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QUALITY IMPROVEMENT

A Visual Fatigue Scale to Measure Cancer-Related Fatigue: The Process of Development

NINA N. GRENON, DNP, AOCN, ELIZABETH B. RUSSELL, MS, PA-C, MARY LOU SIEFERT, DNSc, MBA, RN, AOCN, and TERRI JABALEY, PhD, RN, OCN

From Dana-Farber Cancer Institute, Boston, Massachusetts

Authors' disclosures of conflicts of interest are found at the end of this article.

Correspondence to: Nina N. Grenon, Dana-Farber Cancer Institute, 450 Brookline Ave, Boston, MA 02215

E-mail: nina_grenon@dfci.harvard.edu

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Abstract

Background: Cancer-related fatigue (CRF) is a common and often underreported issue in the outpatient setting. Advanced practitioners are crucial in assessing and managing CRF, as they are frequently in contact with patients and can observe changes in their condition. Implementing a multidimensional fatigue scale that incorporates images could enhance and expedite the screening process for CRF in cancer outpatient care. **Objective:** The purpose of this study was to create a practical tool for clinical use, specifically a brief, self-rating pictorial scale designed to assess CRF. **Methods:** Nine focus groups comprised of oncology clinical experts and volunteer patients/survivors were conducted at a large National Cancer Institute–designated cancer center. Clinical expert focus groups convened online for 1-hour meetings every 2 weeks, spanning four sessions. During these sessions, the focus groups examined existing cancer fatigue scales and reviewed relevant literature. One of the advanced practice providers created an initial version of a pictorial fatigue scale. Patients then contributed their insights via multiple focus groups based on their personal experiences with CRF. Subsequently, a professional graphic artist refined the images, incorporating the patients' feedback to enhance the scale's accuracy and effectiveness. **Data evaluation and synthesis:** Content validity was established for a Visual Fatigue Scale measuring CRF using an iterative process with nine focus groups made up of oncology clinical experts and patients. The final scale included two image sets and a 10-point numeric scale to correspond with four levels of fatigue (none, mild, moderate, severe). **Implications:** The Visual Fatigue Scale can help identify patients who need more comprehensive evaluation and management, ensuring timely and effective interventions. By utilizing such a scale, health-care providers can better address the multifaceted nature of CRF, improving patient outcomes and quality of life.

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Cancer-related fatigue (CRF) is a common and challenging symptom experienced by many patients throughout their cancer journey. It affects most individuals during treatment, and approximately one third of individuals continue to experience fatigue even after completing therapy (Al Maqbali, 2021). Cancer-related fatigue is characterized as a distressing, persistent, and subjective sense of tiredness or exhaustion related to cancer or its treatment, which is disproportionate to recent activity and interferes with normal functioning (NCCN, 2003). Unlike typical fatigue, CRF is marked by its severity, persistence, and resistance to relief through rest or sleep (Fabi et al., 2020).

The causes of CRF are multifactorial, involving various contributing factors such as cancer therapies, tumor progression, poorly managed pain, anemia, metabolic and nutritional issues, comorbid illnesses, emotional distress, and physical deconditioning (Yang et al., 2019). Cancer-related fatigue significantly impacts patients' quality of life (QOL), affecting physical, functional, psychological, and cognitive aspects of daily living (Hofman et al., 2007).

Addressing CRF has become a major focus in supportive care in oncology. Several expert groups, including the Oncology Nursing Society (ONS), National Comprehensive Cancer Network (NCCN), American Society of Clinical Oncology (ASCO), European Society for Medical Oncology (ESMO), and the Multinational Association for Supportive Care in Cancer (MASCC), have emphasized the need to address CRF in clinical practice (Bower et al., 2024; Fabi et al., 2020; MASCC, 2023; NCCN, 2025; ONS, 2017).

