In-hospital morbidity and mortality among patients from residential respite care

Title: In-hospital morbidity and mortality among patients from residential respite care.

Key words: Residential care, respite care, mortality, hospital

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This is the author manuscript accepted for publication and has undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the [Version of Record](#). Please cite this article as doi: [10.1111/imj.14354](https://doi.org/10.1111/imj.14354)

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Acknowledgements:

None

Word count of main text: 2,645 (excluding references, tables, figures)

Word count of abstract: 247 words

Figures and Tables

Figure 1 – Identification of Respite Admissions

Table 1 – Reasons for Hospital Admission

Table 2 – Baseline Characteristics

Table 3 – Comparison of In-Hospital Outcomes Between Respite and Permanent RACF Residents

Keywords: respite, mortality, residential aged care, delirium

Abstract

Background: Residential respite is an important support for many community-dwelling older Australians and their caregivers. Respite clients are often very frail with high or specific care needs. Little is known about the comparative outcomes of hospital admission between permanent residential aged care facility (RACF) residents and residential respite residents.

Methods: Retrospective study of residential respite patients admitted to an Australian tertiary hospital between November 2014-September 2017. Comparison groups: all RACF patients admitted during same period (general RACF group), and control

group matched (2:1) for aged, gender and diagnosis.

Main Outcome Measures: In-hospital mortality, hospital length of stay (LOS), in-hospital complications (including fall, delirium, pressure injury, Medical Emergency Team [MET] call). Comparisons adjusted for age, gender, presenting symptom and matching variable.

Results: 166 admissions from residential respite and 332 matched RACF controls identified from 4,575 admissions for permanent RACF residents. Mortality was significantly higher in respite group vs general RACF group (15.1% vs 8.2%, $p<0.001$) but not matched control group (15.1% vs 16.3% $p=0.795$). LOS was significantly higher in respite patients than either control group. Respite patients had significantly higher prevalence of in-hospital fall (10.8% vs 1.5% $p<0.0001$) and delirium (35.5% vs 17.7% $p<0.001$) than matched RACF controls. No significant differences were seen in in MET-call and pressure injury rates.

Conclusion: While residential respite recipients represent a minority of total residential aged care admissions, they are at high risk of poor outcomes. Prospective identification and timely intervention may improve quality of care for this vulnerable cohort.

Keywords: respite, mortality, residential aged care, delirium

Introduction

Residential care comprises an integral part of the aged care support network in Australia. In addition to permanent care, many access residential care support on a temporary or respite basis, to relieve caregiver burden and provide safe accommodation should their caregiver be unwell or indisposed. People must meet eligibility criteria to be entitled to funded residential respite (i.e. have high care needs), and are commonly frail and multi-morbid. Between 2016-2017 over 57,000 older Australians utilised residential respite care.¹

Recent reports have raised concerns that residential respite care could pose real risks for vulnerable older people. Some accessing residential respite may in fact have increased care needs due to unrecognized illness. Furthermore, respite may present new hazards, including lack of usual doctor access, unfamiliar caregivers, transitions of care and multiple handovers, as well as risk of confusion due to changed environment for persons with cognitive impairment.^{2, 3} A recent Australian report described concerning increases in injurious death in respite residents, including falls, suicide and choking compared with permanent residential aged care facility (RACF) residents.²

Our anecdotal observations highlighted that some residential respite clients experience very poor outcomes of emergency hospital presentation, including prolonged length of stay (LOS) and inpatient mortality. However there is no literature comparing in-hospital outcomes between respite and permanent RACF residents.

We hypothesized that residential respite clients represent a highly-vulnerable group within the wider RACF cohort. Some may be on a trajectory of decline prior to accessing respite, and present late to hospital, with high risk of mortality. For people with cognitive impairment, transition to the unfamiliar environment of respite care may prove problematic, precipitating acute hospital transfer (e.g. for behaviour of concern), and often, difficult discharge planning.

We sought to determine the number of RACF respite clients admitted to our acute tertiary hospital, and compare characteristics and in-hospital outcomes (including adverse outcomes, mortality and LOS) with those of permanent RACF residents.

Methods

Study Design, Setting and Participants

Retrospective audit of hospital admission data.

