



Development of the Hirai Cancer Fatigue Scale: Testing its reliability and validity



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A B S T R A C T

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Purpose: The purpose of this study was to develop the Hirai Cancer Fatigue Scale (HCFS) to assess the fatigue experienced by cancer patients, and to verify its reliability and validity.

Methods: Based on qualitative research about the perception of fatigue by Japanese cancer patients, we developed a questionnaire. The content validity was confirmed by 5 expert oncology nurses and 5 oncologists. 281 Japanese cancer patients participated in this study. Construct validity was analyzed using factor analysis, and internal consistency was analyzed using Cronbach's α coefficient.

Results: A 15-item scale with 3 dimensions, "physical/mental sensation", "activity-related sensation" and "cognitive sensation," was developed by factor analysis. This scale had an overall Cronbach's α coefficient of .943 and a test-retest reliability coefficient of $r = .820$ ($p < 0.01$), confirming the high reliability of the scale. The correlation coefficient was $r = .759$ ($p < 0.01$) between HCFS and abridged Profile of Mood States-Fatigue (POMS-F), and $r = .763$ ($p < 0.01$) between HCFS and Cancer Fatigue Scale (CFS), both showing high correlations and confirming criterion-related validity.

Conclusion: HCFS enables reliable and valid evaluation of Japanese cancer patients' fatigue. Use of the HCFS would assist in convenient self-evaluation of fatigue, and would allow information to be effectively provided to healthcare professionals. It could also be used for outcome evaluation in an intervention study.

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Introduction

Fatigue is the most common symptom among cancer patients (Lawrence et al., 2004; Prue et al., 2006), and is known to be one of the main symptoms of pain. It exists in all stages of cancer survivorship, from diagnosis to end of life; some people have already experienced it at the time of diagnosis of cancer (Vogelzang et al., 1997), and it is an extremely common adverse effect during treatments such as chemotherapy (Butt et al., 2008; Siefert, 2010) and radiation therapy (Stricker et al., 2004). It persists long after completing a standard course of treatment (Kutner et al., 2001),

with almost all patients experiencing fatigue in the terminal stage (Fu et al., 2005). Therefore, properly managing fatigue is a significant issue that must be addressed in order for cancer survivors to maintain an adequate quality of life (QOL).

The number one cause of death in Japan, the world's leader in longevity, is cancer, and 1 in 2 Japanese people suffer from cancer at some point in life (Cancer Statistics in Japan, 2013). Until about 15 years ago, it was usual for Japanese cancer patients to be hospitalized to complete chemotherapy or radiotherapy. Recently, outpatient cancer treatments have become common, the duration of hospitalization for all kinds of cancer treatment have been shortened, and services that allow cancer patients to spend their terminal stages at home have been promoted. However, fatigue in cancer patients is still rarely a focus in either clinical settings or in research fields in Japan. Outpatient nurses can play an important role in the development of a plan to properly manage fatigue that occurs frequently and diminishes the QOL of cancer patients. To

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accomplish this, a scale with high reliability and high validity to properly evaluate fatigue, and that is easy enough for use at an outpatient level, is necessary.

Despite the various definitions of fatigue that have been tested to date, a universal definition does not exist. As the consensus is that fatigue is a subjective and multidimensional symptom (Rhodes et al., 1995; McDaniel and Rhodes, 1998; Fu et al., 2002), fatigue scales require the capability of multidimensional evaluation. Currently, the fatigue scales for cancer patients that can be used in Japanese are: revised Piper Fatigue Scale (revised PFS) (Piper et al., 1998), Cancer Fatigue Scale (CFS) (Okuyama et al., 2000), Brief Fatigue Inventory (BFI) (Mendoza et al., 1999), Profile of Mood States-Fatigue (POMS-F) (McNair et al., 1992), and Functional Assessment of Cancer Therapy (FACT) (Yellen, 1997). However, of these scales, only the revised PFS and CFS are multidimensional scales.

The revised PFS, the first multidimensional fatigue scale, is a well-designed scale based on a theoretical model that makes 4-dimensional measurements of fatigue: severity/behavioral, sensory, affective/meaning, and cognitive/mood. It is a significantly improved version of the original 82-item version with complex wording (Piper et al., 1989). However, as Schwartz (1998) pointed out, there are too many question items, 22 in total, which require a long time to answer, thus possibly becoming a burden on the respondents. In Japan, Kamizato (1999) announced a Japanese version of Piper's 22-item scale and used it in a study to elucidate fatigue in cancer patients undergoing radiation therapy; however, since then it has been little used in either research or clinical settings.

