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ORIGINALES

Factorial structure and internal consistency of the Fatigue Severity Scale in Colombian population with chronic diseases

Estructura factorial y consistencia interna de la Escala de Severidad de Fatiga en población colombiana con enfermedades crónicas

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ABSTRACT

The present study has a psychometric design, with the objective of analyzing the factorial structure and the internal consistency for the Spanish version of the Fatigue Severity Scale (FSS) Questionnaire for Colombian population with chronic disease. Was applied the questionnaire to 52 people with chronic disease in Villavicencio city. The factorial Analysis indicates three factors: Factor 1 named physical affectation, Factor 2 named social affectation and Factor 3 named motivational affectation of the fatigue, where they explain the 76.324% of the total cumulative variance with .870 of Cronbach's Alpha. The results present a high reliability and concordance for the factorial structure with the original version which indicates an adequate validity of the test for Colombian population with chronic disease.

Keywords: Fatigue, Fatigue Severity Scale (FSS); Colombia; Chronic disease people.

RESUMEN

El presente estudio de corte psicométrico, tuvo como objetivo analizar la estructura factorial y la consistencia interna versión en español del cuestionario Fatigue Severity Scale (FSS) en población colombiana de enfermos crónicos. Para ello se aplicó el cuestionario a 52 enfermos crónicos de la ciudad de Villavicencio. El análisis factorial denota tres factores: el factor 1 denominado como afectación física, el factor 2 denominado afectación social y finalmente el factor 3 denominado afectación motivacional de la fatiga, que explican el 76,324% de la varianza total acumulada, y un alfa de Cronbach de 870. Los resultados muestran una alta confiabilidad y concordancia en la estructura factorial con la versión original, lo que implica adecuada validez de la prueba en población colombiana de enfermos crónicos.

Palabras clave: Fatiga; Fatigue Severity Scale (FSS); Colombia; enfermos crónicos.

INTRODUCTION

Fatigue can be defined as a subjective feeling a lack of physical and mental energy perceived by a person and interferes with the daily activities ⁽¹⁾. Fatigue is a disabling symptom. Often co-varies with depression, anxiety and sleep deprivation symptoms and is associated with the poor state of subjective health perception and a low quality of life ^(1, 2, 3). There are not enough fatigue prevalence studies in the human population. But it has been found that women present 2 to 3 times more fatigue complaints than men, that occurs at all ages except for adolescence, that most chronic diseases have at some point in their development fatigue for sufferers and that various psychiatric disorders are associated with fatigue. ⁽⁴⁾

On the other hand, a large number of instruments have been developed to measure fatigue, see, among others, the Fatigue Severity Scale (FSS), the Brief Fatigue Inventory (BFI), the Fatigue Impact Scale (FIS) and the Multidimensional Fatigue Inventory (MFI-20) of which there is also a Colombian version validated with the general population ^(5, 6). The Fatigue Severity Scale (FSS) was designed by Krupp et al. ⁽⁷⁾ for the evaluation of this symptom in neurology. It has been validated psychometrically in different countries of the world, while major studies have been conducted in patients with diseases such as multiple sclerosis, systemic lupus erythematosus, poliomyelitis, hepatitis C, COPD, chronic pain, obesity, kidney failure among others ^(8, 9). The FSS scale has been validated in Latin America only in Brazil and there aren't analyzed versions psychometrically in Spanish language. ⁽¹⁰⁾

Therefore, the purpose of this paper was to assess factorial structure and the reliability of the Fatigue Severity Scale (FSS) in Colombian patients with a diagnosis of chronic disease.

METHODS

Design

This is a cross-sectional study, with a descriptive scope and instrumental type. ⁽¹¹⁾

Participants

52 persons with confirmatory medical diagnoses of chronic diseases (Hypertension, HIV, Myasthenia Gravis, Hemophilia, Lupus, Type 2 Diabetes and Cancer) with an illness time between 3 months to 14 years.

Instruments

The Fatigue Severity Scale was designed by Krupp et al. ⁽⁷⁾. Consist of 9 items with Likert response with 7 possibilities of increasing intensity and that score between 1 and 7. The total is the sum of all the items. This study use the Spanish version translated by Bulbena et al. ⁽¹²⁾.

Procedure

Before starting with the fieldwork phase of the research which involved the application of the Fatigue Severity Scale (FSS) questionnaire, the cultural evaluation of the instrument was carried out according to the Alexandre and Guirardello criteria ⁽¹³⁾. The cultural adaptation work consisted of applying the Fatigue Severity Scale questionnaire to a group of 10 chronic patients of both sexes. These after answering the questionnaire were interviewed to identify words or questions of difficult comprehension, evaluate the acceptability and to make general comments, also registering the necessary time to complete and comprehend the answering system for each item on the questionnaire. There were no major difficulties to justify changes, the patients reported understanding and comprehension of the items in all the psychometric instruments evaluated. After signing the informed consent was proceeded to perform the scale application to the participants. The obtained data was analyzed using the statistical package SPSS version 19.

RESULTS

In order to establish if the sample size was sufficient to the factorial analysis, the Kaiser-Meyer-Olkin statistics and the Bartlett's sphericity test were generated. (Table 1)

Table 1. Kaiser – Meyer – Olkin (KMO) Index and Bartlett's sphericity test.

