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The correlation of ASAS Health Index and scales assessing general health status, disease activity, functional capacity, spinal mobility, and quality of life in Turkish patients with ankylosing spondylitis

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ABSTRACT

Aims: We aimed to investigate whether the Assessment of SpondyloArthritis International Society Health Index (ASAS HI) correlates with scales assessing overall health status, disease activity, spinal mobility, quality of life, and functional capacity in individuals with ankylosing spondylitis (AS).

Methods: This cross-sectional study included patients with AS diagnosed according to the 2010 ASAS classification criteria. ASAS HI, Bath Ankylosing Spondylitis Disease Activity Index (BASDAI), Ankylosing Spondylitis Disease Activity Score-C-Reactive Protein (ASDAS-CRP), Bath Ankylosing Spondylitis Functional Index (BASFI), Dougados Functional Index (DFI), Bath Ankylosing Spondylitis Metrology Index, Bath Ankylosing Spondylitis Patient Global Score (BAS-G), Visual Analog Scale (VAS) for pain and morning stiffness scores, Ankylosing Spondylitis Quality of Life (ASQoL), EuroQol-5D (EQ-5D), and EQ VAS were measured. Statistical analyses were conducted to examine correlations between the ASAS HI and other measurement instruments.

Results: A cohort of 141 patients (84 males and 57 females) with a mean age of 39.02±12.16 years was included in the study. ASAS HI was positively correlated with BASDAI, ASDAS-CRP, and ASDAS-ESR ($p<0.001$, $r=0.63$, $r=0.61$, $r=0.64$). ASAS HI demonstrated strong positive correlations with BASFI and DFI ($p<0.001$, $r=0.71$, $r=0.72$), and a significant negative correlation with EQ-5D ($p<0.001$, $r=-0.67$). Additionally, notable positive associations were observed with ASQoL ($p<0.001$, $r=0.79$) and BAS-G ($p<0.001$, $r=0.63$).

Conclusions: The ASAS HI may serve as a measure of overall health in patients with AS, provide additional insights alongside assessments of disease severity, functional ability, and well-being, and facilitate longitudinal monitoring of treatment outcomes.

Introduction

Ankylosing spondylitis (AS) is a chronic rheumatologic condition characterized by inflammation mainly of the spine, sacroiliac joints, and entheses, and occasionally of the peripheral joints (1). The reported prevalence varies between 0.1% and 1.4%, and it is observed approximately twice as often in men compared to women (2). AS is marked by persistent inflammation, which plays a central role in driving both disability and increased mortality among affected individuals. The evaluation of inflammation using reliable markers in AS plays a key role in predicting patients' long-term prognosis (3). There is no standardized laboratory test to be used as a diagnostic and follow-up tool specific to AS. Currently, C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) are routinely employed as biochemical indicators of inflammation (4).

Over time, AS can cause significant disability in patients. Therefore, monitoring disease activity and function, selection of the optimal treatment, and the evaluation of therapeutic response play a vital role. The Assessment of SpondyloArthritis International Society Health Index (ASAS HI), developed by Kiltz et al. (5), is an ASAS instrument for measuring health status in patients across all spondyloarthritis (SpA) categories, including radiographic and non-radiographic axial and peripheral manifestations of SpA, based on the International Classification of Functioning, Disability and Health (ICF) categories (5). The instrument has been translated and culturally adapted into 15 languages, including Turkish (6). The reliability and validity of the Turkish version were established by Duruöz et al (7). The ASAS HI provides a comprehensive assessment of health status by addressing key domains derived from the ICF framework, including pain, emotional well-being, sleep quality, sexual health, mobility, personal care, and social participation. Importantly, the ASAS HI is intended as a general measure of health status rather than a health-related quality-of-life tool for AS. In contrast, most existing instruments for patients with SpA concentrate on individual health domains, such as pain, disease severity, or physical function, and aim to evaluate specific aspects such as functional performance or health-related quality of life. Nonetheless, the overall effect of AS on patients' functional ability and social engagement has not been comprehensively captured by questionnaires specifically designed for SpA.

Our primary aim was to investigate whether the ASAS HI correlates with measures of pain, disease activity, functional capacity, health status, spinal mobility, and quality of life in patients with AS.

