**Original Research**

# Inter-Rater Reliability of Clinical Frailty Scale in Onco-Critical Care

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## Abstract

**Introduction:** The importance of frailty assessment in critically ill cancer patients cannot be stressed enough. This is commonly done using the Clinical Frailty Scale (CFS) despite its subjective nature and the possibility of an inter-rater variability.

**Methods:** Our single-center, prospective, observational study enrolled 627 consecutive adult cancer patients admitted to the Multidisciplinary Critical Care Unit in a tertiary cancer hospital. Frailty was assessed using clinical frailty scale within 48 hours of admission by a physician and a registered nurse, who were blinded to each other.

**Results:** Inter-rater reliability, assessed using the kappa coefficient, revealed only a moderate level of agreement (kappa coefficient 0.56) between a physician and a registered nurse. This variability is likely influenced by professional backgrounds, clinical judgment, biased responses, and the inherent subjective nature of CFS.

**Conclusion:** Our study underscores the subjective nature of frailty assessment using the clinical frailty scale in Onco-critical care and emphasizes the need for collaborative efforts in refining frailty tools tailored to the dynamic landscape of onco-critical care.

## Introduction

Frailty assessment stands at the forefront of personalized care for critically ill patients, especially in the intricate realm of Onco-critical care. Among the various scoring systems used for assessment of frailty, Clinical Frailty Scale (CFS) is one of the most widely utilized tools, yet concerns persist regarding its subjective nature, particularly when administered by different healthcare professionals. We therefore sought to scrutinize the inter-rater reliability of the CFS in our cohort of critically ill cancer patients, employing the kappa coefficient as a measure of agreement between two independent observers.

## Methodology

This was a single centre, prospective, observational study which included all consecutive adult patients (age > 18 years) with cancer who were admitted to the Multidisciplinary Critical Care Unit (MDCCU) of a tertiary care, cancer hospital between September 2021 and August 2022. Frailty was assessed within 48 hours of admission by two independent observers, namely a physician with ten years of experience and a registered nurse with three years of experience. These observers were trained in assessing frailty using CFS scale and were blinded to each other's

assessment. The assessments were conducted using the CFS (version 2.0), a categorical tool capturing various levels of frailty by observing and rating the individual's physical and cognitive abilities, mobility, and daily activities.[1] The scale ranges from "very fit" to "terminally ill," helping to provide a standardized measure of frailty. The kappa coefficient, a statistical measure used to assess the level of agreement between two categorical variables beyond chance, was employed to quantify inter-rater reliability in our study. A Kappa coefficient value of 1 signifies perfect agreement beyond chance, while 0 or negative values indicate agreement equal to chance alone or worse than chance.

## Results

A total of 627 patients were evaluated during the study period. Frailty level was assessed individually by the two observers within 48 hours admission to MDCCU. Majority of the patients were categorized to have mild frailty by both observers. Although this uniformity in the observers' evaluations strengthens the reliability of our findings, the kappa coefficient derived from our study was 0.56. This coefficient is indicative of only a moderate level of correlation between the physician and nurse assessments. This value implies that, while there is a discernible degree of agreement, the subjective nature of the CFS introduces variability. (Table 1)

**Table 1. Inter rater reliability of CFS**

| Kappa Coefficient | Interpretation |
|---|---|
| 0.56 | Moderate agreement |

## Discussion

The moderate level of agreement raises important considerations regarding the subjective nature of the Clinical Frailty Scale in Onco-critical care setting.[2] This variation could result from differences in professional background, clinical judgement, and the intrinsic subjectivity of the tool. Patients with cancer frequently face unique challenges such as the effects of multi-modal treatment, concurrent conditions, and dynamic changes in health status. As demonstrated by our study, these variables may lead to differing perceptions of frailty levels. In congruent with our finding, a study found moderate to good inter-rater reliability between emergency department staff members when utilizing CFS to assess frailty. It is important to emphasize that the cohort in their study also had dynamic changes in health status.[3]

Another study found, in contrast to our study, a good agreement between perioperative nurses and anesthesiologists' assessments of frailty using CFS in patients undergoing elective surgery.[4] While this research also evaluated inter-rater reliability across diverse healthcare professionals, the study group consisted of stable surgical patients, as against our critically ill cancer cohort. This may explain the higher degree of agreement with CFS assessment. Similarly, a recent study found that when frailty was measured with CFS, there was good inter-rater reliability between paramedics.[5] Additionally, another study demonstrated that there was excellent inter rater reliability across the four groups of health care professionals who used CFS to assess frailty.[6] The latter two studies however evaluated frailty interpretation from case vignettes and this highlights the reason behind more optimal agreement between the raters.

The assessment of frailty encompasses various scoring systems such as CFS, Simple FRAIL questionnaire, PRISMA-7 questionnaire, Gérontopôle Frailty Screening Tool (GFST), Edmonton Frailty Scale (EFS) and Frailty Index-Comprehensive Geriatric Assessment (FI-CGA) scale, each offering a unique perspective on an individual's overall health and vulnerability. The subjective nature of the Clinical Frailty Scale (CFS) becomes pronounced when administered by different cadres of healthcare professionals for frailty assessment. Variability arises due to individual clinician’s experiences and interpretations, influencing the assigned frailty scores. This subjectivity raises concerns about inter-rater reliability and consistency in frailty categorization. Researchers delved into the development of the CFS, acknowledging its subjective elements and emphasizing the need for training and standardization to enhance reliability when used across diverse healthcare professionals. [7]

While CFS relies on the subjective judgment of a clinician, capturing the overall functional status of an

individual, few other frailty assessment scales have a more streamlined and patients' self-reported elements. For instance, the Simple FRAIL questionnaire, PRISMA-7 questionnaire and GFST, allow for a more direct input from the individual, albeit still subjective. [8-10] Likewise EFS and FI-CGA scale incorporate both subjective and objective elements aiming to provide a more comprehensive view of frailty. [11,12]

Our study had a few limitations, firstly, the raters were not matched by their clinical expertise. Although the two raters underwent a pre-trial training with the use of CFS, their level of experience is likely to introduce an additional element of subjectivity. Secondly, even though both the observers evaluated frailty within 48 hours of admission, the time interval between the two assessments could not be controlled due to logistical reasons. This may have potentially influenced the responses from participants.

Our study underscores the subjective nature of frailty assessment using the clinical frailty scale in Onco-critical care. The moderate inter-rater reliability suggests that while the CFS provides a valuable framework for frailty assessment, efforts should be directed towards minimising variability. As the field of Onco-critical care continues to evolve, collaborative efforts between clinicians, researchers and tool developers will be instrumental in refining frailty assessment tools for the complex and dynamic landscape of Onco-critical care.

Conflict of interest: No conflict of interest is declared.

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