Cancer-related fatigue is a complex and multifaceted symptom. Despite its high prevalence, CRF is often inadequately assessed in clinical settings, highlighting the need for improved evaluation and management strategies. Effective assessment tools for CRF should possess several key qualities. Given the subjective nature of fatigue, assessment tools should allow patients to self-report their experiences. This ensures that the evaluation reflects the patient's personal perception of their fatigue levels. The questions should be straightforward and concise, enabling patients experiencing fatigue to complete them without undue burden. This is crucial for ensuring accurate and consistent responses. Fatigue encompasses various dimensions, including physical, cognitive, emotional, and behavioral aspects. An effective assessment tool should capture these different facets to provide a comprehensive understanding of the patient's condition. The instrument should be specifically designed to assess CRF, considering the unique challenges and symptoms associated with this condition. By incorporating these qualities, health-care providers can better evaluate CRF and develop targeted management strategies to support patients and their caregivers effectively (Okuyama et al., 2000).

The NCCN (2025) has published evidence-based guidance for CRF that recommends routine screening at multiple time points across the cancer care trajectory, with further assessment and tailored management for individuals reporting moderate to severe fatigue. These higher levels of fatigue can impair physical function and daily activities, and are often described as "significant" or "clinically significant" fatigue (Butt et al., 2008; Pearson et al., 2021). Several instruments have been developed to assess fatigue in cancer patients; some of the most widely used and validated are the Brief Fatigue Inventory (BFI), the Multidimensional Fatigue Symptom Inventory-Short Form (MFSI-SF), the revised Piper Fatigue Scale (PFS-R), and others (Table 1; Mendoza et al., 1999; Stein et al., 2004; Reeve et al., 2012). These tools are frequently lengthy and present challenges in clinical practice, including linguistic and interpretation difficulties, as well as the practical burden of implementation they may impose in a clinical setting. These challenges can hinder their effective use in routine patient care (NCCN, 2025).

Patients report a preference for using pictorial images with numeric rating scales and descriptors for self-reporting the severity of symptoms such as pain (Ware et al., 2006). The use of a pictorial scale to assess different aspects of fatigue was explored in two studies. Both pictorial scales were found to be valid (Gielissen et al., 2013; Pearson et al., 2021). Gielissen and colleagues sought to measure suffering in cancer survivors with fatigue using an adapted version of the Pictorial Representation of

Table 1. Unidimensional and Multidimensional Fatigue Scales

Scale	Characteristics	Dimensions/Timing
Brief Fatigue Inventory (BFI) (Mendoza et al., 1999)	• Examines fatigue in the previous 24 hours • A 9-item self-report scale	• Physical functioning • Requires 5 minutes to complete
Multidimensional Fatigue Symptom Inventory-Short Form (MFSI-SF) (Stein et al., 1998)	• Measure of fatigue over the previous week • A 30-item self-report scale	• Physical and mental fatigue • Requires 5 minutes to complete
Piper Fatigue Scale Revised (PFS-R) (Reeve et al., 2012)	• Examines the current state of fatigue • A 27-item self-report scale • A 12-item self-report scale (PFS-R)	• Behavioral/intensity, cognitive, affective, and sensory • Requires 5–10 minutes to complete
Fatigue Severity Scale (FSS) (Krupp et al., 1988)	• Differentiates fatigue from depression • Determines the fatigue severity over the past 7 days • A 9-item self-report scale	• Physical functioning • Requires up to 5 minutes to complete
Wu Cancer Fatigue Scale (Wu et al., 2006)	• Utilized in both clinical and research settings • Examines the fatigue level over the past 24 hours • A 9-item self-report scale	• Physical and mental fatigue • Requires less than 5 minutes to complete
European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core-Functional scale 30 (EORTC QLQ-C30 FS) (Aaronson et al., 1993)	• Part of quality-of-life scale • Determines the fatigue level over the past week • Produces ceiling effect in advanced cancers • A 30-item questionnaire	• Physical functioning and mental functioning • Requires 10 minutes to complete
Functional Assessment of Chronic Illness Therapy-Fatigue subscale (FACIT-F) (Webster et al., 2003)	• Part of quality-of-life scale FACT-G Scale • Assesses fatigue over the past 7 days • A 13-item self-report scale	• Physical functioning • Requires 15 minutes to complete
Lee Fatigue Scale (LFS) (Lee et al., 1991)	• Self-assesses fatigue level in the morning for the week following chemotherapy • Original 13-item version is used; research has explored shorter versions (like a 3-item version) to improve efficiency while maintaining validity	• Multidimensional • Short version requires less than 1 minute to complete