CFS is the only multidimensional fatigue scale developed by Japanese researchers that measures fatigue in 3-dimensions: physical, affective and cognitive. This scale is often used in nursing research in Japan because it has 15 items, making it considerably shorter than the revised PFS, and thus less of a burden on patients. However, it is far from convenient, as complicated calculations for each dimension are required for its evaluation. For this reason, this scale has not been used very often in clinical practice to quickly assess outpatient fatigue. In addition, it includes items such as "Do you feel that you make errors more often while speaking?", which is an expression that is unfamiliar and not normally used by Japanese people when they talk about fatigue.

Given the limitations of the previous fatigue scales, we believe that development of a multidimensional fatigue scale based on how Japanese cancer patients express their perception of fatigue, and one that is easier to use, is much required.

Purpose

The purpose of this study was to develop the Hirai Cancer Fatigue Scale (HCFS) that assesses fatigue experienced by cancer patients, and to verify its reliability and validity.

Methods

Conceptual framework

According to the Revised Symptom Management Conceptual Model (Dodd et al., 2001), symptom management consists of three interrelated concepts: "symptom experience", "symptom management strategy", and "outcomes". According to this model, symptom management is a dynamic process that is modified by individual outcomes and the influences of the nursing domains of person, health/illness, or environment. Additionally, according to the Symptoms Experience Model (Armstrong, 2003), various elements of individuals become antecedents of symptom experience and act on symptom production. This model states that the perceived components of the symptom experience include the

symptoms' frequency, intensity, distress, and meaning, and that there are individual differences in perception and expression. The same model also states that the expression or consequences of the symptoms are described as changes in functional and cognitive activities, including adjustment to illness and quality of life.

Based on these models, we set up the conceptual framework of this study, as described below. Fatigue experienced by cancer patients is a series of dynamic processes, where "perception of fatigue", "coping", and "outcome" influence each other. It is also influenced by demographic characteristics (sex and age), disease characteristics (diagnosis, stage of disease, treatment and health status), and personal characteristics (physical, psychological, social and cultural factors) (Fig. 1). Based on this conceptual framework, we developed a scale that measures the perception of fatigue in this study.

Development stage

Preliminary investigation

We first elucidated how Japanese cancer patients express their perception of fatigue, and, with the objective of conceptualizing this, we conducted an open-ended questionnaire survey that asked, "How would you describe your sensation of fatigue?" among 400 inpatient or outpatient Japanese cancer patients at 2 national hospitals in eastern Japan (Hirai et al., 2014). The survey was reviewed and approved by the respective ethical review boards of each hospital. Content analysis showed that 237 codes of fatigue were obtained and 35 subcategories/15 categories/4 core-categories were extracted. The 4 core-categories were "physical sensation", "mental sensation", "cognitive sensation", and "sensation that cannot be described with words". Physical sensations consisted of "My body feels heavy", "I am tired/feel listless or sluggish/don't feel quite right", "I want to lie down/sit down", "I am exhausted/can't get comfortable", "My body doesn't do what I want it to do", "I am sleepy", and "I lack endurance". Mental sensations consisted of "I have no willpower/motivation", "Everything feels bothersome", "I don't want to do anything/I don't want to move", "I am depressed/anxious", and "I am frustrated". Cognitive sensations consisted of "reduction in ability to think" and "reduction in concentration". In addition, indescribable sensations were indicated by "cannot describe in words". Furthermore, we performed a literature review of fatigue and fatigue scales for cancer patients, which aimed to establish the definition and the conceptual framework and to understand the characteristics of each scale. The review revealed that the multidimensionality of fatigue was mostly described in physical, mental and cognitive aspects. It also revealed that existing scales have not necessarily been developed based on the definition of fatigue. The

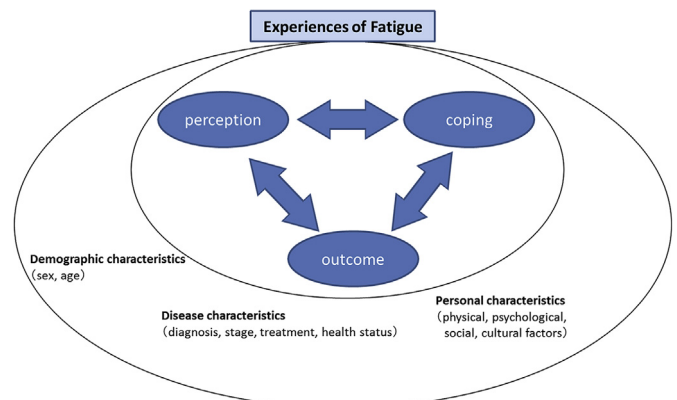


Fig. 1. Conceptual framework.

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