

Fatigue Severity Scale: The Psychometric Properties of the Persian-Version in Patients with Multiple Sclerosis

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Abstract: As fatigue is highly prevalent and has a negative impact on quality of life and performance in a variety of disorders and Fatigue Severity Scale (FSS) is one of the most commonly used self-reported questionnaires to measure fatigue. The aim of this study was to evaluate different aspects of Validity and Reliability of the Persian-version of Fatigue Severity Scale (FSS-P) among people with multiple sclerosis. A sample of 50 people with Relapsing-Remitting type of multiple sclerosis and 30 Healthy Adult were included in this study. The participants were recruited from M.S clinic in Tehran between 2001-2007. The Fatigue Severity Scale (FSS) includes nine items developed to measure disabling fatigue and a Visual Analog Scale (VAS) to measure overall fatigue. A sample of asked to complete FSS and Short-form 36 Health Survey (SF-36) questionnaires. Test-retest reliability and Internal Consistency were assessed, using Intraclass Correlation Coefficient (ICC) and Cronbach's alpha, respectively. Dimensionality was assessed, using item-scale correlation after correction for overlap and convergent validity, using a priori hypothesized correlations with the SF-36. All the participants found the FSS-P to be clear and unambiguous in pilot testing. The ICC was reported 0/93 for the total score and 0/88 for VAS, The Cronbach's alpha was reported 0/96. The total score and the VAS were significantly correlated with the SF-36 vitality subscale ($r = -0/69$ and $r = -0/73$, respectively). Correlations with other SF-36 subscales were moderate ($r = -0/43$ to $r = -0/65$, all $p < 0.001$). The results of the study revealed that the FSS-P is an appropriate instrument psychometrically to assess the people with multiple sclerosis.

Key words: Fatigue severity scale, multiple sclerosis, translation, validity, reliability, Iran

INTRODUCTION

Multiple sclerosis is one of the most common neurological of young adults. Fatigue is one of the most common symptoms of MS. It has been concluded that 75-95% of people with MS (Darcy, 2001). Fatigue can have a major impact on functioning and activities of daily living, quality of life, employment and psychological well-being (Freal *et al.*, 1984). The word Fatigue does not lend itself easily to interpretation. Ask healthcare provides form various specialties to define fatigue and you will likely come up with a wide range of terms, including muscle tiredness, exhaustion, sleepiness, weakness, depression, languor and any number of others. In 1998, the Multiple Sclerosis Council Practice Guidelines defined fatigue as: A subjective lake of physical and/or mental energy that is perceived by the individual or caregiver to interfere with usual and desired activities (Deluca, 2005). A great deal of attention has been focused on the accurate identification and measurement of fatigue in the past 20 years (Freal *et al.*, 1984). Different scales and techniques have been developed, one of them is FSS. Although, cross-cultural studies are time consuming, it is

suggested that there is increasing for international standards to measure health status in a manner that allows comparison across countries but which also are relevant within individual cultures. Thus, it was decided to developed the FSS Iranian version to respond to this increasing demand and provide a validated instrument.

This study reports the development of the Iranian version of the FSS and the results of its psychometric testing among MS patients in Tehran the capital of Iran. The FSS is a nine-item scale that assesses disabling fatigue. Subjects were chosen consecutively from clinic out patients and were administered a 28-item fatigue questionnaire subjects were asked to read each statement of the questionnaire and choose the number from 1-7 that best described their degree of agreement with each statement: 1 indicates strongly disagree and 7 strongly agree. The nine items are combined into a total score; a lower total score indicates less effect of fatigue on everyday life. The FSS also includes a VAS measured as a 100 mm horizontal line anchored at no fatigue and fatigue as bad as it could be, which provides a single item measure of overall fatigue severity. Patients were asked to mark across the VAS line at the point that accurately in

the past 2 weeks. The FSS has demonstrated good internal consistency, test-retest reliability and known groups validity in patients with multiple sclerosis or systemic lupus erythematosus (Krupp *et al.*, 1989; Masur *et al.*, 2004). The FSS was translated into the following languages using standard techniques: Australian English, Mexican Spanish, New Zealand English, Spanish, Swiss, Taiwanese and UK English (Kleinman *et al.*, 2000).

MATERIALS AND METHODS

Permission was asked from the Departments of Neurology, State University of New York at Stany Brook (Dr. Krupp) and the International Quality of Life Assessment (IQOLA) translation methodology was followed to translate the FSS from English in to Persian, the Iranian language (Bullinger *et al.*, 1998). Two independent professionals translated the items and two others translated the response categories. Then a consolidated forward version was produced. This questionnaire then was backward translated into English by two professional translators to check for differences between the Iranian version and the original questionnaire. After a careful review and cultural adaptation few changes have been made and the provisional version of the questionnaire was provided. Subsequently the provisional forward translated questionnaire was pilot tested and administered to a sample of 20 patients with MS. After pilot testing a few more changes have been made. In general, there were no difficulties in translating response categories but in items motivation, exercise and physical functioning have been changed. These all carefully converted to Iranian equivalence and the final version was provided and used in this study. According to the IQOLA Project to test psychometric properties of the Persian-version FSS several tests were performed (Gandek and Ware, 1998; Ware and Gandek, 1998). To test reliability the internal consistency was estimated using Cronbach's alpha. Validity was assessed, using item-scale correlation after correction for overlap and convergent validity, using a priori hypothesized correlations with the SF-36. We evaluated the item performance and scaling characteristics, reliability, convergent and discriminate validity of the FSS using baseline visit data. Separate psychometric analyses were performed on the screening visit data with comparable results, therefore we report only the findings of the base-line data analysis. The sample consisted of 50 patients with MS that had to have these inclusion criteria: age between 20-40 years old, affected by Relapsing-Remitting MS, to have a suitable

mental status (Mini Mental State Examination (MMSE) >22) (Seyedian *et al.*, 2008). Their Expanded Disability Statue Scale (EDSS) score to be from 3.5-6 and not to have other chronic medical diagnosis. The mean of Barthel Index (BI) index scores (Oveisgharan *et al.*, 2006) and the depression substance of Hospital Anxiety and Depression Scale (HADS) (Montazeri *et al.*, 2003, 2005) were evaluated. Thirty healthy adult as control group were participated.

