Ankylosing Spondylitis Measures

The Ankylosing Spondylitis Quality of Life (ASQOL) Scale, Bath Ankylosing Spondylitis Disease Activity Index (BASDAI), Bath Ankylosing Spondylitis Functional Index (BASFI), Bath Ankylosing Spondylitis Global Score (BAS-G), Bath Ankylosing Spondylitis Metrology Index (BASMI), Dougados Functional Index (DFI), Health Assessment Questionnaire for the Spondyloarthropathies (HAQ-S), and Revised Leeds Disability Questionnaire (RLDQ)

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ANKYLosing SPONDYLITIS QUALITY OF LIFE (ASQOL)

General Description

Purpose. To assess the impact of ankylosing spondylitis (AS) on the quality of life of individuals living in the United Kingdom (UK) and the Netherlands (NL) with emphasis on the ability of the person to fulfill his or her needs.

Content. Consists of 18 items requesting a yes or no response to questions related to the impact of pain on sleep, mood, motivation, ability to cope, activities of daily living, independence, relationships, and social life.

Developer/contact information. Dr. L.C. Doward, Galen Research, Enterprise Research, Enterprise House, Manchester Science Park, Lloyd Street North, Manchester M15 6SE, UK. E-mail: lcd@galen.eng.net.

Versions. English, Dutch (1,2).

Number of items in scale. There are 18 items.

Subscales. None described.

Populations. Developmental/target. Patients with ankylosing spondylitis were recruited from 3 hospitals in northern England and from 3 in the southern NL. Subjects were interviewed in their own homes.

Other uses. None recommended by authors.

WHO ICF Components. Impairment, Activity limitation, Participation restriction.

Administration

Method. Self-report.

Training. None reported.

Time to administer/complete. Less than four minutes.

Equipment needed. Instrument and pencil.


Scoring

Responses. Scale. Dichotomous: yes or no (1 or 0). A score of 1 is given as a yes, indicating that AS has an adverse effect on QoL. All item scores are summed to a total score or index.

Score range. The range is 0–18.

Interpretation of scores. High scores indicate worse quality of life.

Method of scoring. Hand scored.

Time to score. Not indicated.

Training to score. None indicated.
Training to interpret. None indicated.

Norms available. None given.

Psychometric Information

Reliability. Internal consistency. Cronbach’s alpha = 0.91 at time 1 and 0.92 at time 2 in the UK, 0.89 at time 1 and 0.90 in the NL.

Test-retest reliability. Spearman rank correlation coefficient for the test-retest reliability of the 18 item ASQoL was r = 0.92 (n = 129 in UK) and r = 0.91 (n = 119 in NL). Intraclass correlation coefficients (ICCs) were 0.92 (UK) and 0.91 (NL).

Validity. Face and content validity. Derived from a series of interviews of patients with AS in both the UK and the NL.

Construct validity. ASQoL was compared with the responses on the Nottingham Health Profile (NHP) and the Bath Ankylosing Spondylitis Functional Index (BASFI) by subjects in the UK and the NL. The Leeds Disability Questionnaire (LDQ) was used for comparison in the UK and the Dougados Functional Index (DFI) was used in the NL. Spearman rank correlation coefficients were reported between the ASQoL and the NHP, BASFI, LDQ, and DFI as follows (reported coefficients are for UK time 1 and the NL time 1, respectively): NHP sections on physical mobility 0.78, 0.79; energy 0.74, 0.73; pain 0.81, 0.79; emotional reactions 0.72, 0.73; sleep 0.54, 0.59; social isolation 0.53, 0.50; BASFI 0.72, 0.75; LDQ 0.70 (UK only); DFI (NL only) 0.80.

Sensitivity/responsiveness to change. Authors recommended future studies to determine the ability of the ASQoL to detect meaningful changes in quality of life.

Comments and Critique

Doward et al (1) stated that the ASQoL is a valuable tool to assess the impact of interventions for AS on the quality of life dimensions of a person with AS. The instrument was first introduced in 1999 by Reynolds et al (2) and has subsequently undergone extensive psychometric analysis for use in both UK populations and in the NL.

References


Additional References


BATH ANKYLOSING SPONDYLITIS DISEASE ACTIVITY INDEX (BASDAI)

General Description

Purpose. To define disease activity and thus disease status in the person with ankylosing spondylitis.

