Psychometric properties of Gujarati version of Fatigue Severity Scale (FSS)

Srishti Sharma[1*], Megha Sheth[2]

[1]PhD Scholar, Lecturer, [2]Lecturer, [1]C. M Patel College of Physiotherapy, Gandhinagar, Gujarat, [2]S.B.B College of Physiotherapy, Ahmedabad, Gujarat, India

*Corresponding Author: Srishti Sharma
Email: srishtisharma22@gmail.com

Abstract

Introduction: Fatigue is a complex symptom and difficult to study because of its multiple types and causes. Fatigue Severity Scale (FSS) is frequently used for measuring fatigue and consists of a nine-item questionnaire. It has high internal consistency (0.81–0.94) and satisfactory test–retest reliability (ICC:0.82). For meaningful comparison to be carried out between various patient groups, it is necessary to investigate the psychometric properties of the FSS in the different population in their vernacular language. This study aimed to translate FSS into Gujarati language and determine its validity and reliability.

Participants: Eight experts, consisting of neurologists, physicians, and physiotherapists were included.15 subjects between 25-60 years, having conditions like parkinsonism (n=5), post-polio syndrome (n=10) having primary symptoms of fatigue were included.

Materials and Methods: In this cross sectional survey, translation of FSS was done into Gujarati as per guidelines of World health Organization. Face, content and concurrent validity were determined. Internal consistency and test-retest reliability was also examined across two raters. Level of significance was kept at 5%.

Results: Experts had experience of 8.56 ± 2.39 years. Face and content validity was established by review of the Gujarati FSS by experts (n=8), with mutual consensus. Patients included nine females and six males, between 45.6 ± 5.3 years. Concurrent validity was assessed using Pearson's correlation, with the coefficient being 0.81(95% CI: 0.75 to 0.84).

Conclusion: Gujarati version of FSS is comparable with the original English instrument in terms of validity and reliability. It is psychometrically feasible and can be used in Gujarati population to assess fatigue in various clinical conditions.

Keywords: Fatigue severity scale, Translation, Validity, Reliability.

Introduction

Fatigue is a complex symptom that is difficult to study because of its multiple types and causes. However, it is a prominent disabling symptom in a variety of medical and neurologic disorders. It can be assessed in a variety of ways, in terms of duration-acute and prolonged and in terms of determined force output. Subjective measures of assessing fatigue consist of questionnaires, diaries or interviews, whereas objective tools focus on physiological processes or performance, such as reaction time or the number of errors.[1]Based on various algorithms studied previously, self-reported measures have been proven to be equally efficacious to field tests to determine force generation. Fatigue is defined as the subjective lack of physical or mental energy, and is among the most debilitating symptoms of post-polio syndrome (PPS). Approximately 66–89% of patients with PPS perceive symptoms of increased fatigue that may lead to decreased physical and social functioning.[2] Also, majority of PPS patients identify fatigue as their most troubling symptom and is typically the earliest symptom, which worsens over time, and often leads to severe incapacitation.

Fatigue assessment typically relies on subjective self-report questionnaires, since it is a subjective experience. A frequently used inventory for the evaluation of fatigue is the Fatigue Severity Scale (FSS) originally developed by Krupp et al. for the use in patients with Systemic Lupus Erythematosus and Multiple Sclerosis.[3] The three most commonly used scales to assess fatigue in persons with PPS include the Fatigue Severity Scale (FSS), the Fatigue Impact Scale (FIS), and the Multidimensional Fatigue Inventory (MFI-20). The validity and reliability of FSS, FIS, and MFI-20 have been studied in persons with PPS, and FSS may be the preferred scale since it has fewer items and therefore is less time consuming.[4]

Extensive research has been done on FSS previously across various populations of PPS, in various countries. However, a major shortcoming is the lack of local linguistic versions which is recommended as it could allow researchers to more accurately measure changes in fatigue intensity occurring over time. In India, the only previous study to assess FSS in Parkinson's patients was conducted using a translated FSS (FSS‑Ind) into (Hindi/Punjabi).[5] Hence the purpose of the study was to translate FSS into Gujarati language, and determine its validity and reliability across some fatigue associated neurological conditions.

Materials and Methods

This study was conducted at the Physiotherapy department of SBB College of Physiotherapy, VS General Hospital, Ahmedabad. Study protocol was approved by Institutional Review board. Steps for translation recommended by WHO were employed for translating FSS, as described in figure 1.[6] Initially forward translation was done of the 9 items of the FSS from English into Gujarati. Thereafter, a bilingual physiotherapist who was blinded with respect to the original version translated it backwards into English. Finally, the Gujarati version was adapted according to this procedure. The original version and the back-translated version of the tool were then compared, and few differences which were identified on comparison were resolved with mutual discussion with forward and backward translators. The

translated version was reviewed by a group of expert physiotherapists working in various neurological conditions having an experience of more than 8 years in the field. Pilot version of the questionnaire was then tested on a sample of patients. After a rigorous review and few modifications, final version of Gujarati-FSS was synthesized and used in the study. None of the items required re-changes.

