Validation of the Turkish version of the fatigue severity scale in patients with fibromyalgia

Rheumatology International

January 2012, Volume 32, Issue 1, pp 27–31 | Cite as

- Asli Gencay-Can (1) (2) Email author (asligencay@yahoo.com)
- Serdar Suleyman Can (3)

1. Fizik Tedavi Bölümü, Kahramanmaras Devlet Hastanesi, Kahramanmaras, Turkey
2. Department of Physical and Rehabilitation Medicine, Kahramanmaras State Hospital, Kahramanmaras, Turkey
3. Department of Psychiatry, Kahramanmaras State Hospital, Kahramanmaras, Turkey

Original Article
First Online: 24 July 2010
Received: 07 March 2010
Accepted: 11 July 2010

Abstract

The aim of the study was to investigate the validity and reliability of the Turkish version of the fatigue severity scale (FSS) in fibromyalgia (FM) patients. Sixty-one FM patients and 54 healthy controls were evaluated using the Turkish version of the FSS. Reliability was investigated using test–retest reliability and internal consistency. Concurrent validity was evaluated between the FSS score and the VAS fatigue. Convergent validity was assessed by comparing the FSS score with the scores of VAS pain, Beck Depression Inventory (BDI), Beck Anxiety Inventory (BAI), and Fibromyalgia Impact Questionnaire (FIQ). Spearman's rank correlation coefficient was used to evaluate validity. Test–retest reliability and internal consistency of the FSS were excellent in FM patients (ICC: 0.94, Cronbach's alpha coefficient: 0.85) and in the healthy controls (ICC: 0.90, Cronbach's alpha coefficient: 0.91). For the concurrent validity, the correlation between the FSS and VAS fatigue was very good in FM group (*r*: 0.63, *P*: 0.000) and in the healthy controls (*r*: 0.94, *P*: 0.000). For the convergent validity, correlations between the FSS and BDI, BAI, FIQ, pain intensity were moderate to good in both groups (*P*: 0.000). The Turkish version of the FSS has been proved to be valid and reliable to detect severity of fatigue in FM patients. We recommend the use of it in clinical practice.

Keywords

Fibromyalgia Fatigue Validity Reliability

Introduction

Fibromyalgia (FM) is a chronic musculoskeletal pain disorder characterized by widespread pain, fatigue, muscle tenderness, sleep disturbances, depression, and anxiety [1, 2, 3]. Fatigue is one of the most common symptoms in FM patients [4, 5].

Fatigue is an overwhelming sense of tiredness and lack of energy that can impair participation in daily tasks and work. It may become a chronic and disabling problem in daily life of the patients with FM [6, 7]. It is important to use measurement tools for accurately evaluating fatigue. Fatigue severity scale (FSS), fatigue impact scale, fatigue rating scale, ordinal scales such as “none” to “very severe fatigue”, VAS (visual analog scale) had been used for this reason [8, 9]. According to recent studies, the most commonly used fatigue-specific measurement is the FSS [8, 10].

The FSS is a measurement of fatigue impact on functioning [6]. It was developed by Krupp et al. for patients with multiple sclerosis and systemic lupus erythematosus to facilitate researches and treatments [11]. It is a short, nine-item self-report questionnaire. Its application is very simple and quick [6, 12]. Because of these, we chose to use the FSS in FM patients. The FSS has high internal consistency, has good test–retest reliability and also has good concurrent validity in several settings such as multiple sclerosis, systemic lupus erythematosus, spinal cord injury, immune-mediated polyneuropathies, postpoliomyelitis syndrome, Parkinson’s disease, chronic hepatitis C, cancer, and stroke [6, 7, 10, 11, 13, 14, 15, 16, 17, 18, 19]. The present study is the first to evaluate the validation of the FSS in patients with FM.

The aim of the study was to investigate the validity and reliability of the Turkish version of the FSS in FM patients.

