

Validated Dutch Translation of the Clinical Frailty Scale for ICU Patients and its use in Practice

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ABSTRACT

1.1. Introduction: To translate the Clinical Frailty Scale (CFS) into Dutch and subsequently explore the impact of an Intensive Care Unit (ICU) admission on frailty using the translated CFS and the extent of recovery following ICU discharge.

1.2. Methods: Translation of the CFS was performed according to the principles of good translation. Regarding the translation of item 'vulnerable' a survey among ICU nurses, intensivists, and geriatrists was sent-out. Subsequently, the CFS was assessed at four different time-points in adult mixed ICU patients.

1.3. Results: The CFS was translated into Dutch and 36 (77%) experts responded and rated 'Risico op kwetsbaarheid' as the best translation for 'Vulnerable'. In total of 70 ICU patients, mean age 60 years, CFS scores could be retrieved completely. The median CFS score before ICU admission was 3.0 (IQR: 2.0-3.5), at ICU discharge this was median 6.0 (IQR: 5.0-6.0). The median CFS score at hospital discharge was 4 (IQR: 2.0-5.6) and three months after hospital discharge the median CFS was 3 (IQR: 2.0-4.0).

1.4. Conclusion: ICU admission results in a significant increase in the level of frailty, as expressed by the Dutch translated CFS. Three months after hospital discharge most of our patients recover to their preadmission level of frailty.

Introduction

The concept of frailty is relatively new in intensive care medicine. Originating from the field of gerontology, it is considered to be a biological syndrome of decreased reserve and resistance to stressors, as a result of progressive decline in multiple physiological systems [1]. This results in an increased risk of adverse outcome following any kind of disturbance to the health of the frail person, often with a dramatic pronounced decline in functional status [2]. Although highly associated, frailty is not synonymous with aging, co morbidities or disabilities.

The pathophysiology of frailty is based on the accumulating damage to the various homeostatic mechanisms of the human body. Although most of these systems have a considerable reserve, after reaching a certain threshold, these systems start to fail. Failing homeostatic systems lead to clinical signs of frailty

such as unexplained weight loss, frequent infections, unsteady gait and posture, falls, and delirium [3].

Frailty is a difficult concept to measure objectively. Multiple frailty assessment tools have been developed since the development of the concept of frailty. Fried et al. [2]. Defined a frailty phenotype consisting of five symptoms or traits: unintentional weight loss, self-reported exhaustion, low energy expenditure, slow gait speed, and weak grip strength [4]. Another model of measuring frailty is the CSHA Frailty Index: a list of 70 potential symptoms of frailty [5,6]. Rockwood et al. produced a simplified version, known as the Clinical Frailty Scale (CFS), a seven-point scale, ranging from very fit to severely frail with a description for each point on the scale [6], and it showed high consistence with the CSHA Frailty Index [7].

Frailty has been used as a predictor of outcome in multiple fields of medicine, for example, frailty scores on admission predict outcome for the elderly burns patient [8] and frailty proved to be an independent predictor of in-hospital complications in geriatric trauma patients [9]. Frailty was also highly associated with increased complications after bariatric surgery [10], and with decreased survival after lung transplantation [11]. Also, measuring frailty is increasingly recognized as a useful tool to guide care, for instance in the perioperative care for patients with hip fractures [12].

In the field of intensive care medicine there is a need for good predictors of long-term outcome after intensive care admission [13]. Pre-admission frailty in elderly Intensive Care Unit (ICU) survivors is an independent predictor of health related quality of life, functional dependence and disability [14]. Frailty was able to identify a critically ill elderly population with a higher morbidity and mortality rate than the non-frail elderly survivors [15]. In view of the value of measuring patients' level of frailty as part of outcome research, there is an increasing interest in the use of frailty assessment tools. The CFS is simple, short and used in studies on frailty in intensive care patients and reliably measures frailty [16-18]. Moreover, due to its simplicity and shortness it can easily be assessed by ICU nurses at the time of ICU

admission and serve as guidance towards ICU discharge and the post-ICU outpatient clinic. Therefore, the aim of our study was first, to translate the CFS into Dutch. Second, to explore the impact of an ICU admission on the CFS scores of these patients and the extent of recovery following ICU stay and hospital discharge.