Residential respite clients were identified by keyword search ("respite") of Electronic Health Record (EHR) Emergency Department (ED) summaries using in-house data warehouse search methodology at a single Australian tertiary centre, between November 2014 (inception of EHR) and September 2017. Manual file audit was subsequently performed to confirm inclusion/exclusion criteria. Inclusion criteria: Current RACF respite client (including RACF respite client with intention to transition into permanent care). Exclusion criteria: presentations related to day-respite or non-RACF respite, patients aged <65 years, hospital LOS <24 hours (i.e. discharged directly from ED, unless dying within ED).

Two comparison groups were identified for the same time period: all RACF admissions ("general RACF group"), and a control group matched for age, gender and (where possible) presenting symptom ("matched RACF group"). These were obtained from an existing database of ED presentations from RACFs (including presenting symptom). Residents discharged directly from ED to their RACF were excluded from analysis. Individuals living in retirement villages, supported residential services and those temporarily in RACFs under Restorative Care or Transitional Care Programs were also excluded.

Respite participants were individually matched to permanent RACF residents at a ratio of 1 case: 2 controls to minimise confounding. For each patient in the respite group of a particular age, gender, and presenting symptom category, an identical filter was applied to the general RACF list, agnostic to clinical outcome data. Two patients from the general RACF group were then selected at random using a random number generator. If a particular age, gender, and presenting symptom filter was unable to identify sufficient RACF residents then respite patients were matched by closest age and gender as available.

Data Collection

For respite and matched RACF controls, data were retrospectively collected from electronic health records. Baseline data collected included age, gender, Charlson Comorbidity Index (CCI)⁴, frailty assessment (Clinical Frailty Scale [CFS]⁵), history of behavioural and psychological symptoms of dementia (BPSD), presence of Advance Care Plan (ACP), and number of prescribed medications on admission. Primary outcome measures collected were in-hospital mortality and total hospital LOS. Secondary outcomes collected included any in-hospital fall, development of delirium post-admission (defined as new-onset in-hospital confusion or documented delirium that was not the reason for admission), any new pressure injury (>24 hours post admission), any Medical Emergency Team (MET) call, and discharge with palliative intent.

As retrospective file audit was not feasible for the entire general RACF group, available data included age, gender, total hospital LOS and inpatient mortality, and no secondary outcomes were measured.

Statistical Analysis

Statistical analysis was conducted using Statistical Package for the Social Sciences (SPSS) v24. Characteristics and outcomes were compared between respite and RACF groups. For continuous variables, Shapiro-Wilk test was performed to assess normality of distribution. Groups were compared Mann-Whitney U test (non-parametric continuous variables) χ^2 (Chi-square) test with two tailed p-values (categorical variables). All univariate analyses with significant results were repeated using logistic or ordinal regression, adjusting for age, gender, presenting symptom and matching variable. Nonparametric dependent variables (e.g. LOS) were transformed to quartiles to ensure statistical assumptions were met.

Ethics Approval

This study was approved by the Austin Health Human Research Ethics Committee (LNR/17/Austin/327).

Results

Overview and Baseline Characteristics

Between 23/11/2014 and 25/9/2017 there were 1,085 hospital presentations identified with the keyword “respite” within discharge summary documentation. File review revealed that only 289 of these were from RACF respite. After exclusion of patients aged <65 (n=35) and those discharged directly from ED (n=85), there were 166 hospital admissions for residential aged care respite clients included in the analysis (Figure 1).

During the same period, the total pool of RACF beds within the hospital catchment increased from 3,378 to 4,508 (25.1%). There were 5,909 ED presentations resulting in 4,575 inpatient admissions from permanent RACF residents. The proportion of permanent RACF residents discharged directly from ED back to their RACF was significantly lower than that of respite residents (22.6% vs 33.9%, $p<0.001$).

Matched controls (n=332) were identified from the 4,575 hospital admissions. Complete age, gender and symptom matches were not available for all respite cases. Both age and gender matches were available in 233/332 (97.6%) of controls; the 8 remaining controls were matched for age and presenting symptom (1 control), gender only (3), age only (4). Overall, 64/166 respite patients (38.6%) had at least 1 complete age, gender and condition match available (i.e. 91/332 [27.4%] of controls).