Methods

Translation

After the permission was obtained from Dr. L. B. Krupp, cross-cultural adaptation of the original questionnaire was performed according to recent guidelines [20]. First of all, the FSS was translated from English into Turkish by two bilingual persons. One of them had prior knowledge about the questionnaire. Both Turkish translations were compared with each other for inconsistencies. A consensus was reached by the synthesis of two translations after discussing. The FSS was then translated back into English by a translator who had not seen the text previously. Consequently, a few changes have been made and the prefinal version of the questionnaire was produced. In the final stage, 10 patients with fibromyalgia completed the prefinal version of the

FSS. But, most of the patients did not understand the “motivation” and it was changed as “willingness to do something”. In addition, “exercise” was changed as “to make a physical activity”.

Subjects

Sixty-one female patients with FM who were diagnosed according to the 1990 ACR criteria and 54 healthy controls were enrolled in the study. All patients were aged between 20 and 50 years and they had at least 5 years of education. The FM patients and the controls were excluded if they had a history of drug taking affecting the central nervous system during the last month, history of taking nonsteroidal antiinflammatory drugs or opioids during the last week, history of neurologic disease, rheumatologic disease or endocrinologic disease. The study was approved by the local ethic committee at Kahramanmaras State Hospital.

Measures

VAS pain

0–100 mm VAS was used for pain intensity. The subjects were asked to mark the point corresponding to the pain during the past week.

VAS fatigue

0–100 mm VAS was used to assess the fatigue of the subjects. They were asked to mark the point corresponding to the fatigue in the previous week.

VAS sleep disturbance

Nighttime sleep disturbance of the subjects in the past week was evaluated by 0–100 mm VAS.

Beck depression inventory (BDI) and beck anxiety inventory (BAI)

Depressive symptoms and anxiety of the subjects were assessed by BDI and BAI. Both inventories are 21-item self-administered questionnaires. These provide a quantitative measure of depressive symptoms and anxiety symptoms. Each item was scored between 0 and 3 points.

Fibromyalgia impact questionnaire (FIQ)

For physical functioning and health status of FM patients, FIQ was used. It is a ten-item, self-administered questionnaire. Because each item has a maximum possible score of 10, the maximum possible total score is 100. The high scores indicate high level of impaired daily activities.

Fatigue severity scale (FSS)

The scale contains nine items that measure the severity of fatigue symptom of the subjects during the past week. Each item is scored from 1 to 7. "1" indicates strong disagreement with the statement, while "7" indicates strong agreement. Total score is calculated by deriving an arithmetic mean. A score of 4 or higher generally indicates severe fatigue [6]. The FSS was performed by the same clinician 1 week after the first application.

Statistics

Reliability

Reliability was investigated using test–retest reliability and internal consistency. For test–retest reliability, the FSS was performed two times by the same clinician. A time interval of 1 week was allowed between the assessments. Intraclass correlation coefficient (ICC) was used to evaluate test–retest reliability. Values of 0.60–0.80 were accepted as evidence of good reliability and with those above 0.80 regarding excellent reliability [21]. Internal consistency was evaluated by calculating Cronbach's alpha coefficient. If Cronbach's alpha coefficient was equal or greater than 0.70, it was considered as satisfactory [22].

Validity

Construct validity was investigated using concurrent and convergent validity. Concurrent validity was determined between the FSS score and the VAS fatigue score performed at the same time. Convergent validity was assessed by comparing the score of the FSS with the scores of VAS pain, VAS sleep disturbance, BDI, BAI, and FIQ. Spearman's rank correlation coefficient was used to evaluate concurrent and construct validity. Construct validity coefficients were accepted as follows: 0.81–1.0 as excellent, 0.61–0.80 very good, 0.41–0.60 good, 0.21–0.40 fair, and 0–0.20 poor [23].

As most of the continuous variables were approximately abnormally distributed, nonparametric statistics were employed for the analyses. The Mann–Whitney *U* and chi square tests were used to compare demographic and clinical characteristics between the groups. For all analyses, SPSS 11.5 for Windows was used. *P*-values less than 0.05 were considered to represent a significant difference for all statistical analysis.

