Check for updates

Arthritis Care & Research
Vol. 72, No. S10, October 2020, pp 369–409
DOI 10.1002/acr.24246
© 2020, American College of Rheumatology
This is an open access article under the terms of the Creative Commons Attribution-NonCommercial License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.

American College of Rheumatology
Empowering Rheumatology Professionals

Measures of Fatigue in Patients With Rheumatic Diseases: A Critical Review

Claudia Elera-Fitzcarrald,[1] Judith Rocha,[2] Paula I. Burgos,[2] Manuel F. Ugarte-Gil,[1] Michelle Petri,[3] and Graciela S. Alarcón[4]

INTRODUCTION

Fatigue is a common symptom, with reported prevalence in the population ranging from 7% to approximately 45% (1–5). For example, evidence regarding fatigue prevalence among the US adult population dates back to the 1970s and early 1990s (2,6); a US survey in 1974 showed that 14.3% of men and 20.4% of women reported suffering from frequent fatigue (2), and another study found that 12% of men and 22% of women were considered to have lack of energy (6).

The prevalence of fatigue in rheumatic diseases varies significantly. For example, in rheumatoid arthritis (RA), its frequency depends primarily on the criteria used to define it. However, clinically relevant fatigue is reported to occur in 40% to 80% of patients with rheumatic diseases (7–9), with 40% experiencing persistent severe fatigue (10). Around one-third of patients with ankylosing spondylitis (AS) experience severe fatigue (11), with an overall prevalence of 53% to 76% (11–13). In osteoarthritis (OA), the prevalence of fatigue varies between 41% (9) and 56%, with 10% of patients experiencing severe fatigue (14).

Fatigue has been described as difficulty in initiating or sustaining voluntary activities (15,16). It is influenced by several factors, including age, sex, physical condition, food intake type, time elapsing between meals, mental status, psychological conditions, personality type, life experience, and health status (17). Fatigue differs depending on whether the individual is healthy or not (18,19). In healthy individuals, fatigue is a predictable and transient physiologic reaction to prolonged intense activity that abates significantly with rest (19). In contrast, individuals with diseases describe fatigue as an overwhelming sense of tiredness at rest, exhaustion with activity, and lack of energy that precludes them from performing their daily tasks (18).

Fatigue is common in many rheumatic conditions (20–22). Because it is a subjective clinical manifestation, fatigue can only be evaluated using patient-reported outcome measures (PROMs); many measures of fatigue have been used in rheumatology populations (23). The Outcome Measures in Rheumatology consortium (24) endorsed the measurement of fatigue in clinical observational, longitudinal studies (25) and clinical trials, mainly in patients with RA and patients with fibromyalgia syndrome (FMS) (25,26).

Different fatigue measures address different aspects of fatigue. For example, as a screening tool, multi-item PROMs can explore broader fatigue issues to create a global score or multidimensional PROMs can produce subscale scores for a range of different facets or domains of fatigue (eg, cognitive and physical fatigue). Multidimensional PROMs with subscales may be useful for informing or evaluating interventions or exploring fatigue causality. Some fatigue PROMs relate to severity only, whereas others include items of both severity and impact (23).

Surprisingly, studies of fatigue in inflammatory rheumatological conditions largely fail to show a correlation with measures of inflammation or disease activity. Studies evaluating the relationship of fatigue PROMs with inflammatory markers have found weak associations (8,27). Very strong associations (eg, more than 0.75) might be expected when examining criterion validity with other fatigue scales (21,22). Additionally, reliability of fatigue PROMs can be problematic to evaluate because of the fluctuating and unpredictable nature of fatigue itself (23).

The characteristics of an ideal fatigue assessment instrument include being easy to understand and complete, causing minimal burden to users, and being able to discriminate cases from noncases with acceptable levels of sensitivity and specificity. Additionally, it should provide a full description of severity and impact, with the ability to act as an outcome measure sensitive to change regarding disease progression and/or treatment. Moreover, it should be reliable, have good reproducibility, and be stable among raters and over time. It must have a stable structure measuring

[1]Claudia Elera-Fitzcarrald, MD, Manuel F. Ugarte-Gil, MD, MSc: Hospital Guillermo Almenara Irigoyen and Universidad Científica del Sur, Lima, Peru; [2]Judith Rocha, MD, Paula I. Burgos, MD: Pontificia Universidad Católica de Chile, Santiago, Chile; [3]Michelle Petri, MD, MPH: Johns Hopkins University School of Medicine, Baltimore, Maryland; [4]Graciela S. Alarcón, MD, MPH: University of Alabama at Birmingham, and Universidad Peruana Cayetano Heredia, Lima, Peru.

Drs. Elera-Fitzcarrald and Rocha contributed equally to this work.

No potential conflicts of interest relevant to this article were reported.

Address correspondence to Graciela S. Alarcón, MD, MPH, The University of Alabama at Birmingham, 830 Faculty Office Tower, 510 20th Street South, Birmingham, AL 35294-3408. E-mail: galarcon@uab.edu.

Submitted for publication January 30, 2020; accepted in revised form April 28, 2020.

and reasonable correlation to similar valid tools, and be able to discriminate between different patient groups and symptoms and to capture changes in symptoms over time (28).

The importance and relevance of fatigue as an outcome measure has been established. Improved standardized assessments of fatigue and comprehensive studies across a range of rheumatic diseases are needed. We will now describe the different instruments used to assess fatigue in patients with rheumatic diseases; for simplicity, we are listing them alphabetically. They are as follows: the Bristol Rheumatoid Arthritis Fatigue (BRAF) Multidimensional Questionnaire (MDQ), the BRAF Numeric Rating Scale (NRS), the Chalder Fatigue Questionnaire (CFQ), the Checklist Individual Strength fatigue (CIS-fatigue), the Fatigue Assessment Scale (FAS), the fatigue NRS, the Fatigue Severity Inventory (FSI), the Fatigue Severity Scale (FSS), the Fatigue Visual Analog Scale (VAS), the Functional Assessment of Chronic Illness Therapy Fatigue (FACIT-F), the Multidimensional Assessment of Fatigue (MAF), the Multidimensional Fatigue Inventory (MFI), the Multidimensional Fatigue Symptom Inventory (MFSI) Short Form (SF), the Patient-Reported Outcomes Measurement Information System (PROMIS) Fatigue scales, the Piper Fatigue Self-Report Scale (PFS), the Profile of Fatigue and Discomfort (PROFAD), the Profile of Mood States subscale fatigue (POMS), the Rheumatoid Arthritis Impact of Disease Fatigue (RAID-F), and the SF-36 Vitality (VT). The most important features of these measuring tools are summarized in Tables 1 and 2.

BRISTOL RHEUMATOID ARTHRITIS FATIGUE MULTIDIMENSIONAL QUESTIONNAIRE

Description

Purpose. The BRAF-MDQ was developed to evaluate the overall experience and impact of fatigue in 229 patients with RA in its different dimensions. It was published in 2010 (29,30).

Content or domains. The BRAF-MDQ covers domains of physical fatigue (eg, average fatigue level in the last 7 days), living with fatigue (eg, has fatigue made it difficult to bathe or shower?), cognitive fatigue (eg, has fatigue made it difficult to concentrate?), and emotional fatigue (eg, has being fatigued bothered you?).

Number of items. Twenty items provide a total fatigue score, which includes four subscale scores for physical fatigue (four items), living with fatigue (seven items), cognitive fatigue (five items), and emotional fatigue (four items).

Response options/scale. There are four options (not at all, a little, quite a lot, and a lot), except in the first three elements, which are numerical or categorical as appropriate.

Recall period for items. The preceding week.

Cost to use. The BRAF-MDQ is free to use.

How to obtain it. Available at the following website: https://www1.uwe.ac.uk/hls/research/healthandclinicalresearch/researchareas/complexandlong-termhealthca/fatiguescales/brafscales.aspx.

Practical application

Method of administration. The BRAF-MDQ is a patient self-report completed with pen and paper.

Scoring. Items are scored from 0 to 3, except for items 1 (scored 0-10), two (scored 0-7), and 3 (scored 0-2). A total fatigue score is obtained by adding the scores for the 20 items. The elements of the subscales are added together to produce scores for physical fatigue, living with fatigue, cognitive fatigue, and emotional fatigue. The instructions for the missing data indicate that only three questions in total can be omitted, questions 1 and 2 must be completed, and only one question from each subscale can be omitted (it is replaced with the patient's average score for that subscale). The instructions and scoring template can be downloaded from the developers' website.

Score interpretation. Higher scores reflect greater fatigue severity. The total fatigue score ranges from 0 to 70; subscale scores range from 0 to 22 for physical fatigue, 0 to 21 for living with fatigue, 0 to 15 for cognitive fatigue, and 0 to 12 for emotional fatigue.

Respondent time to complete. The time to complete has not been reported.

Administrative burden. The time to grade has not been reported.

Translations/adaptations. The BRAF-MDQ has been translated using the appropriate linguistic methodology of direct translation, independent reverse translation by several native speakers, consolidation, and then independent reverse translation to consolidate the final version (information available from the developers). Versions in English (United Kingdom, South Africa, United States, Canada, and Australia), Polish, French (Belgium, Switzerland, and Canada), Afrikaan (South Africa), Swedish, Dutch (Belgium), Spanish (United States, Spain, Mexico, and Colombia), German, Portuguese (Portugal and Brazil), Japanese, South Korean, Turkish, Russian, Romanian, Bulgarian, Norwegian, Hungarian, Danish, Czech, Greek, Italian, and Chinese (Taiwan) can be downloaded from the developers' website.

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Psychometric information

Floor and ceiling effects. Floor effects and ceiling effects are unlikely to be significant. In the 229 patients with RA studied, less than 1% obtained the maximum possible score for total fatigue, 2.7% obtained the maximum score for cognitive and living with fatigue, 4.5% obtained the maximum score for physical fatigue, and 7% obtained the maximum score for emotional fatigue; no patient obtained the lowest possible fatigue score for total and physical fatigue, less than 1% obtained the lowest score for living with fatigue, 5% obtained the lowest score for cognitive fatigue, and 6% obtained the lowest score for emotional fatigue (in patients recruited with VAS of fatigue of more than 5 of 10) (30).

Reliability. *Internal consistency.* In the same 229 patients with RA, Cronbach's α was 0.93 for total fatigue, 0.71 for physical fatigue, 0.91 for living with fatigue, 0.92 for cognitive fatigue, and 0.89 for emotional fatigue; all except one were excellent values. The correlations between total fatigue and the four subscales range from $r = 0.75$ to 0.88 (30) (all very good to excellent).

Test-retest. The test-retest was performed 1 to 2 hours apart (n = 50 patients with RA before and after clinic visits); correlations were excellent overall; for total fatigue $r = 0.95$, for physical fatigue $r = 0.94$, for living with fatigue $r = 0.89$, for cognitive fatigue $r = 0.89$, and for emotional fatigue $r = 0.92$ (31).

Validity. *Content/face.* The items and their wording cover a range of severity and impact of fatigue and were derived from patient interviews, which were then refined with focus groups (29).

Comparison with other fatigue measures. In the 229 patients with RA studied, total fatigue correlated very strongly with the MAF (specific to RA) at 0.82 and with the FACIT-F at –0.81 and positively with the SF-36 VT at –0.64 (30). A range of moderate to strong correlations was also observed between these measures and the BRAF subscales: physical fatigue (severity) –0.68 to 0.83, living with fatigue –0.54 to –0.74, emotional fatigue –0.50 to 0.66, and cognitive fatigue –0.40 to 0.55 (30). The lower levels of association observed in cognitive fatigue may reflect the lack of elements of cognitive fatigue in other fatigue measures. For total fatigue and all subscales, the correlation with SF-36 VT was weaker than with other fatigue scales (see Short Form 36 Vitality).

Construct. In the same 229 patients with RA, total fatigue correlated positively with depression, anxiety, disability, and impotence (0.50-0.63); physical fatigue (severity) correlated moderately with disability, depression, and impotence (0.37-0.45) and weakly with anxiety (0.26); living with fatigue correlated positively with depression, anxiety, disability, and impotence (0.45-0.61); cognitive fatigue correlated moderately with depression, anxiety, and impotence (0.33-0.49) and weakly with disability (0.21); and emotional fatigue correlated positively with depression and anxiety (0.54 and 0.57, respectively) and moderately with impotence and disability (0.45 and 0.35, respectively). Neither total fatigue nor the subscales were strongly associated with pain (0.14-0.38) (30).

Responsiveness. In patients with RA receiving an intramuscular glucocorticoid injection (n = 42), effect sizes (ESs) of 0.33 to 0.56 for the total BRAF-MDQ and subscales at 2 weeks ($P < 0.04$) were observed for all (32).

Minimally important differences. In patients with RA receiving an intramuscular glucocorticoid injection (n = 42), the minimally important differences detected were 17.5% for improvement and 6.1% for fatigue worsening of the pretreatment value of the BRAF-MDQ score (32).

Generalizability. The BRAF-MDQ has been developed and used in RA (32–35).

Use in clinical trials. This tool has been applied in observational studies as well as in clinical trials (32–36).

Critical appraisal of overall value to the rheumatology community

Strengths. The BRAF-MDQ is specific for RA and was developed in collaboration with patients and cognitive interviews of draft statements including the word "fatigue" in each statement. Factor analysis shows that the subscales of emotional fatigue, cognitive fatigue, and living with fatigue can help elucidate different causal or perpetuating mechanisms or highlight individual patient dimensions that require specific interventions. Internal consistency, test-retest reliability, and construct validity are good, and the BRAF-MDQ shows criterion validity with other fatigue scales.

Caveats and cautions. The available data suggest that the BRAF-MDQ would have a better characterization in those patients with more severe fatigue compared with the SF-36 VT (37).

Clinical usability. It has not been used in the clinical setting.

Research usability. The data suggest that the BRAF-MDQ is a useful research tool for identifying the general fatigue experience, the different types of fatigue in RA, and, potentially, how these may have different causal factors or responses to treatment.

BRISTOL RHEUMATOID ARTHRITIS FATIGUE NUMERIC RATING SCALE

Description

Purpose. The aim of the BRAF-NRS was to develop a standardized NRS for measuring a range of the following RA fatigue dimensions: severity, effect on life, and coping ability

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

(30,38). A new version was released in 2018 (the BRAF-NRS version 2) (39).

Content or domains. Three items are included; they measure severity, effect, and coping with RA fatigue.

Number of items. Three (one for each dimension).

Response options. Patients circle the NRS from 0 to 10 for each item. Severity ranges from no fatigue, 0, to totally exhausted, 10. Effect ranges from no effect, 0, to a great deal of effect, 10. Coping ranges from not at all well, 0, to very well, 10. A revision of the BRAF-NRS coping item was developed with a score of 10 as worse coping and ranges from very well, 0, to not at all well, 10.

Recall period for items. The preceding week.

Cost to use. No cost.

How to obtain it. The BRAF-NRS is available from the website of the University of the West of England Bristol (https://www1.uwe.ac.uk/hls/research/healthandclinicalresearch/researchareas/complexandlong-termhealthca/fatiguescales/brafscales.aspx).

Practical application

Method of administration. The BRAF-NRS is a patient self-report completed with pen and paper.

Scoring. It uses a Likert scale from 0 to 10 for each item.

Score interpretation. Scores range from 0 to 10, with higher scores reflecting greater problems for severity and effect NRS but lower scores reflecting greater problems from coping NRS. In the BRAF-NRS version 2, scores range from 0 to 10; higher scores reflect greater problems in all dimensions. In terms of normative data, 1276 patients with RA had a mean (SD) BRAF-NRS severity of 4.8 (2.6), effect of 4.6 (2.7), coping (original) of 6.0 (2.6), and coping (revised) of 4.0 (2.7) (39).

Respondent burden. Time to complete is probably 1 minute for the three items. In the BRAF-NRS, coping may be a particularly challenging notion to grasp across different cultures (40).

Administrative burden. Time to score has not been reported.

Translations/adaptations. The original language is English (United Kingdom). There are currently 35 translated versions of this scale.

Psychometric information

Floor and ceiling effects. Floor effect was almost absent, but there is a ceiling effect. In 588 patients with RA, 11.1% scored at ceiling for severity, 16.8% scored at ceiling for effect, and 17.7% scored at ceiling for coping; 0.2% scored at floor for severity, 0.3% scored at floor for effect, and 1.9% scored at floor for coping (37).

Reliability: test-retest. In a study, 50 patients with RA completed the first BRAF-NRS on arrival at the clinic (T1) and the second BRAF-NRS on the same day (T2) after a minimum of 60 minutes. There was a very strong correlation between the following T1 and T2 scores: severity (r = 0.92), effect (r = 0.85), and coping (r = 0.62) (32).

Validity. *Content.* The single-item NRS covers aspects of fatigue generated from patient interviews and refined with focus groups (29); fatigue coping is not available as a separate domain in other PROMs (41).

Comparison with other fatigue measures. In the 229 patients with RA studied, the NRS correlated with the fatigue measures MAF, FACIT-F, and SF-36 VT (30). Lower levels of association have been seen in the coping NRS, which might reflect the lack of coping items in other fatigue measures. For all the NRSs, correlations with the SF-36 VT were weaker than other fatigue scales. Correlation between severity and effect (r = 0.71) was strong, whereas associations between perceived coping and both severity and effect were weak to moderate (r = –0.235 and –0.352, respectively), suggesting that coping is a different concept (30).

Construct. The construct validity for the original BRAF-NRS coping item was acceptable, but it was better for the revised BRAF-NRS version 2 (revised r = 0.15-0.74, original r = 0.09-0.48) (39).

Responsiveness. Forty-two patients with RA who were prescribed a single high dose of intramuscular glucocorticoids completed their first BRAF-NRS as part of their clinical care while waiting to have their injection. The second BRAF-NRS was obtained at the patients' homes 2 weeks later. The BRAF-NRS was sensitive to change, severity, and effect (ES 0.46-0.47). The BRAF-NRS coping was not sensitive to change (ES 0.05) (32).

Minimally important differences. Three studies analyzing the minimal clinically important difference (MCID) on a number of fatigue severity scales in RA suggest that a change of between 7% and 11% would be clinically important (42,43). Thus, 10% RA fatigue severity MCID might represent a meaningful change; this compares with multiple sclerosis, in which an average MCID of approximately 15% (44) was found in two studies. The Reducing Arthritis Fatigue Team (RAFT) program demonstrated an adjusted mean difference of 0.59 in the BRAF-NRS fatigue impact beyond the improvement seen in the usual-care

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

arm, with the RAFT program showing a 19% change from the baseline mean and the control arm showing a 12% change from the baseline mean (fatigue impact improving by 1.36 and 0.88 units, respectively). However, further work to establish the MCID for the BRAF-NRS impact is still needed (45).

Generalizability. The BRAF-NRS is used in RA (37,40).

Use in clinical trials. None.

Critical appraisal of overall value to the rheumatology community

Strengths. The BRAF-NRS was developed for patients with RA. It is free to use and quick to apply. It shows a good method of development, acceptability, reliability, validity, and ability to detect change.

Caveats and cautions. Investigators using the original BRAF-NRS coping item in ongoing studies should not be tempted to reverse those scores, because they are not mirror images of each other. Investigators should continue to use the original version for studies currently under way, because its performance is acceptable (39).

Clinical usability. The available data suggest that the BRAF-NRS may be a useful, quick tool to identify three different concepts of RA fatigue, which might inform individualized self-management interventions, with no significant administrative or respondent burden (23).

Research usability. The available data suggest that the BRAF-NRS may be a useful research tool to screen for entry criteria and to identify different facets of fatigue that might be changed differentially by interventions (23).

CHALDER FATIGUE QUESTIONNAIRE

Description

Purpose. Sometimes referred to as the Chalder Fatigue Scale, or simply the Questionnaire or Fatigue Scale, the CFQ was developed to assess the severity of disabling fatigue in hospital and community populations and was originally published in 1993, with an additional psychometric evaluation in 2010 (46,47).

Content or domains. The CFQ covers physical fatigue (eg, lack of energy, sensation of weakness, decreased muscle strength, and need for rest) and mental fatigue (eg, concentration and memory).

Number of items. Eleven items produce an overall score, covering two domains of physical and mental fatigue.

Response options/scale. There are four options, slightly modified in the last revision (less than usual, no more than usual, more than usual, and much more than usual) (47).

Recall period for items. The preceding month.

Cost to use. The CFQ is free to use.

How to obtain. The CFQ can be obtained from the developer by e-mail at trudie.chalder@kcl.ac.uk.

Practical application

Method of administration. The CFQ is a patient self-report completed with pen and paper.

Scoring. Items can be scored in two ways. The first is on a scale of 0 to 3, with an overall score range of 0 to 33, a physical fatigue domain range of 0 to 21 (items 1-7) and a mental fatigue domain range of 0 to 12 (items 8-11). Secondly, the CFQ can be scored as a binary (less than usual and no more than usual = 0; more than usual and much more than usual = 1) and then added together to produce an overall score between 0 and 11. No information is available on the handling of missing elements.

Score interpretation. Higher scores reflect greater fatigue. For the Likert score, a score of 29 of 33 discriminates clinically relevant fatigue from non–clinically relevant fatigue (47), and for the binary score, an overall score of 4 or more of 11 designates a fatigue case (46). In terms of normative data, the mean (SD) score in healthy adults (n = 1615) was 14.2 (4.6), compared with 24.4 (5.8) in patients with chronic fatigue syndrome (CFS) and 18.2 (6.1) in patients with FMS (n = 361 and n = 30, respectively) (48). Many studies use the 14-item CFQ draft (score range 0-42), giving an average global fatigue score in 120 patients with systemic lupus erythematosus (SLE) of 22 (interquartile range [IQR] 16-28) (49). Using the 14-item CFQ draft with an aggregated fifth response option (score range 0-56), the overall median fatigue in 51 patients with primary Sjögren's syndrome (SS) was 37 (IQR 32-42) vs. 28 (IQR 28-32) in 51 control subjects ($P < 0.01$) (50).

Respondent time to complete. Time to complete has not been reported.

Administrative burden. The scoring time is unreported.

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Translations/adaptations. The CFQ comprises 11 items scored from 0 to 33 (46) and has undergone a minor editorial change in 2010 (47). However, although the nine rheumatology studies identified here cite the original validation article (46), only three use this version (48,51,52). Three articles use the draft 14-item CFQ (49,53,54), giving scores of 0 to 42; in two articles, it is not clear which version has been used (52,55). A Swedish version combined the draft 14-item CFQ with an additional fifth response option (much better than usual), giving an overall score of 0 to 56 (50).

Psychometric information

Floor and ceiling effects. A significant ceiling effect was found in patients with CFS, with up to 96% of patients with maximum scores (56). No data on floor effects are available.

Reliability. *Internal consistency.* Cronbach's α was calculated in 274 general practice (GP) patients for the 14 draft items, 0.88 to 0.90 for pulling out different items one at a time (excellent values), and 0.84 and 0.82 for two domain scores (physical and mental, respectively; also excellent values) (46). For the final version of 11 items, Cronbach's α was 0.89 in GP patients (n = 274), 0.92 in patients with CFS (n = 361), and 0.88 in a survey of GP assistants (n = 1.615) (46,47). In one study that included rheumatological patients (57) Cronbach's α was 0.93 and 0.92 for the group of patients with CFS (n = 141) and the group of patients with autoimmune diseases (n =162), respectively.

Test-retest. The reliability value of the test-retest, measured using the correlation coefficient of the Spearman range, was 0.55 ($P < 0.001$), a fair value (58).

Validity. *Content/face.* The items were generated by experts, and the final 11-item CFQ covers a range of physical and mental fatigue problems and produces a domain score for each (46).

Comparison with other fatigue measures. Using a validated program of psychiatric fatigue interviews as a comparator, the limit for a case of fatigue was identified as 4 or more of 11 in the 14-item CFQ draft, with 75.5% sensitivity and 74.5% specificity (100 consecutive GP assistants) (46). In SLE (n = 120), the 14-item CFQ draft was strongly associated with the FSS and the Fatigue VAS ($r = 0.6$ for both) (49). In a group of patients with primary SS, RA, and SLE, total fatigue and physical CFQ scores were moderately correlated with the Fatigue VAS ($r = 0.42$ and $r = 0.46$, respectively) (51).