The study was conducted on 15 subjects between 25-60 years, having primary symptom of fatigue, and understanding both English and Gujarati languages. Those having adequate cognition and visited the Physiotherapy department during two visits approximately two days apart were included. Those with clinical depression or other psychiatric problems were excluded. All the participants were informed about the study and its objective, and those willing to participate were included. Baseline data collection included subject demographics (age, gender, marital status, education, number of years living in Gujarat, primary diagnosis and time of onset of fatigue) and presence of co-morbid conditions. FSS was measured in all the subjects in English and Gujarati languages. FSS is a self-administered questionnaire with 9 items (questions) investigating the severity of fatigue in different situations during the past 2 week. Grading of each item ranges from 1 to 7, where 1 indicates strongly disagree and 7 strongly agree, and the final score represents the mean value of the 9 items. The mean score of the nine items is used as the FSS score. A higher score indicates more fatigue and less activity. Originally, the cut-off score for fatigue was set to be ≥ 4, because fewer than 5% of healthy controls rated their fatigue above this level while 60%–90% of patients with medical disorders experienced fatigue at or above this level. Data analysis was performed using IBM-SPSS version 20.00. Level of significance was at 5%.

Step 1: Forward translation
Step 2: Synthesis
Step 3: Backward translation
Step 4: Expert review
Step 5: Pretesting
Step 6: Gujarati version PADS

Fig. 1: WHO steps of translation[6]

Face and content validity of the FSS was evaluated by members of the expert committee (n=8) having experience of 22.5 ± 1.5 years, and was further evaluated through qualitative analysis of the pretest interviews. The internal consistency of the FSS-Gujarati was examined by Cronbach's alpha (α) and to measure test-retest reliability, Intra-class Correlation Coefficient (ICC) was calculated. The scale was considered stable if ICC was> 0.70 as per guidelines given by Deyo R et al.[7] For test-retest reliability, readings were documented on first occasion and again 24 hours later. For inter-rater reliability, two different raters assessed the fatigue scores on the same day, separated by 1-hour interval.

Results

Participants consisted of 9 women and 6 men, with mean age 45.6 ± 5.3 years. Number of participants having parkinsonism were 5, and those having post-polio syndrome were 10. Eight subject experts who reviewed the Gujarati-FSS had experience of 8.56 ± 2.39 years. Mean FSS score was found to be 4.59 ± 0.39 (95% CI: 3.8 to 5.1).

Validity: For face and content validity, an expert panel of 8 professionals, consisting of neurologists, orthopedicians as well as physiotherapists, having mean experience of 8.56 ± 2.39 years was included. The concurrent validity assessed using Pearson's correlation co-efficient of each component as well as total score is shown in table 1.

Reliability: Gujarati-FSS was found to have good internal consistency as measured by Cronbach's alpha of 0.76. Item wise Cronbach's alpha also revealed good internal consistency, and none of the items significantly affected the total score consistency as displayed in table 2. The ICC value was found to be 0.81 (95% CI: 0.75 to 0.84), which suggests substantial level of inter-rater reliability. Test-retest reliability was found to be 0.78, suggesting good consistency over time by the same rater.

Table 1: FSS item wise and total score correlation co-efficient

	Item	*r* value
1.	My motivation is lower when I am fatigued	0.85
2.	Exercise brings on my fatigue	0.68
3.	I am easily fatigued	0.82
4.	Fatigue interferes with my physical functioning	0.80
5.	Fatigue causes frequent problems for me	0.65
6.	My fatigue prevents sustained physical functioning	0.78
7.	Fatigue interferes with carrying out certain duties and responsibilities	0.69
8.	Fatigue is among my three disabling symptoms	0.74
9.	Fatigue interferes with my work, family, or social life	0.71
	Total	0.81

Table 2: Internal consistency of each item in FSS

Item	Corrected item total correlation	Correlation co-efficient if item deleted
1	0.439	0.722
2	0.321	0.772
3	0.497	0.741
4	0.483	0.878
5	0.584	0.824
6	0.415	0.754
7	0.721	0.768
8	0.481	0.740
9	0.515	0.832

Discussion

Previously, FSS has been translated into various languages and this study was done to determine the psychometric properties of Gujarati version of FSS. Concurrent validity of FSS was found to be 0.81, internal consistency was 0.76, test-retest reliability was found to be 0.78 and ICC value was 0.81. These values suggest acceptable psychometric properties in terms of reliability and validity.

