



Comparison of the Multidimensional Health Assessment Questionnaire (MDHAQ-RAPID3) with the Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) and the Bath Ankylosing Spondylitis Functional Index (BASFI) in Patients with Ankylosing Spondylitis

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Abstract

Introduction: To evaluate the correlation between the Routine Assessment of Patient Index Data 3 (RAPID3), derived from the Multidimensional Health Assessment Questionnaire (MDHAQ), and the commonly used indices Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) and Bath Ankylosing Spondylitis Functional Index (BASFI) in patients with Ankylosing Spondylitis (AS).

Methods: A total of 100 patients diagnosed with AS who attended our outpatient clinic between May 18 and September 30, 2009, were enrolled. All patients completed the BASDAI, BASFI, and MDHAQ questionnaires. RAPID3 was calculated using the pain, patient global assessment, and function subscales of MDHAQ. Spearman correlation analysis was used for statistical evaluation.

Results: The mean age was 30±10.9 years, and 69% of the participants were male. The mean disease duration was 5.0±6.7 years. Average BASDAI, BASFI, and RAPID3 scores were 4.93±2.5, 3.94±2.5, and 13.27±7.0, respectively. RAPID3 was strongly correlated with both BASDAI and BASFI ($r=0.77$ and $r=0.72$; $p<0.001$).

Discussion and Conclusion: RAPID3, based solely on patient-reported measures, shows strong correlation with established AS indices and can be considered a practical alternative for clinical monitoring in routine care.

Keywords: Ankylosing spondylitis; BASDAI; BASFI; disease activity; functional assessment; patient-reported outcome measures.

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Ankylosing spondylitis (AS) is a chronic, systemic inflammatory rheumatic disease that primarily affects the axial skeleton, especially the sacroiliac joints and spine [1,2]. It is considered the prototype of seronegative spondyloarthropathies, with a prevalence ranging between 0.5–1% in White populations, and it predominantly affects males in their second or third decade of life [3]. The pathogenesis of AS is strongly associated with genetic predisposition, particularly the presence of HLA-B27, which is positive in approximately 90–95% of patients with AS [4,5].

Clinically, AS leads to inflammation, pain, and progressive stiffness in the spine and peripheral joints, significantly impairing mobility and quality of life [6]. Over time, these symptoms contribute to physical disability, fatigue, sleep disturbances, and psychosocial burden, all of which can substantially reduce overall health status [7,8]. Therefore, regular assessment of disease activity and functional status is essential in the management of AS.

To address this clinical need, several validated instruments have been developed. The Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) and the Bath Ankylosing Spondylitis Functional Index (BASFI) are the most widely used tools for assessing disease activity and functional capacity, respectively [9,10]. These indices have demonstrated strong reliability, reproducibility, and sensitivity to change, making them valuable for both research and clinical use. However, they require time to complete and interpret, which may limit their feasibility in busy outpatient settings [11].

The Multidimensional Health Assessment Questionnaire (MDHAQ) was developed to provide a more efficient assessment of patient status, combining physical function, pain, fatigue, and patient global health evaluation [12]. From the MDHAQ, the Routine Assessment of Patient Index Data 3 (RAPID3) score was derived. RAPID3 includes only three patient-reported domains: physical function, pain, and global assessment, each scored from 0 to 10, yielding a total score from 0 to 30 [13]. Unlike BASDAI and BASFI, RAPID3 can be completed in less than one minute and scored without physician input, making it a promising tool for routine use. RAPID3 offers significant advantages in clinical settings due to its simplicity, rapid completion time (under one minute), and ease of scoring without physician input. These features make it particularly suitable for busy outpatient clinics, where time efficiency and practicality are essential.

Previous research has demonstrated that RAPID3 correlates well with disease activity indices in various rheumatologic conditions, including rheumatoid arthritis, osteoarthritis, fibromyalgia, and Behçet's disease [14–16]. However, its application and validity in AS patients have not been extensively studied, and current data are limited.

Given the need for practical, patient-centered outcome measures in rheumatology, the aim of this study was to evaluate the correlation between the MDHAQ-RAPID3 score and the more established BASDAI and BASFI indices in patients with ankylosing spondylitis. We hypothesize that RAPID3 may serve as a time-saving, feasible, and reliable alternative for assessing both disease activity and functional status in daily clinical practice.

