NIHR | Policy Research Unit Older People and Frailty

Using individual and neighbourhood profiles and trends to understand frailty with nationally representative population data

Part 4: The effect of mapped mismatch between levels of frailty and receipt of care on unplanned admission, admission due to falls, pressure ulcer, and fractures

Asri Maharani, David Sinclair, Tarani Chandola, Peter Bower, Barbara Hanratty, James Nazroo, Neil Pendleton, Gindo Tampubolon, Chris Todd, Raphael Wittenberg, Terence W O'Neill, Fiona Matthews

Executive Summary

June 2023

Using individual and neighbourhood profiles and trends to understand frailty with nationally representative population data

Part 4: The effect of mapped mismatch between levels of frailty and receipt of care on unplanned admission, admission due to falls, pressure ulcer, and fractures

Executive Summary

Asri Maharani[1]*, David Sinclair[2]*, Tarani Chandola[1], Peter Bower[1], Barbara Hanratty[2], James Nazroo[1], Neil Pendleton[1], Gindo Tampubolon[1], Chris Todd[1], Raphael Wittenberg[3], Terence W O'Neill*, Fiona Matthews[2]*

*these authors contributed equally to this work

NIHR Older People and Frailty Policy Research Unit
[1] School of Health Sciences, University of Manchester
[2] Population Health Sciences Institute, Newcastle University
[3] Care Policy and Evaluation Centre, London School of Economics & Political Science

Background

Demands for care services for older people increases with population ageing.[1] Government expenditure on formal adult social care reached £18.9 billion in 2020, with most recipients of services aged 65 years and older.[2] That expenditure, however, covers only individuals deemed sufficiently in need and unable to cover their own care to receive the support they require. Our previous report estimated that around 0.7 million and 1.6 million people aged 65+ in England were frail and prefrail, respectively, in 2018, but only 0.5 million adults in the same age group received government paid for care.[3]

This report aims to answer the question of whether frequency of care and also need for care are associated with the risk of unplanned admission to hospital for any cause and for conditions associated with frailty, specifically, falls, fractures and pressure ulcers, using a nationally representative cohort of community-dwelling older adults in England.

Methods

The analysis presented in the report uses data from a dataset that combines the English Longitudinal Study of Ageing (ELSA)[4] with the census of public hospital records in England, the Hospital Episode Statistics (HES)[5], and mortality data from the Office for National Statistics.[6] Frailty was measured using the frailty index,[7] composed of 60 variables representing conditions that accumulate with age and are associated with adverse outcomes, including disability, mobility, cognitive function, and chronic diseases. The frailty index was categorised into robust (≤ 0.08), pre-frailty (>0.08-0.25) and frailty (> 0.25).[8] Based on the frequency of care received, respondents were classified into those in receipt of: [1] frequent care; [2] infrequent care; and [3] did not receive care. Based on need for care, we classified the respondents into having: [1] unmet care needs; [2] met care needs; and [3] did not receive care. The outcome measures are unplanned admissions, hospitalisations due to falls, fractures and pressure ulcers.

Competing-risk regression analysis using a version of the Fine and Gray analysis was used to examine the effect of mismatch between levels of frailty and receipt of care on each hospitalisation category. Death is the potential competing risk in this study when examining hospital admissions. The analyses were adjusted with age, sex, ethnicity, educational attainment and wealth in quintiles.

Results

The study sample consisted of 7,656 respondents (3,535 male and 4,121 female). The prevalence of frail and prefrail was estimated as 17.7% and 40.6%, respectively. Around a quarter of adults aged 60 years and older in England received care, of which approximately 60% received infrequent care, while the rest had frequent care. Less

than a third (32%) of the respondents who received care reported having unmet need of care.

After adjustment for covariates including frailty status, compared to those not receiving care, the adjusted subdistribution hazard ratios (SHRs) for unplanned admission for infrequent care was 1.19 (95%CI:1.06; 1.33) and for frequent care 1.29 (95%CI:1.12; 1.48), **see Table 1**. After adjustment for covariates including frailty status the strength of the SHRs was attenuated. Compared to those not receiving care, the adjusted SHR for unplanned admission for those in receipt of care was 1.22 (95%CI:1.09; 1.35) and for those with an unmet need for care 1.21 (95%CI:0.91; 1.61), with the confidence interval embracing unity.

Table 1 Subdistribution hazard ratio (95% CI) for the association between frailty status, frequency of care, need for care and unplanned admissions

	Care receipt	Unmet need for care
Frailty status, reference: robust		
Prefrail	1.76 (1.59; 1.95)	1.77 (1.60; 1.95)
Frail	2.46 (2.13; 2.84)	2.51 (2.18; 2.89)
Frequency of care receipt, reference: no care		
Received infrequent care	1.19 (1.06; 1.33)	
Received frequent care	1.29 (1.12; 1.48)	
Need for care, reference: no care		
Met care needs		1.22 (1.09; 1.35)
Unmet care needs		1.21 (0.91; 1.61)

Note: Unplanned admissions N=2,662, competing event deaths N=310. All models were adjusted for age, sex, marital status, wealth in quintiles and education attainment.