Construct. A CFQ score of 29 of 33 discriminates patients with CFS from the general population in 96% of cases (47). In SLE, with the draft 14-item CFQ, mean fatigue was significantly different between patients (23.5, SEM 0.9; n = 93) and control subjects (15.0, SEM 0.6; n = 41) (53). However, no differences were found in total CFQ or physical and mental domains between control subjects and patients with SLE or primary SS, and patients with RA alone differed from control subjects in physical fatigue ($P < 0.05$) (51). In SLE, preliminary CFQ scores of 14 items were moderately associated with two measures of disease activity, the Systemic Lupus Activity Measure and the European Consensus Lupus Activity Measure ($r = 0.36$-0.4), and aerobic capacity ($r = -0.33$) (49). In chronic upper extremity pain (n = 73), the CFQ was moderately associated with pain disability ($r = 0.44$) and pain intensity ($r = 0.32$) (52).

Responsiveness. In a study of 93 patients with SLE randomized to exercise, relaxation, or control groups, after 12 weeks of treatment, there was significant improvement in fatigue measured using the CFQ (22-15 vs. 24-21) (55).

Minimally important differences. The MCID estimated by linear regression was 9.9 (42).

Generalizability. The CFQ has been used in SLE, primary SS, RA, PsA, FMS, spondyloarthritis, and carpal tunnel disorder as well as CFS and generalized chronic pain (48–55).

Use in clinical trials. This tool has been applied in observational studies as well as clinical trials (50,51,53–55).

Critical appraisal of overall value to the rheumatology community

Strengths. The CFQ is a scale of fatigue severity rather than a measure of impact or consequence, and it considers physical and mental domains. The CFQ has good internal consistency in populations with CFS and good sensitivity to change in rheumatology.

Caveats and cautions. Users must obtain the correct version (47) from the developer. Some researchers continue to use the preliminary 14-item version, which makes comparisons between studies difficult. Response options include one positive, one neutral, and two negative responses, which may bias the Likert score (0-3), although the use of the binary score (0 or 1) to define cases solves this problem. There are few rheumatology data in the two domains; neither internal consistency nor test-retest have been addressed. The use of the CFQ in CFS has been criticized because patients with CFS often record the maximum score in most of the 11 questions. As a result, patients can no longer indicate a worsening of their fatigue (ceiling effect) (56).

Clinical usability. Not available.

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Research usability. The CFQ has been used as an outcome in several trials, including a trial in multiple sclerosis (MS), among others (59).

CHECKLIST INDIVIDUAL STRENGTH FATIGUE

Description

Purpose. CIS-fatigue is an eight-item subscale of CIS that measures subjective fatigue.

Content or domains. The CIS consists of 20 statements on fatigue-related problems. Initially, the questionnaire consisted of 24 items, but after testing it in 298 patients who experienced from unexplained chronic fatigue for more than a year, four items were removed (60). The factor analysis indicated four components (60) with the remaining 20 questions. These components were easy to interpret and were called subjective fatigue (eight items), concentration (five items), motivation (four items), and physical activity (three items).

Number of items. Twenty items provide a total CIS20R score, including four subscale scores for subjective fatigue experience (eight items), concentration (five items), motivation (four items), and physical activity levels (three items). Although the entire CIS20R assesses fatigue, the eight-item subjective fatigue subscale is commonly the only subscale reported and is often referred to as the CIS8R, CIS-fatigue, or Fatigue Severity.

Response options. Examples of statements are: "I feel tired," "I have trouble concentrating," and "I don't do much during the day," etc (see website at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1739950/pdf/v057p00353.pdf). Almost half of the questions are inverted, meaning that the statements indicate fitness instead of fatigue, and the scoring system is reversed. "Yes, that is true" would then indicate a score of 1 instead of 7. Examples of such statements are "I feel fit," "I feel rested," or "I am full of plans" (see website at https://www.me-pedia.org/images/f/f8/Checklist_Individual_Strength_overzicht.pdf [in Dutch]).

Recall period for items. The preceding 2 weeks.

Cost to use. No cost.

How to obtain it. The CIS-fatigue can be obtained from the developer by e-mail (j.vercoulen@mps.umcn.nl).

Practical application

Method of administration. The CIS is a patient self-report completed with pen and paper.

Scoring. The CIS consists of 20 statements on fatigue-related problems respondents might have experienced in the past 2 weeks. A Likert scoring scheme is used. With each statement, respondents indicate a score from 1 to 7, indicating either yes, that is true or no, that is not true.

Score interpretation. The CIS-fatigue uses eight items. Each item is scored on a seven-point Likert scale. Based on scores in healthy controls, a score below 27 (mean score for healthy adults plus 1 SD) was equated with a normal experience of fatigue, a score between 27 and 34 indicated moderate fatigue, and a score of 35 or higher indicated severe fatigue (60). A score of 35 or above at baseline as well as at 12 months was called persistent severe fatigue (10).

Respondent time to complete. Time to complete has not been reported.

Administrative burden. Time to score has not been reported.

Translations/adaptations. The CIS originates from the Netherlands. Dutch, English, Swedish, and Korean versions are available from the developer.

Psychometric information

Floor and ceiling effects. The fatigue severity subscale asks eight questions that give a score from 8 to 56. Although healthy persons score, on average, 17.3 and patients with other chronic conditions usually score below 40, patients with chronic myalgic encephalomyelitis (CME) or CFS easily reach a score above 50. For example, in a study of homebound CME/CFS (which included some of the authors of the CIS) (61), it was noted that "the CIS-fatigue score involves an overall rating and in CFS patients easily reaches the extreme end of its scale." There are no studies on floor and ceiling effects in rheumatic diseases.

Reliability. The subscale's reliability coefficient for the CIS was 0.94 at baseline and 0.92 at follow-up (10), which are excellent.

Internal consistency. In CFS, for total CIS20R score, Cronbach's α was 0.90, and Gutman split-half reliability coefficient was 0.92; Cronbach's α for subscales ranged from 0.83 to 0.92 (60). In patients with RA (n = 227), Cronbach's α for the subjective fatigue CIS8R was 0.92 (62), and it was 0.89 in patients with FMS (n = 78) (36). In all these analyses, the results were excellent. In patients with RA, factor analysis was reported as confirming the four subscales (no detailed data were provided) (n = 227) (62).

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Test-retest. In 227 patients with RA, the intraclass correlation coefficient (ICC) of subjective fatigue CIS8R over 1 month was 0.81 (62), an excellent value.

Validity. *Content.* No information was provided on how items were generated (60), but the CIS20R covers a range of fatigue issues likely to be common in rheumatology populations (20–22).

Comparison with other fatigue measures. In patients with RA (n = 227), the subjective fatigue CIS8R correlated very strongly with the SF-36 VT and with a fatigue NRS (both 0.81) (62). In patients with FMS (n = 224), subjective fatigue CIS8R correlated with the Fatigue VAS at 0.61 (63).

Construct. In patients with RA (n = 228), subjective fatigue CIS8R correlated strongly with pain (0.55); moderately with disability, sleep disturbance, helplessness, anxiety, and depression (0.32-0.40); weakly with rheumatoid factor, Disease Activity Score in 28 joints (DAS28), and tender or swollen joints (0.18-0.3); and not at all with disease duration or inflammatory indices (62). The total CIS20R score discriminates between healthy workers and workers with health-related reasons for being fatigued (64).

Responsiveness. In patients with FMS (n = 78) receiving cognitive-behavioral therapy (CBT), the subjective fatigue CIS8R improved by a mean (SD) −10.6 (10.7) (65). In patients with RA who were started on anti–tumor necrosis factor (TNF) therapy (n = 126), the total CIS20R score improved from a median of 85 (IQR 65-97) to a median of 69 (IQR 48-90) over 6 months (66), whereas in a subset of 59 working-age patients, CIS20R score improvement was 11.8% at 6 months (67). In distressed patients with early RA (n = 30), CBT gave a post-treatment ES of 0.55 for the subjective fatigue CIS8R (0.48 at 6 months) (68).

Minimally important differences. No MCID was reported, but in FMS (n = 78), changes in the subjective fatigue CIS8R correlated with a transition question on perceived change (0.53) and with VASs for the usefulness of and satisfaction with the level of change (0.42 and 0.33, respectively) (65).

Generalizability. The questionnaire has been used in various conditions, including FMS (63), RA (62), MS (69), cancer (70), asthma (71), amyotrophic lateral sclerosis (72), sarcoidosis (73), and mitochondrial disorders (74).

Use in clinical trials. The CIS has shown sensitivity to treatment interventions in a randomized clinical trial of CBT for patients with CFS (75) and other chronic diseases (76).

Critical appraisal of overall value to the rheumatology community

Strengths. It is a tool that assess several aspects of fatigue, including fatigue severity. The fact that population norms and a validated cutoff score are now available makes it useful for both research and clinical applications.

Caveats and cautions. The subjective fatigue (also called fatigue severity) subscale of the CIS has been the most widely used in the field of CFS (75,77–79). Because this subscale asks general questions about fatigue with responses such as "I feel tired" or "I feel weak," patients with CFS often score close to the maximum score (56). The fatigue severity subscale asks eight questions, giving a score ranging from 8 to 56. Although healthy persons score on average 17.3 and patients with other chronic conditions usually score below 40, patients with CFS easily reach a score above 50. No data on other rheumatic diseases have been reported.

Clinical usability. Not available.

Research usability. The CIS-fatigue has been a primary outcome in randomized trials on the effects of CBT in various illness, including CME/CFS (80).

FATIGUE ASSESSMENT SCALE

Description

Purpose. The FAS is a 10-item scale evaluating symptoms of chronic fatigue; it was developed in the Netherlands in 2003. In contrast with other similar measures, the FAS treats fatigue as a unidimensional construct and does not separate its measurement into different factors. However, in order to ensure that the scale would evaluate all aspects of fatigue, developers chose items to represent both physical and mental symptoms.

Content or domains. The FAS consists of 10 fatigue items. Five questions reflect physical fatigue, and five reflect on mental fatigue. Although these two aspects of fatigue are represented in the questionnaire, the FAS was shown to be unidimensional in a study among a working Dutch population and a representative sample of the general population (81).

Number of items. Nine of the 10 items were selected from an initial item pool consisting of 40 items that were taken from the following four commonly used fatigue questionnaires: the Fatigue Scale (FS); the CIS, the emotional exhaustion (EE) subscale of the

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Dutch version Maslach Burnout Inventory (MBI), and the energy and fatigue subscale of the World Health Organization Quality of Life (WHOQOL-EF) (81).

Response options. Ten statements refer to how the patient usually feels. For each statement, there are five answer categories, varying from never to always (1 = never, 2 = sometimes, 3 = regularly, 4 = often, and 5 = always).

Recall period for items. The preceding year.

Cost to use. No cost.

How to obtain it. Refer to the original article published by the developers (81). Additionally, digital versions as well as PDFs on various languages are available online (www.wasog.org).

Practical application

Method of administration. The FAS is a self-report measure completed with paper and pen.

Scoring. The instruction of the FAS is directed at how a person usually feels. Each item of the FAS is answered using a five-point Likert-type scale ranging from 1 (never) to 5 (always). Items 4 and 10 are reverse scored. Total scores can range from 10, indicating the lowest level of fatigue, to 50, denoting the highest.

Score interpretation. The total FAS score can be calculated by summing the scores on all questions (recoding scores for the two negatively framed questions). The total score ranges from 10 to 50 (82).

Respondent time to complete. Time to complete has not been reported.

Administrative burden. Time to score has not been reported.

Translations/adaptations. The FAS has been translated into Croatian (83) and Swedish (84).

Psychometric information

Floor and ceiling effects. No floor and ceiling effects were found in the Swedish study (84).

Reliability. *Internal consistency.* Internal consistency is good (Cronbach's $\alpha = 0.82$) (84).

Test-retest. Test-retest reliability was 0.89 (83,85), which is excellent.

Validity. *Content/face.* Nine of 10 items of the FAS were obtained from other well-known fatigue scales. It covers mental and physical fatigue (81).

Comparison with other fatigue measures. The FAS correlated with other fatigue scales, including the CIS (including subscales), the FS, the WHOQOL-EF, and the EE subscale of the MBI ($r = 0.6$-0.8; $P < 0.001$ in all cases) (81).

Construct. In patients with sarcoidosis, the FAS correlated ($r = 0.39$) with neurologic and with psychological problems ($r = 0.46$) ($P < 0.001$ for both comparisons) (83). No data in rheumatic diseases have been reported.

Responsiveness. A validation FAS in a chronic hepatitis C study showed that this scale had good responsiveness. Moreover, patients who worsened based on hemoglobin abnormalities used to define anemia (grades 1-4) showed a greater mean increase in the FAS total score from baseline to week 24 (denoting worsened fatigue) compared with the not worsened group in both studies (86).

Minimally important differences. A change in the FAS score of four points or more indicates a clinically significant change in fatigue (87).

Generalizability. The FAS has been used to assess post-stroke fatigue (88) and has been used in mothers of children with different pathologies (89), in SLE (90), and in sarcoidosis (81,83,85).

Use in clinical trials. The FAS has been frequently used in clinical trials of interventions for fatigue in subjects with MS, including carnitine, amantadine, aspirin, modafinil, and CBT (91).

Critical appraisal of overall value to the rheumatology community

Strengths. Because of its psychometric properties, brevity, and ease of administration, the FAS is a valuable tool for assessing fatigue. The FAS has been shown to measure fatigue independently from depression and neuroticism (81).

Caveats and cautions. It has not been validated in longitudinal studies (90).

Clinical usability. Not studied.

Research usability. It can be used in clinical research as a validated fatigue assessment measure.

FATIGUE NUMERIC RATING SCALE

Description

Purpose. The fatigue NRS is a unidimensional measure that captures the intensity or severity of fatigue.

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Content or domains. The fatigue NRS typically comprises a unidimensional 11-point NRS with anchors of 0 (none) and 10 (a great deal). There is no standardized Fatigue NRS for use in rheumatic diseases.

Number of items. The fatigue NRS is a single-item scale.

Response options/scale. Patients are instructed to indicate between two numeric extremes the number that most accurately reflects their state of fatigue. Response options are not standardized, with researchers creating their own. For example, for the question "What is your level of fatigue?" the answers could range from 0 for no fatigue to 10 for the greatest possible fatigue.

Recall period for items. Generally, 1 week.

Cost to use. No cost.

How to obtain. Researchers usually create their own NRS.

Practical application

Method of administration. The fatigue NRS is a patient self-report completed with pen and paper.

Scoring. Although most fatigue NRSs range from 0 to 10, one variation uses a score ranging from 0 to 3.

Score interpretation. Higher scores represent a greater severity or intensity of fatigue.

Respondent time to complete. An NRS scale usually takes less than 1 minute to complete.

Administrative burden. NRS scales are easy to administer and to score.

Translations/adaptations. There is no standard fatigue NRS to translate.

Psychometric information

Floor and ceiling effects. No data have been reported.

Reliability. *Internal consistency.* No data have been reported.

Test-retest. In patients with RA, the test-retest ICC for the NRS was 0.79 ($P < 0.008$) (92).

Validity. *Content.* NRSs are unidimensional measures, and because they are not standardized, the content largely depends on the construct the researchers wish to explore and the language they use to capture it.

Comparison with other fatigue measures. No data.

Construct. No data.

Responsiveness. In patients with RA treated with TNFα blockade, mean (SD) fatigue scores at baseline were 6.7 (2.1). At 3 months, the fatigue scores had fallen to 4.3 (2.6) ($P < 0.001$) (92).

Minimally important differences. In oncologic patients, the MCID for a fatigue NRS of 0 to 10 was 2.4 for improvement and 1.1 for worsening (93).

Generalizability. The fatigue NRS has been used in RA and FMS (30,92,94).

Use in clinical trials. This tool has been applied in observational studies as well as in clinical trials (30,92,94).

Critical appraisal of the overall value to the rheumatology community

Strengths. It is quick and simple to administer and score, and the respondent's burden is minimal. For people experiencing severe fatigue, multidimensional fatigue measures may increase the burden of responding (28).

Caveats and cautions. There is no standardization of questions or of the way these scales are implemented, which makes it difficult to compare them.

Clinical usability. The fatigue NRS is easy to use in clinical practice to identify patients' concerns and responses to treatment.

Research usability. The fatigue NRS is used in rheumatology research and provides a global fatigue score. A multidimensional assessment may provide a more complete picture and improve understanding of the clinical relationships between fatigue and, hence, potential treatment.

FATIGUE SEVERITY INVENTORY

Description

Purpose. The FSI was designed to provide information about the intensity, duration, daily pattern, and interference of fatigue. It is an NRS and was originally established in women undergoing treatment for breast cancer (95).

Content or domains. The FSI consists of 14 items, which are each rated on a 0 to 10 scale. Single items ask respondents to rate the average level of fatigue severity over the past week as well as the level of fatigue on the days with

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

the most and least fatigue, the number of days with fatigue, during how much of the day fatigue was experienced, and the current level of fatigue.

Number of items. The FSI contains 14 items.

Response options. The measure includes four intensity items. These items ask the respondent to rate the intensity of fatigue at its worst, its least, and on average during the previous week and at the present time, using an 11-point rating scale (0 = not at all fatigued and 10 = extreme fatigue). Following the intensity items, there is a seven-item subscale that assesses the interference of fatigue. The respondents are asked to indicate on a 11-point rating scale (0 = no interference and 10 = extreme interference) the extent to which fatigue interfered with general activity, ability to bathe and dress, work activity, ability to concentrate, relations to others, enjoyment of life, and mood during the previous week. The next two items assess fatigue duration, eg, the number of days in the previous week (0-7 days) fatigue was experienced and the mean percentage of time each day it was present (0 = none of the day and 10 = the entire day) (96).

Recall period for items. The preceding week.

Cost to use. No cost.

How to obtain. The FSI can be obtained from the University of South Florida website at http://www.cas.usf.edu/~jacobsen/FSI&MFSIpage.htm. English, Spanish, German, and French versions can be used at no charge.

Practical application

Method of administration. The FSI is a patient self-report completed with pen and paper.

Scoring. The FSI is a 14-item measure that assesses the frequency and severity of fatigue and its perceived interference. The measure includes three items specific to fatigue severity in the preceding week. Participants rate, on 11-point scale (0 = not at all fatigued, 10 = as fatigued as I could be) their level of fatigue 1) on average in the previous week (FSI average), 2) on the day they felt most fatigued in the past week, and 3) on the day they felt least fatigued in the preceding week. A composite fatigue score is derived by calculating the average across the three severity items.

Score interpretation. Individuals who scored three or more than the cutoff reported significantly greater fatigue interference, more days of fatigue on average, and a greater proportion of each day being fatigued (95).

Respondent time to complete. The time to complete has not been reported.

Administrative burden. Time to score has not been reported.

Translations/adaptations. The FSI has been translated into Swedish (97), Chinese (98), and Hebrew (99).

Psychometric information

Floor and ceiling effects. No data on floor or ceiling effects are available.

Reliability. *Internal consistency.* The interference subscale of the FSI showed excellent internal consistency (100).

Test-retest. The estimates of the test-retest reliability were poor and did not demonstrate that the FSI can reliably measure fatigue across a short (2 to 4 weeks) or a long period of time (4 to 6 weeks) (96).

Validity. *Content/face.* It is a self-report measure designed to assess fatigue severity, fatigue frequency, perceived interference associated with fatigue, and the daily pattern of fatigue (100).

Comparison with other fatigue measures. Significant correlations with the POMS (r = 0.6-0.7) and the SF-36 VT scale (r = –0.6 to 0.8) ($P < 0.001$ in all cases) support the convergent validity of the scale (96).

Construct. The FSI correlated with anxiety (measured with the State-Trait Anxiety Inventory [STAI]) and with depression (measured with the Center for Epidemiological Studies Depression Scale), with r values between 0.4 and 0.6 ($P < 0.001$ in all cases) (96).

Responsiveness. Standardized response means of the FSI is good (range between –0.08 and –0.38; ES between –0.09 and –0.35). In the same study, the standardized response mean for the SF-36 VT was –0.08, and the ES was –0.08 (101).

Minimally important differences. The MCID ranged from 0.5 to 1.2 for global change, from 0.08 to 0.4 for improvement, and from 1.0 to 1.2 for deterioration (102).

Generalizability. The FSI has been used in patients with different forms of cancer (96,103,104) and in those with RA (105). It has also been used in persons with schizophrenia and schizoaffective disorders (106), CFS, and heart failure (50).

Use in clinical trials. No data on its use in clinical trials have been reported.

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Critical appraisal of overall value to the rheumatology community

Strengths. The FSI has been used extensively to assess fatigue, especially among patients with cancer. It was further validated in a study of individuals of both sexes with a variety of different cancer diagnoses (103). The scale has since been used to assess fatigue in a number of clinical populations, including patients with breast cancer (107), patients undergoing hematopoietic stem cell transplantation (108), patients with hepatocellular cancer undergoing stereotactic radiotherapy (109), and patients with CFS (110).

Caveats and cautions. The FSI has poor test-retest reliability.

Clinical usability. The FSI could be used in studies designed to identify the biological and psychosocial correlates of fatigue.

Research usability. The FSI can discriminate between cases of fatigue and noncases.

FATIGUE SEVERITY SCALE

Description

Purpose. The FSS was developed to evaluate disabling fatigue in MS and SLE and was published in 1989 (111).

Contents. The FSS covers the physical, social, and cognitive effects of fatigue (eg, function, work, and motivation).

Number of items. Nine elements produce an overall score. The FSS was designed to rate the extent of fatigue symptoms and their impact on patient functioning (including motivation, exercise, physical function, duties, and interference with work, family, or social life).

Response options/scale. There are seven options ranging from strongly disagree to strongly agree.

Recall period for items. The preceding week.

Cost to use. The FSS is free to use.

How to obtain. The FSS can be obtained from the developer by e-mail at lkrupp@notes.cc.sunysb.edu.

Practical application

Method of administration. The FSS is a patient self-report completed with pen and paper.

Scoring. Items are scored from 1 to 7, added together, and then averaged to produce an overall score.

Score interpretation. Scores range from 1 to 7, with higher scores reflecting greater fatigue. In terms of normative data, the mean (SD) score in healthy adults (n = 20) was 2.3 (0.7), compared with 4.7 (1.5) in patients with SLE, and 4.2 (1.2) in patients with RA (n = 29 and n = 122, respectively) (111,112). In patients with PsA (n = 135) who used a modified FSS (mFSS) of 0 to 10 (see Translations/adaptations), the mean score was 5.7 (95% confidence interval [CI] 5.1-6.3) (113). In another PsA study (n = 75) using the mFSS, patients who reported fatigue in a clinical evaluation had a mean score (SD) of 6.9 (2.4) compared with 3.8 (2.8) in those who reported no fatigue (114). In patients with OA (n = 137), the mean (SD) FSS was 3.63 (1.55) (115).

Respondent time to complete. Time to complete has not been reported.

Administrative burden. Time to score has not been reported.

Translations/adaptations. The FSS has been translated into several languages, including Spanish, French, Chinese, Arabic, and Portuguese (116,117), with a Swedish translation describing the appropriate linguistic methodology and then assessing the reliability and validity of construct and criterion in SLE (118). The adaptations include a multidimensional fatigue assessment instrument of 29 items in German (119); a US adaptation for telephone administration in RA, which reduced the response options from 1 to 7 to 1 to 5 and states that the FSS has 10 elements instead of nine (120); and an mFSS used in PsA that increased the response options from 1 to 7 to 0 to 10 (not at all to totally), although no justification was provided for this (113).

Psychometric information

Floor and ceiling effects. In one study, for floor and ceiling effects, 4.5% of the sample had the lowest possible score and 4% had the highest possible score (121).

Reliability. *Internal consistency.* Cronbach's α was 0.89 to 0.96 in SLE (n = 22-29), an excellent value (111,118,122). For the mFSS (response options 0-10), Cronbach's α was 0.95 in both PsA (n = 91) and SLE (n = 113), an excellent value (113).

Test-retest. No significant differences in the FSS were observed in stable patients with SLE over the course of 1 week (118).

Validity. *Content/face.* The FSS covers a variety of fatigue problems. It is not indicated how the items were generated (111), but the FSS was later subjected to cognitive tests in Swedish patients with SLE (118).

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Comparison with other fatigue measures. The mFSS was strongly correlated with a VAS fatigue at 0.81 in patients SLE (n = 29) (111) and with the FACIT-F at –0.79 in patients with PsA (n = 135) (123). The correlation with the SF-36 VT was –0.56 to –0.63 in patients with SLE, OA, and RA (n = 32, n = 137, and n = 52, respectively) (115,118).