Material and Methods

4.1. Translation of the Clinical Frailty Scale

After obtaining permission from the original authors, the original version of the Rockwood Clinical Frailty Scale (CFS) was translated according to the principles of good translation. First, the CFS was translated into Dutch by members of the research group (BD, GM, MvdB). Then this CFS-NL was translated backward by a native speaker (JP) with a medical background [19]. A discussion within the research team was held on the items that were not clear or possibly confusing and, where possible, consensus was reached. Since it appeared impossible for the 4th item 'Vulnerable' to achieve consensus on the best translation, subsequently a survey was held among ICU nurses, intensivists, intensivists in training, and geriatricians who were considered to be experts. Each person received three possible translations: 'bedreigd', 'potentieel verschil' en 'risico op kwetsbaarheid', selected by the research group, and he/she could indicate the most appropriate translation three points, the second best translation two points and the least appropriate translation one point. The proposed translation with the highest score was deemed to be the most suitable.

4.2. Patients and setting

The translated CFS was subsequently used to determine the impact of ICU stay on the CFS scores of the ICU patients. This study was performed in a 36-bed mixed ICU of a university hospital in the Netherlands. Patients included in the study were part of two other studies for which the medical ethical committee waived the need for consent for both studies (File numbers: UMCU: 15-771 and CMO: 2016-2289). One study was a multinational study (PROGRESS-ICU study from Karolinska University Sweden) following patients up till three months after ICU stay. The second study was a pilot study for a large

long-term follow-up study, MONITOR-ICU study, following ICU patients for a period of five years after ICU stay. For both studies the translated CFS was added as an additional questionnaire.

4.3. Data collection

Level of frailty was determined using CFS-NL at four different time points: before ICU admission as baseline measurement, after ICU discharge, after hospital discharge, and three months after hospital discharge. CFS assessment were performed by ICU nurses and research nurses. After patient’s permission the patients were asked to rate their own perceived level of frailty according to the CFS. The CFS was read by the nurse, or if possible by the patient self. Patients who were scheduled for ICU admission were asked at the outpatient clinic. In other cases, patients were asked as soon as possible after ICU admission to rank their level of frailty before entering the ICU. At the time of ICU discharge the CFS was given to the patient with request to filled this out at the time of hospital discharge. Three months after patients’ ICU discharge the CFS was sent to patients’ home address. In both latter cases a returning envelope was added.

Furthermore, demographic and patient characteristics as age, gender, severity of illness, admission category, length of ICU and hospital stay were retrieved from the patient’s medical records.

4.4. Statistics

Patient and demographic characteristics were descriptively analyzed. Normally distributed continuous variables are expressed as mean with standard deviation, categorical variables and skewed distributed continuous variables are expressed as median with the first and third Inter Quartile Range (IQR). Since the purpose of this study was to explore changes of the frailty scores using the CFS-NL over time, no statistical tests were performed.

Results

5.1. Translation of the Clinical Frailty Scale and survey

Consensus within the research team was achieved on all items except the translation of item 4: ‘Vulnerable’. In

total 47 persons were invited to participate in the survey, of which 36 (77%) ICU nurses, intensivists, and geriatricians responded. ‘Risico op kwetsbaarheid’ was considered (Figure 1) the most suitable translation of the item ‘Vulnerable’, and as such, this translation was used in the Dutch translation of the CFS. The complete Dutch translation of the CFS-NL is displayed in Figure 2, as well as the original English items.

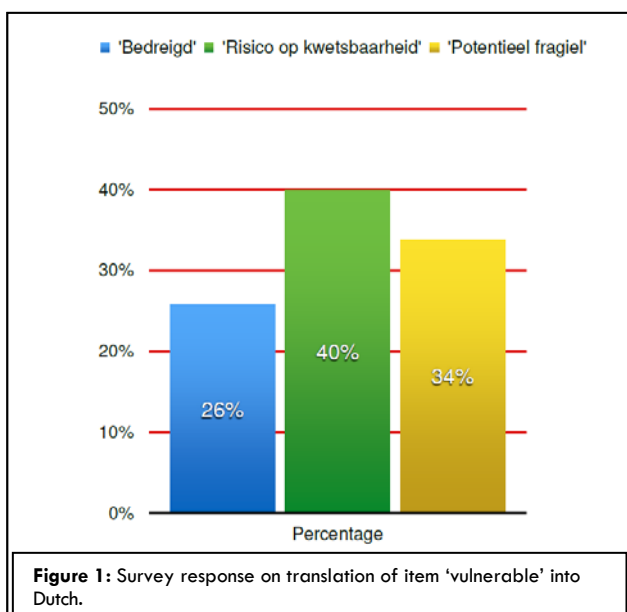
5.2. Changes in CFS during and after ICU and hospital stay

Over a period of ten weeks, a total of 98 patients were asked to participate, 17 (17%) patients denied consent and 11 patients (11%) did not survive. A total of 70 patients were assessed for the changes in their frailty status before, during and after a ICU admission. Their mean age was 60 (±14.5) years with a severity of illness score (APACHE-II) of mean 16.6 (±6.3) and 59% of the included patients were male. The length of ICU stay was median 2 days [IQR 0-6 days] and in-hospital stay median 12 days (7-21 days), (Table 1).