Figure 1A shows that the cumulative incidence of unplanned hospital admissions increased over time for all frailty categories; the slope was greater among those who were frail and prefrail than those who were robust taking account of death as a competing risk. The slope was greater also within frailty categories for those who were in receipt of care than those who were not. The cumulative incidence curve for frail people who had frequent care increased steeply with time, followed by frail people who had infrequent care. **Figure 1B** shows that, taking account of death as a competing risk, cumulative incidence of unplanned hospital admissions was higher within frailty categories for those who were in receipt of care than those with an unmet need for care.

During five years of follow-up, there were 586, 159, and 432 admissions due to falls, pressure ulcers and fractures, respectively. Older people who received care had higher risk of hospitalisation due to falls and pressure ulcer, but not fractures, than those who did not receive care independent of frailty status (**Table 2**)

Conclusion

- Frailty and prefrailty were associated with a higher risk unplanned hospital admissions, hospital admissions were due to falls, fractures and also pressure ulcers.
- Older people who received infrequent and frequent care had higher risk of unplanned admission independent of frailty status.
- Unmet need for care was not significantly associated with an increased risk of unplanned admission compared to those receiving no care.

Figure 1 Estimates of the cumulative incidence curves of risk of unplanned hospitalisation according to frailty status and (A) frequency of care and (B) need for care. Death was the competing risk.
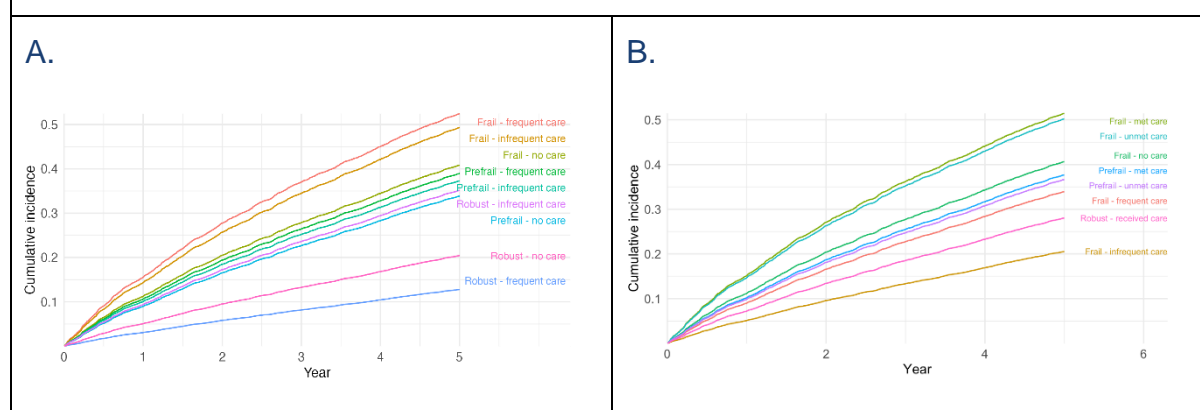

Table 2 Subdistribution hazard ratio (95% CI) for the association between frailty status and care receipt with hospitalisation due to falls, fractures, and pressure ulcers, England 2012-2018

	Hospitalisation due to falls[a]	Hospitalisation due to fractures[a]	Hospitalisation due to pressure ulcers[a]
Frailty status, reference: robust			
Prefrail	2.18 (1.68; 2.83)	1.78 (1.35; 2.34)	3.66 (1.79; 7.47)
Frail	2.73 (1.95; 3.80)	2.11 (1.45; 3.07)	8.52 (3.80; 19.12)
Received care, reference: No			
Yes	1.30 (1.03; 1.63)	1.25 (0.95; 1.63)	1.70 (1.07; 2.69)

Note: [a]Adjusted for age, gender, ethnicity, marital status, wealth and education.

References:

1. Government Office for Science, Future of an Ageing Population. 2016: London.
2. Foster, D., Adult social care funding (England). 2022, House of Commons Library: London.

3. Sinclair, D., et al., Using individual and neighbourhood profiles and trends to understand frailty with nationally representative population data. Part 2: Frailty and receipt for care in England. 2021, NIHR Policy Research Unit Older People and Frailty: England.

4. Banks, J., et al., English Longitudinal Study of Ageing: Waves 0-9, 1998-2019 [data collection]. 36th Edition. UK Data Service. SN: 5050. 2021.

5. NHS Digital, Hospital Episode Statistics (HES). 2022.

6. Office for National Statistics, Death Registration data. [Online]. 2019.

7. Wade, K.F., et al., Does pain predict frailty in older men and women? Findings from the English Longitudinal Study of Ageing (ELSA). 2017. 72(3): 403-409.

8. Romero-Ortuno, R., An alternative method for Frailty Index cut-off points to define frailty categories. European Geriatric Medicine, 2013. 4(5): 299-303.

NIHR | **Policy Research Unit**
Older People and Frailty

This document is available in large print.

Please contact the NIHR Older People and Frailty PRU for assistance.

Email: pru-manager@manchester.ac.uk

Telephone: 0161 306 7797

MANCHESTER
1824
The University of Manchester

Newcastle University

CPEC
CARE POLICY AND EVALUATION CENTRE
Research at **LSE**