Content. Consists of six 10-cm horizontal visual analog scales to measure severity of fatigue, spinal and peripheral joint pain, localized tenderness, and morning stiffness (both qualitative and quantitative).

Developer/contact information. Dr. Andrew Calin, Royal National Hospital for Rheumatic Diseases, Upper Borough Walls, Bath, BA1 1RL, UK.

Versions. English (1), French (2), Swedish (3), and Dutch (4).

Number of items in scale. There are 6 questions related to 5 major symptoms: fatigue, spinal pain, joint pain/swelling, areas of localized tenderness, morning stiffness.

Subscales. None were reported.


Other uses. None recommended by authors.

WHO ICF Components. Impairment.

Administration

Method. Self-report questionnaire.

Training. Minimal.
**Time to administer/complete.** Between 30 seconds and 2 minutes (mean: 67 seconds).

**Equipment needed.** Instrument, pencil.


**Scoring**

**Responses. Scale.** Ten centimeter visual analog scales. A score of 0 = none (no symptoms), and a score of 10 = very severe symptoms. A mean score is calculated across all 6 items.

**Score range.** The range is 0–10.

**Interpretation of scores.** No other cut-points were noted and no critical score points are provided. Scores varied, as reported, across the scale. Higher scores reflect greater disease activity.

**Method of scoring.** Hand-scored.

**Time to score.** Not stated.

**Training to score.** Minimal.

**Training to interpret.** Minimal.

**Norms available.** None reported.

**Psychometric Information**

**Reliability. Internal consistency.** Cronbach’s coefficient alpha was not reported.

**Test-retest.** Measured 24 hours apart (r = 0.93; P < 0.001). Reliability across the scale responses were reported to be good (mean score 4.31, SD 2.12), with mean score higher for inpatients (5.06) than outpatients (4.0) with P = 0.05.

**Score distributions.** Scores spread across at least 95% of scale. Score distribution (score range: 0.5–10; mean: 4.31). Intraclass correlations (ICCs) ranged between r = 0.34 (fatigue versus pain) and r = 0.66 (spinal pain versus localized tenderness; r = 0.79 between quality and quantity of morning stiffness.

**Validity. Content.** Validity based on clinical experience of a team of physiotherapists, research associates and rheumatologists with input from patients.

**Convergent.** Validity compared between the Bath DAI and the Newcastle Enthesis Index. BASDAI correlated well with the Bath DAI on the validity criteria of time, reproducibility, score distribution, sensitivity, and percentage improvement.

**Sensitivity/responsiveness to change.** BASDAI reflected sensitivity to change when compared with the DAI (mean inpatient scores improving from 5.34 on day 0 to 4.12 by day 18.) Scores on BASDAI reflected 16% improvement in inpatient scores after 3 weeks of treatment. There was no significant partiality among patients for either the Bath DAI or BASDAI in terms of questionnaire preference. Although the DAI showed greater change over 3 weeks of treatment than did the BASDAI (22.8% versus 16.4% score improvement; NS), the authors commented this may be due to a bias of Bath DAI towards pain and its inclusion of a scale measuring the patient’s well-being.

**Comments and Critique**

The authors report the BASDAI to be superior to the Newcastle Enthesis Index due to the limitation of content, insufficient reliability, score range and sensitivity to change of the Newcastle Enthesis Index. The Newcastle Index requires a trained clinician or physiotherapist to perform the assessment. The earlier Bath DAI is not as comprehensive as the BASDAI. The Bath DAI omitted reference to fatigue, quality of morning stiffness, and localized tenderness. The authors consider the five components of the BASDAI to be vital to viewing a comprehensive picture of the disease activity of the patient.

**References**

### Additional References


### BATH ANKYLOSING SPONDYLITIS FUNCTIONAL INDEX (BASFI)

#### General Description

**Purpose.** To define and monitor functional ability in persons with ankylosing spondylitis.

**Content.** Items ask the respondents about their perception of their functional ability and how well they are able to function in everyday life.

**Developer/contact information.** Dr. Andrew Calin, Royal National Hospital for Rheumatic Diseases, Upper Borough Walls, Bath, BA1 1RL, UK.