Illness and Self Measure-Plus (PRISM+) and found that the burden of suffering assessed by PRISM+ was related to but not identical to fatigue severity. Pearson and colleagues evaluated two tools designed to screen for tiredness and fatigue. The first tool, the Edmonton Symptom Assessment System Revised (ESAS-r), uses a numerical scale, while the second, the Fatigue Pictogram, uses pictures to represent five levels of fatigue, ranging from "not at all tired" to "extremely tired." Both tools were equally preferred by users, but the pictorial tool had fewer instances of missing data, likely because it was easier to use (Fitch et al., 2012; Pearson et al., 2021). Neither pictorial scale specifically assesses fatigue; the Fatigue Pictogram asks about tiredness, and the PRISM+ measures suffering rather than fatigue. To our knowledge, there is no pictorial scale to measure CRF for screening or assessment purposes.

Advantages of pictorial scales include the ease and brevity of administration. Fatigue is a complex symptom, and management of it would benefit from the use of a pictorial tool that includes more information than severity alone. A pictorial scale with four levels of severity (none, mild, moderate, and severe) represented by pictures would provide the necessary information about the severity of fatigue in a brief, easy-to-administer tool. Due to the subjective nature of the fatigue experience, patients' self-monitoring on a regular basis

provides valuable information to guide more in-depth evaluation and treatment by clinicians and to gauge the benefit of interventions. Therefore, a short, easy-to-use pictorial tool could guide more effective and individualized management of the multidimensional nature of CRF, resulting in improved patients' QOL and well-being.

This study aimed to create a practical tool for clinical use, specifically a brief, self-rating pictorial scale designed to assess CRF. The development process was divided into two phases. The first phase, which this study focused on, involved the creation of the tool and its initial content validation. The content validation aimed to ensure that the tool accurately and comprehensively represents the concept and multidimensional nature of CRF. The scale has undergone psychometric testing, which will be described in a future publication.

METHODS

Design

The study team utilized a qualitative approach with a series of nine focus group sessions.

Sample/Setting

The study was conducted in a large National Cancer Institute–designated academic cancer center in the Northeastern United States. Nine focus group sessions consisting of clinical experts in cancer care, patients, and survivors were conducted via video calls over the course of 6 months. The clinical expert focus group was comprised of two education specialists, two oncology nurses (one clinical specialist), one physician associate (PA), one nurse practitioner (DNP), two nurse scientists, and one project manager. The patient focus groups were comprised of seven patient/survivor participants total (six female, one male). All patient volunteers were members of a Patient and Families Advisory Council. Volunteers were adult patients in active cancer treatment or survivors who had received cancer treatment in the past.

Methods

Content validity was established using a process of systematic analysis, combining subject matter expert judgment and patient consensus through repetitive subjective analysis (Sauer et al., 2021). Using an inductive approach, an expert nurse scientist in qualitative inquiry and focus group facilitation conducted focus group interviews. Initial focus group sessions, comprised of oncology clinical and educational experts, focused on a review of relevant literature and validated fatigue tools. The team took into consideration the multidimensional nature of fatigue and its impact on the daily function of a patient with cancer or survivor. Based on this, two separate sets of images with written descriptors were created to correspond with four levels of fatigue: none, mild, moderate, and severe (NCCN, 2025). Patient/survivor focus group meetings were then conducted, with group members providing verbal feedback on the images and corresponding written descriptors. Data were collected and stored on a password-protected computer. Focus group attendees were reminded at the start of each session that overall participation, as well as any individual contributions made, was completely voluntary and kept confidential. Participants were instructed to maintain confidentiality of attendance and all content discussed. No names or other personal identifiers were recorded. No compensation for participation was provided.

The focus group facilitator used a semi-structured interview guide. Three main prompts guided the discussion. Probes were used as needed (Table 2). Groups were not audio recorded. Feedback was captured in free-text notes. Careful consideration was made to the content and context of narrative data provided.