Construct. The FSS correctly discriminated 90% of patients with SLE (n = 29) from healthy controls (111). A systematic review reported the evaluation of the construct validity of the FSS in a number of SLE studies, demonstrating a range of correlations with disease activity (0.16-0.53), depression (0.22-0.59), and pain (0.35-0.54) (116). In patients with SLE (n = 22), the FSS correlated strongly with pain, general health, and physical and social roles (0.59-0.60) and correlated moderately with function, emotional role, and mental health (0.41-0.44) (118). In patients with SLE (n = 57), no association was found with inflammatory indices (124). In a working population with RA (n = 122), the FSS correlated with anxiety and depression (0.55 and 0.53, respectively) and with disability, pain, and stress (0.33-0.48) (125). In patients with PsA (n = 135), the mFSS (10-point response) correlated with the number of active joints (0.37) but not with that of swollen or damaged joints (123).

Responsiveness. In patients with AS randomized to receive etanercept or placebo (n = 40), the FSS showed an ES of 0.43 for treatment at 4 months (ES of the SF-36 VT = 0.69); the FSS did not respond at 1 month, unlike the SF-36 VT (ES 0.15 vs. 0.54) (126). In patients with SLE (n = 58), ESs of 0.55 and 0.44 were shown from telephone interventions for fatigue (modified option of 10 items with five FSS responses) (120). According to a systematic review of previous SLE studies, a recommendation for major improvement in the FSS for patients with SLE was 15% (116).

Minimally important differences. The minimally important differences detected in patients with RA were 6.6% for improvement and 16.7% for worsening of value of the FSS (42).

Generalizability. It has been widely used in studies of SLE and also in RA, OA, and AS, and, with a modified version, in PsA (112–116,118,120,123–125,127,128) as well as in many long-term conditions (eg, MS, cancer, neurologic disorders, and others).

Use in clinical trials. This tool has been applied in observational studies as well as in clinical trials.

Critical appraisal of overall value to the rheumatology community

Strengths. The FSS has good internal consistency, reliability, and construct and criterion validity and is sensitive to change. It has been evaluated in several rheumatologic conditions, particularly SLE (116).

Caveats and cautions. Comparison between rheumatological groups may be difficult if some groups use the mFSS instead of the FSS.

Clinical usability. The FSS is not used in the clinic setting.

Research usability. The FSS has been frequently used in rheumatology research, providing a global fatigue score.

FATIGUE VISUAL ANALOG SCALE

Description

Purpose. The Fatigue VAS is a unidimensional measure that captures the intensity or severity of fatigue.

Content or domains. The Fatigue VAS typically comprises a 100-mm or a 10-cm horizontal line anchored by two statements representing the extreme ends of a single fatigue continuum. There is no standardized Fatigue VAS for use in rheumatic diseases. A systematic review of the literature from 1996 to 2004 found 26 rheumatology studies reporting use of a Fatigue VAS, and only three of them were identical in content (41). The stem question also varies, describing tiredness, fatigue, or unusual fatigue (23,129–132).

Number of items. The Fatigue VAS is a single-item scale.

Response options. Patients are instructed to mark on the VAS line, between two extremes, the point that most accurately reflects their state of fatigue. Response options are not standardized and depend on the nature of the anchoring question, with researchers creating their own. Examples include not at all tired to very tired, no fatigue to total exhaustion, none to as bad as it could be, no problem to major problem, absence of fatigue to worst condition imaginable, no fatigue to complete fatigue, and no fatigue to intolerable fatigue (43,51,129–131,133,134).

Recall period for items. Generally, 1 week.

Cost to use. No cost.

How to obtain. Researchers usually create their own VAS (135–138).

Practical application

Method of administration. The Fatigue VAS is a patient self-report completed with pen and paper.

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Scoring. A ruler is used to measure the distance from the left-sided anchor to the respondent's mark on the VAS line. Although most Fatigue VASs range from 0 to 100 mm, some use a 0 to 10–cm scale. One variation uses a 15-cm VAS and calculates a score ranging from 0 to 3 (9,139).

Score interpretation. Typically, in 0 to 100 or 0 to 10 scales, higher scores represent a greater severity or intensity of fatigue. In terms of normative data, the VAS fatigue mean (SD) score (in mm) has been reported in healthy controls (n =144) as 20.5 (0.02) (134). In comparison, examples in rheumatology populations describe a mean (SD) of 49.7 (2.0) in patients with RA, 43.3 (2.0) in patients with hand OA, 50.4 (30.6) in patients with SLE, 40.8 (31.7) in patients with PsA, 74.4 (12.9) in patients with primary SS, 6.7 (2.0) on a scale of 0 to 10 in patients with AS, and 7.21 (1.91) on a scale of 0 to 10 in patients with FMS (n = 20-202) (134,140–142). In one RA study, researchers defined fatigue as clinically relevant at a VAS score of 20 mm or more and severe fatigue at a score of 50 mm or more (8). In an AS study, researchers defined fatigue as a major symptom at 50 mm (13); elsewhere, researchers have defined substantial fatigue in patients with RA, OA, and FMS as 2 or more on a VAS scaled from 0 to 3, with a cutoff of 1 or more for mild fatigue (9).

Respondent time to complete. A VAS usually takes less than 1 minute to complete.

Administrative burden. VASs are easy to administer and to score. The availability to the patient of their prior VAS score may affect subsequent responses. Therefore, researchers should be consistent in whether or not these are made available to the patients during the completion of the new VAS (143).

Translations/adaptations. There is no standard Fatigue VAS to translate.

Psychometric information

Floor and ceiling effects. Patients with lower scores required a larger change in their Fatigue VAS to report worsening, and people with higher scores required a larger change to perceive improvement, which might be related to floor and ceiling effects or different interpretations at different points in the VAS (133).

Reliability: test-retest. In patients with RA, over 1 to 2 days, the ICC of a Fatigue VAS was good (0.74, 95% CI 0.65-0.81; n = 122) (132).

Validity. *Content/face.* VASs are unidimensional measures and, because they are not standardized, the content largely depends on the construct the researchers wish to explore and the language they use to capture it.

Comparison with other fatigue measures. In RA, the Fatigue VAS very strongly correlated with the MAF at 0.80 and strongly correlated with the SF-36 VT at 0.71 (n = 7760) (139). In FMS and in primary SS, the Fatigue VAS correlated strongly with MFI total (general fatigue) at 0.62 and 0.70 but moderately with MFI mental fatigue and reduced motivation (0.32-0.39), and correlation ranged between moderate and strong for physical fatigue and reduced activity (0.36-0.67) (77,80). In AS (n = 812), the Fatigue VAS correlated with the SF-36 VT at –0.64 (13).

Construct. In a study of two populations with RA (n = 238 and 274, respectively), the Fatigue VAS was positively associated with the DAS28 at r = 0.43 and r = 0.69 and with pain at r = 0.63 and r = 0.68 (8). In another RA study (n = 22), the Fatigue VAS correlated very strongly with pain (0.8) and strongly with sleep (0.6) (130). In AS (n = 639), the Fatigue VAS correlated strongly with axial pain (0.58) but weakly with global pain (0.24) and did not correlate with C-reactive protein (–0.07) (129). In FMS (n = 50), the Fatigue VAS correlated strongly with pain (0.6) but moderately with sleep (0.3), which was not statistically significant (130).

Responsiveness. In RA (n = 5155), the Fatigue VAS was more sensitive to changes in pain and patient global opinion over 6 months than the MAF or the SF-36 VT. However, there were no differences in performance in relation to either disability or quality of life (QoL) (139).

Minimally important differences. In RA (n = 307), the MCID for a Fatigue VAS of 0 to 10 was between –0.82 and –1.12 for improvement and between 1.13 and 1.26 for worsening, based on Khanna et al (133); this is similar to the MCID of 10 in a Fatigue VAS of 0 to 100, as found by Wells et al (43). In SLE (n = 202), the MCID for a Fatigue VAS (0-100) was –13.9 for improvement and 9.1 for worsening, based on a transition question (141). In PsA (n = 200), the MCID was –8.15 for improvement and 3.63 for worsening, also based on a transition question (142).

Generalizability. The Fatigue VAS is used extensively in rheumatologic conditions, eg, RA (131–133), SLE (141), AS (129), PsA (142), primary SS (51), FMS (144), and OA (145).

Use in clinical trials. The Fatigue VAS has been used in RA clinical trials (43,146).

Critical appraisal of overall value to the rheumatology community

Strengths. It is quick and simple to administer and score, and the respondent's burden is minimal. In rheumatology, test-retest reliability is good in RA but weak in primary SS; construct validity is good. Criterion validity is good with the MAF but is weaker

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

with the SF-36 VT and the MFI, whereas sensitivity to change is good and may be stronger than that of the SF-36 VT (23).

Caveats and cautions. There are many practical and conceptual concerns with the Fatigue VAS, including the following: VAS length distortion with photocopying; some patients have difficulty understanding the abstract nature of a VAS; patients avoid the extreme ends of a VAS; the precision of a 100-mm line may not be appreciated by respondents, who tend to consider responses in multiples of 5 to 10–mm blocks; and when patients' VASs are plotted against their ordinal fatigue scales of none/mild/moderate/severe, VAS scores show considerable overlap across categories (eg, VAS ratings of 10 and 100 both appear in moderate categories) (147,148). The lack of a standardized Fatigue VAS limits comparisons between studies and makes replication across studies difficult, and validation is largely based on cumulative data on several differently phrased VASs. A standardized Fatigue VAS format developed with patients with RA, the BRAF-VAS, has been tested and found to be marginally less robust than the NRS versions. Therefore, in view of the other VAS concerns listed here, the NRS versions are recommended by the developers (see Bristol Rheumatoid Arthritis Fatigue Numeric Rating Scale) (29,30,147,148). However, evaluation of the BRAF short scales found that the NRS scored higher than the VAS, indicating that the two different PROM formats are not interchangeable (30).

Researchers should take note of studies with the pain VASs, which led to recommendations that VASs should be 100-mm long because VASs of less than 100 mm lead to greater error variance, a horizontal VAS should be used because they provide a more uniform distribution of scores than vertical VASs do, anchor wording should be at each end and not below or above the VAS, and end markers should be placed at right angles to the VAS (not arrows or other markers).

Clinical usability. The Fatigue VAS is easy to use in clinical practice to identify patients' concerns and responses to treatment.

Research usability. The Fatigue VAS is used in rheumatology research and provides a global fatigue score. A multidimensional assessment may provide a more complete picture and improve understanding of the clinical relationships between fatigue and, hence, potential treatment (23).

FUNCTIONAL ASSESSMENT OF CHRONIC ILLNESS THERAPY FATIGUE

Description

Purpose. The FACIT-F was developed in 1997 to measure fatigue in oncology patients with anemia, and it is a standalone (or add-on) questionnaire in the Functional Assessment in Cancer Therapy measurement system (5). This has since been widened to include assessment of chronic illnesses (FACIT measurement system). The current version of FACIT-F is version 4.

Content. The FACIT-F covers physical fatigue (eg, feeling tired), functional fatigue (eg, trouble finishing things), emotional fatigue (eg, frustration), and social consequences of fatigue (eg, fatigue limits social activity).

Number of items. Thirteen items produce a global score.

Response options. Five responses ranging from not at all to very much.

Recall period for items. The preceding week

Cost to use. No cost.

How to obtain. The FACIT-F can be obtained from the FACIT website after free registration at the following URL: http://www.facit.org/. English versions are free to use, but a fee is payable for non-English versions used in commercial studies.

Practical application

Method of administration. The FACIT-F is a patient self-report that is completed in person (pen and paper) or by telephone interviews.

Scoring. Items are scored from 0 to 4, with two positively phrased items that are reverse scored. Items are summed, divided by the number of items answered, and then multiplied by 13, therefore allowing for missing items. However, more than 50% of items must be answered (ie, at least seven items). Scoring instructions, including computerized versions, can be downloaded from the developers' website.

Score interpretation. Scores range from 0 to 52, with higher scores reflecting less fatigue. In terms of normative data, the mean score for 1010 healthy adults was 43.6 (SD 9.4) (149); this compares with 29.17 (SD 11.06) in patients with RA, 35.8 (SD 12.4) in patients with PsA, 25.7 (SD 12.0) in patients with SLE, and 30.1 in patients with primary SS (n = 631, 135, 80, and 277, respectively) (123,128,150,151).

Respondent time to complete. Three to four minutes.

Administrative burden. Time to score has not been reported.

Translations/adaptations. The FACIT-F is available in over 50 languages.

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Psychometric information

Floor and ceiling effects. Floor and ceiling effect data have not been reported in the rheumatology literature. However, item 7 ("I have energy") and item 10 ("I am too tired to eat") were intended to avoid the floor (item 10) and ceiling (item 7) effects (152).

Reliability. *Internal consistency.* Cronbach's α was good in RA (0.86-0.87 at three time points [n = 631]) and excellent in 0.96 in PsA (0.96 [n = 135]) (123,150).

Test-retest. The ICC over 1 week was 0.95 in patients with PsA (n = 73) (123).

Validity. *Content/face.* Items were generated by patients with cancer (5) but cover a range of fatigue issues common to patients with arthritis (5,20–22).

Comparison with other fatigue measures. In PsA (n = 135), the FACIT-F correlated with inflamed joint count (r = –0.43, 95% CI 0.56-0.28) but not with damaged joint count (r = 0.06, 95% CI 0.23-0.11), age, or disease duration (123). In RA (n = 505), FACIT-F correlated with disability (Health Assessment Questionnaire) and activity (DAS28) at r = –0.42 to –0.44 (153). FACIT-F scores were not statistically significantly different between patients with OA (n = 43) and those with primary SS (n = 71). Sleepiness was more strongly associated with the FACIT-F in patients with primary SS than in patients with OA (0.53 vs. 0.27) (154).

Construct. In RA, the FACIT-F correlated strongly with MAF at 0, 12, and 24 weeks of treatment (r = –0.84 to –0.88) and with the SF-36 VT (r = 0.73-0.84) (n = 567-631) (150). In PsA (n = 135), the correlation with the modified FSS was –0.79 (95% CI –0.85 to –0.72).Those patients responding positively to an anchor question on overwhelming fatigue had lower FACIT-F scores (ie, more severe fatigue) than those responding negatively (mean [SD] 34.9 [13.9] vs. 38.5 [1.4]; n = 135) (123).

Responsiveness. After 24 weeks of treatment, the FACIT-F showed a mean change of 2.1 in 631 patients with RA who did not achieve the American College of Rheumatology 20% criteria for improvement in disease activity (ACR20) (ES 0.19) compared with 12.4 in those who achieved the ACR70 (ES 1.13) (150). Sensitivity to change has also been shown in other anti-TNF trials in RA (155,156). In PsA, changes in the FACIT-F were similar to changes in the SF-36 VT (n = 313) (157).

Minimally important differences. An MCID of 3 to 4 points is generally used, which was calculated using 0.2 and 0.5 ES cutoffs for five groups (major worsening to major improvement) in 631 patients with RA receiving treatment and was then confirmed in a second study (n = 271) (52,150). On a normalized scale of 0 to 100 (rather than 0-52), others have proposed an MCID for RA of 15.9 points (42). In SLE (n = 80), based on linear regression analysis on comparative fatigue ratings from patients after paired interviews; the ES required for an average patient to move to a different fatigue category (ie, much, somewhat or a little, less or more fatigued) was calculated as 0.5 (95% CI 0.31-0.65), which the authors also presented as a FACIT-F MCID score of –5.9 (95% CI –8.1 to –3.6) (128).

Generalizability. The FACIT-F has been evaluated in RA and PsA and has been used in primary SS, OA, and SLE (42,123,128,150,153–157) as well as many long-term conditions (eg, MS, cancer, and neurologic disorders).

Use in clinical trials. This tool has been applied in observational studies as well as clinical trials.

Critical appraisal of overall value to the rheumatology community

Strengths. The FACIT-F is used across many rheumatologic conditions, particularly in pharmacologic trials. It covers a range of fatigue concepts in easy-to-understand language. The FACIT-F has good internal consistency and reliability, construct and criterion validity, and sensitivity to change.

Caveats and cautions. Cultural difficulties because of racially and ethnically diverse populations have an important impact on the reliability of this tool (158).

Clinical use. This instrument is frequently used in pharmacologic trials (155,156,159).

Research usability. This instrument gives a global score and has been widely used in rheumatological diseases (23).

MULTIDIMENSIONAL ASSESSMENT OF FATIGUE

Description

Purpose. The MAF was developed in 1991 to measure multiple dimensions of fatigue in adults with RA (160). It was a revision of the Piper's FS, which had been developed and tested in patients with cancer (161).

Content or domains. The MAF covers the following four dimensions of fatigue: severity, distress, interference in activities of daily living (chores, cooking, bathing, dressing, working, visiting, sexual activity, leisure, shopping, walking, and exercise), and frequency and change during the last week.

Number of items. Fifteen items provide a Global Fatigue Index (GFI). Question 16 ("To what extent has your fatigue changed during the last week?") does not contribute to the GFI.

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Response options/scale. The number of response options depends on the nature of each element. The original version used a VAS for items 1 and 4 to 14, but based on feedback from respondents, these were changed to an NRS ranging from 1 to 10 in 1995 (7). Points 1 (grade) and 4 to 14 (interference) have anchors of nothing to much, point 2 (severity) has anchors of light" to severe, and point 3 (distress) has anchors of no distress to extreme distress. Points 4 to 14 (interference with activities) provide an opportunity for respondents to indicate whether they are not carrying out the activity for reasons other than fatigue, and the point is not computed. Items 15 and 16 have four ordinal response options scored from one to four, with item 15 (frequency) ranging from almost no day to every day, and item 16 (change) ranging from decreased to increased.

Recall period for items. The preceding week.

How to obtain it. The developer, Basia Belza, holds the copyright to the MAF; the instrument can be downloaded from the website at https://maf.nursing.uw.edu or obtained by postal mail at the following address: Basia Belza, PhD, RN, Department of Nursing Systems and Biobehavorial Health, Box 357266, University of Washington, Seattle, WA 98195-7266.

Cost to use. A fee may be charged for commercial use.

Practical application

Method of administration. The MAF is a patient self-report completed with pen and paper.

Scoring. The MAF was developed to provide an added score, the GFI. If the respondent indicates no fatigue at all for item 1, all remaining items should be recorded as 0. Items 1 to 3 are added, items 4 to 14 are averaged but should not be recorded when the respondent indicates that he or she does not do an activity for reasons other than fatigue, and item 15 is transformed into a 0 to 10 scale by multiplying the score by 2.5. The GFI is calculated by adding these three components (sum of items 1-3, average of items 4-14, and transformed item 15). Item 16 (change) does not contribute to GFI, and it is graded from 1 to 4.

Score interpretation. The GFI ranges from 1 (no fatigue) to 50 (severe fatigue). A higher score represents a greater severity of fatigue, distress, or interference with activities of daily living. Item 16 (change) is scored from 1 (decreased fatigue) to 4 (increased fatigue). In terms of normative data, in healthy controls (n = 46), the mean (SD) GFI was 17.0 (11.3) (7). In patients with rheumatologic conditions, the mean GFI was 29.2 (SD 9.9) in RA, 32 (SD 20) in AS, 36.4 (SD 8.1) in FMS, 31.1 (SD 11.4) in SLE, and 27.7 (SD 10.8) in OA (n = 51-1636) (7,14,128,162,163).

Respondent time to complete. The author states that it takes 5 minutes or less to complete the MAF (164).

Administrative burden. The time to score has not been reported.

Translations/adaptations. The MAF was originally developed in American English. The Mapi Research Institute has versions in Spanish, Dutch, French, Mandarin, Croatian, Danish, Finnish, Czech, German, Turkish, Swedish, Afrikaans, Russian, Portuguese, Polish, Italian, Hungarian, Hebrew, and Norwegian. The translations were done using direct and back translations. The distribution of the MAF is managed by the Mapi Research Trust on behalf of Basia Belza, developer and copyright holder of the MAF. Contact Mapi Research Trust staff for information, translations, and permission to use (Mapi Research Trust, Lyon, France). The MAF is hosted in the Patient-Reported Outcome and Quality of Life Instruments Database (https://eprovide.mapi-trust.org/instruments/multidimensional-assessment-of-fatigue).

Psychometric information

Floor and ceiling effects. Floor and ceiling effects have not been reported in rheumatologic patients.

Reliability. *Internal consistency.* Cronbach's α for internal consistency was 0.93 in the original VAS version (n = 133 patients with RA), 0.92 for the final NRS version (n = 122 patients with RA), and 0.92 in patients with knee OA (n = 44) (165–167), which are all excellent values.

Test-retest. No significant change was reported in the MAF for three time points (intervals of 6 to 8 weeks) for patients with RA (n = 51) (101); in patients with cancer (n = 37), test-retest reliability was r = 0.87 for 48 hours (167).

Validity. *Content/face.* The MAF covers a variety of fatigue problems (severity, distress, interference with activities, frequency, and change) to create a GFI. The original factor analysis in RA (n = 35) showed that the 15 items comprising the GFI load in a single factor (all greater than 0.55) (160). A subsequent analysis in RA (n = 7760) indicated the following three factors: interference with recreational-type activities; interference with bathing/dressing; and frequency of fatigue, degree, severity, and distress, with four additional elements being loaded on all three factors equally (139).

Comparison with other fatigue measures. In RA, the MAF was strongly correlated with the fatigue and vigor subscales of the Mood Profile at 0.84 and –0.62, respectively (n = 51) (7), with a Fatigue VAS at 0.8 (n = 7760) (139) and an NRS of "annoying fatigue" at 0.69 (n = 48) (166). The correlation with the SF-36 VT was variable, from –0.79 in RA (n = 7760) to –0.54 in OA (n = 137), but was only –0.37 in AS (n = 68) (12,119,139).

Construct. In RA (n = 51), the MAF correlated with depression, pain, disability, and sleep (r = 0.47-0.58) and correlated very weakly with inflammatory markers (0.12) (7). The

MAF discriminated between patients with RA (n = 48) with and without a history of depression (34.3 [SD 10.0] vs. 28.8 [SD 9.5]) (166). In knee OA (n = 44), the MAF correlated with female sex, pain, depression, anxiety, and cardiorespiratory endurance (r = 0.52-0.62) but not with muscle fatigue (quadriceps) (r = 0.01) (168). In AS (n = 68), the MAF correlated moderately with pain and hemoglobin levels (0.39 and –0.38, respectively), weakly with the SF-36 mental health (–0.27) and weakly but not significantly with the emotional role of the SF-36 (–0.22) (12).

Responsiveness. In patients with RA (n = 631), after 24 weeks of treatment, the MAF showed a mean change of –2.1 in patients who did not meet ACR20 in disease activity (ES –0.18), compared with a mean change of –14.9 in those who did reach ACR70 (ES –1.25), similar to the findings for the FACIT-F and SF-36 VT (150). In patients with FMS (n = 267), after 8 weeks of esreboxetine, the MAF improved by –6.39 (SE 0.75) compared with –2.82 (SE 1.74) in placebo (162). Based on linear regression analysis on comparative fatigue ratings of patients after paired interviews, the required ES for an average patient to move to a different fatigue category (eg, much, somewhat or a little, less or more fatigued) was calculated as 0.75 in RA (n = 61) (42) and 0.45 (95% CI 0.25-0.61) in SLE (n = 80); the authors also present this as a MAF MCID score of 5.0 (95% CI 2.8-7.2) (128).

Minimally important differences. Nonparametric estimates for the MCID relative to "little more fatigue" tended to be smaller than those for "little less fatigue." The consistently positive values correspond with optimistic self-reference bias, although confidence intervals indicate that this is significant only for the MAF. The global MCID estimated by linear regression was 18.7 for the MAF (42).

Generalizability. Developed in RA, the MAF has also been used in other rheumatologic conditions, such as OA, AS, SLE, and FMS (7,42,119,128,150,162,163,165–171) as well as in other long-term conditions, such as human immunodeficiency virus (HIV), MS, cancer, chronic obstructive pulmonary disorder, coronary disease, breastfeeding, and the postpartum period. It has also been applied to healthy adults (7).

Use in clinical trials. This tool has been applied in observational studies as well as in clinical trials.