**Versions.** English (1), Dutch (2), and Swedish (3).

**Number of items in scale.** There are 10 items.

**Subscales.** None described.

**Populations.** Developmental/target. Persons with ankylosing spondylitis.

**Other uses.** None recommended by authors.

**WHO ICF Components.** Activity limitation, Participation restriction.

#### Administration

**Method.** Self-report questionnaire.

**Training.** Minimal.

**Time to administer/complete.** According to the authors, 100 seconds maximum.

**Equipment needed.** Instrument and pencil.


#### Scoring

**Responses.** Scale. 10-cm visual analog scale.

**Score range.** Range is 0 (easy) to 10 (impossible).

**Interpretation of scores.** The mean of the 10 scales gives the BASFI score (0–10). A score of 0 indicates the activity was easy and a score of 10 indicates the activity was impossible for the person to accomplish. No critical score points were given.

**Method of scoring.** Scored by hand. Subject marks a line on the 10-cm scale between 0 and 10.

**Time to score.** Not indicated.

**Training to score.** None indicated.

**Training to interpret.** None indicated.

**Norms available.** None given.

#### Psychometric Information

**Reliability.** Test-retest reliability. Scores taken 24 hours apart at the same time of day (r = 0.89, P < 0.001).

**Interobserver reliability.** Twenty patients were observed performing 8 different tasks by 2 physiotherapists whom scored both the BASFI and the Dougados Functional Index. Comparison of patient and observer scores on the BASFI resulted in r = 0.87–0.89, P < 0.001. Interobserver consistency on the Dougados Functional Index was r = 0.90, P < 0.001.

**Internal consistency.** Cronbach’s alpha was not reported.

**Validity.** Content. Completed by a panel of experts composed of rheumatologists, physiotherapists, research associates, and persons with ankylosing spondylitis.

**Convergent.** Compared with Dougados Functional Index, distribution of scores among 149 patients: BASFI (mean score = 4.03; 95% of scale used); Dougados Functional Index (mean score 2.85; 65% of scale used).

**Sensitivity/responsiveness to change.** There was 20% (P = 0.004) improvement in function over 3 weeks versus 6% (P = 0.03) improvement.
demonstrated by the Dougados functional index during the physiotherapy treatment over the same 3-week period.

Comments and Critique

The BASFI satisfies the criteria for the design of a functional index. It is quick and easy to complete, is reliable and is sensitive to change across the spectrum of the disease. The BASFI has higher sensitivity to change in functional ability of the patient than does the Dougados Functional Index. Eyres et al (4) compared the BASFI with the Revised Leeds Disability Questionnaire (RLDQ) and noted that, while both instruments provide a measure of functional ability in AS, the RLDQ shows a floor effect, and the BASFI exhibits a ceiling effect. They recommend the BASFI may be improved by using a numeric rating scale for the response options.

References


BATH ANKYLOSING SPONDYLITIS GLOBAL SCORE (BAS-G)

General Description

Purpose. To make a global assessment of the well-being of the person with ankylosing spondylitis over a given period of time (1).

Content. Questions asking the patient to mark on a visual analog scale of 10 cm the effect of AS on their well-being over the last week/6 months.

Developer/contact information. Dr. Andrew Calin, Royal National Hospital for Rheumatic Diseases, Upper Borough Walls, Bath, BA1 1RL, UK.

Versions. English.

Number of items in scale. Two.

Subscales. None described.

Populations. Developmental/target. Original population was 329 patients with ankylosing spondylitis.

Other uses. None recommended by authors.

WHO ICF Components. Participation restriction, Environmental factor.

Administration

Method. Self-report on a 10-cm visual analog scale.

Training. None indicated.
Time to administer/complete. Less than 60 seconds.

Equipment needed. Instrument and pencil.


Scoring

Responses. Scale. 10-cm visual analog scale.

Score range. The range is 0 (none) to 10 (very severe effect).

Interpretation of scores. No established cut points reported other than those characteristic of a 0 to 10 visual analog scale. Higher scores reflect more severe effect.

Method of scoring. Hand score.

Time to score. Not indicated.

Training to score. None indicated.

Training to interpret. None indicated.

Norms available. None indicated.

Psychometric Information

Reliability. Internal consistency. Not reported.

Test-retest. The 24-hour test-retest reliability is considered by the authors to be excellent (1 week \( r = 0.84 \), 6 months \( r = 0.93 \)).

Validity construct. BAS-G correlated more strongly with BASDAI (\( r = 0.73 \)) and BASFI (\( r = 0.30-0.59 \)) than with the BASMI (\( r = -0.16 \)) or sex (\( r = 0.09 \)).