Consensus was obtained by facilitating open and respectful conversations among focus group participants, allowing each participant the opportunity to voice their opinion and determine commonalities. Consensus was confirmed by the facilitator, summarizing the synthesis of ideas and final decisions for revision of the Visual Fatigue Scale at the end of each group, encouraging expression of final concerns or objections. Finally, consensus was achieved when commonalities were identified, and there was no dissent from any group members about final determinations for revision. The sample size was determined when saturation of data was reached: when no new information emerged from the group and

Table 2. Semi-Structured Interview Guide for Patient/Survivor Participant Focus Groups

Thinking about your own experience of cancer-related fatigue, please comment on the following:

1. Whether the images are representative of your experience and what your preferences are.
   a. Is one set of images preferable or a combination?
   b. Please comment on the characteristics of the images. What do you like or dislike about them (including the environment)?
   c. Please comment on the characteristics that may or may not identify them as cancer patients (e.g., presence or absence of hair or the presence of an infusion port).
   d. Please comment on whether you feel the images are sensitive to cultural diversity (e.g., gender, skin color, clothing).
2. Please provide your input on how well you think the images represent or demonstrate the multidimensional nature of fatigue (e.g. mental, physical, and social aspects of fatigue).
3. Consider the descriptors and the language used. What do you like or dislike?
4. Do they address the potential physical and mental dimensions of fatigue?
5. Do you have anything else you would like to share?

there was consensus about additions, deletions, and revisions to the images. The tool was revised based on focus group findings, and a professional artist rendering was sent to all focus group members for confirmation of final consensus of agreement that participants' input was addressed and no further dissent was expressed.

Thematic analysis was performed to identify commonalities in the narrative data within the context of the experience of CRF. Narrative analysis was conducted simultaneously with data collection and at its conclusion, as repetitive content emerged from the data. Common themes representing focus group consensus with tool revisions were returned to focus group participants for member checking to confirm agreement.

The Institutional Review Board (IRB) of the hosting institution approved the study, providing a Quality Improvement (QI) determination, and as such did not provide ongoing formal supervision.

RESULTS

Content validity for a Visual Fatigue Scale to measure CRF was established through a series of focus groups comprised of oncology clinical experts and patient volunteers. Based on the findings of the initial focus groups involving oncology clinical experts, two sets of prototype images were sketched to correspond with four levels of fatigue. An image set depicting faces, a set depicting person/bench images, and corresponding written descriptors were matched with four levels of fatigue (no fatigue, mild fatigue, moderate fatigue, and severe fatigue; Figure 1).

The image sets and descriptors were then reviewed in the patient volunteer focus groups. The patient volunteers provided positive and negative feedback on the image sets, including the suggestion to remove the image set depicting faces alone, as they did not feel that it was reflective of the multifaceted experience of fatigue. One patient stated, "I like the movement implied in the bench images" and another said, "The mouths of the face images should not indicate happiness or sadness." The group also recommended the creation of a separate image set, potentially incorporating a battery image to represent various levels of energy vs. fatigue, suggesting "A battery is more universal, neutral, impersonal." Minor alterations to the written descriptors were also suggested: patients recommended streamlining the verbiage and omitting some examples, such as reading a book or newspaper, stating "nobody reads during treatment." They noted that including both physical and mental fatigue in the descriptors was important.

In subsequent focus groups with oncology clinical experts, patient recommendations to alter the images were considered and resulted in omission of the facial image set and the creation of a battery image set in various states of "battery charge" to depict the four different levels of fatigue. A 0 to 10 numeric scale was added. Minor changes in the written descriptors were also incorporated (Figure 2).

After these changes were integrated into the prototype, a professional graphic artist prepared a finalized draft version of the images. The revised