Methods

Research design, study population, and ethical considerations

This cross-sectional study was undertaken between October 4, 2018, and October 8, 2018, in the Rheumatology Division of the Department of Physical Medicine and Rehabilitation at Cumhuriyet University Faculty of Medicine. The eligibility criteria for participation included: a diagnosis of AS according to the 2010 ASAS criteria (8); AS patients aged 18 years or older; patients willing and competent to provide written informed consent; and participants capable of adhering to study procedures. Patients with active inflammatory bowel disease, poorly controlled diabetes, recently active coronary artery disease, heart failure, a history of cancer or lymphoproliferative disease, gout, calcium pyrophosphate dihydrate crystal deposition, other concomitant inflammatory rheumatic diseases, hepatitis, active tuberculosis, concomitant fibromyalgia, mental health disorders, and pregnancy were excluded. The study included 141 patients.

Ethics Committee approval was obtained from the Clinical Research Ethics Committee of Cumhuriyet University (approval no.: 2018-03/04; date: 26.03.2018). In accordance with the Declaration of Helsinki, all participants provided written informed consent after receiving appropriate study information.

Data collection and instruments

A predesigned data collection form was used to record the patients' socio-demographic and clinical characteristics. This form consisted of questions regarding demographic and clinical parameters such as gender identity, age of patients, level of education, civil status, work status, disease duration, concurrent chronic disorders, smoking status, body mass index (BMI), certain laboratory findings [such as CRP, ESR, human leukocyte antigen-B27 (HLA-B27)], and medications used.

Patient-reported outcome measures assessing pain, disease activity, functional capacity, duration of morning stiffness, health status, quality of life, and general condition were completed by the patients themselves, with explanatory assistance provided when necessary. Spinal mobility measurements and BMI were assessed by the investigator.

Laboratory data

CRP and ESR values were obtained from routine tests. Normal reference ranges were 0-8 mg/L for CRP and 0-20 mm/h for ESR. HLA-B27 test results were obtained from patients' medical records.

Pain and morning stiffness

Visual Analog Scale (VAS) is accepted as an appropriate and practical method for assessing the severity of the most common complaints of pain and stiffness among patients with AS. In this study, pain intensity was assessed with VAS. The scale is composed of a 10 cm (100 mm) line, which can be oriented horizontally or vertically. The beginning of the line denotes "no pain or stiffness," and the end denotes "the most severe pain or stiffness imaginable." Patients are informed that pain intensity increases from the left to the right end of the line and are asked to indicate the point that corresponds most closely to their current

level of pain. The point marked by the patient is measured in cm or mm (9). The duration of morning stiffness was measured in minutes, and severity was assessed using VAS.

Disease activity

To assess disease activity, the Bath Ankylosing Spondylitis Disease Activity Index (BASDAI), Ankylosing Spondylitis Disease Activity Score (ASDAS)-CRP, and ASDAS-ESR were employed (10-12).

The BASDAI assesses fatigue, spinal pain, localized tenderness in enthesitis areas, and the duration and intensity of morning stiffness. For this purpose, the patient is asked to answer 6 questions and to provide a score between 0 and 10 on the VAS. The answers in questions 5-6 are summed and divided by two, the result is summed with the other scores, and the result is divided by 5. If the score obtained is between 0 and 3, it is classified as mild; between 3.1 and 5, as moderate; between 5.1 and 7, as severe; and between 7.1 and 10, as very severe. In general practice, patients with a score of 4 or higher are considered active, and those with a score below 4 are considered inactive (10,12).

The parameters used in the ASDAS Score are: (1) total back pain (BASDAI question 2), (2) patient global assessment (VAS), (3) peripheral pain/swelling (BASDAI question 3), (4) duration of morning stiffness (BASDAI question 6), and (5) CRP or ESR levels. In the calculation, CRP is expressed in mg/L and ESR in mm/h. The VAS scores and the CRP values are included in the ASDAS formula. The evaluation of the results is presented as follows: above 3.5 is very high disease activity, 2.1-3.5 is high disease activity, 2.1-1.3 is moderate disease activity, and values below 1.3 are inactive disease status. A change greater than 1.1 in the ASDAS-CRP, which is useful for treatment follow-up, is classified as clinically meaningful, while a change greater than 2 points represents a substantial improvement (12).