Results

Sample characteristics

There were no significant differences between the FM patients and the controls on demographic characteristics ($P > 0.05$). Scores of VAS pain, VAS sleep disturbance, BDI, BAI, FSS_1, FSS2, and VAS fatigue were significantly impaired in FM patients

compared to the healthy controls ($P < 0.001$) (Table 1). The mean duration of symptoms was 33.15 ± 26.13 months and the mean FIQ score was 84.37 ± 10.51 in FM patients.

Table 1

Demographic and clinical characteristics of the study groups (proportions and means with standard deviations)

	Fibromyalgia group (*n* = 61)	**Control group (*n* = 54)**	***P* value**
Age	33.28 ± 6.12	31.46 ± 5.47	0.10
Years of education	7.70 ± 2.47	8.43 ± 2.47	0.11
Marital status (%)			
Married	75.4%	33.3%	0.31
Not married	24.6%	66.7%	
VAS pain (mm)	88.5 ± 13.8	15.9 ± 10.8	0.000*
VAS sleep disturbance (mm)	83.5 ± 19.7	8.8 ± 10.3	0.000*
BDI	31.3 ± 12.2	12.8 ± 5.5	0.000*
BAI	34.7 ± 11.6	11.8 ± 5.8	0.000*
VAS fatigue	88.2 ± 15.6	19.6 ± 9.4	0.000*
FSS_1	6.1 ± 0.9	1.7 ± 0.7	0.000*
FSS_2	6.2 ± 0.9	1.7 ± 0.7	0.000*

VAS visual analog scale, *BDI* beck depression inventory, *BAI* beck anxiety inventory, *FSS* $_1$ fatigue severity scale for day 1, *FSS* $_2$ fatigue severity scale for day 7

* Significantly different

Reliability

Test–retest reliability was found to be excellent for the FSS in both groups. The ICCs were 0.94 in the FM group and 0.90 in the control group. Internal consistency was also found excellent. Cronbach's alpha coefficients were 0.85 for the FSS_1 and 0.87 for the FSS_2 in the FM group, while 0.91 and 0.92 in the control group, respectively ($P = 0.000$).

Validity

Concurrent validity was measured by comparing the scores of the FSS with VAS fatigue using the Spearman's rank correlation coefficient. There was a very good positive correlation between the FSS and VAS fatigue for day 1 in the FM group (r: 0.63, P: 0.000) and in the control group (r: 0.67, P: 0.000).

Convergent validity was evaluated using the correlation between the FSS and VAS pain, VAS sleep disturbance, BDI, BAI, FIQ in both groups for day 1. There were good or very good positive correlations between the FSS and FIQ, BAI, BDI in both groups. The correlation between the FSS and VAS pain was fair in both groups. However, we found no correlation between the FSS and VAS sleep disturbance in the groups ($P > 0.05$) (Table 2).

Table 2

Correlations between the FSS and VAS fatigue, VAS pain, VAS sleep disturbance, BDI, BAI, FIQ (Spearman's rank correlation coefficients)

	Fibromyalgia group FSS_1	**Control group FSS_1**
VAS fatigue	0.63*	0.67*
VAS pain	0.38*	0.34*
VAS sleep disturbance	0.15	0.18
BDI	0.44*	0.42*
BAI	0.47*	0.43*
FIQ	*0.62**	

FSS_1 fatigue severity scale for day 1, *VAS* visual analog scale, *BDI* beck depression inventory, *BAI* beck anxiety inventory, *FIQ* fibromyalgia impact questionnaire

* $P < 0.05$

Discussion

Fatigue is a common and disturbing symptom in the patients with FM. The most commonly used fatigue-specific measurement is the FSS [8, 10]. The FSS was found to be reliable and valid measurement in several settings [6, 7, 11, 13, 14, 15, 16, 17, 18, 19]. The present study is the first to evaluate the validation of the FSS in patients with FM. We translated the FSS into Turkish and evaluated its validity in FM patients. Test–retest reliability, internal consistency, and validity of the FSS were found to be acceptable in FM patients.