Critical appraisal of overall value to the rheumatology community

Strengths. The MAF is RA specific and covers numerous aspects of fatigue to produce an overall score. It has good internal consistency, construct and criterion validity, and reliability and is sensitive to change.

Caveats and cautions. Lack of reference to fatigue in the 11 items asking about interference with activities may reduce clarity for patients who can respond with respect to disability interference. Missing data have been reported as a problem (30,139). In RA (n = 271), the item response theory suggests that the MAF covers the mid-range of fatigue severity (wider than the SF-36 VT but slightly less than the FACIT-F) (150).

Clinical usability. The MAF is not used in clinical practice.

Research usability. The MAF produces an overall score based on a range of fatigue impacts. It has a reasonable administrative and participant burden, although scoring problems can arise when there is a large number of missing elements.

MULTIDIMENSIONAL FATIGUE INVENTORY

Description

Purpose. The MFI was originally developed to measure fatigue in patients with cancer (172,173). Published in 1995, it was initially evaluated in these patients, in those with CFS, and in healthy volunteers who might be physically tired (army recruits) or cognitively tired (junior physicians) (172).

Content or domains. The MFI covers domains of general fatigue, physical fatigue, activity, motivation, and mental fatigue.

Number of items. The MFI contains 20 items, producing five subscales of four items each (general fatigue, physical fatigue, reduced activity, reduced motivation, and mental fatigue). Creating a total score is discouraged by the developers.

Response options/scale. The original MFI-20 had seven response options (172), but this was revised to the current version with five response options following evaluation. The five checkboxes range from "yes, that's true" to "no, that's not true."

Recall period for items. This is stated as "lately."

Cost to use. The MFI is used free of charge for academic use. Charges for commercial use apply.

How to obtain. The MFI can be obtained from the developers by e-mail at emsmets@amc.uva.nl. It is also available by post at the following address: Ema Smets, PhD, Medical Psychology J3-220, Academic Medical Center, University of Amsterdam, PO Box 22660, 1100 DD Amsterdam, the Netherlands.

Practical application

Method of administration. The MFI is a patient self-report completed with pen and paper.

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Scoring. Items are scored from 1 to 5, with 10 items expressed positively. Elements of the subscale are added together to produce scores for general fatigue, physical fatigue, reduced activity, reduced motivation, and mental fatigue.

Score interpretation. Higher scores reflect greater severity.

Respondent time to complete. The time to complete has not been reported.

Administrative burden. The time to score has not been reported.

Translations/adaptations. The MFI has been translated into Chinese, Croatian, Czech, Danish, Dutch, Finnish, French, German, Italian, Korean, Lithuanian, Norwegian, Polish, Romanian, Spanish, and Swedish.

Psychometric information

Floor and ceiling effects. In patients with cancer (n = 116), 10.4% to 33.6% got the best possible score for different subscales (mental fatigue 33.6%), suggesting a potentially substantial ceiling effect; 4.5% to 15.7% got the worst possible score (reduced activity 15.7%), suggesting a lower, but still potentially important, floor effect (173). No data have been reported for rheumatology populations.

Reliability. *Internal consistency.* Cronbach's α for most subscales ranged from 0.85 to 0.89 in 82 patients with RA or primary SS, which are excellent values (174).

Test-retest. In AS and primary SS (n = 40 and 28, respectively), repeat administrations between 2 and 42 days gave ICCs of 0.57 to 0.85 across the subscales, which are good values (149,156). The ICC in patients with chronic widespread pain or FMS (n = 36) ranged from 0.75 to 0.92, also excellent values (175).

Validity. *Content/face.* The MFI covers five fatigue domains, which resonate with qualitative studies in rheumatology (2–4). In primary SS, 29 patients rated MFI fatigue coverage as a mean (SD) of 2.96 (0.6) on a scale of 1 to 4 (bad to very good) (176).

Comparison with other fatigue measures. In AS and RA (n = 812 and 490, respectively), four subscales correlated with the SF-36 VT (–0.53 to –0.74), whereas mental fatigue correlated less strongly (–0.42 and –0.4, respectively), supporting the MFI as a distinctive concept of fatigue (13,177). The correlations with a Fatigue VAS in RA and primary SS were strong for general fatigue (0.7 and 0.77, respectively), physical fatigue (0.67 and 0.72, respectively), and reduced activity (0.54 and 0.58, respectively) but were moderate for reduced motivation (0.31 and 0.53, respectively) and mental fatigue (0.34 and 0.39, respectively) (n = 48 and 490, respectively) (176,177). In FMS, the correlations with a Fatigue VAS were 0.62 for general fatigue, but ranged from 0.32 to 0.36 for the remaining subscales (n = 165) (175).

Construct. All subscales differentiated between fatigued and nonfatigued patients with AS (n = 415 and 361, respectively) compared on a VAS fatigue (13). All subscales differentiated between healthy women (n = 32) and women with RA (n = 44) but after controlling for depression, reduced motivation, and mental fatigue, it no longer differentiated patients from controls (178). Subscales correlated strongly with depression at r = 0.58 to 0.74 (reduced motivation 0.74) in RA (n = 44) (178). Inflammatory indices (erythrocyte sedimentation rate) were not associated with fatigue subscales in primary SS. However, in RA, disease activity scores were moderately associated with general fatigue, physical fatigue, and reduced activity at 0.42 to 0.47 (n = 49 and 44, respectively) (178). In RA, associations with the SF-36 pain were stronger for general fatigue, physical fatigue, and reduced activity (–0.51 to –0.61) than for mental fatigue and reduced motivation (–0.23 and –0.40, respectively) (n = 490) (177).

Responsiveness. Three studies report ESs. In 40 patients with AS randomized to receive spa therapy, ESs were 0.82 for general fatigue, 0.81 for physical fatigue, 0.28 for reduced activity, 0.52 for reduced motivation, and 0.38 for mental fatigue compared with 0.89 in a Fatigue VAS (13). In FMS (n = 1196), a significant improvement was observed in a total MFI score of 20 items after milnacipran (144). Using the total MFI score of 20 items (not recommended by the developers) and based on linear regression analysis in the comparative fatigue ratings of patients after paired interviews, the ES required for an average patient to move to a different fatigue category (ie, much, somewhat or a little, less or more fatigued) was calculated as 0.76 in RA (n = 61) (42).

Minimally important differences. The minimally important differences detected in patients with RA were 8.5% for improvement and 11.9% for fatigue worsening of the value of the MFI (42).

Generalizability. In addition to cancer and various long-term conditions (eg, Parkinson disease and liver disease), the MFI has been used in several studies in RA, FMS, AS, primary SS, SLE, antineutrophil cytoplasmic antibody–associated vasculitis (AAV), and large-vessel vasculitis (42,116,128,144,174–181).

Use in clinical trials. This tool has been applied in observational studies as well as in clinical trials.

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Critical appraisal of overall value to the rheumatology community

Strengths. The MFI provides a profile of five fatigue domains and has been used in several rheumatological conditions. Internal consistency and test-retest reliability show a range of results, whereas construct and criterion validity are good. Sensitivity to change was good for general and physical fatigue.

Caveats and cautions. A proportion of patients with cancer had minimum or maximum scores, suggesting that there may be significant ceiling and floor effects. Criterion validity was variable in all subscales. In rheumatology, the wording of some items ("physically, I can take a lot," "physically, I felt only able to do a little," and "physically, I felt I am in a bad condition") may be interpreted as related to disability or disease activity, and sensitivity to change was weak in some subscales.

Clinical usability. It has not been used in the clinical setting.

Research usability. The MFI is an easy scale to include in a package of questionnaires. However, possible floor and ceiling effects and the interpretation of some phraseology related to broader RA problems rather than fatigue should be considered.

MULTIDIMENSIONAL FATIGUE SYMPTOM INVENTORY SHORT FORM

Description

Purpose. MFSI is a self-report measure designed to assess the principal manifestations of fatigue for use with patients with cancer. It was published in 1998 (182).

Content or domains. The MFSI consists of both rationally and empirically derived subscales. The rationally derived subscales, which were developed based on expert assignment to categories, are designed to assess global, somatic, affective, cognitive, and behavioral manifestations of fatigue. The empirically derived subscales, which were developed using factor analysis, are considered to assess general, physical, emotional, and mental manifestations of fatigue as well as vigor (an estimate of the patient's energy level).

The SF of the MFSI yields scores only for the empirically derived subscales; it may be used as a substitute for the MFSI when time constraints and scale length are of concern (182,183).

Number of items. The MFSI has 83 items. The MFSI-SF has 30 items.

Response options/scale. Items are rated on a five-point scale indicating how true each statement was for the respondent (0 = not at all, 1 = a little, 2 = moderately, 3 = quite a bit, and 4 = extremely).

Recall period for items. The preceding week.

Cost to use. The MFSI is free to use.

How to obtain it. The questionnaire is available at http://www.cas.usf.edu/~jacobsen/FSI&MFSIpage.htm. Additional information can be obtained from Paul B. Jacobsen, PhD, Psychosocial Oncology Program, Moffitt Cancer Center and Research Institute, 12902 Magnolia Drive, Tampa, Florida 33612 (telephone: 813-979-3862; e-mail: jacobsen@moffitt.usf.edu).

Practical application

Method of administration. The MFSI is a patient self-report completed with pen and paper.

Scoring. The MFSI can be scored for both the rationally derived and empirically derived scales. The scoring for the rationally derived scales is as follows: global scale = sum of items 26, 35, 43, 45, 52, 54, 60, 62, 70, 71, and 78 divided by 11, and somatic scale = sum of items 1, 4, 9, 12, 14, 16, 18, 20, 25, 27, 37, 38, 42, 48, 51, 57, 68, 73, 74, 79, 82 divided by 21.

The scoring of MFSI-SF is as follows: general scale = sum of items 10, 12, 14, 17, 18, and 28; physical scale = sum of items 2, 4, 6, 16, 19, and 26; emotional scale = sum of items 3, 8, 13, 21, 23, and 30; mental scale = sum of items 1, 11, 15, 20, 25, and 27; vigor scale = sum of items 5, 7, 9, 22, 24, and 29; and the total score = (general + physical + emotional + mental) – vigor.

Score interpretation. Higher scores indicate more fatigue.

Respondent time to complete. The MFSI-SF takes approximately 5 minutes to complete; the MFSI takes approximately 10 minutes to complete (183).

Administrative burden. The time to score has not been reported.

Translations/adaptations. The MFSI is available in Chinese, English, and Spanish.

Psychometric information

Floor and ceiling effects. Floor and ceiling effects have not been reported.

Reliability. *Internal consistency.* Sixteen studies reported on the internal consistency reliability of the multi-item fatigue subscales. The following were reported on all five of the subscales: physical mean α = 0.84 (95% CI 0.81-0.86), general mean α = 0.93 (95% CI 0.91-0.95), mental mean α = 0.87

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

(95% CI 0.85-0. 90), emotional mean α = 0.90 (95% CI 0.87-0.94), and vigor mean α = 0.86 (95% CI 0.82-0.89). The mean Cronbach's α coefficient for total fatigue was 0.87 (95% CI 0.83-0.91) and ranged from 0.74 to 0.95 for the different subscales (184).

Test-retest. In the original study, the scales produced moderate correlations between assessments at 3- to 4-week intervals (mean 0.56, 95% CI 0.50-0.62) and 6- to 8-week intervals (mean 0.64, 95% CI 0.59-0.69) in a group of patients with breast cancer who were about to start active treatment or in the post-treatment period and in a control group without cancer. The test-retest correlation, for example, was r = 0.55, an acceptable value, for vigor between the first and second administration of the MFSI-SF and 0.64 between the first and third administration. Test-retest correlations for mental fatigue were 0.64 in the first interval and 0.70 in the second interval (184).

Validity. *Content/face.* The items cover a range of severity and impact of fatigue.

Comparison with other fatigue measures. The MFSI-SF fatigue subscales have been shown to be positively correlated with the POMS fatigue subscale, the FSI, and the fatigue item of the Bath AS Disease Activity Index. The correlation coefficients between the POMS fatigue subscale and the MFSI-SF fatigue subscales range from a good value of r = 0.62 with emotional fatigue to an excellent value of r = 0.88 with general fatigue. Correlations between the FSI and the MFSI-SF fatigue subscales range from a fair value of r = 0.36 between the FSI average fatigue item and emotional fatigue to a good value of r = 0.82 between the FSI average fatigue item and general fatigue (184,185).

Construct. In patients with allogeneic hematopoietic stem cell transplants and their caregivers, the MFSI-SF correlated with psychological distress (measured with the Distress Thermometer) and with depression and anxiety (measured with the Center for Epidemiological Studies Depression Scale [CES-D] and Hospital Anxiety and Depression Scale) (r = 0.51-0.56; $P < 0.001$) (186). For example, the mean correlation of total fatigue with the CES-D was r = 0.77 (95% CI 0.70-0.85), a good value. In the one study reporting associations with the STAI, correlation coefficients ranged from 0.51 to 0.80, which are good values (184). In patients with OA, the MFSI-SF correlated with depression measured with CES-D, with r = 0.77 to 0.82 (187).

Responsiveness. In a study of patients with FMS, the fatigue total score was significantly reduced because of effective treatment of training and practice of a brief focused breathing technique. Patients also evidenced significant improvements on general fatigue, physical fatigue, mental fatigue, and vigor (188).

Minimally important differences. No data could be found in rheumatological patients. In patients with cancer, the MCID identified ranged from 4.50 to 10.79 points (189).

Generalizability. The MFSI-SF has been used in FMS, OA, and AS (185,187,188).

Use in clinical trials. This tool has been applied in observational studies as well as clinical trials.

Critical appraisal of the overall value to the rheumatology community

Strengths. The instrument has thus far been used predominantly in patients with cancer. Results have also been reported in patients with other health conditions (eg, OA and FMS) as well as in individuals with no reported health conditions. The reliability of the MFSI-SF has been assessed primarily in terms of internal consistency and test-retest reliability. The mean Cronbach's α indicated good internal consistency. The test-retest reliability of the MFSI-SF suggested moderately strong reliability over time. There was good evidence for the concurrent validity of the fatigue and vigor subscales of the MFSI-SF. Studies generally reported moderate to high correlations between these MFSI-SF subscales and other measures commonly used.

Caveats and cautions. It has been mainly used and validated in patients with cancer.

Clinical usability. The available data suggest that the MFSI-SF is a useful tool for measuring fatigue.

Research usability. The data support the use of the MFSI-SF as an outcome measure in studies evaluating treatments likely to produce fatigue as well as studies testing interventions to prevent or relieve fatigue.

PROMIS FATIGUE SCALES

Description

Purpose. The PROMIS is a National Institute of Health Roadmap initiative to develop item banks (collections of questions) to measure patient-reported symptoms and other aspects of health-related QoL across various condition and disease populations. The PROMIS has developed numerous item banks including fatigue (190,191).

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Content or domains. Item banks and subsequent PROMIS SFs, or fixed-length questionnaires were developed. The PROMIS Fatigue item banks assess a range of self-reported symptoms, from mild subjective feelings of tiredness to an overwhelming, debilitating, and sustained sense of exhaustion that likely decreases one's ability to execute daily activities and function normally in family or social roles.

Number of items. There are several adult fatigue SFs, ranging in length from four to 13 items. There are also forms with 10 items for children and parent proxies. For the computer adaptive test (CAT) version, a minimum number of items (four for adult and adult cancer CATs and five for children and parent proxy CATs) must be answered in order to receive a score for the fatigue CAT. The response to the first item will guide the system's choice of the next item for the participant. The participant's response to the second item will dictate the selection of the following question and so on. As additional items are administered, the potential for error is reduced, and confidence in the respondent's score increases. The CAT will continue until either the SE drops below a specified level (on the T score metric 3.0 for adult and adult cancer CATs and 4.0 for children and parent proxy CATs) or the participant has answered the maximum number of questions (12), whichever occurs first.

Response options/scale. Response options are on a five-point Likert scale and are as follows: not at all, a little bit, somewhat, quite a bit, and very much.

Recall period for items. The preceding 7 days.

Cost for use. Free access to self- and proxy-report measures along with information to help users select, administer, score, and interpret measures.

How to obtain. Available on to HealthMeasures website at (https://www.healthmeasures.net/explore-measurement-systems/promis)

Practical application

Method of administration. PROMIS measures can be administered using CATs or static SFs administered by paper or telephone.

Scoring. Each question usually has five response options ranging in value from one to five. To find the total raw score for an SF with all questions answered, the values of the response to each question are summed up. For example, for the adult eight-item form, the lowest possible raw score is 8; the highest possible raw score is 40. All questions must be answered in order to produce a valid score using the scoring tables. If a participant has skipped a question, the HealthMeasures scoring service (https://www.assessmentcenter.net/ac_scoringservice) is used to generate a final score.

The applicable score conversion table in the scoring manual is located and used to translate the total raw score into a T score for each participant. The T score rescales the raw score into a standardized score with a mean of 50 and an SD of 10. Therefore, a person with a T score of 40 is 1 SD below the mean.

Score interpretation. For PROMIS T scores, a score of 50 is the average for the US general population, with an SD of 10. Higher scores reflect greater fatigue. To find out more about the calibration and centering samples visit the HealthMeasures website (http://www.healthmeasures.net/scoreand-interpret/interpret-scores/promis). The T score is provided with an error term (SE), which is a statistical measure of variance and represents the margin of error for the T score.

Respondent time to complete. The time to complete has not been reported.

Administrative burden. The time to grade has not been reported but is probably 2 to 3 minutes using the template. If a CAT is used, scoring is immediate.

Translation/adaptations. Translations following a process of forward and back-translation, multiple expert reviews, harmonization across languages, and cognitive debriefing with a sample of native speakers of the target language (linguistic validation) have been done. A universal approach to translation ensures that, whenever possible, one language version is created for multiple countries instead of country-specific versions of the same language. Spanish, Dutch, Portuguese (Brazil and Portugal), Korean, Hebrew, German, Chinese, Italian, Japanese, Afrikaans, Bengali, Bosnian, Bulgarian, Czech, Estonian, French, Greek, Creole, Hindi, Hungarian, Italian, Malaysian, Polish, Slovak, Turkish, Zulu, and Russian versions can be solicited from the developers.

Fatigue instruments are available for adults (ages 18 or more), pediatric self-report (ages 8-17) and for parents serving as proxy reporters for their child (ages 5-17).

Psychometric information

Floor and ceiling effects. On the seven-item PROMIS SF, 1% had scores at the lowest level (29.4) and highest (83.2) level. On the eight-item PROMIS SF, 6% were at the lowest level (33.1) and 7% at the highest level (77.7), whereas on the four-item PROMIS SF, 7% scores were at the lowest level (33.7) and 10% were at the highest level (75.8), well below the threshold of 15% for evidence of floor and ceiling effects (192). On the 29-item PROMIS SF in patients with RA, 5.5% were at the lowest (33.7) level and 9% were at the highest levels (75.8); in patients with OA, 1.9% were at the lowest level and 14.9% were at the highest level;

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

in patients with FM, 17.5% were at the lowest level and 2.1% were at the highest level; and in patients with SLE, 7.7% were at the lowest level and 9.7% were at the highest level (193).

Reliability. *Internal consistency.* Cronbach's α showed evidence of adequate reliability at the individual level for the seven-item PROMIS Fatigue SF (0.96) and eight-item PROMIS Fatigue SF (0.95) and at the group level for the four-item PROMIS Fatigue SF (0.84). ICCs between scales were 0.93 (95% CI 0.92-0.95) for the seven-item PROMIS Fatigue SF and the eight-item PROMIS Fatigue SF, 0.91 (95% CI 0.90-0.92) for the seven-item PROMIS Fatigue SF and the 4-item PROMIS Fatigue SF, and 0.98 (95% CI 0.98-0.99) for the eight-item PROMIS Fatigue SF and the four-item PROMIS Fatigue SF (192).

Test-retest. No test-retest data could be found.

Validity. *Content/face.* The PROMIS Fatigue SF asks about the intensity of fatigue and its impact on day-to-day function.

Comparison with other fatigue measures. In patients with RA, PROMIS Fatigue SF scores were strongly correlated with the RAND 36 Vitality and Fatigue NRS ($r \geq 0.85$). A range of strong correlations was also observed between the different PROMIS Fatigue SF scores ($r \geq 0.91$) (192).

Construct. In patients with RA, PROMIS Fatigue SF scores were strongly and negatively associated with physical function and participation ($r = -0.77$ to -0.78), and moderately to highly and positively correlated with pain, sleep, anxiety, and depression ($r = 0.60$-0.75). Associations were strongest between fatigue and other symptoms affected by worsening disease activity (pain, function, and participation). PROMIS Fatigue SF scores were moderately and directly correlated with the patient assessments of disease activity ($r = 0.56$-0.59) and weakly to moderately and directly with tender joint counts, assessments of disease activity, and clinical disease activity index ($r = 0.32$-0.50) but correlated only minimally with observable characteristics such as swollen joint counts and laboratory markers of inflammation ($r = 0.15$-0.22) (192).

Responsiveness. No data could be found.

Minimally important differences. No data could be found in rheumatological patients. In patients with cancer, the following are the recommended T score MCID ranges: 2.5 to 4.5 for the 17-item Fatigue score and 3.0 to 5.0 for the seven-item Fatigue score (194).

Generalizability. The PROMIS Fatigue SF has been used in RA, FMS, sickle cell disease, pregnancy, systemic sclerosis, SLE, overlap connective tissue diseases, AAV, OA, undifferentiated connective tissue disease, myositis, PsA, and healthy controls (191,192,195).

Use in clinical trials. This tool has been applied in observational studies as well as in clinical trials.

Critical appraisal of the overall value to the rheumatology community

Strengths. Scores on the PROMIS SFs showed evidence of adequate reliability at the group level and correlated highly with each other, other fatigue measures, and other PROMs that reflect disease activity supporting construct validity. The option to administer different subsets of test items via CAT or paper-based SFs reflects an important strength of using item response theory–derived measures. Other benefits to using PROMIS SFs to measure fatigue include the reduced item number compared with some other measures, which reduces respondent burden. The availability of US general population norms facilitates comparisons of scores with those of age- and sex-matched individuals. The PROMIS Fatigue SFs have been widely translated, facilitating their use in multilingual populations and multinational studies. Also, modules of PROMIS measures are also available for use in Epic electronic health records.

Caveats and cautions. Although attractive for use in many settings, CATs require the availability of the internet, computers, or mobile technology (eg, smartphones) and algorithms for real-time administration and scoring. Moreover, the use of CATs in international clinical trials would require that the complete item bank has undergone translation and cultural validation into multiple languages. Thus, in clinical trials and across health systems in which internet access to support CAT platforms may be limited, the use of fixed-item SFs may be preferable to ensure reliable collection of data. We could not examine responsiveness or change in fatigue in relation to treatments or other intervention because data to that effect are not available.

Clinical usability. The available data suggest that the PROMIS is a useful tool for measuring fatigue.

Research usability. The available data suggest that the PROMIS is a useful research tool to measure fatigue.

REVISED PIPER FATIGUE SELF-REPORT SCALE (PFS-R)

Description

Purpose. The PFS was developed to assess perceived fatigue in patients with chronic diseases such as cancer. The scale was originally developed in 1989 and was revised in 1998 (161,196).

Content or domains. The PFS-R consists of four dimensions of subjective fatigue. The subscales are behavioral/severity (six items), affective meaning (five items), sensory (five items), and cognitive/mood (six items). The behavioral/severity subscale

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

consists of items related to the impact and distress of fatigue on activities of daily living, the affective meaning subscale consists of items related to the emotional attributes of fatigue, the sensory subscale consists of items related to physical symptoms of fatigue, and the cognitive/mood subscale consists of items related to mental and mood status (161).

Number of items. The original PFS consisted of 40 questions (items). The PFS-R includes 22 questions, numerically scaled (161). Five additional items are not used to calculate subscale or total fatigue scores, but the authors recommend keeping them on the scale because they furnish qualitative data.

Response options/scale. Each of the 22 questions should be answered with a number that varies from 1 to 10. The smaller numbers indicate a strong disagreement with the statement, and the larger numbers indicate a strong agreement. Item 1, in particular, gives a categorical way in which to assess the duration of the respondent's fatigue. The other four items are open-ended questions.

Recall period for items. The PFS-R deals with the fatigue that the subject is experiencing "now."

Cost to use. Members of health care community can reproduce the scale for noncommercial use.

How to obtain. The questionnaire is available in the study. It is reprinted with permission (196).