Sensitivity/responsiveness to change. Satisfactory sensitivity to change: improvement over 2 weeks in pre/post global scores (pre-course minus post-course, mean difference = 1.54, SE 0.31, \( P = 0.001 \)). There was a 29% improvement in 1 week scores and 6% improvement in 6 months scores.

Comments and Critique

The BAS-G is a quick, quantifiable, and valid way to determine the patient’s perspective of the effects of AS on their well-being. The BAS-G correlates well with other measures the authors have used to assess AS, namely the BASDAI and the BASFI. They readily admit that the sample upon which they tested their instrument may represent a sample bias since they were hospital based and members of a self-help group. The psychological status of the patients involved in this research was not defined. The authors also suggest that the BAS-G might be used to assess other chronic or rheumatic diseases.

Reference


Additional References


BATH ANKYLOSING SPONDYLITIS METROLOGY INDEX (BASMI)

General Description

Purpose. To assess the axial status (cervical, dorsal and lumbar spine, hips, and pelvic soft tissue) of individuals with ankylosing spondylitis and derive a metrology index to define clinically significant changes in spinal movement (1).

Content. Five clinical measures used to assess the status of the axial skeleton including cervical rotation, tragus to wall distance, lumbar side flexion, lumbar flexion, and intermalleolar distance.

Developer/contact information. Dr. Andrew Calin, Royal National Hospital for Rheumatic
Diseases, Upper Borough Walls, Bath, BA1 1RL, UK.

**Versions.** English (2) and Finnish (3). No alternate forms or cross-cultural adaptations were reported.

**Number of items in scale.** Five.

**Subscales.** None described.


**Other uses.** None recommended by authors.

**WHO ICF Components.** Impairment.

**Administration**

**Method.** Clinical examination by trained health provider.

**Training.** Physical therapists, rheumatologists, or research associates with an interest in ankylosing spondylitis and are trained to complete the clinical exam.

**Time to administer/complete.** 7 minutes.

**Equipment needed.** Gravity action goniometer, tape measure, ruler mounted on a floor stand.


**Scoring**

**Responses.** Scale. Tragus to wall (centimeter tape measure); lumbar flexion (centimeter tape measure); cervical rotation (degrees of motion); lumbar side flexion (centimeter tape measure); intermalleolar distance (centimeter tape measure).

**Score range.** The range is 0–10. Tragus to wall (<10 cm–≥38 cm); lumbar flexion (≥7.0 cm–≤0.7 cm); cervical rotation (≥85.0°–≤8.5°); lumbar side flexion (≥20.0 cm–≤1.2 cm); intermalleolar distance (≥120 cm–≤30 cm).

**Interpretation of scores.** The authors report established cut points on the 0–10 scale. Measurements derived from the clinical exam and refer to BASMI to calculate a score (0–10) for the 5 measures. Add these together, and divide by 5 to obtain BASMI. The range of severity 0–10 reflects mild to severe disease activity and functional ability in the spinal column (axial status).

**Method of scoring.** Hand scored.

**Time to score.** 7 minutes.

**Training to score.** Minimal for rheumatologists and physical therapists.

**Training to interpret.** Minimal.

**Norms available.** Yes. Ankylosing spondylitis.

**Psychometric Information**

**Reliability.** Interobserver variation and reliability. Between 3 physiotherapists for cervical rotation (r = 0.98, P < 0.001); tragus to wall (r = 0.99, P < 0.001); lumbar side flexion (r = 0.94, P < 0.001); modified Schober (r = 0.99, P < 0.001); and intermalleolar distance (r = 0.98, P < 0.001).

**Intraobserver variation and reliability.** Measures taken by each of 3 physiotherapists on consecutive days at about the same time of day were assessed for intraobserver reliability for cervical rotation (r = 0.99, P < 0.001); tragus to wall (r = 0.99, P < 0.001); lumbar side flexion (r = 0.98, P < 0.001); modified Schober (r = 0.99, P < 0.001); and intermalleolar distance (r = 0.99, P < 0.001).

**Validity.** Content validity. Determined by a research team of rheumatologist, physiotherapists, and research associates with a specialist interest in ankylosing spondylitis.

**Criterion validity.** Comparison between BASMI (5 measures) and total scores of 20 clinical measurements (total metrology score): r = 0.92, P < 0.001.

**Sensitivity/responsiveness to change.** Authors reported a 30% improvement in BASMI scores over a 3-week period of treatment of 56 patients.