For concurrent validity, we compared the FSS with VAS fatigue in the FM group and in the control group. We detected high correlation coefficients providing support for validity in the groups for day 1 (r: 0.63, P: 0.000 in the FM group; r: 0.67, P: 0.000 in healthy controls). In the patients with spinal cord injury, Anton et al. found high correlation between two measurement (r: 0.67, P: 0.000) [6] and also in the patients with hepatitis C, Kleinman et al. showed good correlation between the measurements (r: 0.75, P: 0.000) [17]. Similarly, Valko et al. observed significant correlation in multiple sclerosis patients (r: 0.79, $P < 0.01$) and in healthy subjects (r: 0.52; $P < 0.01$) [12].

Pain, sleep disturbance, decreased physical functioning, depression, and anxiety are common symptoms in FM and they can contribute to fatigue. We investigated the correlation between the FSS and VAS pain, VAS sleep disturbance, BDI, BAI, FIQ for day 1 in both groups for convergent validity. The FSS score of FM group had the highest correlation with FIQ score (r: 0.62, P: 0.000). It has been shown that increased fatigue is related to impaired functioning and health status in FM patients. Similar to our results, Kleinman et al. found high correlation coefficient between physical functioning and the FSS in hepatitis C patients (r: 0.54; $P < 0.001$) [17].

The FSS scores of both groups were also highly correlated with depression score (r: 0.44, P: 0.000 in the FM group; r: 0.42, P: 0.000 in the control group) and anxiety score (r: 0.47, P: 0.000 in the FM group; r: 0.43, P: 0.000 in the control group). Although they had used different depression scale, Schepers et al. found similar correlation coefficient between the FSS and depressive symptoms in stroke patients (r: 0.39, $P < 0.001$) [19]. In contrast to these results, Krupp et al. detected smaller correlation coefficient in multiple sclerosis patients (r: 0.26, $P < 0.05$) and in healthy controls (r: 0.20, $P < 0.05$), but their sample size was smaller than ours (11). We also found moderate but statistically significant correlation between the FSS and pain intensity in the FM group and in the control group (r: 0.38, P: 0.000; r: 0.34; P: 0.000, respectively). These results showed that depression, anxiety, and pain intensity increase fatigue severity.

There was no correlation between the fatigue severity and sleep disturbance in both groups (r: 0.15, $P < 0.05$ in the FM group;r: 0.18, $P < 0.05$ in the control group). Similar to the present study, Schepers et al. observed no significant correlation between the FSS and sleep disturbance in stroke patients (r: 0.12, $P < 0.05$) [19]. The results of the present study suggest that fatigue and sleep disturbance are overlapping but separate entities in FM patients and in healthy controls. Fatigue severity is independent of sleep disturbance among these subjects.

In the present study, the FSS scores of the FM patients were significantly higher than the scores of the healthy controls. The FSS is a useful measurement to distinguish severity of fatigue between FM patients and healthy subjects. In addition, the FSS measures the impact of fatigue on daily functioning rather than the intensity of fatigue symptoms as VAS fatigue. Multiple-item scale is more reliable than a single indicator [10, 11].

There are several limitations in our study: (1) The sample size of the study was small (2) The educational level of the study sample was low. The results of the study may be affected by low educational level (3) We did not exclude the patients with a MMSE score below 24 so that filling in the questionnaires may be affected by cognitive disfunction of the FM patients.

Conclusions

In conclusion, prevalence and severity of fatigue requires valid and reliable measurements for management of affected patients and monitoring of disease-related fatigue. In the present study, the Turkish version of the FSS has been proved to be valid and reliable to detect presence and severity of fatigue in FM patients. We recommend the use of it in clinical practice.

Notes

Acknowledgments

We thank Dr. Lauren B. Krupp for her permission to translate the FSS into Turkish. We also thank Ibrahim Can for his excellent translation.