Practical application

Method of administration. The PFS-R is a patient self-report completed with pen and paper.

Scoring. The total score varies from 0 to 10. Total and subscale mean scores are derived from summing up the individual items and dividing this value by the number of items in the subscale/total scale to maintain the 0 to 10 scaling. The severity codes are as follows: 0 = none, 1 to 3 = mild, 4 to 6 = moderate, and 7 to 10 = severe. In the case of missing item data, if the respondent has answered at least 75% to 80% of the remaining items on that particular subscale, the subscale mean score is calculated based on the number of items answered. The mean value is substituted for the missing item score.

Score interpretation. The higher scores correspond with higher fatigue levels.

Respondent time to complete. The time to complete has not been reported.

Administrative burden. The time to score has not been reported.

Translations/adaptations. Versions in Greek, French, Dutch, Swedish, and Portuguese (Brazilian) have been carried out.

Psychometric information

Floor and ceiling effects. No data are available on floor/ceiling effects in rheumatology.

Reliability. *Internal consistency.* The PFS has been reported in a study of 110 consecutive patients with cancer. Internal consistency was evaluated using Cronbach's α; for the entire PFS-R (22 items), it was 0.95, an excellent value (197).

Test-retest. In a study of patients with SLE, the test-retest reliability of PFS-R (22 items) was 0.92. Seven patients were studied over a 2-week interval (198).

Validity. *Content/face.* The items and their wording cover a multidimensional measure of cancer-related fatigue. Face and content of the items were determined by a literature review and a review by an 11-member national fatigue expert panel (161).

Comparison with other fatigue measures. The PFS had a significant correlation ($P \leq 0.001$) with the POMS (197). In a study of patients with cancer, Pearson's correlations of the PFS total fatigue score with the MFI and Rotterdam Symptom Checklist (RSCL) subscales were moderate (range 0.49-0.84). As expected, the PFS total fatigue score correlated highest with the MFI subscale for general fatigue (0.84) and lowest with the MFI subscale for mental fatigue (0.49) of the MFI. The PFS total fatigue score correlated well with the overall QoL score of the RSCL (0.74). The highest correlation with the RSCL was found between the PFS behavioral/severity subscale and the RSCL overall QoL score (0.78) (199).

Construct. In a study of patients with FMS, it was observed that the PFS scores were correlated with depression, anxiety, and poor quality of sleep (200).

Responsiveness. In a study examining the effects of exercise intervention on fatigue level among patients with SLE, there was a statistically significant difference between the study group and the control group regarding fatigue level post intervention; 54.3% and 40.0% of the study and the control groups,

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

respectively, experienced severe fatigue before the intervention compared with 17.1% and 31.4% post intervention (198).

Minimally important differences. The minimally important differences have not been reported.

Generalizability. The PFS has been used in patients with FMS and SLE (198,200).

Use in clinical trials. This tool has been applied in observational studies as well as clinical trials.

Critical appraisal of the overall value to the rheumatology community

Strengths. PFS analysis shows subscales of behavioral/severity, affective meaning, sensory, and cognitive/mood.

Caveats and cautions. As reviewed, most of the available validation information is from patients with cancer, and little information is available from patients with rheumatic conditions.

Clinical usability. The available data suggest that the PFS is not recommended until studies of internal consistency, reliability, and construct validity in rheumatologic patients become available.

Research usability. As for clinical usability, the PFS is not a recommended research tool to measure fatigue in rheumatologic patients.

PROFILE OF MOOD STATES - SUBSCALE FATIGUE (POMS-F)

Description

Purpose. The POMS is an instrument that measures mood. This measure was developed in the United States (Biehl and Landauer: unpublished observations). The POMS is mainly used in the context of clinical psychology, psychotherapy, medicine, and sports science. In the clinical context, it has been used in the fields of cardiology (201), oncology (202), neurology, and HIV research (203). Published in 1975, it was designed to measure mood. However, it may address some of the cognitive elements and overwhelming fatigue experienced by patients with RA.

Content or domains. The POMS covers domains of depression, anxiety, fatigue, vigor, irritability, tension, and confusion. For the development of the SF, the scales for confusion and tension were omitted, and the scales for anxiety and depression were combined into one scale.

Number of items. Originally, the POMS included 65 items that loaded on seven different scales (depression, anxiety, fatigue, vigor, irritability, tension, and confusion). In addition to the long version, an SF of the POMS is available. The 35 items load on four scales (depression/anxiety, fatigue, vigor, and irritability) (204). There is also a seven-item fatigue-inertia subscale of the POMS-F Inertia scale.

Response options/scale. The response scale is divided into five categories ranging from not at all to very strong. In the short version, the answer scale is divided into seven categories.

Recall period. The questions refer to the time period of the "last week including today." The short version refers to the last 24 hours or the last week.

Cost to use. The forms and manual have a cost.

How to obtain it. The questionnaire is under copyright and can be ordered online or by telephone from Multi-Health Systems, Inc (https://storefront.mhs.com/collections/poms-2).

Practical application

Method of administration. The POMS is a patient self-report completed with pen and paper.

Scoring. The POMS-F total scores range from 0 to 28. The instructions and scoring template can be downloaded from the developers' website.

Score interpretation. Higher scores reflect greater fatigue severity. The total fatigue score is 28.

Respondent time to complete. The test takes approximately 8 to 10 minutes for the long version and 3 to 5 minutes for the short version (205).

Administrative burden. The time to score has not been reported.

Translations/adaptations. The POMS is available in German, English, Japanese, French, Spanish, Portuguese, Malaysian, and Chinese.

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Psychometric information

Floor and ceiling effects. The floor effect was high in the domains of irritability and numbness for the modified POMS, but there were no ceiling effects; there are no data for the FS (206).

Reliability. *Internal consistency.* In patients with RA, the POMS had good internal consistency (Cronbach's α = 0.88, a good value) (207).

Test-retest. No test-retest data could be found.

Validity. *Content/face.* Items cover a range of fatigue impacts.

Comparison with other fatigue measures. The POMS-F has moderate or stronger inverse correlations ($r > -0.50$) between the SF-36 VT and FSI (201).

Construct. Nyenhuis et al (208) used the POMS in 400 healthy adults and 170 geriatric patients. The authors reported a good concordance with the depression and anxiety instruments Beck Depression Inventory (209) and the Brief STAI (210), respectively.

Responsiveness. Three dance- or exercise-based interventions revealed change in POMS, although this only approached significance (169,211,212), whereas in one of these interventions, the MAF showed significant change (169).

Minimally important differences. The MCID estimated by linear regression was 16.6 (42).

Generalizability. The POMS-F has been used in patients with SLE, AAV, and RA (213–215).

Use in clinical trials. This tool has been applied in observational studies.

Critical appraisal of the overall value to the rheumatology community

Strengths. The POMS-F is a widely used instrument and is easy to administer to patients and to be reviewed by interviewers.

Caveats and cautions. The POMS-F was not designed for rheumatological pathologies, and little information is available regarding its validity in such populations.

Clinical usability. The POMS-F is not used in the clinic setting.

Research usability. It may be a useful research tool to identify fatigue and response to treatment.

RHEUMATOID ARTHRITIS IMPACT OF DISEASE FATIGUE SUBSCALE

Description

Purpose. The RAID-F is a measure specifically designed for patients with RA, with the aim to assess the impact of its domains in patients' fatigue.

Content or domains. The RAID covers domains of pain, functional disability, fatigue, emotional well-being, physical well-being, sleep, and coping (216). The RAID-F includes only the fatigue item (217).

Number of items. The RAID-F is calculated based on an NRS question, assessed as a number between 0 and 10 (218).

Response options. Patients are instructed to circle the number that best describes each domain. The options range from "not fatigue" to "totally exhausted" (218).

Recall period for items. The preceding week.

Cost to use. No cost.

How to obtain. The RAID can be obtained from the European League Against Rheumatism website at https://www.eular.org/tools_products_.cfm.

Practical application

Method of administration. The RAID-F is a patient self-report completed on pen and paper.

Scoring. The RAID-F is calculated based on an NRS question and is assessed as a number between 0 and 10 (218).

Score interpretation. The range of the RAID-F value is 0 to 10, and higher figures indicate worse fatigue.

Respondent time to complete. The RAID-F usually takes less than 1 minute to complete.

Administrative burden. The time to score has not been reported.

Translations/adaptations. The RAID has been translated into over 70 languages (https://www.eular.org/tools_products_.cfm).

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Psychometric information

Floor and ceiling effects. In Heiberg et al, a weak floor effect was observed. The floor effect was the most pronounced for the sleep and coping components (219).

Reliability. The reliability of the RAID has been tested with the ICC (two-way model; single measure) with a 95% CI. Reliability was very high (ICC = 0.90; 95% CI 0.84-0.94), with mean (SD) scores of 3.8 (2.2) and 3.6 (1.9) at the first and second assessments (218).

Validity. *Content/face.* Items were generated by patients with RA and rheumatologists/health professionals (216,218).

Comparison with other fatigue measures. The RAID correlates with the physical and mental component summary measures of the SF-36 (r = –0.59 and $P < 0.001$ for both) (218).

Construct. The RAID correlated with patients' global disease activity (r = 0.76) and the DAS28 (r = 0.69) ($P < 0.001$ for both) (218).

Responsiveness. In disease-modifying antirheumatic drug–naive patients with RA (n = 230) who started a treat-to-target trial, responsiveness was high at 3 and 6 months (standardized response mean of more than 0.80) (220).

Minimally important differences. An MCID of 3 points has been defined (221). The sensitivity to change was good, and standardized response means were good (0.98; 95% CI 0.96-1.00) compared with the DAS28 (1.06; 95% CI 1.01-1.11) (218).The patient acceptable symptom state has a maximum of 2 points (221).

Generalizability. The RAID was developed for RA.

Use in clinical trials. This score has been used in RA clinical trials as a measure of their impact (218).

Critical appraisal of overall value to the rheumatology community

Strengths. The RAID-F has good internal consistency, reliability, and construct and criterion validity (216,218).

Caveats and cautions. More work is needed on the coping tool, regarding both the concept and the instrument (218). This issue is not easy to understand (222).

Clinical usability. The RAID has been used in registries (219) and also in national audits (223), both as a global score and for individualized goal setting in clinical practice, using its seven items individually instead of its global weighted score (224–226).

Research usability. The RAID has been used in RA clinical trials (227).

SHORT FORM 36 VITALITY

Description

Purpose. The SF-36 VT was developed to measure vitality, conceptualized as a single continuum from energy to fatigue, in general and in clinical populations; the complete SF-36 was first published in 1992 (228). The second version was published in 2000 (SF-36 version 2); in the SF-36 version 2, one vitality question has been reworded (from "full of pep" to "full of life"). The SF-12 version 2, a shorter version published at the same time, also includes a vitality subscale. Most publications do not state whether they have used the SF-36 VT or the reworded SF-36 version 2 VT.

Content or domains. The SF-36 VT covers energy (eg, feeling full of pep) and fatigue (eg, feeling worn out), whereas the SF-12 VT contains one item on energy.

Number of items. Original and revised versions have four items in the SF-36 VT (two on energy and two on fatigue) to produce a single score; the SF-12 VT has one item (energy).

Response options. In the original SF-36, the vitality subscale has six response options ranging from all of the time to none of the time. In the SF-36 version 2 and the SF-12 version 2, these have been reduced to five options to improve the psychometric performance (see developer's website at http:// www.sf-36.org/tools/sf36.shtml).

Recall period for items. The SF-36 is available in a standard form that uses a 4-week recall period and in an acute form that uses a 1-week recall period.

Cost to use. License fees are available on application and depend on whether the survey is used in a commercial or nonprofit setting. Manuals can also be purchased.

Practical application

Method of administration. The SF-36 is a patient self-report (229).

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Scoring. Items are summed for a total score, which can be transformed to a standard score.

Score interpretation. Scores range from 0 to 100, with higher scores representing less fatigue. In terms of normative data, age- and sex-based norms are available for many countries (229). Rheumatology studies report mean SF-36 VT scores for healthy controls of 57.4 and 62.2 (n = 77-606) (151,230). This compares with the SF-36 VT mean of 43.4 (SD 23.4) in RA, 43.0 (SD 24) in AS, 38.9 in primary SS, 35.9 (SD 23.1) in SLE, 27.1 (SD 21.1) in FMS, and 25.7 (SD 20.1) in PsA, although SDs are wide (n = 152-13722) (11,151,231). However, two studies report a higher vitality, one in patients with RA compared with in healthy controls, and in the other in patients with OA 2 to 10 years after joint arthroplasty (232,233).

Respondent time to complete. The SF-36 VT has only four items. However, if it is administered with the entire SF-36 questionnaire, this would take longer to complete. The format is not difficult to understand.

Administrative burden. Scoring the SF-36 VT is relatively quick, but it is rarely administered in isolation, and scoring the entire SF-36 is more complex and takes longer. Computerized systems are available for purchase from Quality Metric (229).

Translations/adaptations. The SF-36 VT is available in over 120 languages (229).

Psychometric information

Floor and ceiling effects. The SF-36 VT subscale has shown minimal floor and ceiling effects (0.1% and 0.3%, respectively) (234).

Reliability. *Internal consistency.* For the SF-36 VT, Cronbach's α was 0.84 to 0.88 over three time points in patients with RA (n = 631) (150), whereas in patients with OA (n = 62), all SF-36 domains, including the SF-36 VT, had a Cronbach's α of 0.75 to 0.94 (232).

Test-retest. In one OA study (n = 62; mean age 58 years, 2 to 10 years post arthroplasty), 4-week test-retest reliability of the SF-36 VT was r = 0.92 (232); in contrast, another OA study found very poor 1-week stability at r = 0.03 (n = 21; mean age 70 years) (235). In patients with RA (n = 150), the ICC for the SF-36 VT was excellent (0.91; 95% CI 0.86-0.94) over 2 weeks (236).

Validity. *Content/face.* The SF-36 VT covers both energy and fatigue, but these may not be opposite ends of a single continuum (237). Thus, although a person who is not fatigued would score 0 out of 100 on a scale containing four fatigue items, they could potentially score 50 on the SF-36 VT by answering no to both the energy and fatigue items because of a lack of energy rather than the presence of fatigue. In an RA study, the SF-36 version 2 VT items loaded across the following two separate factors: "full of life" and "lot of energy" loaded on a factor with items of feeling happy, peaceful, and healthy, whereas "feel tired" and "worn out" loaded on a factor with items of feeling down and feeling sad (n = 401) (237).

Comparison with other fatigue measures. Data on criterion validity in rheumatology populations are varied for the SF-36 VT. For example, correlation with the MAF ranges from very strong (0.79) in RA (139) to strong in OA (–0.54) (119) but only is moderate in AS (–0.37) (12). Correlation with a Fatigue VAS ranges from very strong (0.8) in RA (139) to strong (0.64) in AS (13). Correlation with the facet and domain scores of the Profile of Fatigue ranges from very strong (–0.84) to strong (–0.63) (in patients with primary SS; n = 50) (238), and correlation with the MDFI domains ranges from strong (0.73) to only moderate (0.42) (in patients with AS; n = 812) (13). In the evaluation of the BRAF-MDQ and its four subscales, correlations with the SF-36 VT were moderate to strong (–0.40 to –0.68), but in every instance, they were lower than the strong correlations between the BRAF and MAF or FACIT-F (–0.52 to –0.83) (30).

Construct. In patients with RA (n = 86), the SF-36 VT correlated strongly with disability (r = 0.56) and weakly to moderately with physician global assessment, patient global assessment, pain, tender joints, and inflammatory markers (–0.27 to –0.37) (239); its correlation with anxiety, depression, and helplessness is reported as 0.28 to 0.50 (n = 229) (30). The SF-36 VT discriminated between patients with RA with low versus moderate DAS28 but not between those with moderate versus high DAS28 (n = 200) (236).

Responsiveness. In patients with RA (n = 631) receiving 24 weeks of anti-TNF therapy, the SF-36 VT showed a mean improvement of 5.2 in patients who did not achieve an ACR20 for improvement in disease activity (ES 0.25) compared with 31.4 in those who achieved ACR70 (ES 1.52), which were similar to the changes demonstrated by the FACIT-F (150). In patients with PsA (n = 313), 24-week treatment with anti-TNF therapy produced a mean improvement of 12.8 (SD 21) compared with 1.7 (SD 19.1) in the placebo group (157). In patients with AS (n = 40) randomized to etanercept or placebo, the SF-36 VT showed an ES of 0.54 for treatment at 1 month and an ES of 0.69 at 4 months, whereas the FSS was not responsive at 1 month (ES 0.15) but showed a similar ES at 4 months (0.43) (126). In patients with OA of the hip (n = 135) and knee (n = 59) receiving total joint replacements, the SF-36 VT showed an ES of 1.0 and 0.6, respectively, at 6 months (240).

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Minimally important differences. A study of 80 patients reported significant levels of fatigue (mean normalized [0 = none; 100 = maximum] fatigue scores for seven instruments including the SF-36 VT). The MCID of normalized scores estimated by linear regression ranged from 7.0 (CFS) to 14.3 (MFI), with an SF-36 VT MCID score of –10.7 (95% CI –15.5 to –5.9) (128).

Generalizability. The SF-36 VT can be aggregated with other subscales to form the mental component summary score; in earlier literature, the SF-36 VT data were not always reported separately. However, recent evidence indicates that fatigue is a priority for rheumatology patients as well as patients with several other conditions (25,26). Thus, the SF-36 VT data are increasingly being provided. SF-36 VT reports in musculoskeletal studies include data from patients with RA, PsA, AS, primary SS, SLE, FMS, and OA (11,13,30,42,55 ,128,139,146,150,159,230,232,233,236,237,239,241–244). Only a few studies using the SF-12 could be found (all in OA), and these did not report the single vitality item separately. Overall, the SF-36 has been used in 14000 articles, and the revised SF-36 version 2 has been used in 260, as reported on the developer's website at the following URL: https://www.omicsonline.org/articles-images/2155-9562-6-323-t002.html.

Use in clinical trials. The SF-36 VT is a generic outcome measure in clinical trials of patients with several rheumatic and nonrheumatic disorders, including OA, RA, SLE, ulcerative colitis, primary SS, FMS, and AS, among others (245–250).

Critical appraisal of overall value to the rheumatology community

Strengths. The SF-36 VT has been used across many rheumatologic conditions and in many studies. Internal consistency, construct validity, and sensitivity are good. The SF-36 VT may be useful when wishing to compare fatigue with patients with other conditions and with healthy populations.

Caveats and cautions. In rheumatology populations, there are conceptual concerns over the assumption of fatigue and energy as opposite ends of a single continuum because energy is a positive health state rather than an absence of fatigue, which is supported by data demonstrating that the two energy and two fatigue items load on two separate factors. There are some reports that vitality is higher in patients with OA and RA than in healthy controls and reports of ceiling effects for the SF-36 VT, and item response theory suggests that the SF-36 VT may not capture higher levels of fatigue. Although criterion validity is good with the MAF and a Fatigue VAS in RA, there are a range of correlations with other fatigue PROMs in rheumatology populations, some as low as 0.37. The conflicting data on test-retest performance in rheumatology (ranging from 0.03-0.92) are concerning.

Clinical usability. It is not commonly used in clinical care (23).

Research usability. The SF-36 VT is frequently used in rheumatology research, providing a global fatigue score. However, the above caveats from data in rheumatology populations should be noted. If the entire SF-36 is being administered in order to capture many health domains to compare with other populations, then researchers may wish to consider whether an additional brief fatigue measure would be helpful (23).

CONCLUSIONS

Fatigue is a symptom experienced by many patients suffering from chronic diseases, including rheumatological patients. Because of differences in definition and measures of fatigue, varying prevalence rates have been reported. One study showed a prevalence of fatigue between 35% and 82% in different diseases (251). Disabling fatigue may have a major influence on the daily activities and the social and professional lives of patients and their relatives, resulting in a reduced QoL (177). Fatigue impacts the ability of patients to manage self-care; thus, its management is an important clinical goal. Most patients do not discuss fatigue with their clinicians, but when they do so, they feel the symptom is dismissed or only briefly addressed because physicians lack the tools to understand and manage this symptom (20). The main area of the use of fatigue scales is research because they are generally unwieldy to incorporate into the clinical setting. In any case, given that fatigue has a high prevalence and impact on QoL, it is important that this symptom should be considered within routine clinical evaluation.

Understanding the impact of fatigue in rheumatic disease conditions is important for patients and clinicians. Integrating fatigue assessment into the management of patients will help enhance the evaluation of their health experience and degree of disability. The level of fatigue can often not be explained by clinical parameters (10). In this light, the use of validated instruments allows for a more comprehensive assessment of the disease and the impact of any interventions.

Fatigue is a complex multidimensional symptom with subjective and objective components. The review of fatigue measures yields a wide array of tools with a varying number of items and differences in the dimensions of fatigue that they cover (eg, physical, cognitive, and emotional aspect) and in their psychometric properties. For example, some instruments include only physical fatigue, although emotional and psychosocial fatigue are also experienced by rheumatological patients. This may be, in part, why less is known about fatigue or how to manage it in this population.

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Whether multidimensional instruments of fatigue are needed has been discussed in the literature. For example, Lai et al (252) suggested that there is limited clinical value in measuring multidimensions of fatigue in patients with cancer. Although the multidimensional instruments offer the theoretical advantage of covering more aspects of fatigue, such as the cognitive or affective symptoms, the multidimensional instruments often take longer to complete, may be more expensive to use, and may contribute to participant burden when compared with single-dimensional instruments (253).

When designing a clinical research study, investigators must consider the strengths and weakness of the different fatigue measures. Studies of fatigue and the impact of interventions to reduce fatigue require the use of valid and reliable instruments. For example, the usefulness of any questionnaire in clinical management and research trials depends on its ability to indicate a likelihood of treatment success during follow-up. The MCID reflects a clinically relevant change score, but data available only for some measures. On the other hand, it is evident that because of ceiling and floor effects, the same scale may not be useful for all (eg, patients with terminal cancer and patients with newly diagnosed MS with subtle symptoms).

The use of multiple instruments across studies, with inappropriate or unvalidated scales, results in a lack of consistency in the components of fatigue measured and limits comparisons across studies. As a result, the prevalence and incidence of fatigue, as well as its impact in rheumatologic disorders, are less well established. Another challenge with the fatigue instruments as employed in these patients is the variability in the types of responses (eg, Likert and dichotomous). Thus, the ability to merge or harmonize data across studies is significantly impacted.

The following scales stand out in this review because they were developed and validated in specific rheumatological populations, leading us to recommend their use: the BRAF-MDQ and the BRAF-NRS in patients with RA; the FACIT and the FSS in patients with SLE, and the PROFAD-SSI in patients with primary SS.

The aim of this review was to determine the suitability of fatigue instruments that could be used in research in patients with rheumatological disorders. Each of these tools has shown variable psychometric validity. This review did not identify a scale or instrument that could be designated as the ideal fatigue instrument for use in patients with different rheumatological disorders. Ultimately, the selection of a fatigue measure should be tailored to the goals of the research.

AUTHOR CONTRIBUTIONS

All authors drafted the article, revised it critically for important intellectual content, and approved the final version to be published.