**Comments and Critique**

The BASMI gives reliable data regarding the disease status in ankylosing spondylitis. It is quick to complete, valid, reliable, reproducible and sensitive to change across the disease spectrum. Subsequent to the authors’ original scoring system on the BASMI, they have improved the scoring system to enhance the instruments’ usefulness (4). Further studies have been completed to compare
the relationship between the BASMI and radiological findings (5).

References

DOUGADOS FUNCTIONAL INDEX (DFI)
General Description

Purpose. To assess the functional abilities of persons with ankylosing spondylitis (1).

Content. There are 20 questions asking patients to report how well they are able to accomplish various activities of daily living (ADLs). Can you put on your shoes, pull on trousers, pull on pullover, get in bath tub, remain standing for 10 minutes, climb 1 flight of stairs, run, sit down, get up from a chair, get into a car, bend over to pick up an object, crouch, lie down, turn in bed, get out of bed, sleep on your back, sleep on your stomach, do your job or housework, cough or sneeze, breathe deeply?

Developer/contact information. Dr. Maxim Dougados, Rheumatology Clinic, Hôpital Cochin, 27 rue du Faubourg Saint Jacques, 75674 Paris Cedex 14, France.

Versions. French, English. Widely used in clinical trials. No alternate forms or cross-cultural adaptations were reported.

Number of items in scale. There are 20 items.

Subscales. None described.


Other uses. Used but not validated for assessing persons with psoriatic arthritis and Reiter’s Syndrome.

WHO ICF Components. Impairment, Activity limitation, Participation restriction.

Administration

Method. Self-report questionnaire.

Training. None indicated.

Time to administer/comlete. Two minutes.

Equipment needed. Instrument and pencil.


Scoring

Responses. Scale. The scale is 0 = yes, with no difficulty; 1 = yes, but with difficulty; 2 = impossible to do. Item scores (0, 1, 2) are added to give a total score of dysfunction.

Score range. Range is 0–40.

Interpretation of scores. No critical score points given. The higher overall scores reflect greater functional limitation.

Method of scoring. Hand scored.

Time to score. Not indicated; minimal.

Training to score. Not indicated; minimal.

Training to interpret. Not indicated; minimal.

Norms available. None indicated.

Psychometric Information

Reliability. Interobserver reliability. Two observers (rheumatologists) evaluated the same patients at the same time on the functional index, articular index, Schober’s test, hand-ground distance, chest expansion, and morning stiffness. The intraclass correlations between the 2 observers was r = 0.9944 (intraclass correlations) on the functional index. No statistically significant difference between the observers was reported.

Intraobserver reliability. The same observer (rheumatologist) evaluated the same patients 1
week apart on the functional index, articular index, Schober’s test, hand-ground distance, chest expansion, morning stiffness. These variables were measured using intraclass correlations. The ICC for the functional index was $r = 0.8616$.

**Validity. Content validity.** Achieved by 3 rheumatologists suggesting items for the self-report functional index using the same procedures established for the Lee functional index (2).

**Criterion validity.** The functional index was compared to clinical measures of articular index, morning stiffness, number of nocturnal awakenings, chest expansion, Schober’s test, hand-ground distance, self physiotherapy, and pain in a cross-sectional sample. Stepwise multiple regression revealed an overall correlation coefficient between the independent variables (see above list) and functional index (dependent variable) as $R^2 = 0.41$. Spearman correlations between the assessment of the investigating clinician and the functional index reached $P = 0.0001$.

**Sensitivity/responsiveness to change.** Low sensitivity to changes in scores has been reported in clinical trials (3).

**Comments and Critique**

The DFI was one of the first-generation functional indices created to evaluate the ability of persons with ankylosing spondylitis. It does not require a great amount of time to complete, and has a high degree of validity and reliability. However, the range of scores (0–2) is so narrow it does not allow for the patient to qualify how they accomplish a task or whether they use assistive devices to help them accomplish their ADLs. These weaknesses tend to restrict the sensitivity of the instrument. The scoring system only allows 3 choices on the part of the patient and makes the index relatively insensitive to changes in functional ability.