Materials and Methods

This cross-sectional observational study was conducted between May 18 and September 30, 2009, in the Physical Medicine and Rehabilitation outpatient clinic of Haydarpaşa Numune Training and Research Hospital with 100 patients with AS diagnosed with the Modified New York Criteria (1984). Patients were between 18–65 years of age and had a confirmed diagnosis of AS. Exclusion criteria included the presence of other inflammatory rheumatic diseases, cognitive impairment preventing completion of the questionnaire, or missing clinical data.

All participants completed the following three validated questionnaires on the same day:

- Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) [17],
- Bath Ankylosing Spondylitis Functional Index (BASFI) [18],
- Multidimensional Health Assessment Questionnaire (MDHAQ) [19].

The RAPID3 score from the MDHAQ was calculated by summing the scores of three components: physical function, pain, and global assessment of the patient. Each component is scored from 0 to 10, resulting in a total RAPID3 score ranging from 0 to 30.

Demographic data (age, gender, education level) and clinical characteristics (duration of disease, medication use, comorbidities) were obtained from patient records. Selected laboratory data, including C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR), were also recorded. This study was conducted in accordance with the ethical principles of the 1964 Declaration of Helsinki

and its subsequent amendments and comparable ethical standards. All participants were informed about the study procedures before inclusion, and written informed consent was obtained.

Statistical Analysis

Statistical analyses were performed using SPSS version 15.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics are reported as mean±standard deviation (SD) for continuous variables and percentage for categorical variables. The primary analysis included the calculation of Spearman's rank correlation coefficients to assess the association between RAPID3 and the indices identified (BASDAI and BASFI). p -values<0.05 were considered statistically significant. Spearman's rank correlation was preferred due to the non-parametric distribution of the data, ensuring appropriate statistical assessment of associations.

Results

Demographic and Clinical Characteristics

A total of 100 patients with a confirmed diagnosis of AS were evaluated. The mean age was 30.0 ± 10.9 years, with an age range of 18 to 59 years. Among them, 69 were male (69%) and 31 were female (31%), yielding a male-to-female ratio of approximately 2.2:1.

The mean disease duration was 5.0 ± 6.7 years, ranging from less than 1 year to over 20 years. Education level analysis showed that 46% of patients had completed high school or higher education. Most patients (72%) were receiving non-steroidal anti-inflammatory drugs (NSAIDs), and 28% were on anti-TNF therapy at the time of the study.

Questionnaire Scores and Descriptive Data

Patients completed three self-reported instruments: BASDAI, BASFI, and MDHAQ (from which RAPID3 was derived). The results are summarized below (Table 1).

The distribution of RAPID3 scores was slightly right-skewed, indicating that a portion of patients reported moderate to high levels of disease impact, despite clinical stability in some.

Correlation Between RAPID3 and AS-Specific Indices

Spearman's rank correlation coefficients demonstrated strong and statistically significant correlations between the RAPID3 score and the established AS assessment tools:

- RAPID3 and BASDAI: $r=0.77$, $p<0.001$
- RAPID3 and BASFI: $r=0.72$, $p<0.001$

Table 1. Demographic and clinical characteristics of the study population and descriptive statistics of questionnaire scores

Variable	Mean±SD / n (%)	Range
Age (years)	30.0 ± 10.9	18–59
Gender (Male/Female)	69 (69%) / 31 (31%)	—
Disease duration (years)	5.0 ± 6.7	<1–>20
Education (High school or above)	46 (46%)	—
NSAID use	72 (72%)	—
Anti-TNF therapy	28 (28%)	—
BASDAI	4.93 ± 2.5	0.2–9.8
BASFI	3.94 ± 2.5	0.0–9.2
RAPID3	13.27 ± 7.0	1.0–29.0

SD: Standard Deviation; NSAID: Non-Steroidal Anti-Inflammatory Drug; BASDAI: Bath Ankylosing Spondylitis Disease Activity Index; BASFI: Bath Ankylosing Spondylitis Functional Index; RAPID3: Routine Assessment of Patient Index Data 3.

Table 2. Spearman correlation coefficients between MDHAQ components and BASDAI / BASFI

MDHAQ Component	r with BASDAI	r with BASFI	p
Pain	0.72	0.60	<0.01
Patient Global Assessment	0.70	0.76	<0.01
Fatigue	0.62	0.53	<0.01
Function (MDHAQ)	0.50	0.73	<0.01

Spearman correlation used; all correlations significant at $p<0.01$ level. BASDAI: Bath Ankylosing Spondylitis Disease Activity Index; BASFI: Bath Ankylosing Spondylitis Functional Index; MDHAQ: Multidimensional Health Assessment Questionnaire.

