

Psychometric Properties of the Cancer Fatigue Scale in Babylon City

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A prevalent symptom of cancer is fatigue which is reported by both cancer patients and cancer survivors. Cancer fatigue has two dimensions of physical and psychological and affects sufferers' life quality. In this study The *Cancer Fatigue Scale* (CFS, Okuyama et al., 2000) was translated from English into Arabic by the researchers. Back translation was employed to ensure transliteral equivalence across the two languages. The Arabic scale was distributed among 230 cancer patients at several cancer hospitals in Babylon, Iraq. A VAS of fatigue was also given to the participants along with the CFS. Confirmatory factor analysis supported the 3-factor structure proposed by the scale developers in Japanese. Further analyses showed acceptable item discrimination indices for the items and high reliability coefficients for the subscales. The correlation between the VAS of fatigue and the CFS was 0.55, which supported the criterion validity of the CFS. These findings were interpreted as evidence for the validity and applicability of the CFS in the Arab populations.

Keywords: Cancer, fatigue, assessment, scale, validation, Arabic

Cancer causes a general deterioration of patients, which may include hair loss, shortness of breath, vomiting, as well as fatigue (Smets et al., 1993). These symptoms are not only associated with the cancer disease itself but also its treatment (Ryan et al., 2007). Symptoms are also associated with cognitive decline (Berger et al., 2015). Cancer-related fatigue, referred to as CRF, is pervasive and directly affects the life quality of the affected individuals. CRF is expressed via the National Comprehensive Cancer as a bothering, relentless, feeling of bodily, affective, and/or cognitive weariness that is linked to cancer or its treatment, which is not commensurate with recent activities and negatively affects daily life (Berger et al., 2015). Morrow et al. (2002) found that CRF showed by cancer cases is different from the normal fatigue as it cannot be alleviated by rest. Further, the prevalence of CRF is over 50% in cancer patients as well as those who are treated with chemotherapy (Nerenz et al., 1982).

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Statistics confirm that the rates of CRF can vary from 62 to 85 percent, based on which 9 to 45 percent reported it to be moderate to severe fatigue during the maintenance or active phase of the disease (Roila et al., 2019). Regarding the survivorship phase including the short and long term CRF, Davis et al. (2018) reported that 60% of the patients experience moderate to severe fatigue, and some patients might be fatigued for up to 30 years (Bøhn et al. 2019).

As a subjective phenomenon, CRF is normally assessed through employing self-reports. This subjectivity has led to severe inconsistencies while rating CRF in terms of its severity (Smets et al., 1993). There have been several attempts to provide scales based on which a true rating of fatigue could be presented including the *Brief Fatigue Inventory* developed by the European Organization for Research and Treatment of Cancer or the *Piper Fatigue Scale* (Agasi-Idenburg et al., 2010; Minton & Stone, 2009). However, Richardson (1998) emphasized that, as a subjective matter, there is always a necessity for the assessment of cancer fatigue from different perspectives and based on several factors.

One brief scale, referred to as the CFS, focuses on three components of physical, cognitive, and affective and was developed and validated by Okuyama et al. (2000). The advantages of this scale over the other scales is that it is brief (can be completed within 2 minutes) and is designed to show the essence of tiredness experienced by cancer cases that were soundly validated in such populations. This self-report scale includes 15 items on a 5-point Likert scale. Its dimensions include physical, affective as well as cognitive and it turned out to be valid and reliable in a sample of cancer cases proper for examining the psychometric features. It must also be stressed that the Japanese style of the scale was validated via Okuyama et al. (2003). In the same vein, a Turkish version was validated and reported to be reliable according to Şahin et al. (2018).

While fatigue seems to be an inseparable part of cancer, there seems to be a need for a valid and reliable scale to be used as a reference among Arab speaking patients. Such a scale does not exist in the Arabic language. Thus, the current research was an attempt to validate an Arabic style of the CRF questionnaire developed and validated by Okuyama et al. (2000). Accordingly, factorial structure, item-total correlations, internal consistency, convergent validity, and test-retest reliability were measured in order to validate the scale.

METHOD

Participants

Participants in the present research are 231 (157 males & 74 females) outpatients and inpatients diagnosed with cancer at cancer hospitals in Babylon in Iraq. The age range was 26 to 87 ($M=62.33$, $SD=7.89$)

Instrument

The 15-item CFS (Okuyama et al., 2000) was translated from English into Arabic via forward and backward procedures. The scale is consisted of three subscales of physical (7 items), affective (4 items), and cognitive (4 items). Each term is ranged on a 5-point response scale of None, A little, Somewhat, Considerably, and Very much. Sample items from different subscales include *Do you become tired easily?*, *Could you focus on certain items?*, and *Do you feel that your thinking has become slower?* High scores suggest a person who is suffering from cancer fatigue.

A VAS for Fatigue was employed to examine the convergent CFS validity. Participants were requested to rate the level of fatigue they felt at the time of completing the CFS. A 100-milimeter VAS was printed at the bottom of the CFS scale and patients were asked to mark the intensity of their fatigue on the VAS from 00 (not fatigued at all) to 100 (extremely fatigued).