KMO and Bartlett test	
Measurement of sample adequacy.	Kaiser-Meyer-Olkin ,815
Bartlett's sphericity test.	Approximate Chi-square 129,979
	G1 36
	Sig. ,000

The data displayed in the table 1 shows that there are enough participants to perform the factorial analysis. Therefore, the extraction of principal components with Varimax Rotation was performed, presenting on the first place the factorial loading for each reactant (table 2) to determine if are eliminated or remain the same.

Table 2. Factor Loading for each reactant.

Reactive	Extraction
Fatigue1	,891
Fatigue2	,468
Fatigue3	,734
Fatigue4	,886
Fatigue5	,707
Fatigue6	,705
Fatigue7	,885
Fatigue8	,736
Fatigue9	,858

Table 2 presents that all the factors in the scale have enough extraction (more than 0.3) to keep them all. Thus, determining the number of factors that are part of the scale of the applied sample (Table 3).

Table 3. Factor extraction of the Fatigue Severity Scale.

Sum of square saturations of rotation			
Component	Total	% of variance	% accumulated
1	3,051	33,904	33,904
2	2,600	28,885	62,789
3	1,218	13,535	76,324

The results (Table 3) show that the 76.324% is explained in 3 factors of the total cumulative variance. With this number of factors, was proceeding to obtain the reactants to each factor.

Table 4. Reactants belonging to each factor.

Item	Component		
	1	2	3
Fatigue1			,926
Fatigue2	,674		
Fatigue3	,800		
Fatigue4	,910		
Fatigue5	,727		
Fatigue6	,627		
Fatigue7		,920	
Fatigue8		,725	
Fatigue9		,895	

Note a: Principal components extraction, with Varimax rotation.

Note b: The rotation converged in 4 interactions.

The previous table presents that component 1 named as physical affectation of the fatigue consists of the reactant 2, 3, 4, 5, and 6, Component 2 named as social affectation of the fatigue consist of the reactant 7, 8, and 9, the third factor consists of item 1 named motivational affectation of the fatigue. Finally, on what implies to reliability, the data show a Cronbach's Alpha of .870, and the internal consistency Analysis was conducted based on the inter element correlations and the corrected correlation analysis of the total elements (table 5), where positive correlation between all reactants were found, as well as positive correlation over .30 in all the reactants of the scale facing the total score of the scale.

Table 5. Item correlations and total corrected correlation.

	Fatigue1	Fatigue2	Fatigue3	Fatigue4	Fatigue5	Fatigue6	Fatigue7	Fatigue8	Fatigue9	Correlation element-total corrected
Fatigue1	1,000	,157	,297	,183	,086	,368	,123	,339	,300	,316
Fatigue2	---	1,000	,434	,534	,291	,411	,266	,232	,189	,440
Fatigue3	---	---	1,000	,712	,594	,600	,219	,482	,408	,678
Fatigue4	---	---	---	1,000	,724	,703	,399	,557	,270	,746
Fatigue5	---	---	---	---	1,000	,424	,455	,473	,336	,607
Fatigue6	---	---	---	---	---	1,000	,472	,617	,485	,744
Fatigue7	---	---	---	---	---	---	1,000	,635	,800	,595

Fatigue8	---	---	---	---	---	---	---	1,000	,642	,718
Fatigue9	---	---	---	---	---	---	---	---	1,000	,605

DISCUSSION

The fatigue is a feeling that can generate serious adaptative problematics both in the daily life as in clinical contexts, the reason why several studies ^(1, 2, 3, 4, 8, 9) highlight the need of evaluation. Against the scale, it is important to note that despite the fact that FSS has been widely used in the world, not enough studies have been done concerning its structure factor, by which is expected an important contribution through this research on how this test behaves on a psychometric level.

Indeed, the present study examined the psychometric properties of the FSS questionnaire in a Colombian sample with a diagnosis of chronic disease. The results present a three factor scale: the factor 1 can be named as physical affectation, and contains the reactants 2, 3, 4, 5 and 6, the factor 2 known as social affectation and has the reactants 7, 8 and 9, and finally the factor 3 is composed by only the reactant 1 and evaluates the motivational affectation of the fatigue. Equally, the scale shows a proper index of internal consistency, appropriate correlations between corrected total element, as well as positive correlations between all the reactants.

The results found in the present research suggest that the scale can be used in Colombian population with chronic diseases, while the scale shows 3 factors with appropriate theoretical congruence with the reactants, and internally, show high data of reliability and internal consistency.

The above results are related to various studies developed in the validated FSS questionnaire with samples of people with chronic disease, see, among others, chronic hepatitis ⁽⁸⁾, stroke ⁽¹⁴⁾, COPD ⁽¹⁰⁾, fibromyalgia ⁽¹⁵⁾, however, none of those found in the review, carried out the factorial analysis of the scale, which may make this study a pioneer on the factor validity of this scale for Spanish language, to serve as a guide to continue in this fatigue research line with chronic patients.

In this research, there are certain limitations, therefore, the results may not be generalized without precautions given the sample size and that it was composed only by chronically ill. It would be important to analyze it for example with the general population.

Conclusions: the present study has been the first in Spanish language reporting the psychometric properties of the FSS, questionnaire that has been use abundantly in Ibero-America only based on the Spanish translation. The Colombian psychometric analysis of the FSS is the first step for future studies to know the validity and reliability of this instrument in population samples with and without chronic disease diagnosis.

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