



Development and validation of the daily fatigue cancer scale (DFCS): Single-item questions for clinical practice



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ARTICLE INFO

Article history:

Received 14 June 2016

Received in revised form

8 December 2016

Accepted 10 December 2016

Keywords:

Cancer-related fatigue

Assessment

Clinical practice

Visual-analog-scale

Instrumental study

ABSTRACT

Purpose: Cancer-Related Fatigue (CRF), subjective symptom, is considered the most prevalent and disabling in cancer. To help caregivers better understand it, we developed and evaluated the psychometric properties of a visual analog scale to assess daily CRF.

Method: In our qualitative study, we conducted interviews with caregivers, patients and scientists (N = 30) to generate items and select the scale's format. We then administered the final scale to a sample of 104 patients hospitalized for cancer surgery. In our quantitative study, we evaluated psychometric items with standardized questionnaires to compare and identify the construct validity of our fatigue scale. Because clinicians need a cutoff to diagnose fatigue in daily care, we also analyzed the scale's sensitivity.

Results: Correlations evidenced good construct validity for our scale, with $r = 0.886$ ($p > 0.01$), confirming that both physical fatigue and psychological fatigue ($r = 0.768$) were effectively measured. The Receiver Operating Curve (ROC) showed good sensitivity and specificity (>0.80), giving clinicians a threshold to identify tired patients, with only a 3% chance of misdiagnosis.

Conclusion: The Daily Fatigue Cancer Scale is a good tool to detect patient fatigue and improve patient care.

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1. Introduction

Cancer-Related Fatigue (CRF) is a subjective symptom of fatigue, which differs from ordinary fatigue. Several authors have proposed various definitions of cancer-related fatigue. In 2007, the National Comprehensive Cancer Network [NCCN] proposed that CRF was a «distressing persistent subjective sense of physical, emotional, and/or cognitive tiredness or exhaustion related to cancer or cancer treatment that is not proportional to recent activity and that interferes with usual functioning» (National Comprehensive Cancer Network, 2007), which seems accepted as a consensus. CRF is the most frequent and specific symptom in cancer, but also the most disabling (Glaus et al., 1996; Lawrence et al., 2004; Richardson, 1995). Up to 80–90% of cancer patients (Irvine et al., 1991; Ream and Richardson, 1996) frequently mention this symptom, and report that it prevents them from leading a normal life – more so

than nausea or pain (Curt, 2000). In 2006, Prue et al. conducted a review of the literature to determine the forms and prevalence of CRF (Prue et al., 2006). They showed that a majority of studies reported an increase in fatigue at the beginning of anticancer therapy, with a prevalence of 39%–90%. Unlike other types of fatigue, and while it is characterized by its intensity, CRF cannot be alleviated by resting. It has been shown to start at diagnosis and to consistently increase with the evolution of the disease, to continue beyond treatments, even in patients in remission (Cella et al., 2002), thereby resulting in a significant decrease in patients' quality of life (Holzner et al., 2003; Payne et al., 2003). This impact on quality of life is arguably a major issue. Researchers and caregivers should therefore work to improve CRF management.

Glaus et al. studied the concept of CRF by conducting patient interviews (Glaus et al., 1996). These authors highlighted three different aspects of CRF: They showed that patients experience physical, cognitive and affective sensations. Indeed, cancer patients use these 3 sensations in 59%, 12% and 29% of the cases, respectively, to describe their fatigue. Diseases such as cancer are physically exhausting because of the treatments, but also quite trying emotionally and

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psychologically. A strong association between fatigue and depression has frequently been reported (Brown and Kroenke, 2009). A meta-analysis in 2011 estimated the prevalence of depression in cancer patients at 16.3% (Mitchell et al., 2011). Hamama-Raz et al. (2007) examined the relative contribution of psychosocial factors to psychological adjustment. The authors evaluated objective illness-related factors and subjective factors of psychological adjustment. They found that subjective factors were more strongly associated with adjustment than some medical factors (Hamama-Raz et al., 2007).

The basis for this research is the pressing need to provide a reliable assessment tool for nurses. Though their healthcare routine does not allow sufficient time for it, nurses are expected to quickly and accurately assess fatigue symptoms in patients. In fact, nurses report that collecting and assessing such information in order to manage patient fatigue is difficult because, in part, exhausted patients are less autonomous. These professionals therefore need a quick and user-friendly tool that can provide a useful criterion for healthcare decisions. Our aim was thusly to provide a solution for this assessment in light of the limited length of time to make it. We first conducted a literature review of all fatigue questionnaires to find an adequate tool. In our review, 23 questionnaires were examined, including 5 in French. These fatigue questionnaires were found unsuitable to daily nursing practice because they were either too long, or required prior training or additional time for scoring. In addition, those tools were not suitable for repeated measures. Indeed, psychological questionnaires are too long (about 20 items) and ill-suited to repeated measures because of learning bias. Nurses need a tool that can be used once –or many times–daily. In light of their overloaded routine (care-giving, pain management and emergency treatment), the use of a long questionnaire –however adapted– may lead to oversights in the evaluation of patient fatigue. Instead, a well-designed tool would aim to facilitate the work of the nurses, and thereby help improve patient care. We thus chose to design and develop a more adequate tool to measure daily CRF.