Procedure

This research includes two stages: scale translation and validation. The scale validation stage including forward and backward translation of the English CFS into Arabic. Two medical doctors proficient in both languages translated the scale. Two other colleagues back-translated the Arabic scale into English. Discrepancies between the two English versions were discussed and a consensus was reached as regards the best equivalent in Arabic. Scale validation was based on correlational analysis and confirmatory factor analysis (CFA). The reliability and validity of the Arabic version of the CFS was demonstrated by examining its factorial structure, internal consistency, convergent validity, test-retest reliability and item-total correlations.

RESULTS

Table 1 shows the means, standard deviations, Cronbach's alpha reliability, and two-week test-retest reliability for the total CFS and its subscales. As Table 1 shows all the subscales have acceptable reliability indices (Nunnally, 1978) which shows the precision of the scale in measuring different aspects of cancer fatigue.

Table 1.
Statistics and Reliability Coefficients for the CFS Subscales

Subscale	Mean	SD	Alpha	Retest Reliability (N=56)
Physical	8.33	6.16	.84	.70

Affective	9.58	4.25	.73	.64
Cognitive	5.11	4.46	.75	.74
Total Scale	23.02	11.08	.86	.78

Table 2 shows the correlations between the CFS subscales and the total scale. All the correlations are positive and statistically significant at $p < .05$. The CFS subscales and the total scale score also correlated with the VAS of fatigue.

Table 2.
Correlations between CFS Subscales and the VAS of Fatigue

Subscale	Physical	Affective	Cognitive	Fatigue VAS
Physical	--	--	--	.74**
Affective	.29*	--	--	.41*
Cognitive	.47*	.20*	--	.44*
Total Scale	.83**	.58**	.67**	.70**

Note: * Indicates a significant at the 0.05 level; ** Indicates link is significant at the 0.01 level

In order to demonstrate the construct validity of the CFS, confirmatory factor analysis was employed. Baghaei and Tabatabaee Yazdi (2016) state that the fit of data to a latent trait pattern like the CFA or item response theory models is an indication that the covariation between the items is caused by an underlying latent dimension and this may be used as evidence for validity (Baghaei et al., 2019). In line with Okuyama et al. (2000), a three-factor structure was hypothesized for the Arabic CFS and the model was fitted to the data using the AMOS computer programme. All three factors were allowed to correlate. All the factor loadings were above .40. Several fit statistics including CFI, GFI, and TLI (>0.90), AGFI (>.80), χ^2/df (<3), and RMSEA (<0.08) were examined (Hu & Bentler, 1999). Results as shown in Table 3 indicated that the three-factor model fits the data: CFI=.911, TLI=.922, $df=87$, $\chi^2=207.06$, $\chi^2/df=2.38$, and RMSEA=.059.

Table 3.
Fit Values for the Correlated 3-Factor Model

Model	CFI	TLI	GFI	AGFI	χ^2/df	RMSEA
Correlated 3-factor model	.911	.922	.92	.89	2.38	.059

DISCUSSION

The self-recognized phenomenon of cancer related fatigue may have a greater negative effect on life quality and individual functioning than depression or pain (Cheng et al., 2011). The problem of fatigue is often

perceived by cancer patients as an inexorable symptom. Thus, this problem engages a large number of patients and can be important in dealing with the disease, especially during active treatments. There are still gaps in knowledge about the phenomenon and also in relation to other symptoms. However, there has been a lack of an appropriate measure in order to assess CRF among patients affected by cancer in Arabic populations (Al Maqbali et al., 2020).

According to the World Bank the Arabic speaking countries have a population of 456 million. Thus, the current paper reports the description of the validation of the Arabic version of the cancer related fatigue scale developed by Okuyama et al. (2000). The priority of the scale over other accessible scales is that it covers the physical three dimensions, affective, as well as cognitive, which were missing in other developed measures.

We translated the original scale into Arabic to be used in research among Arab patients. To do so, back translation as a common and accepted strategy was employed. Then, the data gathered from the participants were analyzed through correlation and confirmatory factor analysis. Based on the results it was found that the patterns of correlation were in line with findings of the researchers in the original development of the scale. The results for validity analysis, which was conducted through confirmatory factor analysis, were also evidence for the acceptable scale validity. The fit of the three-factor model is consistent with findings of the original research by Okuyama et al. (2000).

We note that the English version of the scale is extensively used in research on cancer factors related to fatigue, including prediction of fatigue (Haghighat et al., 2003), physical activity intensity (Tonosaki et al., 2014), coping styles and pain and age (Reuter, et al. 2006), energy conservation strategies (Sadeghi et al., 2016), and life quality (Abrahams, et al., 2018). Thus, the authors of the present paper recommend the Arabic version to be used as a validated and reliable measure to assess the levels of cancer-related fatigue among Arab populations. Also, it can be employed as an instrument in studies associated to the relationships among the many other factors that cancer patients need to deal with in accordance with the cancer-induced fatigue. We recommend that future studies with the Arabic version be carried out with the goal of providing additional evidence for the validity of this promising measure.

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