References

1. Clauw DJ (2009) Fibromyalgia: an overview. Am J Med 122:3–13
Google Scholar (http://scholar.google.com/scholar_lookup?title=Fibromyalgia%3A%20an%20overview&author=DJ.%20Clauw&journal=Am%20J%20Med&volume=122&pages=3-13&publication_year=2009)

2. Chong Y-Y, Ng B-Y (2009) Clinical aspects and management of fibromyalgia syndrome. Ann Acad Med Singapore 38:967–973
PubMed (http://proxy2.marmara-elibrary.com/MuseSessionID=0210jd27g/MuseProtocol=http/MuseHost=www.ncbi.nlm.nih.gov/MusePath/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=19956819)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Clinical%20aspects%20and%20management%20of%20fibromyalgia%20syndrome&author=Y-Y.%20Chong&author=B-Y.%20Ng&journal=Ann%20Acad%20Med%20Singapore&volume=38&pages=967-973&publication_year=2009)

3. Mckay PG, Duffy T, Martin CR (2009) Are chronic fatigue syndrome and fibromyalgia the same? Implications for the provision of appropriate mental health intervention. J Psychiatr Ment Health Nurs 16:884–894
PubMed (http://proxy2.marmara-elibrary.com/MuseSessionID=0210jd27g/MuseProtocol=http/MuseHost=www.ncbi.nlm.nih.gov/MusePath/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=19930362)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Are%20chronic%20fatigue%20syndrome%20and%20fibromyalgia%20the%20same%3F%20Implications%20for%20the%20provision%20of%20appropriate%20mental%20health%20intervention&author=PG.%20Mckay&author=T.%20Duffy&author=CR.%20Martin&journal=J%20Psychiatr%20Ment%20Health%20Nurs&volume=16&pages=884-894&publication_year=2009)

4. Aaron LA, Burke MM, Buchwald D (2000) Overlapping conditions among patients with chronic fatigue syndrome, fibromyalgia, and temporomandibular disorder. Arch Intern Med 160:221–227
PubMed (http://proxy2.marmara-elibrary.com/MuseSessionID=0210jd27g/MuseProtocol=http/MuseHost=www.ncbi.nlm.nih.gov/MusePath/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=10647761)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Overlapping%20conditions%20among%20patients%20with%20chronic%20fatigue%20syndrome%2C%20fibromyalgia%2C%20and%20temporomandibular%20disorder&author=LA.%20Aaron&author=MM.%20Burke&author=D.%20Buchwald&journal=Arch%20Intern%20Med&volume=160&pages=221-227&publication_year=2000)

5. Jason LA, Taylor RR, Kennedy CL (2000) Chronic fatigue syndrome, fibromyalgia, and multiple chemical sensitivities in a community-based sample of persons with chronic fatigue syndrome-like symptoms. Psychosom Med 62:655–663
PubMed (http://proxy2.marmara-elibrary.com/MuseSessionID=0210jd27g/MuseProtocol=http/MuseHost=www.ncbi.nlm.nih.gov/MusePath/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=11020095)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Chronic%20fatigue%20syndrome%2C%20fibromyalgia%2C%20and%20multiple%20chemical%20sensitivities%20in%20a%20community-based%20sample%20of%20persons%20with%20chronic%20fatigue%20syndrome-like%20symptoms&author=LA.%20Jason&author=RR.%20Taylor&author=CL.%20Kennedy&journal=Psychosom%20Med&volume=62&pages=655-663&publication_year=2000)

6. Anton HA, Miller WC, Townson AF (2008) Measuring fatigue in persons with spinal cord injury. Arch Phys Med Rehab 89:538–542
Google Scholar (http://scholar.google.com/scholar_lookup?title=Measuring%20fatigue%20in%20persons%20with%20spinal%20cord%20injury&author=HA.%20Anton&author=WC.%20Miller&author=AF.%20Townson&journal=Arch%20Phys%20Med%20Rehab&volume=89&pages=538-542&publication_year=2008)

7. Herlofson K, Larsen JP (2002) Measuring fatigue in patients with Parkinson's disease–the fatigue severity scale. Europ J Neurol 9:595–600

Google Scholar (http://scholar.google.com/scholar_lookup?title=Measuring%20fatigue%20in%20patients%20with%20Parkinson%E2%80%99s%20disease%E2%80%93the%20fatigue%20severity%20scale&author=K.%20Herlofson&author=JP.%20Larsen&journal=Europ%20J%20Neurol&volume=9&pages=595-600&publication_year=2002)