**References**


**Additional Reference**


**HEALTH ASSESSMENT QUESTIONNAIRE FOR THE SPONDYLOARTHRITOPATHIES (HAQ-S)**

**General Description**

**Purpose.** To assess the physical functional status of the person with ankylosing spondylitis.

**Content.** A functional status measure for patients with ankylosing spondylitis using items from the Disability Index of the Health Assessment Questionnaire (HAQ) (1,2) with an additional 5 questions specific to those persons with spondylitis. Functional items from the HAQ address dressing, arising, eating, walking, hygiene, reaching, gripping, and errands and chores. Scales added to the HAQ-S ask about driving a car in reverse, using the rear view mirror in the car, carrying a full grocery bag, sitting for long periods, and working at a desk.

**Developer/contact information.** Dr. L.H. Daltroy, Robert Breck Brigham Multipurpose Arthritis Center, Brigham and Women’s Hospital, 75 Francis Street, Boston, MA 02115.

**Versions.** English, Dutch (3,4), Finnish (5), and Spanish (6).

**Number of items in scale.** There are 20 items on HAQ Disability Index, 5 items added regarding ankylosing spondylitis.

**Subscales.** There are 8 in Health Assessment Questionnaire, 2 specific to ankylosing spondylitis were added.

**Populations. Developmental/target.** Persons with ankylosing spondylitis. Used to assess psoriatic arthritis (6,7).

**Other uses.** None recommended by Daltroy et al (1).

**WHO ICF Components.** Impairment, Activity limitation, Participation restriction, Environmental factor.
Administration

Method. Self-report questionnaire.

Training. None indicated.

Time to administer/complete. Not stated.

Equipment needed. Instrument and pencil.


Scoring

Responses. Scale. Scale is 0–3.

Score range. The range is 0–3. 0 = able to do with no difficulty, 1 = able to do with some difficulty, 2 = able to do with much difficulty, 3 = unable to do.

Interpretation of scores. Higher scores reflect worse function.

Method of scoring. Hand scored. Scores marked by the respondent are added for each of the 10 subscales and a mean score is derived from the total scores (possible range 0–3.0). The mean score represents the HAQ-S score.

Time to score. Not stated.

Training to score. None indicated.

Training to interpret. None indicated.

Norms available. None stated.

Psychometric Information

Reliability. Test-retest reliability. Correlations between scores on the anthropometric data of measures taken at Time 1 and Time 3 using the Pearson’s product moment was reported as r = 0.92.

Validity. Content validity. Daltroy et al (1) stated face validity was achieved for the original HAQ from the responses of 300 British patients with AS who identified the activities of daily living that were troublesome some for them. The 5 additional activities were added based upon the clinical experience of the investigators.

Criterion validity. Correlations were reported between the HAQ-S and flexibility measures of chest expansion, finger to floor, neck rotation, and Smythe’s test. The HAQ-S (global score) was not highly correlated with these measures except for neck rotation.

Construct validity. HAQ and HAQ-S (r = 0.98). Ward et al has reported construct validity between HAQ-S, Dougados Functional Index, HAQ, and Arthritis Impact Measurement Scales-2 (8). The HAQ-S demonstrated higher construct validity than the Functional Index, but performed similarly to the HAQ. Ward et al reported the HAQ-S to be significantly more valid than the Dougados Functional index (8).

Sensitivity/responsiveness to change. Daltroy et al reported that the addition of the 2 subscales to the HAQ identified more functional problems in persons with spondylitis than the HAQ alone (1). Ward and Kuzis (8) reported the HAQ-S to be similar to the HAQ in sensitivity. Heikkila et al (9) reported the HAQ-S to be relatively insensitive compared with the Bath Ankylosing Spondylitis Functional Index (BASFI).

Comments and Critique

The addition of 2 subscales to the Health Assessment Questionnaire (2) was intended to identify functional concerns specific to persons with AS more readily than did the HAQ alone. Subsequent authors have addressed the issues related to sensitivity to change and usefulness compared to other instruments (3–10).

References

REVISED LEEDS DISABILITY QUESTIONNAIRE (RLDQ)

General Description

**Purpose.** To assess disability in the person with ankylosing spondylitis.

**Content.** Consists of 4 categories of questions: mobility (getting into and out of the bath, getting into and out of the car, getting up and out of bed in the morning, rolling over in bed), bending down (wiping yourself after using the toilet, putting on and taking off your socks, putting on and taking off your shoes and tying your shoe laces, cutting your toenails), neck movements (opening high windows, looking both ways before crossing the road [e.g., do you have to move your feet], looking at what you are reaching on a high shelf, drinking from a small glass or can [e.g., do you have to bend your knees?]), and posture (walk on your heels, coughing or sneezing, sleep on your back, sleep on your stomach.)