With the exception of “confusion” (respite: 11% vs RACF: 4%, $p<0.05$), there was no significant difference between prevalence of presenting symptom category between respite and matched RACF groups. The most common reason for presentation by respite clients was cardiorespiratory illness followed by falls and fractures (Table 1).

Table 2 outlines characteristics of respite and the matched and general RACF control groups. There was no difference in age between respite and either matched or general RACF group. There was a higher proportion of males in the respite group compared with the general RACF group (46.4% vs 36.5%, $p=0.009$).

There was no difference in CCI between respite and matched controls, although advanced diabetes and connective tissue disease were more commonly reported for RACF patients. Matched RACF controls were also more likely to have a severely-frail or pre-terminal CFS score, although complete data to derive CFS were unavailable in 78/498 (15.7%) participants. Matched RACF controls were significantly more likely to have a documented ACP (35.5% vs 23.5% $p=0.037$), and greater polypharmacy (median number of medications 11 vs 9, $p=0.023$).

In-Hospital Outcomes

Respite vs General RACF Group. There was higher in-hospital mortality during the audit period in respite clients (25/166, 15.1%) than the general RACF group (374/4,575, 8.2%, $p<0.001$). Of these, 4/166 (2.4%) respite patients died in the ED compared with only 27/5,909 (0.5%) of general RACF group, $p<0.001$.

The LOS for admitted respite patients was significantly longer than general RACF group: median (interquartile range [IQR]) 6 (1-17) days vs 1 (1-5), $p<0.001$ (Table 3).

Respite vs Matched Control Group. There was no difference in mortality between respite group and matched controls (54/332, 16.3%, $p=0.795$). Death was most

commonly-attributed to pneumonia in both the respite group (9 deaths) and matched RACF control group (16 deaths).

Compared with matched controls, patients from respite experienced significantly-longer hospital LOS: median (IQR) 6 (1-17) days vs 2 (1-6), $p<0.001$).

The respite group was significantly more likely to have in-hospital falls compared to matched controls (18/166 [10.8%] vs 5/332 [1.5%], $p<0.05$). Documentation of delirium was also significantly more common in respite patients (59/166 [35.5%]) than the matched RACF control group (59/332 [17.7%], $p<0.001$). This finding remained significant even when excluding those presenting with “confusion” (24.1% vs 14.2%, $p=0.006$). There was no difference seen in number of pressure areas or MET Calls.

There was no significant difference in proportion of respite patients or controls discharged with palliative intent (3.0% vs 1.2%, $p=0.153$), nor when this was combined with in-hospital mortality (18.1% vs 17.5%, $p=0.868$).

Of those respite patients that survived to discharge, 60.9% (86/141) were unable to return to their original respite bed. One quarter (22/86) of these patients were ultimately discharged to permanent RACF care.

All differences remained significant after adjustment for age, gender, matching variable and presenting symptom.

Discussion

Residential respite plays an essential role in supporting community-dwelling older Australians and their caregivers. However in some cases respite itself may present risks. People accessing respite are often very frail or with high or specific care needs, and face difficulties including unfamiliarity of environment and new carers, problems accessing medical care, multiple clinical handovers and possibility of unappreciated illness the need for increased care. Whilst there is evidence that respite residents have higher rates of unnatural and injurious death than permanent RACF residents³, no recent studies have compared outcomes in these groups in the inpatient setting.

We sought to (1) identify the frequency of respite admissions to our hospital network, using novel data warehouse search methodology and EHR, (2) compare comorbidity and frailty measures between respite and permanent residents, and (3) compare in-hospital outcomes including LOS, mortality and other adverse events between these groups.

We hypothesized that some respite clients are on a trajectory of decline prior to accessing respite, for others, transition to the unfamiliar environment of respite care for some people with dementia may have unintended consequences, precipitating acute hospital transfer.

We found that while admissions from residential respite comprise a small proportion of hospital presentations from RACFs, these people had much higher in-hospital mortality than RACF residents overall, and equivalent mortality to a matched RACF control group. Further, respite clients experienced significantly-higher rates of

delirium, falls in hospital, and longer LOS than permanent RACF residents. Our findings suggest that while residential respite residents represent a minority of admissions from aged care, they are a vulnerable group at high risk of poor outcomes that may benefit from prospective identification and intervention.

