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# Postoperative fatigue; translation and validation of a revised 10-item short form of the Identity-Consequence Fatigue Scale (ICFS)☆

Torkjell Nøstdahl [a,*], Tomm Bernklev [b,c], Johan Raeder [c,d], Leiv Sandvik [e,f], Olav Fredheim [g,h,i]

[a] Department of Anaesthesia, Telemark Hospital, Skien, Norway
[b] Research & Development, Telemark Hospital Trust, Skien, Norway
[c] Institute of Clinical Medicine, University of Oslo, Norway
[d] Department of Anaesthesiology, Oslo University Hospital, Norway
[e] Oslo Centre for Biostatistics and Epidemiology, Oslo University Hospital, Norway
[f] Faculty of Dentistry, University of Oslo, Norway
[g] Pain and Palliation Research Group, Department of Circulation and Medical Imaging, Faculty of Medicine, Norwegian University of Science and Technology, Trondheim, Norway
[h] National Competence Centre for Complex Symptom Disorders, Department of Pain and Complex Disorders, St. Olav University Hospital, Trondheim, Norway
[i] Centre of Palliative Medicine, Surgical Division, Akershus University Hospital, Lørenskog, Norway

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ABSTRACT

*Objective:* Postoperative fatigue is a common problem after otherwise uncomplicated surgery. It may defer patients from resuming their daily activities and is often reported to be among their most severe symptoms. There are few validated instruments for assessing postoperative fatigue. Our aim was to translate into Norwegian and explore a Short Form of the Identity-Consequences Fatigue Scale; a fatigue questionnaire specifically developed to assess postoperative fatigue.
*Methods:* The fatigue scale was translated to Norwegian through a forward-backward process, and subsequently validated in a large, mixed surgical population. We performed Principal Component Analyses on the complete 31-item scale and on the 10-item Short Form. The analyses were performed separately on pre- and postoperative data (n = 422 and n = 315, respectively).
*Results:* The factor analyses confirmed that the translation was valid and revealed three defined dimensions in the 10-item scale. There was no statistically significant difference between means of reported fatigue when measured with the 31- or 10-item scale. Ninety-eight% of change in fatigue from pre- to postoperative status was retained when using the 10-item scale as compared to the 31-item scale.
*Conclusion:* The abridged, 10-item Short Form performed equal to the 31-item scale and may replace the complete 31-item ICSF scale in exploring the incidence of pre- and post-operative fatigue.


## 1. Introduction

Fatigue is a subjective experience, often defined as a persistent tiredness or weakness, being physical, mental or both. It is common in the general population [1,2] but is also present in a wide range of diseases. When present, it is often reported by patients as being among their most severe and distressing symptoms [3]. It may have impact on physical, behavioural, cognitive and social functioning, imposing restrictions on daily activities, delays resumption of recreational activities and prevents otherwise fit patients from returning to work [4–6]. Postoperative fatigue (POF) is an often underestimated problem after otherwise uncomplicated surgery [4]. It is most prominent during the first postoperative days, but may last several weeks, and the incidence, severity and duration varies extensively depending on type of surgery performed [6,7]. POF must be distinguished from residual sedative effects of anaesthetic and analgesic drugs which usually last for less than 8–12 h [8,9]. POF often affects previously healthy people with little or no baseline fatigue, it has a direct relation to the surgical procedures and perioperative interventions, and it usually has a limited time span; tapering off within days or weeks after the surgery [4,7,10].The aetiology of POF is poorly understood, but appears to be multifactorial; involving biological, psychological and social factors [4,10,11]. As a consequence, multidimensional assessment tools should be applied in POF research. However, assessment of POF has frequently been assessed only by one-dimensional fatigue scales or multidimensional Quality of Life assessment tools with fatigue as a one-dimensional subscale [4].

A major problem related to POF research has been the use of various non-validated assessment methods [6]. Research based on non-validated assessment tools should generally be viewed with caution. This is also a recognised and comprehensively debated issue in fatigue research in a wide variety of fatigue related diseases [3,5,12]. According

☆ The study was conducted at: Department of Anaesthesia, Telemark Hospital Trust, Skien, Norway.

* Corresponding author.
*E-mail address:* nost@sthf.no (T. Nøstdahl).

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to a recent review on POF [4], at present only two questionnaires may provide valid and comprehensive assessment of POF; the Fatigue Questionnaire (FQ), presented by Chalder et al. [13] and the Identity-Consequence Fatigue Scale (ICFS), presented by Paddison et al. [14].

The FQ has been translated into Norwegian and validated in a general population [1]. However, this questionnaire is primarily constructed to assess fatigue in patients with chronic fatigue. According to Dittner, if an instrument is developed to measure fatigue in one clinical condition, its use in other patient groups may not be justified [3]. Different scales may be measuring different aspects of fatigue.

The ICFS is directed towards assessing fatigue in a general surgical population, but is quite extensive and time-consuming in a clinical situation. In 2011 Paddison et al. published an abridged version of the ICFS; the 13-item Surgical Recovery Scale (SRS) [15]. A Short Form may be considered favourable, minimising patient burden, thus possibly yielding better patient compliance. The authors' primary aim was to develop a measure responsive to differences in surgical recovery as a single score while being able to retain 90% or more of the variance present in the original measure. They validated the revised short version against quality criteria for health status questionnaires, as proposed by Terwee et al. [16] However, the validation was limited as there was no factor analysis performed on the SRS in order to explore the scale's structure or fatigue subscales. In our opinion it would add to the scale's versatility and usefulness as an outcome measure if subscales also were identified. This would require an Exploratory Factor Analysis. In order to explore the SRS it would be essential to first perform a proper validation of the translated complete 31-item ICFS in a large, mixed patient population.