REFERENCES

1. Bengtsson C, Edstrom K, Furunes B, Sigurdsson JA, Tibblin G. Prevalence of subjectively experienced symptoms in a population sample of women with special reference to women with arterial hypertension. Scand J Prim Health Care 1987;5:155–62.
2. Chen MK. The epidemiology of self-perceived fatigue among adults. Prev Med 1986;15:74–81.
3. Lewis G, Wessely S. The epidemiology of fatigue: more questions than answers. J Epidemiol Community Health 1992;46:92–7.
4. Loge JH, Ekeberg O, Kaasa S. Fatigue in the general Norwegian population: normative data and associations. J Psychosom Res 1998;45:53–65.
5. Yellen SB, Cella DF, Webster K, Blendowski C, Kaplan E. Measuring fatigue and other anemia-related symptoms with the Functional Assessment of Cancer Therapy (FACT) measurement system. J Pain Symptom Manage 1997;13:63–74.
6. Cheng H, Gurland BJ, Maurer MS. Self-reported lack of energy (anergia) among elders in a multiethnic community. J Gerontol A Biol Sci Med Sci 2008;63:707–14.
7. Belza BL. Comparison of self-reported fatigue in rheumatoid arthritis and controls. J Rheumatol 1995;22:639–43.
8. Pollard LC, Choy EH, Gonzalez J, Khoshaba B, Scott DL. Fatigue in rheumatoid arthritis reflects pain, not disease activity. Rheumatology (Oxford) 2006;45:885–9.
9. Wolfe F, Hawley DJ, Wilson K. The prevalence and meaning of fatigue in rheumatic disease. J Rheumatol 1996;23:1407–17.
10. Repping-Wuts H, Fransen J, van Achterberg T, Bleijenberg G, van Riel P. Persistent severe fatigue in patients with rheumatoid arthritis. J Clin Nurs 2007;16:377–83.
11. Dagfinrud H, Vollestad NK, Loge JH, Kvien TK, Mengshoel AM. Fatigue in patients with ankylosing spondylitis: a comparison with the general population and associations with clinical and self-reported measures. Arthritis Rheum 2005;53:5–11.
12. Turan Y, Duruoz MT, Bal S, Guvenc A, Cerrahoglu L, Gurgan A. Assessment of fatigue in patients with ankylosing spondylitis. Rheumatol Int 2007;27:847–52.
13. Van Tubergen A, Coenen J, Landewe R, Spoorenberg A, Chorus A, Boonen A, et al. Assessment of fatigue in patients with ankylosing spondylitis: a psychometric analysis. Arthritis Rheum 2002;47:8–16.
14. Stebbings S, Herbison P, Doyle TC, Treharne GJ, Highton J. A comparison of fatigue correlates in rheumatoid arthritis and osteoarthritis: disparity in associations with disability, anxiety and sleep disturbance. Rheumatology (Oxford) 2010;49:361–7.
15. Chaudhuri A, Behan PO. Fatigue in neurological disorders. Lancet 2004;363:978–88.
16. Tanaka M, Watanabe Y. Supraspinal regulation of physical fatigue. Neurosci Biobehav Rev 2012;36:727–34.
17. Finsterer J, Mahjoub SZ. Fatigue in healthy and diseased individuals. Am J Hosp Palliat Care 2014;31:562–75.
18. Davis MP, Walsh D. Mechanisms of fatigue. J Support Oncol 2010;8:164–74.
19. Kluger BM, Krupp LB, Enoka RM. Fatigue and fatigability in neurologic illnesses: proposal for a unified taxonomy. Neurology 2013;80:409–16.
20. Hewlett S, Cockshott Z, Byron M, Kitchen K, Tipler S, Pope D, et al. Patients' perceptions of fatigue in rheumatoid arthritis: overwhelming, uncontrollable, ignored. Arthritis Rheum 2005;53:697–702.

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

21. Power JD, Badley EM, French MR, Wall AJ, Hawker GA. Fatigue in osteoarthritis: a qualitative study. BMC Musculoskelet Disord 2008;9:63.
22. Repping-Wuts H, Uitterhoeve R, van Riel P, van Achterberg T. Fatigue as experienced by patients with rheumatoid arthritis (RA): a qualitative study. Int J Nurs Stud 2008;45:995–1002.
23. Hewlett S, Dures E, Almeida C. Measures of fatigue: Bristol Rheumatoid Arthritis Fatigue Multi-Dimensional Questionnaire (BRAF MDQ), Bristol Rheumatoid Arthritis Fatigue Numerical Rating Scales (BRAF NRS) for severity, effect, and coping, Chalder Fatigue Questionnaire (CFQ), Checklist Individual Strength (CIS20R and CIS8R), Fatigue Severity Scale (FSS), Functional Assessment Chronic Illness Therapy (Fatigue) (FACIT-F), Multi-Dimensional Assessment of Fatigue (MAF), Multi-Dimensional Fatigue Inventory (MFI), Pediatric Quality Of Life (PedsQL) Multi-Dimensional Fatigue Scale, Profile of Fatigue (ProF), Short Form 36 Vitality Subscale (SF-36 VT), and Visual Analog Scales (VAS). Arthritis Care Res (Hoboken) 2011;63 Suppl 11:S263–86.
24. Kirwan JR, Hewlett SE, Heiberg T, Hughes RA, Carr M, Hehir M, et al. Incorporating the patient perspective into outcome assessment in rheumatoid arthritis: progress at OMERACT. J Rheumatol 2005;32:2250–6.
25. Kirwan JR, Minnock P, Adebajo A, Bresnihan B, Choy E, de Wit M, et al. Patient perspective: fatigue as a recommended patient centered outcome measure in rheumatoid arthritis. J Rheumatol 2007;34:1174–7.
26. Choy EH, Arnold LM, Clauw DJ, Crofford LJ, Glass JM, Simon LS, et al. Content and criterion validity of the preliminary core dataset for clinical trials in fibromyalgia syndrome. J Rheumatol 2009;36:2330–4.
27. Hewlett S, Chalder T, Choy E, Cramp F, Davis B, Dures E, et al. Fatigue in rheumatoid arthritis: time for a conceptual model. Rheumatology (Oxford) 2011;50:1004–6.
28. Whitehead L. The measurement of fatigue in chronic illness: a systematic review of unidimensional and multidimensional fatigue measures. J Pain Symptom Manage 2009;37:107–28.
29. Nicklin J, Cramp F, Kirwan J, Urban M, Hewlett S. Collaboration with patients in the design of patient-reported outcome measures: capturing the experience of fatigue in rheumatoid arthritis. Arthritis Care Res (Hoboken) 2010;62:1552–8.
30. Nicklin J, Cramp F, Kirwan J, Greenwood R, Urban M, Hewlett S. Measuring fatigue in rheumatoid arthritis: a cross-sectional study to evaluate the Bristol Rheumatoid Arthritis Fatigue Multi-Dimensional questionnaire, visual analog scales, and numerical rating scales. Arthritis Care Res 2010;62:1559–68.
31. Dures E, Kirwan J, Greenwood R, Cramp F, Hewlett S. Test-retest reliability of the Bristol Rheumatoid Arthritis Fatigue Scales [abstract]. Rheumatology (Oxford) 2011;50 Suppl 3:iii83–4.
32. Dures EK, Hewlett SE, Cramp FA, Greenwood R, Nicklin JK, Urban M, et al. Reliability and sensitivity to change of the Bristol Rheumatoid Arthritis Fatigue scales. Rheumatology (Oxford) 2013;52:1832–9.
33. Kirwan J, Coteur G, Dures E, Nicklin J, Bryson J, Hewlett S. Validity and responsiveness of the Bristol Rheumatoid Arthritis Fatigue Multidimensional Questionnaire (BRAF-MDQ) in a randomized controlled clinical trial. Value Health 2014;17:A568–9.
34. Sari F, Oskay D, Tufan A. Reliability, validity, and cross-cultural adaptation of the Turkish version of the Bristol Rheumatoid Arthritis Fatigue Multi-Dimensional Questionnaire. Clin Rheumatol 2018;37:1465–70.
35. Hewlett S, Kirwan J, Bode C, Cramp F, Carmona L, Dures E, et al. The revised Bristol Rheumatoid Arthritis Fatigue measures and the Rheumatoid Arthritis Impact of Disease scale: validation in six countries. Rheumatology (Oxford) 2018;57:300–8.
36. Feldthusen C, Dean E, Forsblad-d'Elia H, Mannerkorpi K. Effects of person-centered physical therapy on fatigue-related variables in persons with rheumatoid arthritis: a randomized controlled trial. Arch Phys Med Rehabil 2016;97:26–36.
37. Oude Voshaar MA, Ten Klooster PM, Bode C, Vonkeman HE, Glas CA, Jansen T, et al. Assessment of fatigue in rheumatoid arthritis: a psychometric comparison of single-item, multiitem, and multidimensional measures. J Rheumatol 2015;42:413–20.
38. Nicklin J, Cramp F, Kirwan J, Urban M, Hewlett S. Collaboration with patients in the design of patient-reported outcome measures: capturing the experience of fatigue in rheumatoid arthritis. Arthritis Care Res (Hoboken) 2010;62:1552–8.
39. Hewlett S, Kirwan J, Bode C, Cramp F, Carmona L, Dures E, et al. The revised Bristol Rheumatoid Arthritis Fatigue measures and the Rheumatoid Arthritis Impact of Disease scale: validation in six countries. Rheumatology (Oxford) 2018;57:300–8.
40. Hewlett S, Nicklin J, Bode C, Carmona L, Dures E, Engelbrecht M, et al. Translating patient reported outcome measures: methodological issues explored using cognitive interviewing with three rheumatoid arthritis measures in six European languages. Rheumatology (Oxford) 2016;55:1009–16.
41. Hewlett S, Hehir M, Kirwan JR. Measuring fatigue in rheumatoid arthritis: a systematic review of scales in use. Arthritis Rheum 2007;57:429–39.
42. Pouchot J, Kherani RB, Brant R, Lacaille D, Lehman AJ, Ensworth S, et al. Determination of the minimal clinically important difference for seven fatigue measures in rheumatoid arthritis. J Clin Epidemiol 2008;61:705–13.
43. Wells G, Li T, Maxwell L, MacLean R, Tugwell P. Determining the minimal clinically important differences in activity, fatigue, and sleep quality in patients with rheumatoid arthritis. J Rheumatol 2007;34:280–9.
44. Kos D, Duportail M, D'Hooghe M, Nagels G, Kerckhofs E. Multidisciplinary fatigue management programme in multiple sclerosis: a randomized clinical trial. Mult Scler 2007;13:996–1003.
45. Hewlett S, Almeida C, Ambler N, Blair PS, Choy E, Dures E, et al. Group cognitive-behavioural programme to reduce the impact of rheumatoid arthritis fatigue: the RAFT RCT with economic and qualitative evaluations. Health Technol Assess 2019;23:1–130.
46. Chalder T, Berelowitz G, Pawlikowska T, Watts L, Wessely S, Wright D, et al. Development of a fatigue scale. J Psychosom Res 1993;37:147–53.
47. Cella M, Chalder T. Measuring fatigue in clinical and community settings. J Psychosom Res 2010;69:17–22.
48. Naschitz JE, Rozenbaum M, Fields MC, Enis S, Manor H, Dreyfuss D, et al. Cardiovascular reactivity in fibromyalgia: evidence for pathogenic heterogeneity. J Rheumatol 2005;32:335–9.
49. Tench CM, McCurdie I, White PD, D'Cruz DP. The prevalence and associations of fatigue in systemic lupus erythematosus. Rheumatology (Oxford) 2000;39:1249–54.
50. Strombeck B, Ekdahl C, Manthorpe R, Jacobsson LT. Physical capacity in women with primary Sjogren's syndrome: a controlled study. Arthritis Rheum 2003;49:681–8.
51. Lwin CT, Bishay M, Platts RG, Booth DA, Bowman SJ. The assessment of fatigue in primary Sjogren's syndrome. Scand J Rheumatol 2003;32:33–7.
52. Henderson M, Kidd BL, Pearson RM, White PD. Chronic upper limb pain: an exploration of the biopsychosocial model. J Rheumatol 2005;32:118–22.

2151-4658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

53. Tench C, Bentley D, Vleck V, McCurdie I, White P, D'Cruz D. Aerobic fitness, fatigue, and physical disability in systemic lupus erythematosus. J Rheumatol 2002;29:474–81.
54. White PD, Henderson M, Pearson RM, Coldrick AR, White AG, Kidd BL. Illness behavior and psychosocial factors in diffuse upper limb pain disorder: a case-control study. J Rheumatol 2003;30:139–45.
55. Tench CM, McCarthy J, McCurdie I, White PD, D'Cruz DP. Fatigue in systemic lupus erythematosus: a randomized controlled trial of exercise. Rheumatology (Oxford) 2003;42:1050–4.
56. Stouten B. Identification of ambiguities in the 1994 chronic fatigue syndrome research case definition and recommendations for resolution. BMC Health Serv Res 2005;5:37.
57. Ali S, Matcham F, Irving K, Chalder T. Fatigue and psychosocial variables in autoimmune rheumatic disease and chronic fatigue syndrome: a cross-sectional comparison. J Psychosom Res 2017;92:1–8.
58. Tanaka M, Fukuda S, Mizuno K, Imai-Matsumura K, Jodoi T, Kawatani J, et al. Reliability and validity of the Japanese version of the Chalder Fatigue Scale among youth in Japan. Psychol Rep 2008;103:682–90.
59. Pottgen J, Moss-Morris R, Wendebourg JM, Feddersen L, Lau S, Kopke S, et al. Randomised controlled trial of a self-guided online fatigue intervention in multiple sclerosis. J Neurol Neurosurg Psychiatry 2018;89:970–6.
60. Vercoulen JH, Swanink CM, Fennis JF, Galama JM, van der Meer JW, Bleijenberg G. Dimensional assessment of chronic fatigue syndrome. J Psychosom Res 1994;38:383–92.
61. Van der Werf S PJ, Klein-Rouweler E, Alberts M, van der Meer J, Bleijenberg G. Homebound chronic fatigue syndrome patients. In: van der Werf SP, editor. Determinants and consequences of experienced fatigue in chronic fatigue syndrome and neurological conditions. Veenendaal (The Netherlands): Universal Press; 2003. p. 31–41.
62. Van Hoogmoed D, Fransen J, Bleijenberg G, van Riel P. Physical and psychosocial correlates of severe fatigue in rheumatoid arthritis. Rheumatology (Oxford) 2010;49:1294–302.
63. Zijlstra TR, Taal E, van de Laar MA, Rasker JJ. Validation of a Dutch translation of the fibromyalgia impact questionnaire. Rheumatology (Oxford) 2007;46:131–4.
64. Beurskens AJ, Bultmann U, Kant I, Vercoulen JH, Bleijenberg G, Swaen GM. Fatigue among working people: validity of a questionnaire measure. Occup Environ Med 2000;57:353–7.
65. van Koulil S, Kraaimaat FW, van Lankveld W, van Riel PL, Evers AW. A patient's perspective on multidisciplinary treatment gain for fibromyalgia: an indicator for pre-post treatment effects? [full-length article]. Arthritis Rheum 2009;61:1626–32.
66. Raterman HG, Hoving JL, Nurmohamed MT, Herenius MM, Sluiter JK, Lems WF, et al. Work ability: a new outcome measure in rheumatoid arthritis? [full-length article]. Scand J Rheumatol 2010;39:127–31.
67. Hoving JL, Bartelds GM, Sluiter JK, Sadiraj K, Groot I, Lems WF, et al. Perceived work ability, quality of life, and fatigue in patients with rheumatoid arthritis after a 6-month course of TNF inhibitors: prospective intervention study and partial economic evaluation. Scand J Rheumatol 2009;38:246–50.
68. Evers AW, Kraaimaat FW, van Riel PL, de Jong AJ. Tailored cognitive-behavioral therapy in early rheumatoid arthritis for patients at risk: a randomized controlled trial. Pain 2002;100:141–53.
69. Van der Werf SP, Jongen PJ, Lycklama a Nijeholt GJ, Barkhof F, Hommes OR, Bleijenberg G. Fatigue in multiple sclerosis: interrelations between fatigue complaints, cerebral MRI abnormalities and neurological disability. J Neurol Sci 1998;160:164–70.
70. Servaes P, van der Werf S, Prins J, Verhagen S, Bleijenberg G. Fatigue in disease-free cancer patients compared with fatigue in patients with chronic fatigue syndrome. Support Care Cancer 2001;9:11–7.
71. Van Herck M, Spruit MA, Burtin C, Djamin R, Antons J, Goertz YM, et al. Fatigue is highly prevalent in patients with asthma and contributes to the burden of disease. J Clin Med 2018;7:471.
72. Panitz S, Kornhuber M, Hanisch F. The checklist individual strength (CIS20-R) in patients with amyotrophic lateral sclerosis: a longitudinal study. Acta Neurol Scand 2015;131:372–80.
73. Korenromp IH, Heijnen CJ, Vogels OJ, van den Bosch JM, Grutters JC. Characterization of chronic fatigue in patients with sarcoidosis in clinical remission. Chest 2011;140:441–7.
74. Smits B, van den Heuvel L, Knoop H, Kusters B, Janssen A, Borm G, et al. Mitochondrial enzymes discriminate between mitochondrial disorders and chronic fatigue syndrome. Mitochondrion 2011;11:735–8.
75. Prins JB, Bleijenberg G, Bazelmans E, Elving LD, de Boo TM, Severens JL, et al. Cognitive behaviour therapy for chronic fatigue syndrome: a multicentre randomised controlled trial. Lancet 2001;357:841–7.
76. Vercoulen JH, Hommes OR, Swanink CM, Jongen PJ, Fennis JF, Galama JM, et al. The measurement of fatigue in patients with multiple sclerosis: a multidimensional comparison with patients with chronic fatigue syndrome and healthy subjects. Arch Neurol 1996;53:642–9.
77. Janse A, Worm-Smeitink M, Bleijenberg G, Donders R, Knoop H. Efficacy of web-based cognitive-behavioural therapy for chronic fatigue syndrome: randomised controlled trial. Br J Psychiatry 2018;212:112–8.
78. Knoop H, van der Meer JW, Bleijenberg G. Guided self-instructions for people with chronic fatigue syndrome: randomised controlled trial. Br J Psychiatry 2008;193:340–1.
79. Wiborg JF, van Bussel J, van Dijk A, Bleijenberg G, Knoop H. Randomised controlled trial of cognitive behaviour therapy delivered in groups of patients with chronic fatigue syndrome. Psychother Psychosom 2015;84:368–76.
80. Kim D-Y, Lee J-S, Park S-Y, Kim S-J, Son C-G. Systematic review of randomized controlled trials for chronic fatigue syndrome/myalgic encephalomyelitis (CFS/ME). J Transl Med 2020;18:7.
81. Michielsen HJ, de Vries J, Vvn Heck GL. Psychometric qualities of a brief self-rated fatigue measure: the Fatigue Assessment Scale. J Psychosom Res 2003;54:345–52.
82. Drent M, Lower EE, de Vries J. Sarcoidosis-associated fatigue. Eur Respir J 2012;40:255–63.
83. Michielsen HJ, de Vries J, Drent M, Peros-Golubicic T. Psychometric qualities of the Fatigue Assessment Scale in Croatian sarcoidosis patients. Sarcoidosis Vasc Diffuse Lung Dis 2005;22:133–8.
84. Brandal A, Eriksson M, Wester P, Lundin-Olsson L. Reliability and validity of the Swedish Fatigue Assessment Scale when self-administrered by persons with mild to moderate stroke. Top Stroke Rehabil 2016;23:90–7.
85. De Vries J, Michielsen HJ, van Heck GL. Assessment of fatigue among working people: a comparison of six questionnaires. Occup Environ Med 2003;60 Suppl 1:i10–5.
86. Rosa K, Fu M, Gilles L, Cerri K, Peeters M, Bubb J, et al. Validation of the Fatigue Severity Scale in chronic hepatitis C. Health Qual Life Outcomes 2014;12:90.
87. De Kleijn WP, de Vries J, Wijnen PA, Drent M. Minimal (clinically) important differences for the Fatigue Assessment Scale in sarcoidosis. Respir Med 2011;105:1388–95.

2151-4658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

88. Cumming TB, Mead G. Classifying post-stroke fatigue: optimal cut-off on the Fatigue Assessment Scale. J Psychosom Res 2017;103:147–9.
89. Giallo R, Wood CE, Jellett R, Porter R. Fatigue, wellbeing and parental self-efficacy in mothers of children with an autism spectrum disorder. Autism 2013;17:465–80.
90. Horisberger A, Courvoisier D, Ribi C. The Fatigue Assessment Scale as a simple and reliable tool in systemic lupus erythematosus: a cross-sectional study. Arthritis Res Ther 2019;21:80.
91. Goodwin E, Hawton A, Green C. Using the Fatigue Severity Scale to inform healthcare decision-making in multiple sclerosis: mapping to three quality-adjusted life-year measures (EQ-5D-3L, SF-6D, MSIS-8D). Health Qual Life Outcomes 2019;17:136.
92. Minnock P, Kirwan J, Bresnihan B. Fatigue is a reliable, sensitive and unique outcome measure in rheumatoid arthritis. Rheumatology (Oxford) 2009;48:1533–6.
93. Schwartz AL, Meek PM, Nail LM, Fargo J, Lundquist M, Donofrio M, et al. Measurement of fatigue: determining minimally important clinical differences. J Clin Epidemiol 2002;55:239–44.
94. Salaffi F, Sarzi-Puttini P, Girolimetti R, Gasparini S, Atzeni F, Grassi W. Development and validation of the self-administered Fibromyalgia Assessment Status: a disease-specific composite measure for evaluating treatment effect. Arthritis Res Ther 2009;11:R125.
95. Donovan KA, Jacobsen PB, Small BJ, Munster PN, Andrykowski MA. Identifying clinically meaningful fatigue with the Fatigue Symptom Inventory. J Pain Symptom Manage 2008;36:480–7.
96. Hann DM, Jacobsen PB, Azzarello LM, Martin SC, Curran SL, Fields KK, et al. Measurement of fatigue in cancer patients: development and validation of the Fatigue Symptom Inventory. Qual Life Res 1998;7:301–10.
97. Kirsh KL, Passik S, Holtsclaw E, Donaghy K, Theobald D. I get tired for no reason: a single item screening for cancer-related fatigue. J Pain Symptom Manage 2001;22:931–7.
98. Andrykowski MA, Schmidt JE, Salsman JM, Beacham AO, Jacobsen PB. Use of a case definition approach to identify cancer-related fatigue in women undergoing adjuvant therapy for breast cancer. J Clin Oncol 2005;23:6613–22.
99. Mendoza TR, Wang XS, Cleeland CS, Morrissey M, Johnson BA, Wendt JK, et al. The rapid assessment of fatigue severity in cancer patients: use of the Brief Fatigue Inventory. Cancer 1999;85:1186–96.
100. Donovan KA, Jacobsen PB. The Fatigue Symptom Inventory: a systematic review of its psychometric properties. Support Care Cancer 2010;19:169–85.
101. Brown LF, Kroenke K, Theobald DE, Wu J. Comparison of SF-36 vitality scale and Fatigue Symptom Inventory in assessing cancer-related fatigue. Supportive Care Cancer 2011;19:1255–9.
102. Nordin A, Taft C, Lundgren-Nilsson A, Dencker A. Minimal important differences for fatigue patient reported outcome measures-a systematic review. BMC Med Res Methodol 2016;16:62.
103. Hann DM, Denniston MM, Baker F. Measurement of fatigue in cancer patients: further validation of the Fatigue Symptom Inventory. Qual Life Res 2000;9:847–54.
104. Hann DM, Jacobsen PB, Martin SC, Kronish LE, Azzarello LM, Fields KK. Fatigue in women treated with bone marrow transplantation for breast cancer: a comparison with women with no history of cancer. Supportive Care Cancer 1997;5:44–52.
105. Katz P, Margaretten M, Trupin L, Schmajuk G, Yazdany J, Yelin E. Role of sleep disturbance, depression, obesity, and physical inactivity in fatigue in rheumatoid arthritis. Arthritis Care Res (Hoboken) 2016;68:81–90.
106. Henderson DC, Kunkel L, Nguyen DD, Borba CP, Daley TB, Louie PM, et al. An exploratory open-label trial of aripiprazole as an adjuvant to clozapine therapy in chronic schizophrenia. Acta Psychiatr Scand 2006;113:142–7.
107. Donovan KA, Jacobsen PB, Andrykowski MA, Winters EM, Balducci L, Malik U, et al. Course of fatigue in women receiving chemotherapy and/or radiotherapy for early stage breast cancer. J Pain Symptom Manage 2004;28:373–80.
108. Hacker ED, Ferrans CE. Ecological momentary assessment of fatigue in patients receiving intensive cancer therapy. J Pain Symptom Manage 2007;33:267–75.
109. Lai Y-H, Shun S-C, Hsiao Y-L, Chiou J-F, Wei L-L, Tsai J-T, et al. Fatigue experiences in hepatocellular carcinoma patients during six weeks of stereotactic radiotherapy. Oncologist 2007;12:221–30.
110. Siegel SD, Antoni MH, Fletcher MA, Maher K, Segota MC, Klimas N. Impaired natural immunity, cognitive dysfunction, and physical symptoms in patients with chronic fatigue syndrome: preliminary evidence for a subgroup? [full-length article]. J Psychosom Res 2006;60:559–66.
111. Krupp LB, LaRocca NG, Muir-Nash J, Steinberg AD. The fatigue severity scale: application to patients with multiple sclerosis and systemic lupus erythematosus. Arch Neurol 1989;46:1121–3.
112. Harboe E, Greve OJ, Beyer M, Goransson LG, Tjensvoll AB, Maroni S, et al. Fatigue is associated with cerebral white matter hyperintensities in patients with systemic lupus erythematosus. J Neurol Neurosurg Psychiatry 2008;79:199–201.
113. Schentag CT, Cichon J, MacKinnon A, Gladman DD, Urowitz MB. Validation and normative data for the 0–10 point scale version of the fatigue severity scale [abstract]. Arthritis Rheum 2000;43 Suppl 9:S117.
114. Schentag CT, Beaton M, Rahman P, Husted J, Gladman DD.Prevalence and correlates of fatigue in psoriatic arthritis (PsA) [abstract]. Arthritis Rheum 2000;43Suppl 9:S105.
115. Cross M, Lapsley H, Barcenilla A, Brooks P, March L. Association between measures of fatigue and health-related quality of life in rheumatoid arthritis and osteoarthritis. Patient 2008;1:97–104.
116. Ad Hoc Committee on Systemic Lupus Erythematosus Response Criteria for Fatigue. Measurement of fatigue in systemic lupus erythematosus: a systematic review. Arthritis Rheum 2007;57:1348–57.
117. Al-Sobayel HI, Al-Hugail HA, AlSaif RM, Albawardi NM, Alnahdi AH, Daif AM, et al. Validation of an Arabic version of Fatigue Severity Scale. Saudi Med J 2016;37:73–8.
118. Mattsson M, Moller B, Lundberg I, Gard G, Bostrom C. Reliability and validity of the Fatigue Severity Scale in Swedish for patients with systemic lupus erythematosus. Scand J Rheumatol 2008;37:269–77.
119. Schwartz JE, Jandorf L, Krupp LB. The measurement of fatigue: a new instrument. J Psychosom Res 1993;37:753–62.
120. Austin JS, Maisiak RS, Macrina DM, Heck LW. Health outcome improvements in patients with systemic lupus erythematosus using two telephone counseling interventions. Arthritis Care Res 1996;9:391–9.
121. Feng C, He Q, Wu Y, Hu X, Wu J, He X, et al. Psychometric properties of fatigue severity scale in Chinese systemic lupus erythematosus patients. Health Qual Life Outcomes 2019;17:71.
122. Lorentzen K, Danielsen MA, Kay SD, Voss A. Validation of the Fatigue Severity Scale in Danish patients with systemic lupus erythematosus. Dan Med J 2014;61:A4808.
123. Chandran V, Bhella S, Schentag C, Gladman DD. Functional assessment of chronic illness therapy-fatigue scale is valid in patients with psoriatic arthritis. Ann Rheum Dis 2007;66:936–9.
124. Omdal R, Mellgren SI, Koldingsnes W, Jacobsen EA, Husby G. Fatigue in patients with systemic lupus erythematosus: lack of

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

associations to serum cytokines, antiphospholipid antibodies, or other disease characteristics. J Rheumatol 2002;29:482–6.