Functional status

Bath Ankylosing Spondylitis Functional Index (BASFI) and Dougados Functional Index (DFI) were used to assess the functional status of the patient with AS (13,14).

The BASFI includes 10 questions about activities related to the patient's functional anatomy and day-to-day living activities. The patient is asked to rate each activity on a VAS from 0 to 10 according to the degree of difficulty. The marks are measured in cm, and the result is divided by 10. Higher scores are interpreted as indicating greater limitation in physical function (13).

The DFI includes 20 questions related to functional capacity and daily living tasks. Patients answer these questions using three response categories: 0= able to do without difficulty; 1= able to do with difficulty; and 2= unable to do. The overall score ranges from 0 to 40. A higher score indicates greater functional limitations (14).

Quality of life

The EuroQol-5D (EQ-5D) index assesses five health dimensions: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression (15). Each dimension is rated on three levels: no problems, some problems, and severe problems, yielding a total of 243 possible health states. From these responses, an index score ranging from -0.59 to 1 is derived, where 0 represents a state equivalent to death, 1 represents optimal health, and negative scores correspond to severely impaired states, such as unconsciousness or a completely bedridden state. The EQ VAS complements this by allowing individuals to self-rate their current health status on a 0-100 scale, visually represented like a thermometer, producing a health-related quality of life score (15).

AsQoL was used to assess quality of life in patients with AS (16). This scale, used by AS patients, comprises 18 statement-based items rather than questions. There are yes/no options for each sentence. Patients are asked to provide the most appropriate response based on their current situation. These items are related to the patients' daily life functions, social relations, mental state, the severity of pain they feel, and how it affects their daily life. The statements in the questionnaire are negatively worded. Each "yes" answer is scored as 1 point. Elevated scores on the scale indicate diminished QoL. This QoL measure is quick, simple, and easy for patients to understand.

General condition

Bath Ankylosing Spondylitis Patient Global Score (BAS-G) is a practical measure of the general effects of the disease on the patient's overall health status, whereby the patient evaluates his/her own condition in recent days using VAS (17,18). This measure is a simple but highly reflective assessment of disease activity, in which the patient evaluates himself/herself with respect to general aspects such as symptoms, functional status, and QoL. It consists of two questions: "How have you felt in the last week?" and "How have you felt in the last six months?" Patients are requested to respond to these questions using the VAS. A total score is calculated by averaging these two VAS values.

Spinal mobility

Spinal mobility was evaluated using the Bath Ankylosing Spondylitis Metrology Index (BASMI) (19). This index comprises five clinical assessment measures: tragus-to-wall distance, lateral spinal flexion, modified lumbar Schober, cervical rotation, and intermalleolar distance. The results for right and left lateral lumbar flexions, cervical rotations, and tragus-wall distance are averaged. Each measurement is evaluated separately; scores of zero, one, and two are assigned according to specific measurement intervals. The scores of the five measurements are summed. A total score ranging from 0 to 10 is calculated. The increased score, the greater the limitation of mobility due to AS (20).

Health status

The ASAS HI was established to assess health status across all SpA subtypes, including radiographic and non-radiographic axial SpA as well as peripheral manifestations (5). It is a self-reported questionnaire comprising 17 items covering domains such as pain, emotional functioning, sleep, sexual health, physical movement, personal care, and social engagement. Each item is phrased in the first person and present tense, with two possible responses: “agree” or “disagree.” A value of 1 is assigned to each “agree” answer and 0 to each “disagree” answer, resulting in an overall score ranging from 0 to 17. Increased scores denote more pronounced impairment, and lower scores indicate better health.

Outcomes

The primary outcome of this study was the correlation between the ASAS HI and disease activity (BASDAI, ASDAS-CRP, ASDAS-ESR), functional status (BASFI, DFI), spinal mobility (BASMI), quality of life (ASQoL, EQ-5D, EQ-VAS), and patient global assessment (BAS-G). The secondary outcome was the comparison of ASAS HI scores among disease activity groups based on BASDAI and ASDAS-CRP.