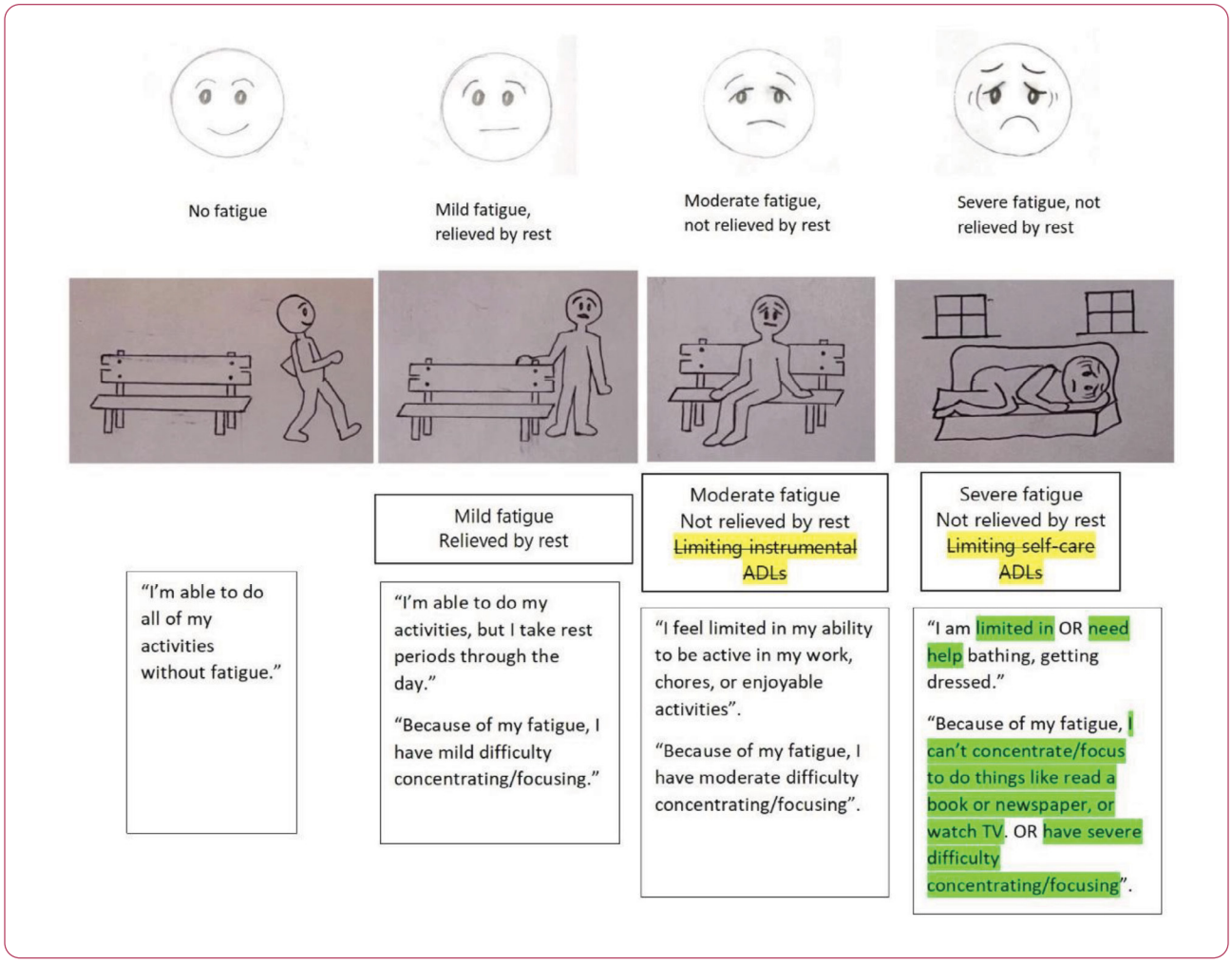

Figure 1. First draft of the Visual Fatigue Scale.

images and descriptors were sent back to the original oncology clinical experts and patient volunteers to provide further feedback via email. Ultimately, patients suggested omitting the written descriptors completely, as they noted that the descriptors did not add significant value, were not universally applicable, and took additional time to read. Recommended changes were adopted, and both the oncology clinical experts and patient volunteers agreed that no further edits were recommended; thus, consensus was reached that the tool was finalized. The finalized version of the Visual Fatigue Scale for CRF was completed with visual images of person/bench, images of batteries, and a 0 to 10 numeric scale (Figure 3). The scale may be obtained for use with permission by contacting dfcicantorrequest@dfci.harvard.edu.

DISCUSSION AND IMPLICATIONS FOR PRACTICE

Clinical utility refers to the practicality and effectiveness of a screening tool in real-world settings. An ideal screening tool should be simple to use, have a short administration time, and have questions that are easy to understand and response options that are clear. The results should provide actionable insights for both patients and clinicians. In cancer care, screening should identify patients experiencing fatigue who may benefit from further evaluation and tailored management strategies (Badrick & Bowling, 2023).

