Frailty and health service use in rural South Australia

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ABSTRACT

Background: Frailty is a common geriatric condition, well known to contribute to morbidity and mortality. What is not yet well articulated in the literature is the health service use of frail older people in rural areas. This study investigated the impact of frailty on health service use in rural South Australia.
Methods: This secondary cross-sectional analysis included people aged ≥65 years from the LINKIN health census in Port Lincoln. Frailty was classified using a Frailty Index (FI) score ≥0.25. Health service use was determined by patient questionnaire. All regression analyses controlled for age, gender and education level.
Results: 1501 people [mean (SD) age = 75.9 (7.9)] years were included. Frailty prevalence was 25%, with this prevalence higher in females (29%) than in males (21%). Compared with their non-frail peers, frail adults were more likely to have consulted health providers, including: general practitioners (GPs) (odds ratio (OR), 95% confidence interval (CI = 2.09, 1.24–3.53); physiotherapists (OR, CI = 2.42, 1.80–3.25); mental health providers (OR, CI = 2.88, 1.42–5.85); community nurses (OR, CI = 2.57, 1.73–3.82); and dieticians (OR, CI = 2.77, 1.77–4.48). They were also more likely to have visited a health professional prior to a problem occurring (OR, CI = 1.51, 1.08–2.11), travelled to the city for a specialist appointment (OR, CI = 1.53, 1.11–2.11), and to have been hospitalised in the previous 12 months (OR, CI = 2.39, 1.74–3.29).
Conclusion: Frail older adults were more likely to use several health services, yet often had unmet needs in their health care.

1. Introduction

Life expectancy is increasing globally, however these additional lifespan years are not necessarily lived in good health (Rodriguez-Manas & Fried, 2015). An older person may develop frailty, which can detract significantly from health, mobility and quality of life (QOL) (Clegg, Young, Iliffe, Rikkert, & Rockwood, 2013). Frailty is recognised as multidimensional geriatric condition characterised by a decreased reserve of physiological systems, and is associated increased risk of adverse outcomes when encountering minor stressors (Clegg et al., 2013; Rodriguez-Manas & Fried, 2015). Frailty is common, with an estimated 4–59% of the population aged over 65 years identified as frail, depending on the definition of frailty used (Collard, Boter, Schoevers, & Oude Voshaar, 2012).

Understanding health service use patterns by frail older people is integral to guiding clinical practice and health care policy for older people. Frail older people tend to be frequent users of the health care system (Gobbens and van Assen, 2012; Gobbens, van Assen, Luijkx, & Schols, 2012; Rochat et al., 2010), at least in urban-based settings. Very little is known about frailty and health service use in rural communities. Rural communities face enormous difficulties when accessing health care services: there is often a shortage of health care professionals (Moore, Sutton, & Maybery, 2010), specialist health care services are located faraway (Piper, Iedema, & Bower, 2014), and there tends to be a lack of communication between health care providers (Piper et al., 2014). To compound these issues, people in rural communities tend to have higher levels of both disability (Pham et al., 2013) and frailty (Yu et al., 2012) than their city-dwelling peers.

A better insight of frailty and its impact on health care services will have wide-scale implications for health care policy and practice in rural dwelling populations. This study aims to investigate specific health service provision among frail older

people in the rural community of Port Lincoln, South Australia. Use of primary care services and allied health practitioners was investigated, as was access to other health care services.

2. Methods

2.1. Study sample

This cross-sectional study was a secondary analysis of the baseline dataset from the LINKIN population health study (Hoon-Leahy et al., 2012). The LINKIN health study surveyed the effectiveness of the health system in the rural community of Port Lincoln, South Australia. Port Lincoln is classified as an "outer remote region" in Australia (National Centre for Social Applications of Geographical Information Systems (GISCA), 2006), and contains approximately 14,000 people residing in 5000 households and one public hospital (Hoon-Leahy et al., 2012). For the LINKIN health study, a population health census was performed between September to November 2010 and included the entire population aged over 15 years, with the exception of adults in dementia units of nursing homes or those that were hospitalised (Hoon-Leahy et al., 2012). 7895 people completed the health census. The present study focused on those participants aged 65 years and older that completed the health census ($n = 1796$). 127 people (7%) residing in residential care were included in the study.

The methodology of the LINKIN population health census has been described elsewhere (Hoon-Leahy et al., 2012). Previous analyses of the LINKIN health study have revealed that the population has a high level of musculoskeletal conditions (Pham et al., 2013), which can be attributed, at least partially, to the dominance of farming and fishing industries in the area.