125. Mancuso CA, Rincon M, Sayles W, Paget SA. Psychosocial variables and fatigue: a longitudinal study comparing individuals with rheumatoid arthritis and healthy controls. J Rheumatol 2006;33:1496–502.
126. Wanders AJ, Gorman JD, Davis JC, Landewe RB, van der Heijde DM. Responsiveness and discriminative capacity of the assessments in ankylosing spondylitis disease-controlling antirheumatic therapy core set and other outcome measures in a trial of etanercept in ankylosing spondylitis. Arthritis Rheum 2004;51:1–8.
127. Ramsey-Goldman R, Schilling EM, Dunlop D, Langman C, Greenland P, Thomas RJ, et al. A pilot study on the effects of exercise in patients with systemic lupus erythematosus. Arthritis Care Res 2000;13:262–9.
128. Goligher EC, Pouchot J, Brant R, Kherani RB, Avina-Zubieta JA, Lacaille D, et al. Minimal clinically important difference for 7 measures of fatigue in patients with systemic lupus erythematosus. J Rheumatol 2008;35:635–42.
129. Dernis-Labous E, Messow M, Dougados M. Assessment of fatigue in the management of patients with ankylosing spondylitis. Rheumatology (Oxford) 2003;42:1523–8.
130. Mengshoel AM, Forre O. Pain and fatigue in patients with rheumatic disorders. Clin Rheumatol 1993;12:515–21.
131. Riemsma RP, Rasker JJ, Taal E, Griep EN, Wouters JM, Wiegman O. Fatigue in rheumatoid arthritis: the role of self-efficacy and problematic social support. Br J Rheumatol 1998;37:1042–6.
132. Rohekar G, Pope J. Test-retest reliability of patient global assessment and physician global assessment in rheumatoid arthritis. J Rheumatol 2009;36:2178–82.
133. Khanna D, Pope JE, Khanna PP, Maloney M, Samedi N, Norrie D, et al. The minimally important difference for the fatigue visual analog scale in patients with rheumatoid arthritis followed in an academic clinical practice. J Rheumatol 2008;35:2339–43.
134. Slatkowsky-Christensen B, Mowinckel P, Loge JH, Kvien TK. Health-related quality of life in women with symptomatic hand osteoarthritis: a comparison with rheumatoid arthritis patients, healthy controls, and normative data. Arthritis Rheum 2007;57:1404–9.
135. Barlow JH, Turner AP, Wright CC. Long-term outcomes of an arthritis self-management programme. Br J Rheumatol 1998;37:1315–9.
136. Brekke M, Hjortdahl P, Kvien TK. Self-efficacy and health status in rheumatoid arthritis: a two-year longitudinal observational study. Rheumatology (Oxford) 2001;40:387–92.
137. Chiang E-P, Bagley PJ, Selhub J, Nadeau M, Roubenoff R. Abnormal vitamin B(6) status is associated with severity of symptoms in patients with rheumatoid arthritis. Am J Med 2003;114:283–7.
138. Wolfe F, Skevington SM. Measuring the epidemiology of distress: the rheumatology distress index. J Rheumatol 2000;27:2000–9.
139. Wolfe F. Fatigue assessments in rheumatoid arthritis: comparative performance of visual analog scales and longer fatigue questionnaires in 7760 patients. J Rheumatol 2004;31:1896–902.
140. Braun J, van der Heijde D, Doyle MK, Han C, Deodhar A, Inman R, et al. Improvement in hemoglobin levels in patients with ankylosing spondylitis treated with infliximab. Arthritis Rheum 2009;61:1032–6.
141. Colangelo KJ, Pope JE, Peschken C. The minimally important difference for patient reported outcomes in systemic lupus erythematosus including the HAQ-DI, pain, fatigue, and SF-36. J Rheumatol 2009;36:2231–7.
142. Kwok T, Pope JE. Minimally important difference for patient-reported outcomes in psoriatic arthritis: Health Assessment Questionnaire and pain, fatigue, and global visual analog scales. J Rheumatol 2010;37:1024–8.
143. Bellamy N. Musculoskeletal clinical metrology. Boston: Kluwer Academic Publishers; 1993.
144. Clauw DJ, Mease P, Palmer RH, Gendreau RM, Wang Y. Milnacipran for the treatment of fibromyalgia in adults: a 15-week, multicenter, randomized, double-blind, placebo-controlled, multiple-dose clinical trial. Clin Ther 2008;30:1988–2004.
145. Wolfe F. Determinants of WOMAC function, pain and stiffness scores: evidence for the role of low back pain, symptom counts, fatigue and depression in osteoarthritis, rheumatoid arthritis and fibromyalgia. Rheumatology (Oxford) 1999;38:355–61.
146. Wells G, Li T, Maxwell L, Maclean R, Tugwell P. Responsiveness of patient reported outcomes including fatigue, sleep quality, activity limitation, and quality of life following treatment with abatacept for rheumatoid arthritis. Ann Rheum Dis 2008;67:260–5.
147. Brazier J, Deverill M, Green C. A review of the use of health status measures in economic evaluation. J Health Serv Res Policy 1999;4:174–84.
148. Downie WW, Leatham PA, Rhind VM, Wright V, Branco JA, Anderson JA. Studies with pain rating scales. Ann Rheum Dis 1978;37:378–81.
149. Cella D, Lai JS, Chang CH, Peterman A, Slavin M. Fatigue in cancer patients compared with fatigue in the general United States population. Cancer 2002;94:528–38.
150. Cella D, Yount S, Sorensen M, Chartash E, Sengupta N, Grober J. Validation of the Functional Assessment of Chronic Illness Therapy Fatigue Scale relative to other instrumentation in patients with rheumatoid arthritis. J Rheumatol 2005;32:811–9.
151. Segal B, Bowman SJ, Fox PC, Vivino FB, Murukutla N, Brodscholl J, et al. Primary Sjogren's Syndrome: health experiences and predictors of health quality among patients in the United States. Health Qual Life Outcomes 2009;7:46.
152. Kosinski M, Gajria K, Fernandes A, Cella D. Qualitative validation of the FACIT-fatigue scale in systemic lupus erythematosus. Lupus 2013;22:422–30.
153. Mittendorf T, Dietz B, Sterz R, Kupper H, Cifaldi MA, von der Schulenburg JM. Improvement and longterm maintenance of quality of life during treatment with adalimumab in severe rheumatoid arthritis. J Rheumatol 2007;34:2343–50.
154. Walker J, Gordon T, Lester S, Downie-Doyle S, McEvoy D, Pile K, et al. Increased severity of lower urinary tract symptoms and daytime somnolence in primary Sjogren's syndrome. J Rheumatol 2003;30:2406–12.
155. Cohen SB, Emery P, Greenwald MW, Dougados M, Furie RA, Genovese MC, et al. Rituximab for rheumatoid arthritis refractory to anti-tumor necrosis factor therapy: results of a multicenter, randomized, double-blind, placebo-controlled, phase III trial evaluating primary efficacy and safety at twenty-four weeks. Arthritis Rheum 2006;54:2793–806.
156. Weinblatt ME, Keystone EC, Furst DE, Moreland LW, Weisman MH, Birbara CA, et al. Adalimumab, a fully human anti-tumor necrosis factor alpha monoclonal antibody, for the treatment of rheumatoid arthritis in patients taking concomitant methotrexate: the ARMADA trial. Arthritis Rheum 2003;48:35–45.
157. Gladman DD, Mease PJ, Cifaldi MA, Perdok RJ, Sasso E, Medich J. Adalimumab improves joint-related and skin-related functional impairment in patients with psoriatic arthritis: patient-reported outcomes of the Adalimumab Effectiveness in Psoriatic Arthritis Trial. Ann Rheum Dis 2007;66:163–8.
158. Meysami A, Yari H, Haghighat S, Montazeri A. The Functional Assessment of Chronic Illness Therapy - Fatigue (FACIT-Fatigue Subscale): validity and reliability of the Iranian version. Oncol Res Treat 2017;40:789–93.
159. Keystone E, Burmester GR, Furie R, Loveless JE, Emery P, Kremer J, et al. Improvement in patient-reported outcomes in a rituximab

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

trial in patients with severe rheumatoid arthritis refractory to anti-tumor necrosis factor therapy. Arthritis Rheum 2008;59:785–93.

160. Tack BB. Dimensions and correlates of fatigue in older adults with rheumatoid Arthritis. San Francisco: University of California, San Francisco; 1991.
161. Piper B, Lindsey A, Dodd M, Ferketich S, Paul S, Weller S. The development of an instrument to measure the subjective dimension of fatigue. In: Funk S, Tournquist E, Champagne M, Copp L, Weise R, editors. Key aspects of comfort: management of pain, fatigue, and nausea. New York: Springer; 1989. p.199–208).
162. Arnold LM, Zlateva G, Sadosky A, Emir B, Whalen E. Correlations between fibromyalgia symptom and function domains and patient global impression of change: a pooled analysis of three randomized, placebo-controlled trials of pregabalin. Pain Med 2011;12:260–7.
163. Ibn Yacoub Y, Amine B, Laatiris A, Abouqal R, Hajjaj-Hassouni N. Assessment of fatigue in Moroccan patients with ankylosing spondylitis. Clin Rheumatol 2010;29:1295–9.
164. Neuberger GB. Measures of fatigue: the Fatigue Questionnaire, Fatigue Severity Scale, Multidimensional Assessment of Fatigue Scale, and Short Form-36 Vitality (Energy/Fatigue) Subscale of the Short Form Health Survey. Arthritis Rheum 2003;49 Suppl 5:S175–83.
165. Belza BL, Henke CJ, Yelin EH, Epstein WV, Gilliss CL. Correlates of fatigue in older adults with rheumatoid arthritis. Nurs Res 1993;42:93–9.
166. Jump RL, Fifield J, Tennen H, Reisine S, Giuliano AJ. History of affective disorder and the experience of fatigue in rheumatoid arthritis. Arthritis Rheum 2004;51:239–45.
167. Meek PM, Nail LM, Barsevick A, Schwartz AL, Stephen S, Whitmer K, et al. Psychometric testing of fatigue instruments for use with cancer patients. Nurs Res 2000;49:181–90.
168. Bouzubar F. Self-reported fatigue in individuals with knee osteoarthritis [dissertation]. Pittsburgh (PA): Univ. of Pittsburgh; 2003.
169. Neuberger GB, Press AN, Lindsley HB, Hinton R, Cagle PE, Carlson K, et al. Effects of exercise on fatigue, aerobic fitness, and disease activity measures in persons with rheumatoid arthritis. Res Nurs Health 1997;20:195–204.
170. Arnold LM, Chatamra K, Hirsch I, Stoker M. Safety and efficacy of esreboxetine in patients with fibromyalgia: An 8-week, multicenter, randomized, double-blind, placebo-controlled study. Clin Ther 2010;32:1618–32.
171. Bahouq H, Rostom S, Bahiri R, Hakkou J, Aissaoui N, Hajjaj-Hassouni N. Psychometric evaluation of the Arabic version of the multidimensional assessment of fatigue scale (MAF) for use in patients with ankylosing spondylitis. Rheumatol Int 2012;32:3969–76.
172. Smets EM, Garssen B, Bonke B, De Haes JC. The Multidimensional Fatigue Inventory (MFI) psychometric qualities of an instrument to assess fatigue. J Psychosom Res 1995;39:315–25.
173. Smets EM, Garssen B, Cull A, de Haes JC. Application of the multidimensional fatigue inventory (MFI-20) in cancer patients receiving radiotherapy. Br J Cancer 1996;73:241–5.
174. Goodchild CE, Treharne GJ, Booth DA, Kitas GD, Bowman SJ. Measuring fatigue among women with Sjogren's syndrome or rheumatoid arthritis: a comparison of the Profile of Fatigue (ProF) and the Multidimensional Fatigue Inventory (MFI). Musculoskeletal Care 2008;6:31–48.
175. Ericsson A, Mannerkorpi K. Assessment of fatigue in patients with fibromyalgia and chronic widespread pain: reliability and validity of the Swedish version of the MFI-20. Disabil Rehabil 2007;29:1665–70.
176. D'Elia HF, Rehnberg E, Kvist G, Ericsson A, Konttinen YT, Mannerkorpi K. Fatigue and blood pressure in primary Sjögren's syndrome. Scand J Rheumatol 2008;37:284–92.
177. Rupp I, Boshuizen HC, Jacobi CE, Dinant HJ, van den Bos GA. Impact of fatigue on health-related quality of life in rheumatoid arthritis. Arthritis Rheum 2004;51:578–85.
178. Barendregt PJ, Visser MR, Smets EM, Tulen JH, van den Meiracker AH, Boomsma F, et al. Fatigue in primary Sjogren's syndrome. Ann Rheum Dis 1998;57:291–5.
179. Pearson NA, Packham JC, Tutton E, Parsons H, Haywood KL. Assessing fatigue in adults with axial spondyloarthritis: a systematic review of the quality and acceptability of patient-reported outcome measures. Rheumatol Adv Pract 2018;2:rky017.
180. Rimland CA, Quinn KA, Rosenblum JS, Schwartz MN, Gribbons KB, Novakovich E, et al. Outcome measures in large-vessel vasculitis: relationship between patient, physician, imaging, and laboratory-based assessments. Arthritis Care Res (Hoboken) 2019. E-pub ahead of print.
181. Tuin J, Sanders JS, Buhl BM, van Beek AP, Stegeman CA. Androgen deficiency in male patients diagnosed with ANCA-associated vasculitis: a cause of fatigue and reduced health-related quality of life? [full-length article]. Arthritis Res Ther 2013;15:R117.
182. Stein KD, Martin SC, Hann DM, Jacobsen PB. A multidimensional measure of fatigue for use with cancer patients. Cancer Pract 1998;6:143–52.
183. Stein KD, Jacobsen PB, Blanchard CM, Thors C. Further validation of the multidimensional fatigue symptom inventory-short form. J Pain Symptom Manag 2004;27:14–23.
184. Donovan KA, Stein KD, Lee M, Leach CR, Ilozumba O, Jacobsen PB. Systematic review of the multidimensional fatigue symptom inventory-short form. Support Care Cancer 2015;23:191–212.
185. Gunaydin R, Goksel Karatepe A, Cesmeli N, Kaya T. Fatigue in patients with ankylosing spondylitis: relationships with disease-specific variables, depression, and sleep disturbance. Clin Rheumatol 2009;28:1045–51.
186. Bevans M, Wehrlen L, Prachenko O, Soeken K, Zabora J, Wallen GR. Distress screening in allogeneic hematopoietic stem cell (HSCT) caregivers and patients. Psychooncology 2011;20:615–22.
187. Hawker GA, Gignac MA, Badley E, Davis AM, French MR, Li Y, et al. A longitudinal study to explain the pain-depression link in older adults with osteoarthritis. Arthritis Care Res (Hoboken) 2011;63:1382–90.
188. Schmidt J, Joyner M, Tonyan H, Reid K, Hooten W. Psychological and physiological correlates of a brief intervention to enhance self-regulation in patients with fibromyalgia. J Musculoskelet Pain 2012;20.
189. Chan A, Yo TE, Wang XJ, Ng T, Chae J-W, Yeo HL, et al. Minimal clinically important difference of the Multidimensional Fatigue Symptom Inventory-Short Form (MFSI-SF) for fatigue worsening in Asian breast cancer patients. J Pain Symptom Manag 2018;55:992–7.
190. Doward LC, Gnanasakthy A, Baker MG. Patient reported outcomes: looking beyond the label claim. Health Qual Life Outcomes 2010;8:89.
191. Ameringer S, Elswick RK, Menzies V, Robins JL, Starkweather A, Walter J, et al. Psychometric evaluation of the Patient-Reported Outcomes Measurement Information System Fatigue-Short Form across diverse populations. Nurs Res 2016;65:279–89.
192. Bingham Iii CO, Gutierrez AK, Butanis A, Bykerk VP, Curtis JR, Leong A, et al. PROMIS Fatigue short forms are reliable and valid in adults with rheumatoid arthritis. J Patient Rep Outcomes 2019;3:14.
193. Katz P, Pedro S, Michaud K. Performance of the Patient-Reported Outcomes Measurement Information System 29-Item Profile in rheumatoid arthritis, osteoarthritis, fibromyalgia, and systemic lupus erythematosus. Arthritis Care Res (Hoboken) 2017;69:1312–21.

2151-4658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

194. Yost KJ, Eton DT, Garcia SF, Cella D. Minimally important differences were estimated for six Patient-Reported Outcomes Measurement Information System-Cancer scales in advanced-stage cancer patients. J Clin Epidemiol 2011;64:507–16.
195. Nagaraja V, Mara C, Khanna PP, Namas R, Young A, Fox DA, et al. Establishing clinical severity for PROMIS® measures in adult patients with rheumatic diseases. Qual Life Res 2018;27:755–64.
196. Piper BF, Dibble SL, Dodd MJ, Weiss MC, Slaughter RE, Paul SM. The revised Piper Fatigue Scale: psychometric evaluation in women with breast cancer. Oncol Nurs Forum 1998;25:677–84.
197. Annunziata MA, Muzzatti B, Mella S, Narciso D, Giacalone A, Fratino L, et al. The revised piper fatigue scale (PFS-R) for Italian cancer patients: a validation study. Tumori 2010;96:276–81.
198. Kamel F, El-Mokadem NM, Latif OM, Soud AA. Effectiveness of exercises on fatigue level in patients with systemic lupus erythematosus. Am J Nurs Res 2018;6:398–406.
199. Dagnelie PC, Pijls-Johannesma MC, Pijpe A, Boumans BJ, Skrabanja AT, Lambin P, et al. Psychometric properties of the revised Piper Fatigue Scale in Dutch cancer patients were satisfactory. J Clin Epidemiol 2006;59:642–9.
200. Pernambuco AP, da Silva LR, Fonseca AC, d'Avila Reis D. Clinical profile of patients with fibromyalgia syndrome. Fisioter Mov 2017;30:287–96.
201. Fink AM, Eckhardt AL, Fennessy MM, Jones J, Kruse D, VanderZwan KJ, et al. Psychometric properties of three instruments to measure fatigue with myocardial infarction. West J Nurs Res 2010;32:967–83.
202. Braslis KG, Santa-Cruz C, Brickman AL, Soloway MS. Quality of life 12 months after radical prostatectomy. Br J Urol 1995;75:48–53.
203. Schag CA, Ganz PA, Kahn B, Petersen L. Assessing the needs and quality of life of patients with HIV infection: development of the HIV Overview of Problems-Evaluation System (HOPES). Qual Life Res 1992;1:397–413.
204. Shacham S. A shortened version of the Profile of Mood States. J Pers Assess 1983;47:305–6.
205. Curran S, Andrykowski M, Studts J. Short form of the Profile of Mood States (POMS-SF): Psychometric information. Psychol Assess 1995;7:80–3.
206. Morfeld M, Petersen C, Kruger-Bodeker A, von Mackensen S, Bullinger M. The assessment of mood at workplace: psychometric analyses of the revised Profile of Mood States (POMS) questionnaire. Psychosoc Med 2007;4.
207. Jamison M, Neuberger GB, Miller PA. Correlates of falls and fear of falling among adults with rheumatoid arthritis. Arthritis Rheum 2003;49:673–80.
208. Nyenhuis DL, Yamamoto C, Luchetta T, Terrien A, Parmentier A. Adult and geriatric normative data and validation of the profile of mood states. J Clin Psychol 1999;55:79–86.
209. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. Arch Gen Psychiatry 1961;4:561–71.
210. Spielberger CD, O'Neil HF, Hansen DN. Anxiety, drive theory, and computer-assisted learning. Prog Exp Pers Res 1972;6:109–48.
211. Noreau L, Martineau H, Roy L, Belzile M. Effects of a modified dance-based exercise on cardiorespiratory fitness, psychological state and health status of persons with rheumatoid arthritis. Am J Phys Med Rehabil 1995;74:19–27.
212. Perlman SG, Connell KJ, Clark A, Robinson MS, Conlon P, Gecht M, et al. Dance-based aerobic exercise for rheumatoid arthritis. Arthritis Care Res 1990;3:29–35.
213. Yun J-D, Ha J, Kim S, Park HA, Yoo J, Ahn SS, et al. Predictor of depressive disorders in patients with antineutrophil cytoplasmic antibody-associated vasculitis. Clin Rheumatol 2019;38:3485–91.
214. Choi ST, Kang JI, Park IH, Lee YW, Song JS, Park YB, et al. Subscale analysis of quality of life in patients with systemic lupus erythematosus: association with depression, fatigue, disease activity and damage. Clin Exp Rheumatol 2012;30:665–72.
215. Vadacca M, Bruni R, Terminio N, Sambataro G, Margiotta D, Serino FM, et al. Alexithymia, mood states and pain experience in systemic lupus erythematosus and rheumatoid arthritis. Clin Rheumatol 2014;33:1443–50.
216. Gossec L, Dougados M, Rincheval N, Balanescu A, Boumpas DT, Canadelo S, et al. Elaboration of the preliminary Rheumatoid Arthritis Impact of Disease (RAID) score: a EULAR initiative. Ann Rheum Dis 2009;68:1680–5.
217. Santos EJ, Duarte C, da Silva JA, Ferreira RJ. The impact of fatigue in rheumatoid arthritis and the challenges of its assessment. Rheumatology (Oxford) 2019;58 Suppl 5:v3–9.
218. Gossec L, Paternotte S, Aanerud GJ, Balanescu A, Boumpas DT, Carmona L, et al. Finalisation and validation of the rheumatoid arthritis impact of disease score, a patient-derived composite measure of impact of rheumatoid arthritis: a EULAR initiative. Ann Rheum Dis 2011;70:935–42.
219. Heiberg T, Austad C, Kvien TK, Uhlig T. Performance of the Rheumatoid Arthritis Impact of Disease (RAID) score in relation to other patient-reported outcomes in a register of patients with rheumatoid arthritis. Ann Rheum Dis 2011;70:1080–2.
220. Holten K, Sexton J, Kvien TK, Aga A-B, Haavardsholm EA. Comparative analyses of responsiveness between the Rheumatoid Arthritis Impact of Disease score, other patient-reported outcomes and disease activity measures: secondary analyses from the ARCTIC study. RMD Open 2018;4:e000754.
221. Dougados M, Brault Y, Logeart I, van der Heijde D, Gossec L, Kvien T. Defining cut-off values for disease activity states and improvement scores for patient-reported outcomes: the example of the Rheumatoid Arthritis Impact of Disease (RAID). Arthritis Res Ther 2012;14:R129.
222. Holtzman S, Newth S, Delongis A. The role of social support in coping with daily pain among patients with rheumatoid arthritis. J Health Psychol 2004;9:677–95.
223. Ledingham JM, Snowden N, Rivett A, Galloway J, Ide Z, Firth J, et al. Patient- and clinician-reported outcomes for patients with new presentation of inflammatory arthritis: observations from the National Clinical Audit for Rheumatoid and Early Inflammatory Arthritis. Rheumatology (Oxford) 2017;56:231–8.
224. Gullick NJ, Scott DL. Rheumatoid arthritis: clinical utility of the RAID (RA impact of disease) score. Nat Rev Rheumatol 2011;7:499–500.
225. Ferreira RJ, Dougados M, Kirwan JR, Duarte C, de Wit M, Soubrier M, et al. Drivers of patient global assessment in patients with rheumatoid arthritis who are close to remission: an analysis of 1588 patients. Rheumatology (Oxford) 2017;56:1573–8.
226. Boers M. RAID: a valid tool to quantify the impact of rheumatoid arthritis: but what impact will it have on the core set for trials? [editorial]. Ann Rheum Dis 2011;70:884–5.
227. Strand V, Reaney M, Chen CI, Proudfoot CW, Guillonneau S, Bauer D, et al. Sarilumab improves patient-reported outcomes in rheumatoid arthritis patients with inadequate response/intolerance to tumour necrosis factor inhibitors. RMD Open 2017;3:e000416.
228. Ware JE, Sherbourne CD. The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. Med Care 1992;30:473–83.
229. Busija L, Pausenberger E, Haines TP, Haymes S, Buchbinder R, Osborne RH. Adult measures of general health and health-related quality of life: Medical Outcomes Study Short Form 36-Item (SF-36) and Short Form 12-Item (SF-12) Health Surveys, Nottingham Health Profile (NHP), Sickness Impact Profile (SIP), Medical

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Outcomes Study Short Form 6D (SF-6D), Health Utilities Index Mark 3 (HUI3), Quality of Well-Being Scale (QWB), and Assessment of Quality of Life (AQoL). Arthritis Care Res (Hoboken) 2011;63 Suppl 11:S383–412.