The novel EHR keyword search methodology identified 289 presentations from residential respite over a 3-year period, of which 166 met inclusion criteria. During the same period, there were 4,575 admissions from permanent RACF residents.

Although not a primary objective of this study, we also observed a high proportion (34%) of RACF respite residents were discharged directly back without admission. This was significantly greater than that of the general RACF population (23%). Future studies could examine this group in more detail to identify whether lack of primary care access played a role in these ED presentations, and what proportion were potentially-avoidable. Concerningly, respite patients presenting to ED were also more likely to die within the ED. Although few in number overall, it is plausible that respite patients may present later or with more severe illness due to lack of familiar medical or nursing support in the respite facility, or less-available documentation of treatment plans.

Although there were similar comorbidity and median Clinical Frailty Scale (CFS) between respite and matched controls, there was a higher proportion of “very frail” (CFS 7-9) in the matched RACF group. Despite this, there was no difference in in-hospital mortality between the groups. We chose the CFS as a frailty scoring method based on clinical judgement that is validated against other approaches, validated for

retrospective use, in the RACF setting, and it is independently associated with mortality.⁵⁻⁷ However, the retrospective nature of data collection and missing information for some patients limits the conclusions that can be drawn and prospective assessments are warranted.

Other observations of note included higher levels of medication prescription in RACF controls (although high in each overall). The matched RACF control group was also significantly more likely to have a documented ACP, although prevalence was low in each overall (RACF 32.5%, respite 23.5%). RACFs are encouraged to conduct ACP discussions for permanent residents but the process may be less robust for temporary clients. Low prevalence of documentation or communication of ACP into the hospital record may be to the detriment of patient care, particularly in the setting of acute illness.⁸

The finding that residential respite patients have significantly higher in-hospital mortality than the general RACF group (15.1% vs 9.1%) supports our original hypothesis that this group represent a highly-vulnerable cohort. Respite patients were also more likely to experience in-hospital complications and difficulties with discharge than RACF controls.

The observed higher prevalence of confusion (as presenting symptom) and inpatient delirium in the respite group are also consistent with the theory that the sudden shift to an unfamiliar environment at respite (and subsequently, in hospital) may contribute to worsening confusion for people with cognitive impairment.⁹

The incidence of delirium observed is possibly an underestimation, as delirium is frequently undetected (up to 75% of cases¹⁰) and the retrospective nature of our study was reliant on accurate case-finding and documentation in the medical record. Nevertheless, our in-hospital prevalence of delirium is comparable with other reports of similar cohorts.¹¹

Higher incidence of in-hospital falls for respite clients is also concerning, but not surprising given previous reports.^{2,3} Future analyses should review inpatient medication prescribing and whether this group is more likely to be prescribed antipsychotic or sedative medication (e.g. to treat delirium).

Our study has several important limitations. As a retrospective file audit there was incomplete data for some variables and interpretation of historical medical record data is potentially subjective. It is also possible that not all cases of respite were identified by treating clinicians and documented within the EHR and so may have been inadvertently overlooked. The decision to exclude <65 year-old respite recipients may have discounted clinically-relevant cases of younger-onset dementia or other disorders of ageing. Although we could estimate the total pool of permanent RACF beds from which presentations were drawn, the total number of respite beds within the catchment was not known, so no conclusions can be made regarding what proportion of all respite admissions experience hospitalisation nor comparisons with presentation rates for permanent residents.

The matching process undertaken represents another important potential source of bias. For each respite “case” there were a limited number of potential age-matched

peers within the dataset, which impeded frequency matching and so individual matching was performed, with a 1:2 case:control ratio. As complete match for age, gender and presenting symptom was not possible for all cases, analyses were adjusted for matching factors with no change to the findings. The higher proportion of respite presentations with “confusion”, could potentially may have influenced some results (e.g. increased incident delirium in respite group), however the findings remained significant even after excluding those with confusion at presentation. Despite these limitations, this process provided a control group to compare outcomes against which would not have been possible for the entire general RACF group during the study period (n=4,575) within the constraints of a retrospective file audit.