8. Hewlett S, Hehir M, Kirwan JR (2007) Measuring fatigue in rheumatoid arthritis: a systematic review of scales in use. Arth Rheum 57:429–439
Google Scholar (http://scholar.google.com/scholar_lookup?title=Measuring%20fatigue%20in%20rheumatoid%20arthritis%3A%20a%20systematic%20review%20of%20scales%20in%20use&author=S.%20Hewlett&author=M.%20Hehir&author=JR.%20Kirwan&journal=Arth%20Rheum&volume=57&pages=429-439&publication_year=2007)

9. Hjollund NH, Andersen JH, Bech P (2007) Assessment of fatigue in chronic disease:a bibliographic study of fatigue measurement scales. Health Qual Life Outcomes 5:12–17
PubMed (http://proxy2.marmara-elibrary.com/MuseSessionID=0210jd27g/MuseProtocol=http/MuseHost=www.ncbi.nlm.nih.gov/MusePath/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=17326844)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Assessment%20of%20fatigue%20in%20chronic%20disease%3Aa%20bibliographic%20study%20of%20fatigue%20measurement%20scales&author=NH.%20Hjollund&author=JH.%20Andersen&author=P.%20Bech&journal=Health%20Qual%20Life%20Outcomes&volume=5&pages=12-17&publication_year=2007)

10. Dittner AJ, Wesselyb SC, Brown RG (2004) The assessment of fatigue: a practical guide for clinicians and researchers. J Psychosom Res 56:157–170
PubMed (http://proxy2.marmara-elibrary.com/MuseSessionID=0210jd27g/MuseProtocol=http/MuseHost=www.ncbi.nlm.nih.gov/MusePath/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=15016573)
Google Scholar (http://scholar.google.com/scholar_lookup?title=The%20assessment%20of%20fatigue%3A%20a%20practical%20guide%20for%20clinicians%20and%20researchers&author=AJ.%20Dittner&author=SC.%20Wesselyb&author=RG.%20Brown&journal=J%20Psychosom%20Res&volume=56&pages=157-170&publication_year=2004)

11. Krupp LB, LaRocca NG, Muir-Nash J, Steinberg AD (1989) The fatigue severity scale: application to patients with multiple sclerosis and systemic lupus erythematosus. Arch Neurol 46:1121–1123
PubMed (http://proxy2.marmara-elibrary.com/MuseSessionID=0210jd27g/MuseProtocol=http/MuseHost=www.ncbi.nlm.nih.gov/MusePath/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=2803071)
Google Scholar (http://scholar.google.com/scholar_lookup?title=The%20fatigue%20severity%20scale%3A%20application%20to%20patients%20with%20multiple%20sclerosis%20and%20systemic%20lupus%20erythematosus&author=LB.%20Krupp&author=NG.%20LaRocca&author=J.%20Muir-Nash&author=AD.%20Steinberg&journal=Arch%20Neurol&volume=46&pages=1121-1123&publication_year=1989)

12. Valko PO, Bassetti CL, Bloch KE, Held U, Baumann CR (2008) Validation of the fatigue severity scale in a Swiss cohort. Sleep 31:1601–1607

PubMed (http://proxy2.marmara-elibrary.com/MuseSessionID=0210jd27g/MuseProtocol=http/MuseHost=www.ncbi.nlm.nih.gov/MusePath/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=19014080)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Validation%20of%20the%20fatigue%20severity%20scale%20in%20a%20Swiss%20cohort&author=PO.%20Valko&author=CL.%20Bassetti&author=KE.%20Bloch&author=U.%20Held&author=CR.%20Baumann&journal=Sleep&volume=31&pages=1601-1607&publication_year=2008)