2.2. Ethical considerations

The study was approved by the University of Adelaide ethics committee and followed guidelines from the Australian Code for the Responsible Conduct of Research (2007). All participants signed informed consent to participate in the study.

2.3. Frailty index (FI) construction

The Frailty Index (FI) of cumulative deficits was used to classify frailty in our research study. The FI was first proposed by Rockwood and Mitnitski as a way to incorporate the multifaceted nature of frailty into an operational definition (Mitnitski, Mogilner, & Rockwood, 2001). The FI has been validated in multiple studies worldwide and is computed by summing a number of health deficits and then dividing this by the number of health deficits in the list (Mitnitski et al., 2001; Rockwood & Mitnitski, 2007). The resulting index is expressed as a ratio. In the present study, guidelines from Searle, Mitnitski, Gahbauer, Gill, and Rockwood (2008) were used to construct a FI of 23 variables (see Appendix A). Previous research has shown that a frailty index with >20 variables is sufficient to define frailty (Rockwood, McMillan, Mitnitski, & Howlett, 2015).

Variables selected to develop our FI increased in prevalence with age, without saturating in prevalence with age (Searle et al., 2008). The overall index included a range of variables: co-morbidities, functional measures and quality of life (QOL). Additionally, although the FI is a continuous variable by default, for the purposes of this study frailty was dichotomised into frail and not-frail categories, using a FI score of ≥ 0.25 to defined frailty, as per recent literature (Song, Mitnitski, & Rockwood, 2010). That is, participants with 6 or more accumulated deficits were considered to be frail. Because of the low number of FI variables included in the study, any participant with one or more missing FI variables was excluded from the study.

2.4. Outcome measurements

To address health service use, LINKIN participants were asked the following in their census survey: "Please indicate, as best you can, the number of visits you have made to the following health services in the last 12 months?" Health services/practitioners/professionals listed included: General Practitioners (GPs) during hours, Diabetes Educators, Mental Health Services, Dieticians, Podiatrists, Community Nurses, Accident and Emergency GP/GP visits after hours (in Port Lincoln, the Accident and Emergency department at the local hospital is where patients go for an after-hours GP consultation), Hospital Admission as an Inpatient, Specialist Doctors, Community Nurses, Physiotherapists, Dentists, Chiropractors, Opticians/Optometrists/Audiologists, and Alternative Health Practitioners. In addition to listing the number of visits made to each of these health services/practitioners/professionals, participants ticked a box to indicate whether these health services used were in Port Lincoln or elsewhere.

To assess whether participants were proactive about their health, the following question was asked of participants: "thinking about your health in the same way as you would look after a care: do you regularly have checks/services to prevent health problems; or do you wait until something goes wrong and then seek help?" LINKIN participants were also asked if they had private health insurance for hospital cover (yes/no). A detailed outline of health service use variables included in the LINKIN health study are outlined in our previous research (Pham et al., 2013).

2.5. Statistical analyses

Three sets of analyses were performed. Firstly, t-tests and Chi squared tests were used to assess statistical differences of demographic characteristics between frail and non-frail groups. Non-normally distributed variables were log-adjusted for comparison purposes, and then reverted back for reporting. Secondly, Spearman's correlations were performed to determine the association of the FI with age. Thirdly, bivariate logistical regression analyses were conducted to determine the association between frailty and each of health service use variables. All regression analyses controlled for age, gender and education level. SPSS 21.0 (SPSS Inc., Chicago, Illinois, USA) was used for all analyses, with statistical significance set at $P < 0.05$.

3. Results

3.1. Participants

Of the 1796 people aged 65 years and over who completed the population health census, 295 had more than three FI variables missing (the co-morbidity questions were not answered) so these participants were not included in the analysis)). Accordingly, the final dataset comprised 1501 older adults. Mean (SD) age was 75.9 (7.9) years. 824 participants (55%) were female. The overall prevalence of frailty was 25%, with this prevalence being higher in females (29%) than in males (21%). Baseline demographic characteristics of participants are shown in Table 1.

Health insurance status was reported by 1455 of study participants, with 946 (65%) of these participants not having any private health insurance (see Table 1). T-test results showed that frail older people were more likely to have no health insurance (75%) than their non-frail peers (59%), $P < 0.001$.

Fig. 1 shows the distribution of frailty scores. The mean (SD) FI score was 0.18 (0.11), and the maximum FI score was 0.64. Age was