This suggests that RAPID3 closely mirrors both disease activity (BASDAI) and functional limitations (BASFI) in AS patients.

Correlation with Individual MDHAQ Components

Further analysis showed that each RAPID3 component was independently associated with both BASDAI and BASFI. Detailed correlation coefficients between MDHAQ components and the AS indices are shown in Table 2.

Notably, the function subscale had a stronger correlation with BASFI, as expected, whereas pain and fatigue were more closely associated with disease activity as captured by BASDAI.

Discussion

This study demonstrated a strong and statistically significant correlation between the MDHAQ-RAPID3, a patient-reported outcome measure derived from the MDHAQ, and two widely used AS assessment tools: BASDAI

and BASFI. These findings suggest that RAPID3 can be a valid and practical alternative for assessing disease activity and functional impairment in patients with AS, especially in routine clinical settings.

The mean MDHAQ-RAPID3 score in our study (13.27 ± 7.0) showed strong positive correlations with both BASDAI ($r=0.77$) and BASFI ($r=0.72$), indicating that patient perceptions of pain, physical function, and global health status captured solely through MDHAQ-RAPID3 closely mirror more detailed disease-specific indices. These results align with previous studies in rheumatoid arthritis, osteoarthritis, fibromyalgia, and Behçet's disease, where MDHAQ-RAPID3 has also demonstrated high correlation with disease-specific activity indices [20-22].

A notable finding is the strong relationship between fatigue, patient global assessment, and disease indices. Fatigue, often underemphasized in traditional scoring systems, showed moderate-to-strong correlations with both BASDAI ($r=0.62$) and BASFI ($r=0.53$), reflecting its impact on both disease activity and functional capacity. This observation is consistent with prior studies highlighting fatigue as a significant symptom burden in patients with AS [23,24].

From a clinical standpoint, MDHAQ-RAPID3's brevity and ease of use make it particularly advantageous in high-volume settings, where time constraints often limit the use of multi-step assessment tools like BASDAI and BASFI [25]. RAPID3 can be completed by the patient in less than one minute and does not require physician scoring, unlike BASMI or ASDAS-CRP, further increasing its feasibility for routine use [26]. While RAPID3 demonstrates strong correlation with BASDAI and BASFI, it lacks components specific to axial spondyloarthritis, such as spinal mobility and enthesitis evaluations. Moreover, it does not capture morning stiffness duration or peripheral joint involvement, which are clinically relevant in AS. Therefore, RAPID3 should be viewed as a complementary tool rather than a replacement for comprehensive disease activity assessments. Its value lies in providing rapid patient-centered insight, especially in follow-up visits and high-volume clinical settings.

However, RAPID3 is not AS-specific, and unlike BASDAI, it does not include parameters such as morning stiffness duration or peripheral joint involvement, which are clinically relevant in AS [27]. Therefore, while it can complement other tools, RAPID3 may not fully replace comprehensive disease activity assessments in all clinical scenarios, especially in patients with complex presentations.

Strengths and Limitations

A key strength of this study is the inclusion of a well-characterized AS cohort in a real-world outpatient setting, increasing the generalizability of findings. The use of validated tools and standardized data collection adds further credibility.

However, some limitations must be acknowledged. First, this was a cross-sectional study, so causal inferences cannot be made. Second, data were collected from a single center, and the population was predominantly young and male, which may not represent the broader AS population. Lastly, the study did not include objective imaging markers or inflammatory biomarkers such as MRI findings or ASDAS-CRP, which could have added more depth to the disease activity evaluation.

Conclusion

This study demonstrates that RAPID3, a brief and fully patient-reported index derived from the MDHAQ, shows a strong correlation with established ankylosing spondylitis assessment tools BASDAI and BASFI. These findings suggest that MDHAQ-RAPID3 can be a valid, time-efficient, and practical alternative for evaluating disease activity and functional status in patients with AS, particularly in routine clinical settings where rapid assessment is essential.

While MDHAQ-RAPID3 is not disease-specific and may not capture all clinical dimensions of AS, its ease of use and strong association with core disease domains make it a valuable adjunct to traditional instruments. Further multicenter and longitudinal studies are recommended to explore its responsiveness to treatment and applicability in diverse AS populations.

***This study was produced from a specialization thesis.**

Ethics Committee Approval: The study was approved by Haydarpaşa Training and Research Hospital Ethics Committee (No: 771/06/2025, Date: 29.10.2010).

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