13. Armutlu K, Korkmaz NC, Sumbuloglu V, Akbiyik DI, Guney Z, Karabudak R (2007) The validity and reliability of the fatigue severity scale in Turkish multiple sclerosis patients. Int J Rehab Res 30:81–85
Google Scholar (http://scholar.google.com/scholar_lookup?title=The%20validity%20and%20reliability%20of%20the%20fatigue%20severity%20scale%20in%20Turkish%20multiple%20sclerosis%20patients&author=K.%20Armutlu&author=NC.%20Korkmaz&author=V.%20Sumbuloglu&author=DI.%20Akbiyik&author=Z.%20Guney&author=R.%20Karabudak&journal=Int%20J%20Rehab%20Res&volume=30&pages=81-85&publication_year=2007)

14. Mattsson M, Möller B, Lundberg IE, Gard G, Boström C (2008) Reliability and validity of the fatigue severity scale in Swedish for patients with systemic lupus erythematosus. Scand J Rheumatol 37:269–277
PubMed (http://proxy2.marmara-elibrary.com/MuseSessionID=0210jd27g/MuseProtocol=http/MuseHost=www.ncbi.nlm.nih.gov/MusePath/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=18612927)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Reliability%20and%20validity%20of%20the%20fatigue%20severity%20scale%20in%20Swedish%20for%20patients%20with%20systemic%20lupus%20erythematosus&author=M.%20Mattsson&author=B.%20M%C3%B6ller&author=IE.%20Lundberg&author=G.%20Gard&author=C.%20Bostr%C3%B6m&journal=Scand%20J%20Rheumatol&volume=37&pages=269-277&publication_year=2008)

15. Merkies IS, Schmitz PI, Samijn JP, van der Meche FG, van Doorn PA (1999) Fatigue in immune-mediated polyneuropathies [abstract]. Neurology 53:1648–1654
PubMed (http://proxy2.marmara-elibrary.com/MuseSessionID=0210jd27g/MuseProtocol=http/MuseHost=www.ncbi.nlm.nih.gov/MusePath/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=10563607)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Fatigue%20in%20immune-mediated%20polyneuropathies%20%5Babstract%5D&author=IS.%20Merkies&author=PI.%20Schmitz&author=JP.%20Samijn&author=FG.%20Meche&author=PA.%20Doorn&journal=Neurology&volume=53&pages=1648-1654&publication_year=1999)

16. Vasconcelos OM, Prokhorenko OA, Kelley KF, Vo AH, Olsen CH, Dalakas MC, Halstead LS, Jabbari B, Campbell WW (2008) A comparison of fatigue scales in postpoliomyelitis syndrome. Arch Phys Med Rehab 87:1213–1217
Google Scholar (http://scholar.google.com/scholar_lookup?title=A%20comparison%20of%20fatigue%20scales%20in%20postpoliomyelitis%20syndrome&author=OM.%20Vasconcelos&author=OA.%20Prokhorenko&author=KF.%20Kelley&author=AH.%20Vo&author=CH.%20Olsen&author=MC

.%20Dalakas&author=LS.%20Halstead&author=B.%20Jabbari&author=WW.%20Campbell&journal=Arch%20Phys%20Med%20Rehab&volume=87&pages=1213-1217&publication_year=2008)

17. Kleinman L, Zodet MW, Hakim Z, Aledort J, Barker C, Chan K, Krupp L, Revicki D (2000) Psychometric evaluation of the fatigue severity scale for use in chronic hepatitis C. Qual Life Res 9:499–508
PubMed (http://proxy2.marmara-elibrary.com/MuseSessionID=0210jd27g/MuseProtocol=http/MuseHost=www.ncbi.nlm.nih.gov/MusePath/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=11190005)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Psychometric%20evaluation%20of%20the%20fatigue%20severity%20scale%20for%20use%20in%20chronic%20hepatitis%20C&author=L.%20Kleinman&author=MW.%20Zodet&author=Z.%20Hakim&author=J.%20Aledort&author=C.%20Barker&author=K.%20Chan&author=L.%20Krupp&author=D.%20Revicki&journal=Qual%20Life%20Res&volume=9&pages=499-508&publication_year=2000)