The single-item response is considered the most patient-friendly form (a visual analogic scale is recommended by the NCCN for CRF diagnosis). The visual aspect of these scales has been shown to have some influence on the result (Paul-Dauphin et al., 1999), and “a good tool is not the one that is the most efficient but the most suited to the situation” as Lesage aptly concluded in his thesis (Lesage, 2012). A visual analogic scale (VAS) thus seemed to be the most suitable tool for our study. A VAS consists of a 10-cm line (3.94 inches) with no gradation, and which ends are labeled so as to define the range of possible answers, usually “not at all” (left) and “extremely” (right). These scales provide a quick and simple assessment tool. They are commonly used by caregivers (e.g., the VAS for pain). Indeed, its simplicity makes it user-friendly, a feature patients widely appreciate. Those advantages allow its systematic use, thereby facilitating open dialogue and improving patient-caregiver relationships.

The aim of our study was to create the Daily Fatigue Cancer Scale (DFCS), a simple and patient-friendly tool adapted to daily nursing practice. We examined psychometric properties, focusing on the construct validity of the DFCS using correlations with another fatigue-assessment tool, the Multi-dimensional Fatigue Inventory (MFI). We also performed correlations with a tool evaluating depression; indeed, in cancer patients, CRF and depression have been shown to be tightly associated.

2. Methods

2.1. Stage I: development of the DFCS

2.1.1. Exploratory interviews

In the first step of the study, we conducted discussions with a small group of surgery nurses (one healthcare manager and seven

caregivers). All were females, aged 35 to 55, and employed at the time in the same facility. The nurses confirmed their preference for the VAS form: As seen above, it was considered the most suitable. The DFCS was then debated in greater detail. The nurses suggested the integration of smileys at both ends to add expressiveness and originality to the tool. Visual scales or other tools with faces have already been presented in the literature (Castel et al., 2005; Dunham and Herman, 1975; Gynther et al., 1979; McKinley et al., 2004). This idea was accepted.

In an attempt to gauge their understanding of cancer-related fatigue, we asked the nurses for a definition of patient fatigue. Producing a clear definition was difficult for them: They invoked individual patient differences and behaviors, e.g., patients “who are tired of ablutions but not of going out for walks”. These statements highlighted the difficulty of understanding and managing such a subjective symptom, and prompted the organization of interviews with the patients themselves to obtain their own representation of fatigue.

Audio-recorded interviews were conducted with 16 patients (nine women and seven men). In these interviews, the patients were asked three questions: First, “How, from your own point of view, would you define fatigue?”; second, “Do you think there are different types of fatigue?”; and third, “How would you measure fatigue on a daily basis?” The interviews were transcribed and analyzed.

These interviews helped us understand fatigue from the patients' perspective. Content analysis revealed that patients defined fatigue as a two-dimensional concept. The mental and cognitive dimensions of fatigue do not seem to stand out. However, all patients distinguished physical fatigue and emotional fatigue. In the interviews, a majority of patients used the French term “lassitude”, which can be understood as weariness, and many evoked depressive symptoms. Thus, items covering *general fatigue*, *physical fatigue* and *weariness* (lassitude in French) were selected to develop our VAS.

2.1.2. Scale items and design

The selection of the items composing the scale was a delicate process. It was important to ensure that these items be understandable by a majority of patients, and that they simply and clearly solicit the given symptom.

For the item describing general fatigue, we used an item from the “FACIT-F questionnaire” (Cella et al., 2010). For physical fatigue, the explicit term “lack of energy” was chosen. For the patients we interviewed and for the general population, the term “energy” refers to a significant and objective idea correlated to a physical state. The choice of this term was also motivated by the fact that the FACIT questionnaire also uses it (Cella et al., 2002). For the item related to emotional fatigue, we selected the term “to feel weary” (“lassitude” in French), which patients mentioned repeatedly in the interviews.

To design the format of the scale, we tested four different scales on 24 patients (fifteen women and nine men): The first scale consisted in a simple VAS with a single line with a smiley at both ends; the second scale was horizontal triangle showing the strength of the response from tip to base, with extremities labeled “not at all” and “extremely”; the third scale showed a red gradient representing the severity of the fatigue and also included smileys at both ends; the fourth design combined aspects of the three previous models, the triangle and the red gradient, to illustrate fatigue intensity, and smileys at both ends. To prevent methodological bias, these four scales were presented to the patients in different orders.

In summary, the interviews with the nurses and the caregivers allowed us to choose the most adapted form, while the interviews with the patients and the subsequent thematic analysis afforded us a method to select the most adapted items. Finally, discussions with

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