Statistical Analysis

All statistical procedures were executed using SPSS Statistics for Windows, version 22.0 (IBM Corp., Armonk, NY, USA). Descriptive data were expressed as mean ± standard deviation, median (min-max), and percentage. An a priori power analysis was conducted using G*Power 3.1. Given a medium effect size (f=0.25), an alpha error probability of 0.05, and a desired power of 0.90, the required sample size was calculated to be 128. Our study included 141 patients, exceeding this requirement and thus providing adequate statistical power. The Kolmogorov-Smirnov test was used to assess the normality of quantitative data. Since the parametric test assumptions could not be fulfilled in the evaluation of the data, Kruskall-Wallis test was used in the comparison of ASAS HI scores with BASDAI and ASDAS-CRP Group scores. Pairwise post-hoc comparisons were performed using the Mann-Whitney U test. To account for multiple testing in post-hoc comparisons, the Bonferroni correction was applied, and $p<0.0125$ was considered statistically significant. The chi-square test or Fisher’s exact test was applied to examine categorical data, and the results are presented as frequency and percentage [n (%)]. The relationship between the variables was evaluated using Spearman correlation analysis. Correlations ≤0.30 were considered as low, >0.30 and ≤0.50 moderate, between 0.50 and 0.80 as strong, ≥80 as very strong. Two-tailed statistical tests were used, and statistical significance was set at $p\leq0.05$.

Results

A cohort of 141 patients (84 males and 57 females) with a mean age of 39.02±12.16 years was included in the study. The patients’ socio-demographic data are presented in Table 1. The median CRP was 3.37 mg/L (0.60-35), and the median ESR was 8 mm/h (1-48). The ASAS HI had a median of 8 (0-17). Disease activity scores were BASDAI: 4.8 (0-11.1), ASDAS-CRP: 2.8 (0-5), and ASDAS-ESR: 2.6 (0.6-4.8). The Functional indices were BASFI: 4.5 (0-9.5) and DFI: 11 (0-25). Patients’ clinical profiles and laboratory findings are presented in Table 2.

When ASAS HI values were compared across BASDAI groups, a statistically significant difference was observed ($p<0.001$). In pairwise comparisons, statistically significant differences were observed between the mild disease activity group and all other groups and between the moderate disease activity group and all other groups ($p<0.001$). However, the analysis revealed no statistically significant differences between the severe and very severe disease activity groups ($p>0.05$) (Table 3).

When ASAS HI scores were compared across ASDAS-CRP groups, a statistically significant difference was observed ($p<0.001$). In pairwise comparisons, marked differences were found between the following pairs of groups: inactive vs. high disease activity, inactive vs. very high disease activity, moderate vs. high disease activity, moderate vs. very high disease activity, and high vs. very high disease activity (all $p<0.001$). However, the difference between the inactive and moderate disease activity groups was not significant ($p>0.05$) (Table 3).

The analyses revealed no statistically significant correlation between ASAS HI scores and CRP values ($p>0.05$). However, ASAS HI scores demonstrated a modest positive correlation with ESR values ($p<0.016$, $r=0.20$). Additionally, significant positive correlations were noted between ASAS HI scores and pain, morning stiffness severity ($p<0.001$, r values: 0.59, 0.55, respectively), and significant positive moderate correlations was founded between ASAS HI and the morning stiffness ($p<0.001$, r values: 0.33). Furthermore, high-strength significant positive correlations were identified between ASAS HI scores and ASDAS-CRP, ASDAS-ESR, and BASDAI scores ($p<0.001$, r values: 0.61, 0.64, 0.63, respectively).

We also observed strong, positive, and significant correlations between ASAS HI scores and BASFI scores, and between ASAS HI scores and DFI scores ($p<0.001$; $r=0.71$ and 0.72, respectively). However, there was no statistically significant correlation between ASAS HI scores and disease duration (Table 4).