The development of the Visual Fatigue Scale for CRF represents a significant step forward in addressing the challenges of measuring fatigue in oncology patients. Cancer-related fatigue is a

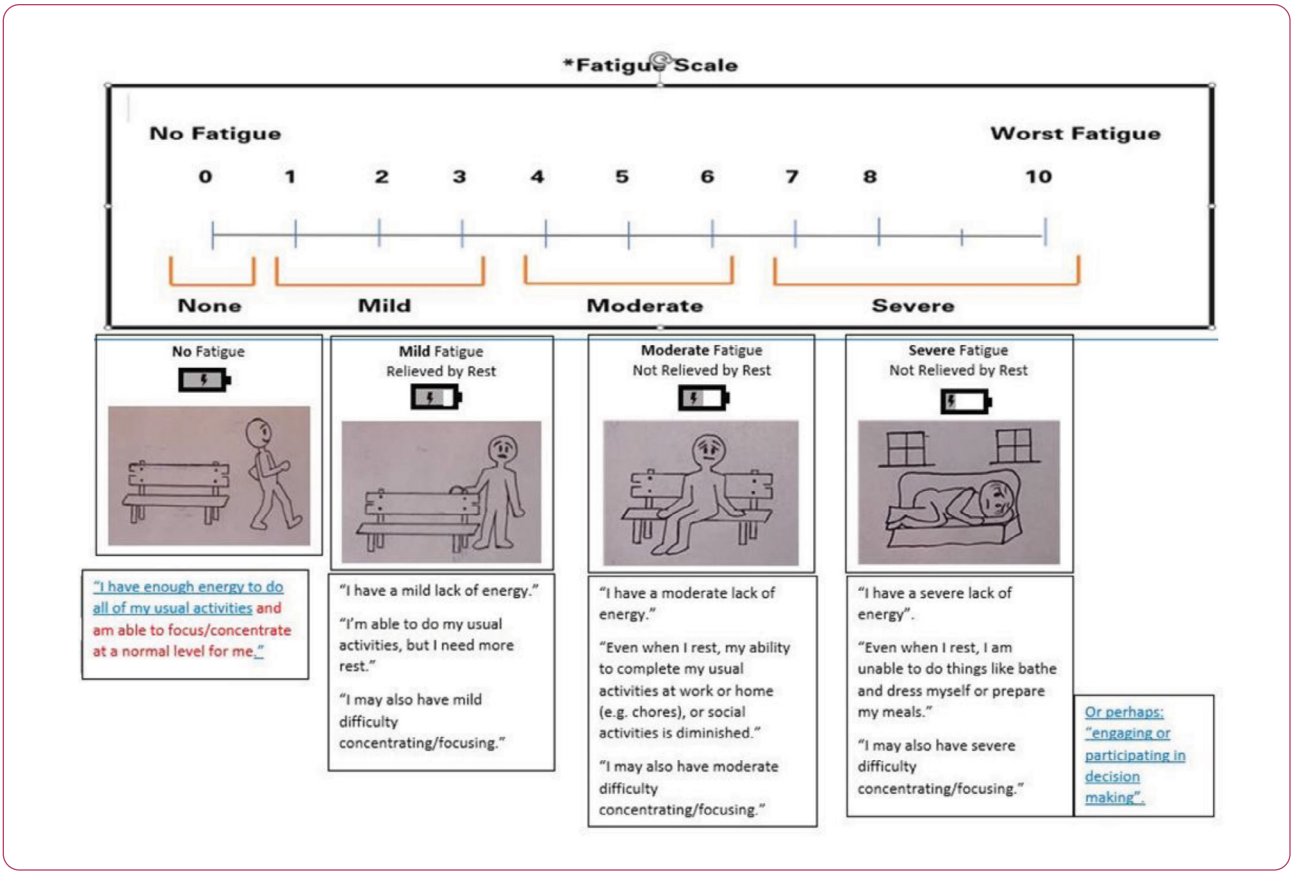

Figure 2. Second draft of the Visual Fatigue Scale.

complex, multidimensional symptom that profoundly impacts the physical, emotional, and cognitive functioning of cancer patients. Traditional fatigue assessment tools often rely on numerical scales or written descriptors, which may not fully capture the multidimensional and subjective experience of fatigue. This study sought to address these limitations by creating a visual scale that incorporated patient and clinical oncology expert input to ensure its relevance and usability.