The aim of this study is to explore the SRS and compare it to the complete 31-item ICFS, in order to consider the Short Form's potential usefulness in assessing postoperative fatigue. This exploration and comparison requires validation of the Norwegian translation of the ICFS.

## 2. Methods and patients

### 2.1. Translation

The translation followed a forward-backward procedure. To ensure that questions will be easily understood and conceptually equivalent to the original, two persons with Norwegian as their native language, with a thorough knowledge and understanding of the English language, jointly translated the questions in the official ICFS from English to Norwegian. Next, two persons with English as their native language, but speaking and writing Norwegian fluently, separately performed a translation back to English again. They had no knowledge of the original version. The original and the backward translated English versions were subsequently compared, and where differences existed, a closer analysis of the conceptual content was performed to reach a translation that could be agreed upon. This multistep translation is in accordance with international recommendations on translation of health-related quality of life (HRLQoL) questionnaires [17].

Finally, and in agreement with Paddison, the specified timeframe in the questions was altered from “within the last three days” to “within the last two days”. We presumed this shorter timeframe was easier to relate to, and would be more relevant as this form is intended to be used several times within a short postoperative phase, e.g. 1 week, to monitor day-to-day changes of fatigue. Paddison would also later implement a two days timeframe in the SRS.

### 2.2. Study population and data collection

Patients aged 18 years or older attending our day surgery unit for various surgical procedures were considered for participation in the study. Further inclusion criteria were ability to read and understand Norwegian well, being deemed cognitive adequate, and ability to fill in questionnaires. In order to reduce the influence of significant fatigue unrelated to surgery and other perioperative interventions, patients with fatigue related diagnosis (e.g. chronic fatigue syndrome, fibromyalgia, adrenal failure), chronic severe pain, regular use of opioids, having recently received chemotherapy or radiation therapy, or with serious organ failure (i.e. ASA[1] 4) were excluded. Type of surgery is listed in Table 1.

Enrolment was principally performed by a study nurse, and enrolment days were arbitrarily chosen between all weekdays, amounting to 1–3 days per week in a period from June 2010 to June 2013. Enrolment flow chart; see Fig. 1.

Baseline demographic data were recorded (Table 2.). A patient self-report questionnaire; the Norwegian ICFS (see Addendum), was filled in by the patients in the pre-operative holding area on day of surgery, before any sedative acting drugs were given. Key perioperative data were collected from routine patient charts. The patients had another copy of the Norwegian ICFS with them home by same day discharge from the unit, to be filled in at postoperative day three and then returned in a pre-stamped envelope. All patients received by SMS[2] a reminder to complete the questionnaire on postoperative day three.

### 2.3. Statistics

The data from the charts were analysed by using SPSS version 21 (IBM SPSS, New York).

Missing data were handled by replacing the missing value with the mean score of the item.

The analyses were conducted by performing a Principal Component Analysis on each data set. Eigenvalues >1 was applied as principal criterion for factor extraction, but extraction of a fixed number of factors was also applied if deemed appropriate. Oblimin Rotation was used since the factors are correlated. The Pattern Matrix was used to display item loadings in their respective factors, with a loading threshold >.40. Internal consistency (Reliability) of each factor was assessed using Cronbach's alpha (α). Discriminant validity was examined by Factor Correlation Matrix. Paired samples t-tests were applied to investigate differences between means at different time points.

### 2.4. Validation

Paddison et al. presented a multifactorial fatigue measure comprising 31 items, belonging to 5 factors (see Appendix A (?)). They found that two factors; *Fatigue* and *Vitality*, fit in an Identity (i.e. cause) Matrix containing 9 items. The remaining three dimensions; *Energy*, *Concentration* and *Daily Activities* fit in a Consequences (i.e. effect) Matrix containing 22 items. They performed the factor analysis on data from a mixed surgical population including both preoperative and postoperative patients. The Identity Matrix and Consequences Matrix were analysed separately.

To validate the Norwegian ICFS we primarily analysed all 31 items together (Table 3). We also performed the factor analysis in the same manner as in the original paper; analysing the Identity and Consequences Matrixes separately. However, and in contrast to the original paper, separate analyses of the pre- and postoperative data were performed, as we deemed analysis of change after intervention (i.e. surgery) to be essential.

Prior to performing a factor analysis of the 13-item SRS the number of items was further reduced by three. Questions D28 and D29 were omitted due to a high proportion of *N/A* answers in our data. Question E19 was omitted because it held a different phrasing than the other questions. It contained the question stem “*Feelings of tiredness have meant …*”, which presumes that fatigue is present, in contrast to the more neutral wording in the other questions (see Addendum). In our opinion, this phrasing poses a potential conceptual problem, especially in settings where little or no fatigue may be expected, as in many

[1] **ASA**; American Society of Anesthesiologists physical classification system.
[2] **SMS**; Short Message System; a text message service of mobile communication systems.