The ICC values are identified as fair for <0.40, moderate for 0.40–0.59, substantial for 0.60–0.79, and excellent for ≥0.80.[7]ICC values ranging between 0.80 to 0.97 have been reported previously in subjects with late effects of polio.[8] In accordance with this, current study also observed good reliability across subjects. Terwee et al have also established that ICC greater than 0.70 was defined as minimal acceptable level of reliability.[9] Vasconcelos et al assessed three different traditional questionnaires of fatigue and compared them on validity and applicability in post-polio syndrome patients. Their results indicated that scores on the FSS most closely agreed with the intensity of self-reported fatigue.[10]

The internal consistency of the FSS-Gujarati, examined by Cronbach's alpha (α) was estimated to be 0.76. Cronbach's alpha (α) should be at least 0.7 as an indicator of the satisfactory homogeneity of the items within the total scale.[7] This, further emphasizes the internal consistency of FSS-Gujarati to be strong, suggesting it to be a useful means to determine fatigue in chronic neurological conditions. Horemans HL et al in a similar study which compared various questionnaires of fatigue showed good internal consistency of FSS (Cronbach's alpha= 0.85).[11]

Fatigue has been examined in prior studies as well, and the correlation for fatigue has been consistently moderate. Schanke et al compared the descriptiveness of VAS for fatigue with FSS and found it to be moderate.[12] In the current study, correlation coefficient for validity between FSS-English and FSS-Gujarati was found to be 0.81, suggesting substantial strength of the scale in terms of validity. Rosti-Otajärvi E et al concluded that FSS showed moderate/high correlations with the perceived burden of the disease, quality of life and disease severity, whereas, age or gender did not have a significant effect on the FSS score.[13]

In India, a previous study done on translation of FSS into Hindi, concluded significant reliability with Cronbach's alpha of 0.91. All items in this study had correlation coefficients of more than 0.90 and p value less than 0.01, and none of the items if deleted, affected the Cronbach's alpha.[5] Much in line with this, our study also reflected acceptable internal consistency and ICC, and nor did any item affect internal consistency of the scale as a whole. Mean FSS score in this study was found to be 4.59 $\pm$ 0.39 (95% CI: 3.8 to 5.1). This is comparable to studies done by Krupp et al for translation of FSS in English and by Rosti in Finnish, where mean FSS scores were 4.8 $\pm$ 1.3 and 4.5 $\pm$ 1.7 respectively.[5,13] Validity and reliability of an assessment are contextual, and this study shows that Gujarati-FSS is psychometrically feasible to assess perceived fatigue among Gujarati patients.

Few limitations can be considered in the study. Construct validity, comparing FSS with other measures of fatigue was not assessed and may be conducted in the future. Similar to other self-report measures, FSS is also likely to be influenced by factors like recall bias, but owing to the findings of this study, psychometric properties of Gujarati-FSS are within acceptable limits and provide an appropriate measure for use in epidemiological studies exploring fatigue.

Conclusion

Gujarati version of the FSS is a valid and reliable measuring tool for the Gujarati population for measuring fatigue. This scale can be of great use to clinicians and researchers in Gujarat for evaluating and managing impairments like fatigue, most commonly seen across various neurological conditions.

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FSS Questionnaire

છેલ્લા ૧ અઠવાડિયામાં, મેં નોધ્યું છે કે,

૧	જ્યારે હું થાકી જઉ ત્યારે મારો ઉત્સાહ ઓછો હોય છે.	૧	૨	૩	૪	૫	૬	૭
૨	કસરત મને થકાવી દે છે.	૧	૨	૩	૪	૫	૬	૭
૩	હું જલ્દી થાકી જઉ છું.	૧	૨	૩	૪	૫	૬	૭
૪	થાક મારા શારિરીક કાર્યોમાં દખલ કરે છે.	૧	૨	૩	૪	૫	૬	૭
૫	થાકને લીધે વારંવાર મને તકલીફ પડે છે.	૧	૨	૩	૪	૫	૬	૭
૬	થાક મને સળંગ શારિરીક કાર્ય કરતા અટકાવે છે.	૧	૨	૩	૪	૫	૬	૭
૭	કેટલીક ફરજ અને જવાબદારી પુરી કરવામાં થાક દખલ કરે છે.	૧	૨	૩	૪	૫	૬	૭
૮	થાક એ મારી ત્રણ અકાર્યક્ષમતામાંનુ મહત્વપૂર્ણ લક્ષણ છે.	૧	૨	૩	૪	૫	૬	૭
૯	થાક એ મારા કામ, પરિવાર અને સામાજ્ઞિક જીવનમાં દખલ કરે છે.	૧	૨	૩	૪	૫	૬	૭