Discussion

In this study, ASAS HI scores were meaningfully correlated with multiple clinical parameters, including parameters of disease activity (BASDAI, ASDAS-CRP, ASDAS-ESR), functional measures (BASFI, DFI), spinal mobility (BASMI), patient global assessment (BAS-G), and quality-of-life scales (ASQoL, EQ-5D). Strong correlations were observed, particularly with disease

Table 1. Socio-demographic data, medication use, clinical features, and HLA-B27 status of AS patients

Characteristics	Values
Age, years, mean ± SD (min-max)	39.02±12.16 (18-68)
Male/female, n (%)	84 (59.6)/57 (40.4)
Disease duration, months, mean ± SD (min-max)	78.41±96.86 (5-480)
BMI (kg/m²), mean ± SD	27.40±5.63
BMI group (kg/m²), n (%)	
<18.5	3 (2.1)
18.5-24.9	44 (31.2)
25-29.9	55 (39)
≥30	39 (27.7)
Background, n (%)	
No features	107 (75.9)
HT	12 (8.5)
DM	2 (1.4)
HT and DM	1 (0.7)
CAD and DM	1 (0.7)
Thyroid disease	5 (3.5)
Others	13 (9.2)
Education status, n (%)	
Illiterate	2 (1.4)
Literate	7 (5)
Primary school	54 (38.3)
High school	32 (22.7)
University	46 (32.6)
Marital status, n (%)	
Married	103 (73)
Single	37 (26.2)
Widowed	1 (0.7)
Smoking status, n (%)	
Non-smoker	101 (71.6)
Smoker	35 (24.8)
Former-smoker	5 (3.5)
Medications used, n (%)	
Non-medication	4 (2.8)
NSAIDs	43 (30.5)
Sulfasalazine	5 (3.5)
NSAIDs and sulfasalazine	9 (6.4)
Biological agents	80 (56.7)
HLA-B27	
Positive	38 (27)
Negative	59 (41.8)
Not obtained	44 (31.2)

HLA-B27: Human leukocyte antigen B27, AS: Ankylosing spondylitis, SD: Standard deviation, Min-max: Minimum-maximum, BMI: Body mass index, HT: Hypertension, DM: Diabetes mellitus, CAD: Coronary artery disease, NSAIDs: Non-steroidal anti-inflammatory drugs

Table 2. Clinical and laboratory characteristics of AS patients

Characteristics	Values*
CRP (mg/L)	3.37 (0.60-35)
ESR (mm/h)	8 (1-48)
Pain (VAS, 0-10 cm)	7 (0-10)
Severity of morning stiffness (VAS, 0-10 cm)	5 (0-10)
Duration of morning stiffness (minutes)	30 (0-180)
ASAS HI	8 (0-17)
BASDAI	4.8 (0-11.1)
ASDAS-CRP	2.8 (0-5)
ASDAS-ESH	2.6 (0.6-4.80)
BASFI	4.5 (0-9.5)
DFI	11 (0-25)
BAS-G	6.5 (0-10)
BASMI	1 (0-10)
ASQoL	9 (0-18)
EQ-5D Index	0.507 (0.04-1)

*Data are presented as median (minimum-maximum)
AS: Ankylosing spondylitis, CRP: C-reactive protein, ESR: Erytrocyte sedimentation rate, VAS: Visual Analogue Scale, ASAS HI: Assessment of SponyloArthritis International Society Health Index, BASDAI: Bath Ankylosing Spondylitis Disease Activity Index, ASDAS: Ankylosing Sponylitis Disease Activity Score, BASFI: Bath Ankylosing Spondylitis Functional Index, DFI: Dougadas Functional Index, BAS-G: Bath Ankylosing Spondylitis Patient Global Score, BASMI: Bath Ankylosing Spondylitis Metrology Index, ASQoL: Ankylosing Spondylitis Quality of Life EQ-5D: EuroQoL-5 Dimension Index

activity, functional capacity, and quality-of-life measures, while weaker associations were found with inflammatory markers such as CRP. The observed outcomes provide new perspectives on the applicability of ASAS HI and its potential role in clinical practice.

The ASAS HI was designed to evaluate health status in patients with all types of SpA (6). Although various scales exist to monitor disease activity, quality of life, and functional capacity in AS, research on the ASAS HI remains limited, as it is a newly developed index.

In patients with AS, pain intensity and the degree and duration of morning stiffness are important parameters for disease follow-up (21). In the current investigation, a statistically marked positive correlation was observed with pain scores in relation to ASAS HI scores. In addition, our study revealed a meaningful positive correlation of morning stiffness duration and intensity with ASAS HI scores. Our findings were consistent with the literature (19-22). Based on this significant correlation between pain, morning stiffness duration, morning stiffness intensity, and ASAS HI scores, ASAS HI may provide additional benefit in assesesing activity of disease in patients diagnosed with AS.