**Developer/contact information.** P. S. Helliwell, Rheumatology and Rehabilitation Research Unit, University of Leeds, 36 Clarendon Road, Leeds LS2 9NZ, UK.

**Versions.** English (1) and Swedish (2).

**Number of items in scale.** Four categories (mobility, bending down, neck movements, posture) with 4 questions in each category (n = 16 questions).

**Subscales.** None described.

**Populations.** Developmental/target. Persons with ankylosing spondylitis.

**Other uses.** None recommended by authors.

**WHO ICF Components.** Impairment, Activity limitation.

**Administration**

**Method.** Self-report.

**Training.** Minimal.

**Time to administer/completion.** Not reported.

**Equipment needed.** Instrument and pencil.


**Scoring**

**Responses. Scale.** The scale is 0–3.

**Score range.** The range is 0 = able to do without difficulty, 1 = able to do with difficulty, 2 = only able to do using unusual movements or gadgets, and 3 = unable to do.

**Interpretation of scores.** Respondents are asked to indicate their level of ability within the previous 4 weeks. Each individual item is scored 0–3 and within each section the highest score is recorded. Section scores are added, and the total score is divided by the number of sections answered, giving an overall score between 0 and 3. Higher scores reflect greater disability.

**Method of scoring.** Hand scored.

**Time to score.** Not indicated.

**Training to score.** None indicated.

**Training to interpret.** None indicated.

**Norms available.** None given.

**Psychometric Information**

**Reliability.** Test-retest reliability. Nine inpatients completed the questionnaire on 2 occasions within 5 days apart (intraclass correlation coefficient [ICC] 0.977; 95% confidence interval [95% CI] 0.867–0.986) and 18 outpatients completing the questionnaire 24 hours apart (ICC 0.924; 95% CI 0.883–0.95).

**Internal consistency.** Cronbach’s alpha for entire questionnaire = 0.93; for individual categories as follows: mobility (0.83), bending down (0.88),...
reaching up and neck movements (0.90), and posture (0.62).


Construct validity. Authors reported correlations (Spearman) between two groups of patients divided according their functional scores (Group 1 from 0 to 1.25) and Group 2 from 1.26 to 3.00). Age, duration of disease and anthropometric variables were compared with the functional scores of the two groups. The mean functional score for those regarded as having mild disease was 1.09 (0.77) at baseline and for those with moderate disease at baseline was 1.51 (0.76) and were not statistically significantly different ($P = 0.11$) The authors’ description of construct validity is somewhat vague. They state that they completed Spearman’s correlations between the functional scores on the initial questionnaire and the anthropometric measures on 42 subjects. The resulting correlations reported were low. Further analysis of the data prompted Abbott et al (1) to recommend a revised version of the initial questionnaire (renamed to become the Revised Leeds Disability Questionnaire [RDLQ]).

External validity. Abbott et al reported that 17 patients were observed and compared with their responses on the questionnaire (1). The ICC was 0.963 (95% CI 0.939–0.987).

Sensitivity/responsiveness to change. Abbott et al (1) reported that the instrument is sensitive to change in response to physical treatments. They suggested that for a study to detect a 15% change in functional score the sample size required per group would be 10 patients, assuming alpha = 0.05 and beta = 0.2.

Comments and Critique

Abbott et al (1) recommended all 4 categories of response by patients with AS be used and that the scoring method is compatible with other scales of disability in common use. Eyres et al (6) reported the results of their comparison of the psychometric properties of the LDQ and the Bath Ankylosing Spondylitis Functional Index (BASFI) in a cohort of 208 persons with AS. Both instruments gave an even spread of scores across the study group; however, they reported that the LDQ responses were negatively skewed and the BASFI responses were positively skewed. There was a statistically significant difference between perceived severity groups for both instruments (Kruskal-Wallis chi-square: LDQ 75.1; BASFI 80.4, $P < 0.0001$). Both instruments had acceptable test-retest scores (LDQ ICC 0.95, 95% CI 0.93–0.97; BASFI ICC 0.94, 95% CI 0.92–0.96). The BASFI has more items displaying differential item functioning. Both instruments displayed disordered item thresholds and the authors stated that neither instrument should be used as an interval measure. Their conclusion was that both the BASFI and the LDQ provide a unidimensional measure of function in AS that is in accord with the patient’s perception of disease severity. They suggest that changing the way the instruments are scored may improve their performance. Eyres et al (6) compared the BASFI with the Revised Leeds Disability Questionnaire (RLDQ) and noted that, while both instruments provide a measure of functional ability in AS, the RLDQ shows a floor effect, and the BASFI exhibits a ceiling effect.