18. Winstead-Fry P (1998) Psychometric assessment of four fatigue scales with a sample of rural cancer patients [abstract]. J Nurs Meas 6:111–122
PubMed (http://proxy2.marmara-elibrary.com/MuseSessionID=0210jd27g/MuseProtocol=http/MuseHost=www.ncbi.nlm.nih.gov/MusePath/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=10028778)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Psychometric%20assessment%20of%20four%20fatigue%20scales%20with%20a%20sample%20of%20rural%20cancer%20patients%20%5Babstract%5D&author=P.%20Winstead-Fry&journal=J%20Nurs%20Meas&volume=6&pages=111-122&publication_year=1998)

19. Schepers VP, Visser-Meily AM, Ketelaar M, Lindeman E (2006) Poststroke fatigue: course and its relation to personal and stroke-related factors. Arch Phys Med Rehabil 87:184–188
PubMed (http://proxy2.marmara-elibrary.com/MuseSessionID=0210jd27g/MuseProtocol=http/MuseHost=www.ncbi.nlm.nih.gov/MusePath/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=16442970)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Poststroke%20fatigue%3A%20course%20and%20its%20relation%20to%20personal%20and%20stroke-related%20factors&author=VP.%20Schepers&author=AM.%20Visser-Meily&author=M.%20Ketelaar&author=E.%20Lindeman&journal=Arch%20Phys%20Med%20Rehabil&volume=87&pages=184-188&publication_year=2006)

20. Beaton DE, Bombardier C, Guillemin F, Ferraz MB (2000) Guidelines for the process of cross-cultural adaptation of self-report measures. Spine 25:3186–3191
PubMed (http://proxy2.marmara-elibrary.com/MuseSessionID=0210jd27g/MuseProtocol=http/MuseHost=www.ncbi.nlm.nih.gov/MusePath/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=11124735)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Guidelines%20for%20the%20process%20of%20cross-cultural%20adaptation%20of%20self-

report%20measures&author=DE.%20Beaton&author=C.%20Bombardier&author=F.%20Guillemin&author=MB.%20Ferraz&journal=Spine&volume=25&pages=3186-3191&publication_year=2000)

21. Shrout PE, Fleiss J (1979) Intraclass correlations: uses in assessing rater reliability. Psychol Bull 86:420–428
PubMed (http://proxy2.marmara-elibrary.com/MuseSessionID=0210jd27g/MuseProtocol=http/MuseHost=www.ncbi.nlm.nih.gov/MusePath/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=18839484)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Intraclass%20correlations%3A%20uses%20in%20assessing%20rater%20reliability&author=PE.%20Shrout&author=J.%20Fleiss&journal=Psychol%20Bull&volume=86&pages=420-428&publication_year=1979)

22. Cronbach LJ (1951) Coefficient alpha and the internal structure of tests. Psychometrika 16:297–334
Google Scholar (http://scholar.google.com/scholar_lookup?title=Coefficient%20alpha%20and%20the%20internal%20structure%20of%20tests&author=LJ.%20Cronbach&journal=Psychometrika&volume=16&pages=297-334&publication_year=1951)

23. Feise RJ, Menke JM (2001) Functional rating index: a new valid and reliable instrument to measure the magnitude of clinical change in spinal conditions. Spine 26:78–87
PubMed (http://proxy2.marmara-elibrary.com/MuseSessionID=0210jd27g/MuseProtocol=http/MuseHost=www.ncbi.nlm.nih.gov/MusePath/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=11148650)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Functional%20rating%20index%3A%20a%20new%20valid%20and%20reliable%20instrument%20to%20measure%20the%20magnitude%20of%20clinical%20change%20in%20spinal%20conditions&author=RJ.%20Feise&author=JM.%20Menke&journal=Spine&volume=26&pages=78-87&publication_year=2001)

Copyright information

About this article

Cite this article as:
Gencay-Can, A. & Can, S.S. Rheumatol Int (2012) 32: 27. https://doi.org/10.1007/s00296-010-1558-3

- DOI (Digital Object Identifier) https://doi.org/10.1007/s00296-010-1558-3
- Publisher Name Springer-Verlag
- Print ISSN 0172-8172
- Online ISSN 1437-160X

- About this journal
- Reprints and Permissions

Personalised recommendations