

## Frailty Predicts Mortality and Emergency Admissions in Prevalent Haemodialysis Recipients: A Comparison of Commonly Used Frailty Scores in a Large Prospective UK Haemodialysis Cohort

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### Background:

Frailty, a clinical syndrome of accelerated ageing with increased vulnerability to stressors, is prevalent among dialysis populations and associated with poor outcomes. However, no gold standard definition for frailty screening exists and this translates into heterogeneously reported epidemiology. Most published studies are from US cohorts, which may not translate to UK cohorts. The aim of the FITNESS study was to compare commonly cited frailty scores in their predictive capacity for adverse events.

### Method:

Prevalent (>3-months) adult haemodialysis patients were recruited into this prospective cohort component of the FITNESS study after informed consent between January 2018 and April 2019. Exclusion criteria included any inpatient admission within the previous 4-weeks. Prospective data collection at recruitment included calculation of the Frailty Index (FI), Fried Frailty Phenotype (FP), Clinical Frailty Scale (CFS) and Edmonton Frailty Scale (EFS), alongside comprehensive medical and social history. FI, FP and EFS were obtained through a combination of physical performance testing and patient questionnaires; the CFS was obtained by MDT discussion led by patients' lead nephrologist. Follow-up data on hospitalisation and mortality were collected from national datasets including hospital episodes statistics and civil registration data respectively (up to 31st August 2019). Univariate and Multivariate Hazard ratios were obtained using Cox regression analyses.

### Results:

486 participants gave informed consent and were followed-up over a median of 55 weeks. There were 726 emergency and 219 elective hospital admissions, with 46 (9.47%) participant deaths. Frailty prevalence was heterogeneous based upon definition criteria; highest using FI (63.2%), lowest with CFS (26.5%) and FP (41.8%) and EFS (50.2%) in between. On univariate analysis, hazard ratios (HRs) for mortality were 4.25 for frailty defined by FI ( $p=0.001$ ), 2.96 defined by CFS ( $p=0.001$ ), 2.50 defined by FP ( $p=0.003$ ) and 1.88 defined by EFS ( $p=0.040$ ). After adjustment for age, gender, previous admission and Charlson Comorbidity Score, HRs for mortality were 4.45 for frailty defined by FI ( $p=0.001$ ), 3.05 defined by CFS ( $p=0.002$ ), 2.48 defined by FP ( $p=0.004$ ), and 2.07 defined by EFS ( $p=0.019$ ). After adjustment for age, gender, Charlson score and previous admissions, adjusted HRs for death/emergency admission were 1.62 for frailty defined by FI ( $p<0.001$ ), 1.54 defined by CFS ( $p=0.001$ ), 1.55 defined by FP ( $p<0.001$ ) and 1.62 defined by EFS ( $p<0.001$ ).

### Conclusion:

Frailty was prevalent in this cohort regardless of the measure used, however there was wide variation in the prevalence of frailty by different scores. All frailty scores demonstrated predictive ability for mortality and hospitalisation on adjusted analyses. The FI demonstrated superior prediction of mortality to other scores, but identified the greatest proportion of participants as frail, and is the most time-consuming of the scores to implement. These limitations may impact routine clinical use. The subjective CFS is more selective at identifying frailty (with lowest reported prevalence) and demonstrates comparable predictive power to

more detailed and time-consuming objective frailty tools. Considering the simplicity and predictive ability of CFS, it may prove attractive for frailty screening for healthcare professionals. Further work must focus on whether frailty can be intervened to improve observed adverse outcomes.