CRP and ESR are widely employed as markers of inflammation in AS and may provide additional value in

Table 3. Comparison of ASAS HI scores according to BASDAI and ASDAS-CRP groups

BASDAI groups	n	ASAS HI Scores			p-value	Post-hoc**
		Median	Minimum	Maximum		
0-3 (Mild disease activity between, I)	32	2.56	0	11.68	<0.001*	I vs. II, III, IV
3.1-5 (Moderate disease activity, II)	43	7.43	0	15		II vs. I, III, IV
5.1-7 (High disease activity, III)	40	9.31	3.40	17		
7.1-10 (Very high disease activity, IV)	26	10.62	5	17		
ASDAS-CRP groups						
<1.3 (Inactive disease activity, I)	3	2.00	0	2	<0.001*	I vs. III, IV
1.3-2.1 (Moderate disease activity, II)	31	3.18	0	13.80		II vs. III, IV
2.1-3.5 (High disease activity, III)	67	7.90	0	17		III vs. IV
≥3.5 (Very high disease activity, IV)	40	11.11	5	17		

*: Kruskal-Wallis test, **: Mann-Whitney U testt
ASAS HI: Assessment of SponyloArthritis International Society Health Index, BASDAI: Bath Ankylosing Spondylitis Disease Activity Index, ASDAS: Ankylosing Spondylitis Disease Score, CRP: C-reactive protein

Table 4. Correlation coefficient between ASAS HI and clinical features

	ASAS HI	
	r	p-value
CRP (mg/L)	0.10	0.217
ESR (mm/h)	0.20	**0.016**
Pain (VAS)	0.59	**<0.001**
Severity of morning stiffness (VAS)	0.55	**<0.001**
Duration of morning stiffness (minute)	0.33	**<0.001**
ASDAS-CRP	0.61	**<0.001**
ASDAS-ESR	0.64	**<0.001**
BASDAI	0.63	**<0.001**
BASFI	0.71	**<0.001**
DFI	0.72	**<0.001**
EQ-5D index	-0.67	**<0.001**
EQ-VAS	-0.44	**<0.001**
ASQoL	0.79	**<0.001**
BASMI	0.23	0.006
BAS-G	0.63	**<0.001**
Disease duration (months)	0.19	0.825

ASAS HI: Assessment of SpondyloArthritis International Society Health Index, CRP: C-reactive protein, ESH: Eryhtrocyte sedimentation rate, VAS: Visual Analogue Scale, ASDAS: Ankylosing Spondylitis Disease Activity Score, BASDAI: Bath Ankylosing Spondylitis Disease Activity Index, BASFI: Bath Ankylosing Spondylitis Functional Index, DFI: Dougadas Functional Index, BAS-G: Bath Ankylosing Spondylitis Patient Global Score, BASMI: Bath Ankylosing Spondylitis Metrology Index, ASQoL: Ankylosing Spondylitis Quality of Life, EQ-5D: EuroQoL-5 Dimension, EQ-VAS: EuroQoL Visual Analogue Scale

assessing disease activity; however, their use is controversial (21). In patients with AS, a 50-70% increase in ESR and CRP has been observed in clinical studies. However, it has been reported that this elevation is not consistently correlated with disease activity and should be evaluated in conjunction with other parameters (4). In our study, there was no correlation between ASAS HI scores and CRP values. There was a statistically significant positive correlation between ASAS HI scores and ESR; however, the strength of the correlation was weak. Min et al. (22) observed a robust correlation between ASAS HI and CRP values. The observed discrepancy could be attributed to variations in sample size and patient characteristics, particularly in disease duration and treatment exposure.

BASDAI and ASDAS-CRP are commonly used scales to evaluate disease activity in patients with AS. A statistically significant positive correlation was observed between these two disease activity scales and ASAS HI scores, though ASAS HI is not a tool for evaluating disease activity. Similar to this study, other studies have reported robust positive correlations between ASAS HI scores and both ASDAS-CRP and BASDAI scores (22-33). Different cut-off values were determined in three previous studies (27,29,30).