References


Additional References

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<tr>
<th>Measure/scale</th>
<th>Content/purpose</th>
<th>Response format</th>
<th>Method of administration</th>
<th>Time for administration</th>
<th>Responses</th>
<th>Method of scoring</th>
<th>Sensitivity/responsive to change</th>
<th>Psychometric properties</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ankylosing Spondylitis Quality of Life (ASQoL)</strong></td>
<td>Quality of life measure for AS</td>
<td>Yes (1) or no (0) ordinal scale</td>
<td>Patient self-report</td>
<td>&lt;4 minutes</td>
<td>Yes = quality of life adversely impacted&lt;br&gt;No = quality of life not impacted (none or no symptoms)–10 (very severe symptoms)</td>
<td>Hand score</td>
<td>Future studies needed</td>
<td>Face and content, construct validity, Internal Consistency, Test-Retest</td>
</tr>
<tr>
<td><strong>Bath Ankylosing Spondylitis Disease Activity Index (BASDAI)</strong></td>
<td>Disease severity measure for AS</td>
<td>Visual analog scale 0–10</td>
<td>Patient self-report</td>
<td>30 seconds to 2 minutes</td>
<td>0 (none or no symptoms)–10 (very severe symptoms)</td>
<td>Hand score</td>
<td>High</td>
<td>Face and content validity</td>
</tr>
<tr>
<td><strong>Bath Ankylosing Spondylitis Functional Index (BASFI)</strong></td>
<td>Functional ability and coping skills in AS</td>
<td>Visual analog scale 0–10</td>
<td>Patient self-report</td>
<td>100 seconds maximum</td>
<td>0 (easy)–10 (impossible)</td>
<td>Hand score</td>
<td>High</td>
<td>Criterion validity</td>
</tr>
<tr>
<td><strong>Bath Ankylosing Spondylitis Global Score (BAS-G)</strong></td>
<td>Effect of AS on well being of patient</td>
<td>Visual analog scale 0–10</td>
<td>Patient self-report</td>
<td>&lt;60 seconds</td>
<td>0 (no effect)–10 (very severe effect)</td>
<td>Hand score</td>
<td>High</td>
<td>Criterion validity</td>
</tr>
<tr>
<td><strong>Bath Ankylosing Spondylitis Metrology Index (BASMI)</strong></td>
<td>Assess axial spine status in AS</td>
<td>Clinical exam</td>
<td>Clinical exam</td>
<td>7 minutes</td>
<td>0 (mild disease involvement) 10 (severe disease involvement)</td>
<td>Hand score</td>
<td>High</td>
<td>Construct, predictive validity</td>
</tr>
<tr>
<td><strong>Dougados Functional Index (DFI)</strong></td>
<td>Functional status measure for AS</td>
<td>0–2 scale</td>
<td>Patient self-report</td>
<td>2 minutes</td>
<td>0 (yes, with no difficulty) 1 (yes, but with difficulty) 2 (impossible to do)</td>
<td>Hand score</td>
<td>Low sensitivity to change</td>
<td>Content validity, Interobserver, intraobserver</td>
</tr>
<tr>
<td><strong>Health Assessment Questionnaire for spondyloarthropathies (HAQ-S)</strong></td>
<td>Functional status measure for AS</td>
<td>0–3 scale</td>
<td>Patient self-report</td>
<td>Not stated</td>
<td>0 (able to do with no difficulty) 1 (able to do with some difficulty) 2 (able to do with much difficulty)</td>
<td>Hand score</td>
<td>Similar to HAQ</td>
<td>Criterion, construct validity</td>
</tr>
<tr>
<td><strong>Revised Leeds Disability Questionnaire RLDQ</strong></td>
<td>Functional status measure for AS</td>
<td>0–3 scale</td>
<td>Patient self-report</td>
<td>Not stated</td>
<td>3 (unable to do) 0 (yes, with no difficulty) 1 (yes, but with difficulty) 2 (only able to do using unusual movements or gadgets) 3 (unable to do)</td>
<td>Hand score</td>
<td>Moderate sensitivity to change</td>
<td>Content validity, construct validity, external validity</td>
</tr>
</tbody>
</table>