The qualitative approach employed in this study, including focus groups with clinical experts and cancer patients, was instrumental in ensuring the content validity of the fatigue scale. By engaging oncology professionals, the study leveraged their expertise in understanding the clinical manifestations of CRF and its impact on patient care. Simultaneously, the inclusion of patient volunteers ensured that the tool was grounded in the lived experiences of individuals directly affected by CRF. These dual perspectives allowed for the creation of a tool that is both clinically meaningful and patient centered.

One of the key findings from the focus groups was the need to move beyond facial imagery to represent fatigue. While facial expressions are commonly used in visual scales, patients expressed that these images did not adequately capture the global experience of fatigue, which encompasses both physical and mental dimensions. Patients noted that the full-body images with benches depicting various levels of activity were more representative of their overall experience of fatigue. This feedback also led to the development of the battery image set, which was ultimately adopted as an additional visual representation. The battery imagery, depicting varying levels of energy depletion, resonated with patients and provided a clear, intuitive way to communicate the severity of fatigue.

The iterative process of refining the tool highlights the importance of patient input in tool development. Patients emphasized the need

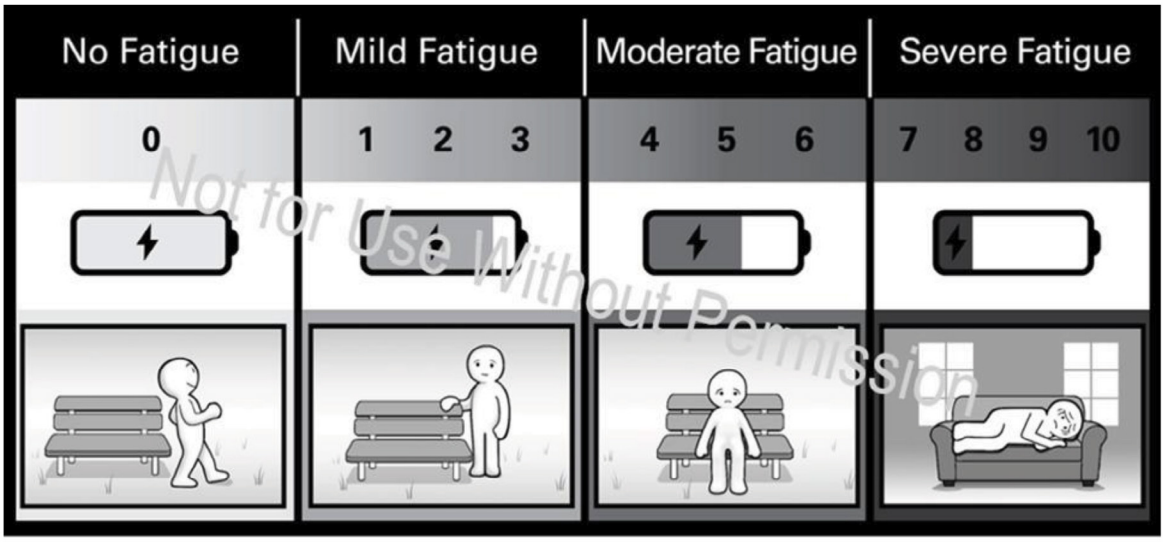

Figure 3. Final version of the Visual Fatigue Scale.

for concise, streamlined language that avoids redundancy while still capturing the multidimensional nature of fatigue. This allowed the scale to capture physical and mental fatigue. The changes to the images and deletion of written descriptors improved the clarity and made the tool more inclusive and relevant for a diverse patient population.

The involvement of a professional graphic artist in the final stages of development added an important layer of refinement to the visual scale. By translating the prototype images into polished, professional graphics, the artist ensured that the final product was visually appealing and easy to interpret. This step underscores the importance of collaboration across disciplines in the creation of patient-centered tools.

Incorporating Eastern Cooperative Oncology Group (ECOG) Performance Status alongside a visual fatigue scale can strengthen interpretation by linking a patient's symptom severity (fatigue intensity) with functional impact (ability to carry out daily activities). A fatigue score of 7/10, for example, carries different clinical implications in a patient who is ECOG 0–1 (fully active or restricted in strenuous activity only) vs. ECOG 3 (limited self-care, confined to bed/chair > 50% of waking hours). Using both measures together can help clinicians (1) distinguish transient treatment-related fatigue from clinically significant functional decline, (2) identify patients who may benefit from rehabilitation, supportive care, or urgent evaluation, and (3) track whether interventions improve symptoms, function, or both (Xi et al., 2024).