The statistical significance of BASDAI and ASDAS, compared with ASAS HI, across disease activity groups suggests that ASAS HI can serve as an easy-to-use and effective tool in daily practice for assessing disease activity, in addition to its use as a health status scale.

ASAS HI is not traditionally considered a tool for functional assessment. In this study, we observed a statistically significant positive correlation between ASAS HI scores and BASFI and DFI scores. In the literature, a strong statistical correlation was found between ASAS HI scores and BASFI scores (22-34). However, these studies did not investigate whether a correlation exists between ASAS HI and DFI. This correlation suggests that it can be used in routine practice to assess functional status in patients with AS.

In this study, we observed a statistically significant but weak positive correlation between ASAS HI and BASMI scores. Consistent with our findings, Di Carlo et al. (24) obtained a statistically significant but weak correlation between ASAS HI and BASMI scores. Choi et al. (25) and Qu et al. (28) also

found statistically significant moderate and strong correlations, respectively, between ASAS HI scores and BASMI scores. This difference may be due to disparities in patient clinical and demographic features, disease severity, and structural damage, as well as to the broader health dimensions captured by ASAS-HI, compared with the more specific metrological scope of BASMI.

In this study, the ASAS HI demonstrated a strong positive correlation with ASQoL, a widely recognized health-related quality of life scale (HRQoL), and a strong correlation with EQ-VAS, an instrument reflecting general health preceptions and a strong negative correlation with EQ-5D, which emphasizes functional and mobility dimensions in HRQoL. Min et al. (22) and Di Carlo et al. (24) demonstrated a marked correlation with ASAS HI scores and ASQoL scores in a study conducted in axial SpA patients, a negative correlation with ASAS HI scores and EQ-5D index scores in axial SpA patients; the correlation strength was moderate, a negative correlation with ASAS HI scores and EQ-VAS scores in axial SpA patients; the correlation strength was moderate. In line with our study, Choi et al. (25) observed a strong negative correlation between ASAS HI scores and EQ-VAS scores. Although the ASAS HI is not a quality-of-life scale, these findings highlight the multidimensional nature of ASAS HI, encompassing aspects of general health and well-being beyond its original purpose.

We investigated the relationship between the BAS-G and the ASAS HI scores. A statistically high correlation between ASAS HI scores and BAS-G scores was observed. Li et al. (31) also obtained a statistically significant high correlation with the ASAS HI and BAS-G scores. The overlap between BAS-G and ASAS HI reinforces the importance of integrating patient-reported outcomes into clinical assessment, particularly in diseases like AS, where subjective and objective disease measures often complement one another.

Study Limitations

ASAS HI score cut-off values were not examined, and ASDAS-CRP and BASDAI were not compared across disease activity groups. This can be attributed to the study's use of an alternative methodological approach. This lack of evaluation might be attributed to the limited number of existing studies, and addressing this gap in future research would help clarify the utility of ASAS HI in classifying disease activity and in integrating it more effectively into clinical decision-making processes.

Although the assessment of the ASAS HI in correlation with several AS activity of disease, pain severity, overall health, functional capacity, metrological index, and quality of life allows the evaluation of all aspects that may affect AS patients, the cross-sectional nature of this study, lack of long-term follow-up, and limited patient group seem to be the shortcomings of this study.

Conclusion

In this study, the ASAS HI showed marked correlations with disease activity indices (ASDAS-CRP/ESR), functional indices (BASFI and DFI), quality-of-life scales (EQ-5D and ASQoL), and the metrology index (BASMI). Therefore, the ASAS HI appears to be a useful instrument for assessing health status and may provide additional benefit in the evaluation of disease severity, functional capacity, and well-being in individuals diagnosed with AS.

Ethics

Ethics Committee Approval: Ethics Committee approval was obtained from the Clinical Research Ethics Committee of Cumhuriyet University (approval no.: 2018-03/04; date: 26.03.2018).

Informed Consent: In accordance with the Declaration of Helsinki, all participants provided written informed consent after receiving appropriate study information.

Footnotes

Authorship Contributions

Surgical and Medical Practices: M.C., H.E., Concept: H.E., Design: M.C., E.K., Data Collection or Processing: M.C., Analysis or Interpretation: M.C., H.E., E.K., Literature Search: M.C., H.E., E.K., Writing: M.C., E.K.

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