Polypharmacy & medication regimen complexity as risk factors for hospitalisation among residents of aged care facilities:
A prospective cohort study

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Introduction

Polypharmacy and complex medication regimens are highly prevalent in residential aged care facilities (RACFs). Understanding whether polypharmacy or medication regimen complexity are related to hospitalisations from RACFs is important because medication exposure may be potentially modifiable.

The aim of this study was to investigate the relationship between polypharmacy and medication regimen complexity with time to first hospitalisation, number of hospitalisations and number of hospital days among residents of aged care facilities.

Methods

A 12-month prospective cohort study including residents of six South Australian RACFs was conducted.

Permanent residents aged ≥65 years with the ability to participate in structured assessments in English were eligible for inclusion. Residents who had an estimated life expectancy of <3 months and those who were considered medically unstable were excluded.

Residents were recruited over a five-month period in 2014. At baseline, trained study nurses extracted demographic, clinical and medication data from each resident's records and undertook clinical assessments. Data for hospitalisations and mortality in the following 12 months were extracted from the electronic medical records at the participating RACFs.

Cox regression and Poisson regression models were used to determine the association between polypharmacy (≥9 regular charted medications) or Medication Regimen Complexity Index (MRCI) score and each hospitalisation outcome, with adjustment for age, sex, length of stay in RACF, comorbidities, activities of daily living and dementia severity.

Table 1. Characteristics of residents who were and were not hospitalised

	Hospitalised during follow-up		
	No (n=258)	Yes (n=125)	p-value
Age, median (IQR) (years)	87 (84-92)	88 (84-92)	0.866[a]
Female, N (%)	208 (81)	89 (71)	0.038[b]
Length of stay in RACF, median (IQR) (months)	24.5 (13-43)	24 (16-42)	0.934[a]
Charlson's Comorbidity Index, median (IQR)	2 (1-3)	3 (1-4)	0.121[a]
Total Activities of Daily Living, median (IQR)	3 (1-6)	4 (2-6)	0.048[a]
Dementia severity, median (IQR)	18.5 (3-34)	12 (3-23)	0.012[a]
9 or more regular charted medications, N (%)	148 (57)	95 (76)	<0.001[b]
MRCI score, median (IQR)	43 (32-54)	47.5 (36-59)	0.009[a]

[a] Wilcoxon rank sum test; [b] Chi-squared test

Results

There were 383 residents included in the study. Overall, 63% had 9 or more medications charted for regular use and the median MRCI score was 43.5 (interquartile range (IQR) 33-56).