230. Gilboe IM, Kvien TK, Husby G. Disease course in systemic lupus erythematosus: changes in health status, disease activity, and organ damage after 2 years. J Rheumatol 2001;28:266–74.
231. Wolfe F, Michaud K, Li T, Katz RS. EQ-5D and SF-36 quality of life measures in systemic lupus erythematosus: comparisons with rheumatoid arthritis, noninflammatory rheumatic disorders, and fibromyalgia. J Rheumatol 2010;37:296–304.
232. Soderman P, Malchau H. Validity and reliability of Swedish WOMAC osteoarthritis index: a self-administered disease-specific questionnaire (WOMAC) versus generic instruments (SF-36 and NHP). Acta Orthop Scand 2000;71:39–46.
233. Tuttleman M, Pillemer SR, Tilley BC, Fowler SE, Buckley LM, Alarcon GS, et al. A cross sectional assessment of health status instruments in patients with rheumatoid arthritis participating in a clinical trial. J Rheumatol 1997;24:1910–5.
234. Lim LL, Seubsman S-A, Sleigh A. Thai SF-36 health survey: tests of data quality, scaling assumptions, reliability and validity in healthy men and women. Health Qual Life Outcomes 2008;6:52.
235. Davey HM, Lim J, Butow PN, Barratt AL, Houssami N, Higginson R. Consumer information materials for diagnostic breast tests: women's views on information and their understanding of test results. Health Expect 2003;6:298–311.
236. Linde L, Sorensen J, Ostergaard M, Horslev-Petersen K, Hetland ML. Health-related quality of life: validity, reliability, and responsiveness of SF-36, 15D, EQ-5D [corrected] RAQoL, and HAQ in patients with rheumatoid arthritis. J Rheumatol 2008;35:1528–37.
237. Koh ET, Leong KP, Tsou IY, Lim VH, Pong LY, Chong SY, et al. The reliability, validity and sensitivity to change of the Chinese version of SF-36 in oriental patients with rheumatoid arthritis. Rheumatology (Oxford) 2006;45:1023–8.
238. Strombeck B, Theander E, Jacobsson LT. Assessment of fatigue in primary Sjogren's syndrome: the Swedish version of the Profile of Fatigue. Scand J Rheumatol 2005;34:455–9.
239. Birrell FN, Hassell AB, Jones PW, Dawes PT. How does the short form 36 health questionnaire (SF-36) in rheumatoid arthritis (RA) relate to RA outcome measures and SF-36 population values? A cross-sectional study. Clin Rheumatol 2000;19:195–9.
240. Bowman SJ, Hamburger J, Richards A, Barry RJ, Rauz S. Patient-reported outcomes in primary Sjogren's syndrome: comparison of the long and short versions of the Profile of Fatigue and Discomfort-Sicca Symptoms Inventory. Rheumatology (Oxford) 2009;48:140–3.
241. Busija L, Osborne RH, Nilsdotter A, Buchbinder R, Roos EM. Magnitude and meaningfulness of change in SF-36 scores in four types of orthopedic surgery. Health Qual Life Outcomes 2008;6:55.
242. Loge JH, Kaasa S, Hjermstad MJ, Kvien TK. Translation and performance of the Norwegian SF-36 Health Survey in patients with rheumatoid arthritis. I. Data quality, scaling assumptions, reliability, and construct validity. J Clin Epidemiol 1998;51:1069–76.
243. Saad AA, Ashcroft DM, Watson KD, Symmons DP, Noyce PR, Hyrich KL, et al. Improvements in quality of life and functional status in patients with psoriatic arthritis receiving anti-tumor necrosis factor therapies. Arthritis Care Res (Hoboken) 2010;62:345–53.
244. Varni JW, Limbers CA. The PedsQL Multidimensional Fatigue Scale in young adults: feasibility, reliability and validity in a University student population. Qual Life Res 2008;17:105–14.
245. Kosinski M, Keller SD, Ware JE, Hatoum HT, Kong SX. The SF-36 Health Survey as a generic outcome measure in clinical trials of patients with osteoarthritis and rheumatoid arthritis: relative validity of scales in relation to clinical measures of arthritis severity. Med Care 1999;37 Suppl:MS23–39.
246. Strand V, Gladman D, Isenberg D, Petri M, Smolen J, Tugwell P. Outcome measures to be used in clinical trials in systemic lupus erythematosus. J Rheumatol 1999;26:490–7.
247. Yarlas A, Bayliss M, Cappelleri JC, Maher S, Bushmakin AG, Chen LA, et al. Psychometric validation of the SF-36® Health Survey in ulcerative colitis: results from a systematic literature review. Qual Life Res 2018;27:273–90.
248. Cornec D, Devauchelle-Pensec V, Mariette X, Jousse-Joulin S, Berthelot JM, Perdriger A, et al. Severe health-related quality of life impairment in active primary Sjogren's Syndrome and patient-reported outcomes: data from a large therapeutic trial. Arthritis Care Res (Hoboken) 2017;69:528–35.
249. Arnold LM, Clauw DJ, Wohlreich MM, Wang F, Ahl J, Gaynor PJ, et al. Efficacy of duloxetine in patients with fibromyalgia: pooled analysis of 4 placebo-controlled clinical trials. Prim Care Companion J Clin Psychiatry 2009;11:237–44.
250. Revicki DA, Rentz AM, Luo MP, Wong RL. Psychometric characteristics of the short form 36 health survey and functional assessment of chronic illness Therapy-Fatigue subscale for patients with ankylosing spondylitis. Health Qual Life Outcomes 2011;9:36.
251. Overman CL, Kool MB, da Silva JA, Geenen R. The prevalence of severe fatigue in rheumatic diseases: an international study. Clin Rheumatol 2016;35:409–15.
252. Lai J-S, Crane PK, Cella D. Factor analysis techniques for assessing sufficient unidimensionality of cancer related fatigue. Qual Life Res 2006;15:1179–90.
253. Minton O, Stone P. A systematic review of the scales used for the measurement of cancer-related fatigue (CRF). Ann Oncol 2009;20:17–25.

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Table 1. Description of fatigue PROMs*

Measure	Number of Items	Content/Domains	Method of Administration	Recall Period	Response Format	Range of Scores	Score Interpretation	Cross-cultural Validation
BRAF-MDQ	20 items	Physical fatigue, living with fatigue, cognitive fatigue, and emotional fatigue	Patient self-report	1 wk	Four options: not at all, a little, quite a lot, and a lot. The first three elements are numerical or categorical as appropriate.	0-10 for item 1, 0-7 for item 2, 0-2 for item 3, and 0-3 for remaining items	Higher score = worse fatigue	Yes
BRAF-NRS	3 items	Measures fatigue severity, impact, and coping in RA	Patient self-report	1 wk	0-10 scale	0-10 for each item	For severity and effect, higher = worse fatigue; for coping, higher score = better fatigue	No
CFQ	11 items	Physical and mental fatigue	Patient self-report	1 mo	Four options: less than usual, no more than usual, more than usual and much more than usual	Two scales: one scale with an overall score of 0-33 and a second (binary) scale with an overall score of 0-11	Higher score = worse fatigue	N/A
CIS	20 items	Measures aspects of fatigue In patients with CFS	Patient self-report	2 wk	20-item fatigue questionnaire	Each item is scored on a seven-point Likert scale	Higher score = worse fatigue	No
FAS	10 items	Measures all aspects of fatigue, representing both physical and mental symptoms	Patient self-report	1 y	For each statement, one out of five answer categories can be chosen	10-item scale	Higher score = worse fatigue	No
Fatigue NRS	A single item	Measures the intensity or severity of fatigue	Patient self-report	1 wk	0-10 scale	Rated on an 11-point scale	Higher score = worse fatigue	No
FSI	14 items	Measures the intensity, duration, daily pattern, and interference of fatigue	Patient self-report	1 wk	0-10 scale	Rated on an 11-point scale	Higher score = worse fatigue	No
FSS	Nine items	Physical, social, and cognitive effects of fatigue	Patient self-report	1 wk	Items are scored from 1-7, added together, and then averaged to produce an overall score.	1-7	Higher score = worse fatigue	Yes
Fatigue VAS	A single item	Measures the intensity or severity of fatigue	Patient self-report	1 wk	A 100-mm or 10-cm VAS line is drawn.	0-100 mm or 0-10 cm	Higher score = worse fatigue	No
FACIT-F	13 items	Measured fatigue in oncology patients with anemia and was later tested in other chronic conditions	Patient self-report	1 wk	Items are scored from 0-4, with two positively phrased items reverse scored.	0-52	Higher score = better fatigue	Yes
MAF	15 items	Fatigue severity, distress, interference with activities of daily living, frequency, and change during the last week	Patient self-report	1 wk	Point 1 (grade) and points 4 to 14 (interference) have anchors of "nothing" and "much," point 2 (severity) has anchors of "light" to "severe," and point 3 (distress) has anchors of "no distress" to "extreme distress"	Calculated by adding the three components (sum of items 1-3, average of items 4-14, and transformed item 15)	Higher score = worse fatigue	N/A

(continued)

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Table 1. (*Cont'd*)

Measure	Number of Items	Content/Domains	Method of Administration	Recall Period	Response Format	Range of Scores	Score Interpretation	Cross-cultural Validation
MFI	20 items	General fatigue, physical fatigue, activity, motivation, and mental fatigue	Patient self-report	"Lately"	Five checkboxes ranging from "yes, that's true" to "no, that's not true"	Items scored from 1-5, with 10 items expressed positively. Elements of the subscales are added together to produce scores for general fatigue, physical fatigue, reduced activity, reduced motivation, and mental fatigue	Higher score = worse fatigue	Yes
MFSI-SF	30 items in the short and 83 in the complete form	Assesses general, physical, emotional, and mental manifestations of fatigue	Patient self-report	1 wk	0 = not at all, 1 = a little, 2 = moderately, 3 = quite a bit, and 4 = extremely	Total score = (general + physical + emotional + mental) − vigor	Higher score = worse fatigue	Yes
PROMIS fatigue scales	Four items in the short version; 95 items in the complete form	Fatigue, emotional distress, and social participation across populations and disease conditions	Computerized, paper, or telephone	1 wk	Options are on a 5 -point Likert scale and include not at all, a little bit, somewhat, quite a bit, and very much	PROMIS instruments are scored using item-level calibrations (scoring uses responses to each item for each participant). A summed score is calculated.	Higher score = worse fatigue	Yes
PROFAD-SSI	64 questions in eight domains	Includes two fatigue domains, somatic and mental, and a general discomfort question	Patient self-report	2 wk	Eight-point scale (0-7); 0 = no problem at all and 7 = as bad as imaginable.	The mean of PROFAD (mean of somatic fatigue + mental fatigue + SSI [means of cutaneous dryness + vaginal dryness + ocular dryness])	Higher score = worse fatigue	Yes
POMS-F	65 items for the full version and 35 items for the short version	Depression, anxiety, fatigue, vigor, irritability, tension, and confusion	Patient self-report	1 d or 1 wk	It is divided into five categories ranging from not at all to very strong	0-28	Higher score = worse fatigue	Yes
PFS-R	22 items	Four dimensions of subjective fatigue, with behavioral/severity, affective meaning, sensory, and cognitive/mood subscales	Patient self-report	Same day	Each question is answered with a number, which varies from 1 to 10. Smaller numbers indicate strong disagreement on the statement, and the larger numbers indicate strong agreement.	The total punctuation varies from 0 to 10. Total and subscale mean scores are derived by summing up the individual items and dividing this value by the number of items in the subscale/total scale to maintain the 0 to 10 scaling	Higher score = worse fatigue	Yes
RAID-F	7 items	Measures the impact of fatigue in its domains	Patient self-report	1 wk	0-10 scale	Seven NRS questions; each NRS is assessed as a number between 0 and 10	Higher score = worse fatigue	No
SF-36 VT	4 items	Measures vitality (energy and fatigue) in general and clinical populations	Patient self-report	4 wk	36 questions for the full SF-36 instrument, with six answer options; four items for vitality subscale alone	0-100	Higher score = better fatigue	Yes

* BRAF-MDQ = Bristol Rheumatoid Arthritis Fatigue Multidimensional Questionnaire; BRAF-NRS = Bristol Rheumatoid Arthritis Fatigue Numeric Rating Scale; CFQ = Chalder Fatigue Questionnaire; CFS = chronic fatigue syndrome; CIS = Checklist Individual Strength; FACIT-F = Functional Assessment of Chronic Illness Therapy Fatigue; FAS = Fatigue Assessment Scale; FSI = Fatigue Severity Inventory; FSS = Fatigue Severity Scale; MAF = Multidimensional Assessment of Fatigue; MFI = Multidimensional Fatigue Inventory; MFSI-SF = Multidimensional Fatigue Symptom Inventory Short Form; NRS = numeric rating scale; PFS-R = Revised Piper Fatigue Self-Report Scale; POMS-F = Profile of Mood Fatigue subscale; PROFAD = Profile of Fatigue and Discomfort; PROM = patient-reported outcome measure; PROMIS = Patient-Reported Outcomes Measurement Information System; RA = rheumatoid Arthritis; RAID-F = Rheumatoid Arthritis Impact of Disease Fatigue subscale; SF-36 VT = Short Form 36 vitality subscale; SSI = Sicca Symptoms Inventory; VAS = visual analog scale.

2151465x, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Table 2. Psychometric properties of fatigue PROMs*

Measure	Floor and Ceiling Effects	Reliability	Validity	Responsiveness	Minimally Important Differences	Generalizability	Used in RCTs
BRAF-MDQ	Floor effect: no; ceiling effect: no	Internal consistency: strong; test-retest: strong	Content validity: strong; construct validity: strong; comparison with other fatigue measures: strong	In RA: 0.33-0.56	Improvement: 17.5%; worsening: 6.1%	RA	Yes (RA)
BRAF-NRS	Floor effect: no; ceiling effect: yes	Severity and effect test-retest: strong; coping test-retest: moderate	Content validity: strong; construct validity: strong; comparison with other fatigue measures: strong (moderate for coping)	In RA: ES of 0.46-0.47	Improvement: 17.5%; fatigue worsening: 6.1%	RA	No
CFQ	N/A	Internal consistency: strong; test-retest: strong in other populations	Content validity: good; construct validity: moderate; comparison with other fatigue measures: moderate	In SLE: 22-15	Improvement/ worsening: 9.9	SLE, PSS, RA, PsA, FMS, AS, carpal tunnel disorder, CFS, and generalized chronic pain	Yes
CIS	N/A	Internal consistency: strong; test-retest: strong	Content validity: moderate; construct validity: strong; comparison with other fatigue measures:strong	In CBT for RA: ES of 0.55	No MCID reported	FMS, RA, MS, cancer, asthma, amyotrophic lateral sclerosis, sarcoidosis, and mitochondrial disorders	Yes
FAS	N/A	Internal consistency: strong; test-retest: strong	Content validity: moderate; construct validity: strong; comparison with other fatigue measures: strong	In chronic hepatitis C, this scale had good responsiveness.	3.0 to 4.2; a triangulated value of 4 was suggested.	Sarcoidosis	Yes
Fatigue NRS	N/A	Internal consistency: no data; test-retest: strong	Content validity: no standard format; construct validity: strong; comparison with other fatigue measures: no data	N/A	Improvement: 2.4; worsening: 1.1	Used in rheumatologic conditions	Yes
FSS	Floor effect: no; ceiling effect: no	Internal consistency: strong; test-retest: strong	Content validity: strong; construct validity: strong; comparison with other fatigue measures: strong	In AS: 0.43; in SLE: 0.55 and 0.44	Improvement/ worsening: 20.2	SLE	Yes
Fatigue VAS	Patients with lower scores require a larger change in their fatigue VAS to report worsening, and those with higher scores require a larger change to perceive improvement	Internal consistency: strong; test-retest: strong	Content validity: no standard format; construct validity: strong; comparison with other fatigue measures: variable (moderate to strong)	ES value of 0.4 is considered small, 0.5 is considered moderate, and 0.8 and greater is viewed as large.	In RA, improvement: −0.82 to −1.12; worsening: 1.13 to 1.26	Used in rheumatologic conditions	Yes
FACIT-F	N/A	Internal consistency: strong; test-retest: strong	Content validity: moderate; construct validity: strong; comparison with other fatigue measures: strong	In RA: ES of 0.19	Improvement/ worsening: 3-4	RA, PsA, PSS, OA, and SLE as well as many other long-term conditions	Yes
MAF	N/A	Internal consistency: strong; test-retest: strong	Content validity: moderate; construct validity: strong; comparison with other fatigue measures: strong	In RA: 2.1 and 14.9	Improvement/ worsening: 18.7	RA, OA, AS, SLE, and FMS	Yes
MFI	Floor effect: yes; ceiling effect: yes	Internal consistency: strong; test-retest: strong	Content validity: moderate; construct validity: moderate; comparison with other fatigue measures: moderate	In AS: 0.82	Improvement/ worsening: 16.6	RA, FMS, AS, PSS, SLE, AAV, and LVV	Yes

(continued)

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Table 2. (*Cont'd*)

Measure	Floor and Ceiling Effects	Reliability	Validity	Responsiveness	Minimally Important Differences	Generalizability	Used in RCTs
MFSI-SF	N/A	Internal consistency: strong; test-retest: strong	Content validity: strong; construct validity: strong; comparison with other fatigue measures: strong	In FMS: 10.88	N/A	FMS, OA, and AS	No
PROMIS Fatigue scales	Floor effect: no; ceiling effect: no	Internal consistency: strong; test-retest: N/A	Content validity: strong; construct validity: moderate; comparison with other fatigue measures: strong	N/A	N/A	RA, FMS, SS, SLE, OCTD, AAV, OA, UCTD, myositis, and PsA	No
PROFAD-SSI	N/A	Internal consistency: strong; test-retest: strong	Content validity: strong; construct validity: moderate; comparison with other fatigue measures: moderate	N/A	N/A	PSS	Yes
POMS-F	N/A	Internal consistency: moderate; test-retest: N/A	Content validity: strong; construct validity: strong; comparison with other fatigue measures: strong	In RA: 0.18-0.56	Improvement/ worsening: 16.6	SLE, AAV, and RA	No
PFS-R	N/A	Internal consistency: strong; test-retest: strong	Content validity: strong; construct validity: strong; comparison with other fatigue measures: strong	In SLE: 14.3	N/A	FMS and SLE	Yes
RAID-F	Floor effect: yes	Internal consistency: strong; test-retest: strong	Content validity: no standard format; construct validity: strong; comparison with other fatigue measures: variable, (moderate to strong)	In RA, responsiveness was high at 3 and 6 months (SRM > 0.80).	An MCID of 3 points has been defined.	Developed for RA	Yes
SF-36 VT	Not appropriate for population surveys	Internal consistency: strong; test-retest: variable (very weak to strong)	Content validity: moderate; construct validity: strong; comparison with other fatigue measures: variable (moderate to strong)	In patients with RA receiving anti TNF, SF-36 VT showed a mean improvement of 5.2 in patients who did not achieve an ACR20 for improvement in disease activity (ES of 0.25).	−10.7 (95% CI -15.5 to -5.9)	RA, PsA, AS, PSS, SLE, FMS, and OA	Yes

* AAV = anti-neutrophil cytoplasmic antibody–associated vasculitis; ACR20 = American College of Rheumatology 20% criteria for improvement; AS = ankylosing spondylitis; BRAF-MDQ = Bristol Rheumatoid Arthritis Fatigue Multidimensional Questionnaire; BRAF-NRS = Bristol Rheumatoid Arthritis Fatigue Numeric Rating Scale; CBT = cognitive behavioral therapy; CFQ = Chalder Fatigue Questionnaire; CFS = chronic fatigue syndrome; CIS = Checklist Individual Strength; ES = effect size; FACIT-F = Functional Assessment of Chronic Illness Therapy Fatigue; FAS = Fatigue Assessment Scale; FMS = fibromyalgia syndrome; FSS = Fatigue Severity Scale; LVV = large-vessel vasculitis; MAF = Multidimensional Assessment of Fatigue; MCID = minimum clinically important difference; MFI = Multidimensional Fatigue Inventory; MFSI-SF = Multidimensional Fatigue Symptom Inventory Short Form; MS = multiple sclerosis; N/A = no data available; NRS = numeric rating scale; OA = osteoarthritis; OCTD = overlap connective tissue diseases; PFS-R = Revised Piper Fatigue Self-Report Scale; POMS-F = Profile of Mood States fatigue subscale; PROFAD-SSI = Profile of Fatigue and Discomfort Sicca Symptoms Inventory; PROM = patient-reported outcome measure; PROMIS = Patient-Reported Outcomes Measurement Information System; PsA = psoriatic arthritis; PSS = primary Sjögren's syndrome; RA = rheumatoid arthritis; RAID-F = Rheumatoid Arthritis Impact of Disease fatigue subscale; RCT = randomized controlled trial; SF-36 VT = Short Form 36 vitality subscale; SLE = systemic lupus erythematosus; SRM = standardized response mean; SS = systemic sclerosis; UCTD = undifferentiated connective tissue diseases; VAS = visual analog scale.

21514658, 2020, S10, Downloaded from https://acrjournals.onlinelibrary.wiley.com/doi/10.1002/acr.24246 by Cochrane Peru, Wiley Online Library on [14/11/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License