Table 1: Demographic and patient characteristics.		
	(N=70)	
Age in years, mean (SD)	60.0	(14.5)
Male, n (%)	41	(59)
Sepsis, n (%)	0	(0)
Urgent admission, n (%)	23	(33)
APACHE-II score, mean (SD)	16.6	(6.3)
Co-morbidity, n (%)		
- Cardiac (myocardial infarction, cardiac arrhythmia)	3	(4)
- Pulmonary (COPD)	6	(9)
- Diabetes	4	(6)
- Chronic renal impairment	2	(3)
- Acute renal failure	6	(9)
- Carcinoma (in medical history)	4	(6)
Admission type, n (%)		
- Surgical Elective	25	(36)
- Surgical Non-elective	13	(18)
- Medical	32	(46)
Outcome		
- Mechanical ventilation, n (%)	54	(77)
- Duration of mechanical ventilation (days)	2	[1-5]
- Use of vasopressors, n (%)	39	(56)
- Chronic renal failure, n (%)	0	(0)
LOS-ICU in days	2	[0-6]
LOS-hospital in days	12	[7-21]

Data are expressed as median with IQR, unless reported otherwise.
APACHE-II: Acute Physiology and Chronic Health Evaluation II

Before ICU admission ICU patients considered their level of frailty as 'well' (Figure 2) expressed in a CFS score of median 2.0 (IQR 2.0-4.0), (Figure 3). At ICU discharge patients considered themselves as 'moderately frail', expressed in a CFS score of median 6.0 [IQR 5.0-6.0]. The CFS score at hospital discharge was median 4 (IQR 2.0-5.6) and the CFS score three months after hospital discharge was median 3 (IQR 2.0-4.0) which is defined as 'managing well'.



Discussion

In this study we translated the CFS into Dutch and showed that patient's frailty level three months after ICU admission recovered to around the pre-existing frailty level before ICU stay. ICU admission transiently increased the frailty level but the wide distribution of the CFS at ICU and hospital discharge clearly displays the variation of this impact.

In the mid-nineties it was already recognized that there is 'live after the intensive care' [20] and since more recently there is a growing interest in long-term outcomes of ICU survivors and the effects of an ICU admission on their quality of life, measuring the level of frailty in intensive care patients is highly relevant. A large cohort study of over 1000 ICU patients showed that higher levels of frailty are independently associated with a higher chance of disability in IADL, and higher mortality rate [21]. The relatively low level

of frailty in our study might be attributed to the relatively low age of the study population. However, a recent study showed that frailty in younger ICU patients was not associated with age. The relatively young frail patients had a significantly higher rate of rehospitalisation and a higher mortality rate compared to non-frail ICU patients in the corresponding age group [22].

The level of frailty before ICU admission is slightly lower than in most other studies. This difference may be explained by the fact that we included all types of patients admitted to the intensive care, including elective surgery. It would be reasonable to assume that this group of patients had lower levels of frailty compared to a pure medical population or a population consisting of patients following emergency surgery.

Several limitations of our study need to be addressed. First, there was no consensus during the translation of one item of the CFS. Although, the item 'vulnerable' can easily be translated into Dutch, in view of the other items of the CFS with an increasing level of severity in frailty, there was discussion in the group of researchers and the native English participant (JP). Therefore, we chose an alternative trajectory in order to choose the best option by consulting clinical frailty experts. Second, the number of patients in the study group was relatively small. However, the objective of our study was to explore the frailty scores using the new into Dutch translated Clinical Frailty Scale, the CFS-NL. We established that the CFS can easily be assessed at baseline and after ICU admission. Our results are somewhat indicative and need to be confirmed in a larger cohort, also allowing subgroup analysis. Third, the cohort of patients was very heterogeneous. It consisted of medical and surgical patients. The surgical group consisted of planned surgical and unplanned surgical patients. Although this heterogeneity might have caused large variations in the CFS scores after admission to the ICU and throughout ICU stay, it is a reflection of daily practice, as most ICUs have a mixed patient population. Also, the follow up period of three months may not be long enough to appreciate the full extent of recovery of ICU patients.