The goal is to treat fatigue scoring like the 0–10 pain scale: a quick, repeatable measure of an important symptom that clinicians can track over time and use to trigger a standard follow-up process when patients report moderate to severe fatigue. As with pain, fatigue screening is most actionable when paired with a brief context measure. ECOG is widely used across oncology and provides a familiar, standardized functional anchor that can be documented at the same visit (Sharman et al., 2020).

It is also worth emphasizing that a pictorial/visual format (e.g., a visual analog scale) can broaden usability in populations that may struggle with text-heavy tools. Visual tools can support screening in patients with language barriers (especially when paired with simple anchors and interpreter support) and can be adapted for children using developmentally appropriate imagery and wording.

This increases feasibility in diverse care settings (infusion units, inpatient oncology, rehabilitation) and helps standardize fatigue monitoring across heterogeneous patient populations (Desramé et al., 2023).

Future research could strengthen the Visual Fatigue Scale's generalizability by evaluating its performance across a wider range of real-world cancer care environments, including outpatient infusion units, inpatient oncology services, and cancer rehabilitation programs. These settings differ in acuity, visit frequency, staffing, and symptom burden, and multi-setting validation would clarify whether the scale maintains consistent feasibility (completion rates, time to administer), interpretability, and clinical usefulness (ability to trigger appropriate follow-up and referrals) across the continuum of care.

It would also be valuable to test the tool in specific oncology subpopulations to ensure it functions equitably across age groups and patient needs. Studies in older adults could examine usability in the context of multimorbidity, polypharmacy, frailty, and cognitive impairment, as well as whether standard cut points (e.g., moderate/severe thresholds) predict functional decline or hospitalization risk. In pediatric oncology, research should assess age-appropriate wording/anchors and compare child self-report vs. caregiver proxy-report when necessary. Additionally, targeted evaluations in individuals with physical disabilities (including mobility, neurologic, or sensory impairments) could determine the most accessible administration modes (spoken scale, large-print, electronic) and whether fatigue scores track meaningful outcomes such as participation in therapy, activities of daily living, and fall risk.

Beyond oncology, the scale's broader clinical value could be expanded by testing feasibility and validity in other chronic disease states where fatigue is prominent (e.g., heart failure, chronic obstructive pulmonary disease, chronic kidney disease, autoimmune disease, neurologic disorders, and post-viral syndromes). Such studies could compare fatigue trajectories across conditions, assess responsiveness to interventions, and determine whether a shared visual metric can support cross-specialty symptom monitoring and integrated care pathways.

This study successfully established basic content validity for the Visual Fatigue Scale for CRF. A second study is in progress to evaluate the reliability, sensitivity, and specificity in clinical practice. Future studies could explore the scale's performance across different cancer types, treatment modalities, and demographic groups to ensure its generalizability. Additionally, integrating the scale into electronic health records or mobile applications could enhance its usability and facilitate real-time fatigue assessment in clinical settings.

LIMITATIONS

The development of this Visual Fatigue Scale for CRF in clinical practice has been validated by several oncology experts and patient volunteers to establish content validity. Additionally, the scale has undergone psychometric testing, details of which will be available in a future publication. The sample consisted of a diverse group of adult patients; however, the evaluation was conducted at a single institution in the outpatient setting, which poses a limitation regarding the generalizability of the findings. Another potential limitation is that the Visual Fatigue Scale for CRF might be interpreted differently by individuals with visual and/or mobility impairments. Finally, responses were not audio recorded, and the sample size was limited.

CONCLUSION

The development of the Visual Fatigue Scale for CRF represents a meaningful advancement in the assessment of this challenging symptom. By incorporating both expert consensus and patient feedback, the study created a tool that is both clinically relevant and reflective of the patient experience. The final version, featuring the person/bench images, battery images, and a 0 to 10 numeric scale, has the potential to improve fatigue assessment and ultimately enhance the quality of care for oncology patients. Future research and implementation efforts will be critical in realizing the full impact of this innovative tool.

Disclosure

The authors have no conflicts of interest to disclose.

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