karatepe AG, Akar S, Kirazlı Y, Akkoç N. A Turkish version of the Bath Ankylosing Spondylitis Disease Activity Index: reliability and validity. Rheumatol Int. 2005;25(4):280-4. doi: 10.1007/s00296-003-0432-y
18. 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(12):2286-91.
19. Karatepe AG, Akkoç Y, Akar S, Kirazlı Y, Akkoç N. The Turkish versions of the Bath Ankylosing Spondylitis and Dougados Functional Indices: reliability and validity. Rheumatol Int. 2005;25(8):612-8. doi: 10.1007/s00296-004-0481-x
20. 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(12):2281-5.

21. Duruöz MT, Doward L, Turan Y, Cerrahoglu L, Yurtkuran M, Calis M, et al. Translation and validation of the Turkish version of the Ankylosing Spondylitis Quality of Life (ASQOL) questionnaire. Rheumatol Int. 2013;33(11):2717-22. doi: 10.1007/s00296-013-2796-y
22. Doward LC, Spoorenberg A, Cook SA, Whalley D, Helliwell PS, Kay LJ, et al. Development of the ASQoL: a quality of life instrument specific to ankylosing spondylitis. Ann Rheum Dis. 2003;62(1):20-6. doi: 10.1136/ard.62.1.20
23. Küçükakkaş O, Rezvani A, Yurdakul OV, Tolu S, Kılıçoğlu MS, Aydın T. Fear Assessment in Inflammatory Rheumatic diseases (FAIR) questionnaire: a cross-cultural adaptation and validation to the Turkish language. Clin Rheumatol. 2018;37(12):3247-54. doi: 10.1007/s10067-018-4239-3
24. Aydemir Ö, Güvenir T, Küey L, Kültür S. Hastane Anksiyete ve Depresyon Ölçeği Türkçe formunun geçerlilik ve güvenilirlik çalışması. Turk Psikiyatri Derg. 1997;8(4):280-7.
25. Zigmond AS, Snaith RP. The Hospital Anxiety and Depression Scale. Acta Psychiatr Scand. 1983;67(6):361-70. doi: 10.1111/j.1600-0447.1983.tb09716.x
26. Sandhu J, Packham JC, Healey EL, Jordan KP, Garratt AM, Haywood KL. Evaluation of a modified Arthritis Self-Efficacy Scale for an ankylosing spondylitis UK population. Clin Exp Rheumatol. 2011;29(2):223-30.
27. Lorig K, Chastain RL, Ung E, Shoor S, Holman HR. Development and evaluation of a scale to measure perceived self-efficacy in people with arthritis. Arthritis Rheum. 1989;32(1):37-44. doi: 10.1002/anr.1780320107