The characteristics of residents who were and were not hospitalised during the follow-up period are compared in Table 1. There were 192 hospitalisations in total, with 0.56 (95% CI 0.49-0.65) hospitalisations per person-year and 4.52 (95%CI 4.31-4.76) hospital days per person-year. Figure 1 presents the most common reasons for hospitalisation.
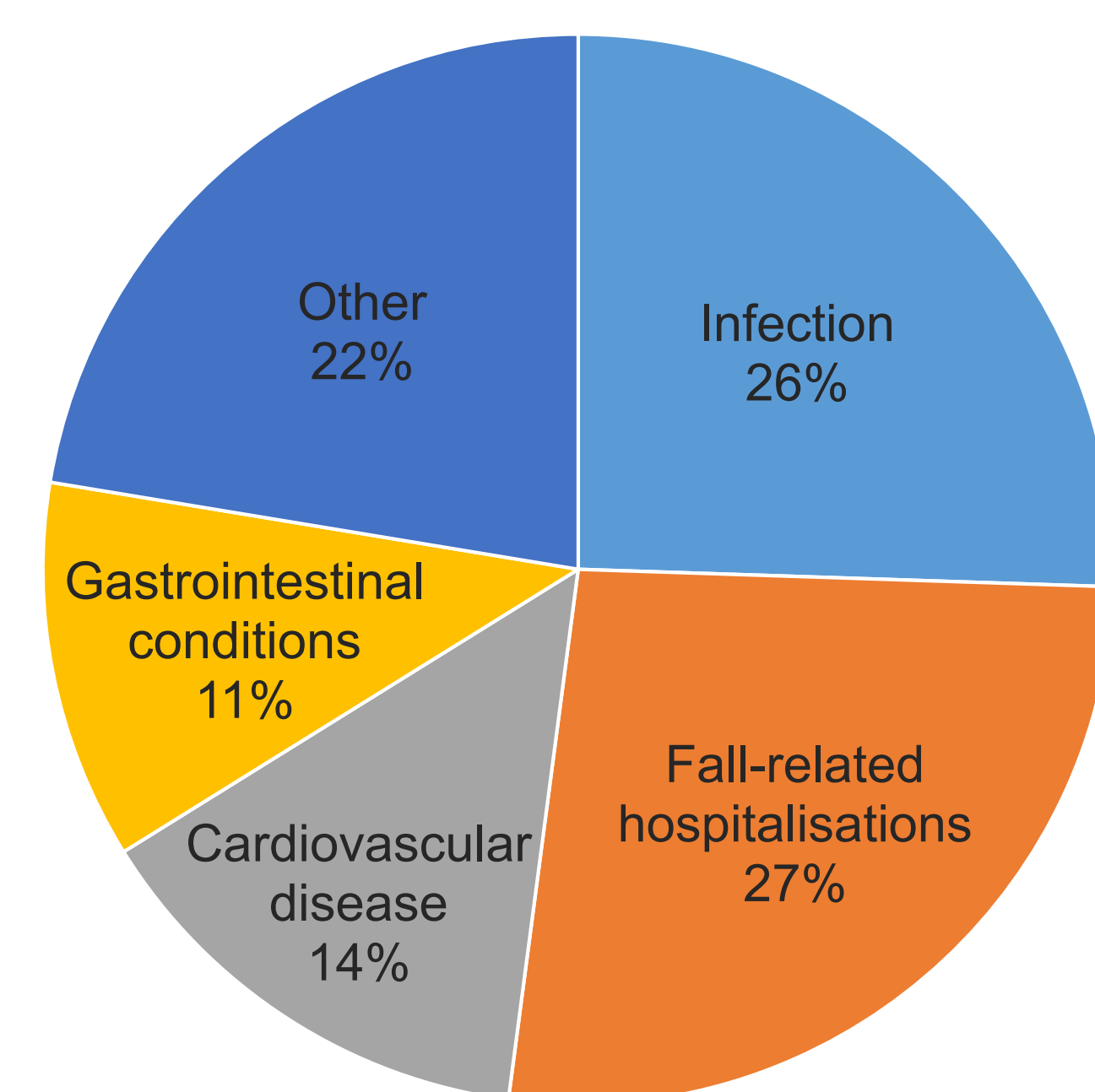

Figure 1. Most common reasons for hospitalisation during follow-up

Overall, 85 residents died during the follow-up period, and, of these, 18 residents died in hospital.

In the adjusted analyses, polypharmacy and MRCI were independently associated with time to first hospitalisation, number of hospitalisations and hospital days per person-year (Table 2).

Table 2. Association between polypharmacy or MRCI and each study outcome

Time to first hospitalisation	Adjusted HR (95% CI)	p-value
9 or more regular charted medications	1.84 (1.21 – 2.79)[a]	0.004
Medication regimen complexity index[b]	1.17 (1.06 – 1.29)	0.002
Number of hospitalisations	**Adjusted IRR (95% CI)**	**p-value**
9 or more regular charted medications	1.51 (1.09 – 2.10)[a]	0.014
Medication regimen complexity index[b]	1.15 (1.06 – 1.24)	<0.001
Number of hospital days	**Adjusted IRR (95% CI)**	**p-value**
9 or more regular charted medications	1.39 (1.24 – 1.56)[a]	<0.001
Medication regimen complexity index[b]	1.19 (1.16 – 1.23)	<0.001

[a] reference group is 0 – 8 regular charted medications
[b] MRCI analysed as a continuous variable divided by 10
CI: confidence interval; HR: hazard ratio; IRR: incident rate ratio

Discussion

Polypharmacy and medication regimen complexity are associated with hospitalisations from RACFs. It is important for clinicians to be alert to the risk of hospitalisation among residents with polypharmacy or complex medication regimens, and consider whether interventions such as ongoing medication reviews may be beneficial.

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