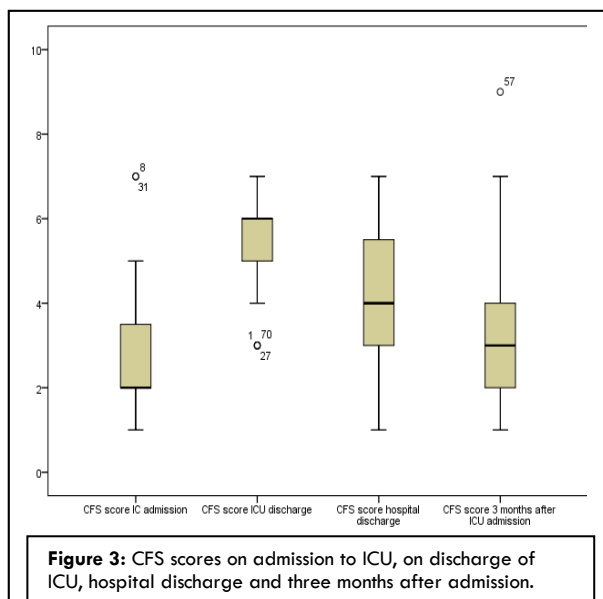
Although most of our patients seem to recover to near baseline, it was a population with a mean APACHE-II score of 16.5, which is not really high. Especially in more severely ill ICU patients with a long ICU stay, the time for full recovery often exceeds the period of three months [23].

Conclusion

We conclude that we successfully translated the CFS into Dutch according to the rules of good translation with forward and backward translation. Furthermore, we determined in a small group of mixed ICU patients that the CFS scores increased after ICU admission and three months after hospital discharge most of our patients recover to near baseline.

Clinical Frailty Scale	Original items	Dutch translation
1	Very Fit – People who are robust, active, energetic and motivated. These people commonly exercise regularly. They are among the fittest for their age.	Zeer fit – Mensen die krachtig, actief, energiek en gemotiveerd zijn. Deze mensen oefenen gewoonlijk regelmatig. Ze behoren tot de fitste van hun leeftijd.
2	Well – People who have no active disease symptoms but are less fit than category 1. Often, they exercise or are very active occasionally, e.g. seasonally.	Fit – Mensen die geen actieve ziektesymptomen hebben, maar minder fit zijn dan categorie 1. Ze bewegen vaak of zijn meer actief tijdens seizoensgebonden activiteiten.
3	Managing Well – People whose medical problems are well controlled, but are not regularly active beyond routine walking.	Zelfredzaam – Mensen wiens medische problemen goed onder controle zijn, maar niet regelmatig actief zijn, behalve routine wandelingen.
4	Vulnerable – While not dependent on others for daily help, often symptoms limit activities. A common complaint is being “slowed up”, and/or being tired during the day.	Risico op kwetsbaarheid – Hoewel ze niet afhankelijk zijn van anderen voor de dagelijkse hulp, hebben ze vaak klachten die activiteiten beperken. Een veelgehoorde klacht is ‘traag’ en/of moe zijn gedurende de dag.
5	Mildly Frail – These people often have more evident slowing, and need help in high order IADLs (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.	Licht kwetsbaar – Deze mensen zijn vaak duidelijk trager en hebben hulp nodig bij complexere dagelijkse activiteiten (financiën, vervoer, zwaar huishoudelijk werk, medicatie). Typisch is dat de lichte kwetsbaarheid winkelen, alleen buiten wandelen, maaltijdbereiding en huishoudelijk werk in toenemende mate belemmert.
6	Moderately Frail – People need help with all outside activities and with keeping house. Inside, they often have problems with stairs and need help with bathing and might need minimal assistance (cuing, standby) with dressing.	Matig kwetsbaar – Mensen hebben hulp nodig bij alle activiteiten buitenshuis en bij het huishouden. Binnenshuis hebben ze vaak problemen met traplopen en hebben hulp nodig bij het douchen en mogelijk minimale hulp (aansporen) bij het aankleden.
7	Severely Frail – Completely dependent for personal care, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within 6 months).	Ernstig kwetsbaar – Volledig afhankelijk van persoonlijke verzorging, ongeacht de reden (fysiek of mentaal). Ze lijken stabiel en geen hoog risico te hebben op overlijden (binnen 6 maanden).
8	Very Severely Frail – Completely dependent, approaching the end of life. Typically, they could not recover even from a minor illness.	Zeer ernstig kwetsbaar – Volledig afhankelijk, het einde van het leven nadert. Typisch is dat ze niet meer kunnen herstellen, zelfs niet van een milde ziekte.
9	Terminally Ill - Approaching the end of life. This category applies to people with a life expectancy <6 months, who are not otherwise evidently frail.	Terminaal – Het einde van het leven nadert. Deze categorie is alleen van toepassing op mensen met een levensverwachting van minder dan 6 maanden en die niet op een andere manier duidelijk kwetsbaar zijn.

Figure 2: Clinical Frailty Scale, original and Dutch translation.



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