RESULTS

The mean age of the respondents was 30.38 (SD = 6.15), 76% were female, mostly married (52%). The most of them were independent (The mean of BI scores was 97.4) and the depression substance of HADS scores was 8.42.

The internal consistency reliability (Cronbach's α) for the FSS total score was 0.96. Test-retest reliability (intraclass correlation coefficient) was 0.93 for the FSS total score. Pearson correlation 0.91 for the VAS. The correlation between the 1st and 2nd test of a number of item and The correlation between each item with other items was examined (Table 1).

For evaluation of convergent validity the correlation between FSS total score, VAS score and SF-36 domain was analyzed. The FSS total score and VAS score were highly correlated ($r = 0.69$, $p < 0.0001$). As expected, the strongest correlation was seen between the SF-36 vitality scale and both the FSS total and VAS score ($r = -0.69$ and $r = -0.73$, respectively, all $p < 0.0001$) (Table 2).

Table 1: The correlations between items

Items	Correlation between the 1st and 2nd test	Correction for overlaps
1	0.84**	0.80**
2	0.52**	0.60**
3	0.71**	0.74**
4	0.90**	0.83**
5	0.78**	0.84**
6	0.62**	0.79**
7	0.70**	0.86**
8	0.23**	0.77**
9	0.80**	0.86**

Table 2: The correlations between FSS total score and VAS score and SF-36 healthy survey scores

SF-36	FSS total	FSS VAS
Pain	-0.59**	-0.57**
General health perceptions	-0.65**	-0.62**
Mental health	-0.43*	-0.50**
Physical functioning	-0.63**	-0.59**
Role-emotional	-0.50**	-0.57**
Role-physical	-0.64**	-0.60**
Social functioning	-0.58**	-0.55**
Vitality	-0.69**	-0.73**
Mental component sum	-0.60**	-0.63**
Physical component sum	-0.64**	-0.67**

$p < 0.05$, ** $p < 0.01$

Table 3: The means of scores of FSS Items in Healthy adult and patients with MS

FSS	Healthy adult (n = 30)				Patients with Ms (n = 50)			
	Mean	SD	Max.	Min.	Mean	SD	Max.	Min.
1	4/76	1/56	7	2	5/08	2/01	7	1
2	2/86	1/52	6	1	5/41	1/85	7	1
3	2/33	1/26	5	1	4/78	2/18	7	1
4	4/26	1/63	7	1	5/48	1/75	7	1
5	2/73	1/72	7	1	5/20	1/96	7	1
6	3/60	1/63	7	1	5/40	1/89	7	1
7	2/96	1/62	7	1	4/74	2/28	7	1
8	2/76	1/94	7	1	4/98	2/17	7	1
9	2/66	1/66	7	1	4/74	2/28	7	1
Total	3/23	1/08	5/10	1/20	5/03	1/70	7	1/66

Discrimination was to test the scale validity. It was hypothesized that the Healthy adult would have poorer fatigue than patients with MS respondents. The analysis showed that the Healthy adult respondents significantly had lower scores as expected (Table 3). This indicated that the FSS well discriminated between groups of people.

DISCUSSION

This study evaluated the scaling characteristics and psychometric properties of the FSS total and VAS scores in a sample of patients with MS participating. We found that the internal consistency and test-retest reliability of the FSS were excellent. The reliability of the FSS total score exceeded 0.93, which is excellent for use in group comparisons as well as individual level comparisons. Test-retest reliability, with an average of 3 weeks between assessments, exceeded 0.94 suggesting good stability. Overall the reliability of the FSS is excellent.

As expected, the FSS total score had the highest correlation with SF-36 vitality score. Significant and moderate correlations were seen between the FSS and other seven SF-36 domain scores. Higher correlations were observed between the FSS and pain, general health perceptions, physical functioning, role limitations (physical and emotional), social functioning. Lower correlation was seen in the mental health. Strong and significant correlations was evident between VAS score and SF-36 domains. These findings suggest that levels of fatigue are associated with all areas of patient functioning and well-being. Patient reports of worsening in general health status were also associated with more impairment in FSS total and VAS scores, suggesting that greater levels of fatigue disability were associated with declining health status. These findings was reported similar in previous study of Chronic hepatitis C (Kleinman *et al.*, 2000).

Discriminate validity analysis also indicated that the FSS could discriminate well between groups of people. The findings showed that the Healthy adult respondents had poorer fatigue as compared to patients with MS respondents.

The FSS appears to have good psychometric and scaling properties. Internal consistency and test-retest reliability of the FSS were excellent. The evidence suggests that although the specific items scaling differs somewhat among countries there is support for the unidimensionality of the FSS items across the different foreign language translations. These findings also support the validity of the FSS. Based on the results of this study, the FSS is expected to be a psychometrically adequate measure of fatigue outcomes in clinical trials of treatments for MS.

CONCLUSION

The present study has provided valuable evidence that supports use of the Persian-version of Fatigue Severity Scale. Reliability and Validity were established for use of the instrument in the general population affected by Relapsing-Remitting Multiple Sclerosis.

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