Conclusion:

Patients who present from residential respite have significantly higher in-hospital mortality than those admitted from permanent residential aged care, and significantly more in-hospital delirium, falls and longer LOS than matched controls. Our study highlights that residential aged care respite clients represent a highly-vulnerable group at risk of poor outcomes and supports an urgent need for interventions to improve quality of care for this cohort.

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Table 1 – Reasons for Hospital Admission

Symptom Category	Respite (n=166)	Matched Controls (n=332)	p-value
Respiratory	36 (21.7)	73 (22.0)	0.939
Cardiac	25 (15.1)	53 (16.0)	0.794
Falls and Fractures	25 (15.7)	69 (20.8)	0.124
Gastrointestinal	12 (7.2)	21 (6.3)	0.702
Wound Care	7 (4.2)	16 (4.8)	0.763
Neurological	5 (3.0)	15 (4.5)	0.420
Confusion	19 (11.4)	12 (3.6)	0.001
Other	37 (22.2)	73 (22.0)	0.939

Data displayed as n (%), p-values are unadjusted (univariate analysis).

Table 2 – Baseline Characteristics

	Respite (n=166)	Matched RACF Controls (n=332)	General RACF Group (n=4,575)
Age	86.0 [81.0, 91.0]	86.0 [81.0, 91.0]	87 [82.0, 91.0]
Male: Female	77: 89 (46.4: 53.6)	149: 183 (44.9: 55.1)	1662: 2913 (36.3: 63.7) ^a
COMORBIDITIES			
Diabetes Uncomplicated	28 (16.9)	58 (17.5)	-
Diabetes with End Organ Damage	10 (6.0)	42 (12.7) ^{a,b}	-
Mild Liver Disease	1 (0.6)	4 (1.2)	-
Moderate/Severe Liver Disease	0	1 (0.3)	-
Solid Tumour – Local Disease	15 (9.0)	32 (9.6)	-
Solid Tumour - Metastatic	5 (3.0)	11 (3.3)	-
Acquired Immunodeficiency Syndrome	0	0	-
Congestive Cardiac Failure	57 (34.3)	118 (35.5)	-
Myocardial Infarction	55 (33.1)	112 (33.7)	-

Pulmonary Disease	46 (27.7)	90 (27.1)	-
Peripheral Vascular Disease	12 (7.2)	37 (11.1)	-
CVA or TIA	43 (25.9)	73 (22.0)	-
Hemiplegia	7 (4.2)	15 (4.5)	-
Dementia	81 (48.7)	185 (55.7)	-
Connective Tissue Disease	5 (3.0)	32 (9.6) ^{a,b}	-
Leukaemia	2 (1.2)	7 (2.1)	-
Malignant Lymphoma	1 (0.6)	3 (0.9)	-
Peptic Ulcer Disease	2 (1.2)	6 (1.8)	-
Moderate to Severe Chronic Kidney Disease	49 (29.5)	98 (29.5)	-
TOTAL CHARLSON COMORBIDITY SCORE	7.0 [5.0, 8.0]	7.0 [6.0, 9.0]	-
History of BPSD	17 (10.2)	54 (16.3)	-
Pre-existing Advance Care Plan	39 (23.6)	108 (32.5) ^{a,b}	-
CLINICAL FRAILTY SCALE* (median)	6	6	-

Score 1-5 (Very Fit to Mildly Frail)	48 (35.8)	81 (28.3)	-
Score = 6 (Moderately Frail)	44 (32.8)	81 (28.3)	-
Score 7-9 (Severely Frail to Terminal)	42 (31.3)	124 (43.4) ^{a,b}	-
Medications on Admission*	9.0 [7.0, 13.0]	11.0 [8.0, 15.0] ^a	-
1st quartile (0-7 medications)	45 (28.8)	60 (18.1) ^{a,b}	
2nd quartile (8-10 medications)	55 (35.3)	96 (28.9)	
3rd quartile (11-14 medications)	29 (18.6)	92 (27.7) ^{a,b}	
4th quartile (15-29 medications)	27 (17.3)	84 (25.3) ^{a,b}	

Data are n (%) or median [interquartile range], $p < 0.05$ vs respite group, ^a unadjusted, ^b adjusted for age, gender, presenting symptom and matching variable.

Abbreviations: CVA: Cerebrovascular Accident, TIA: Transient Ischaemic Attack, BPSD: Behavioural and Psychological Symptoms of Dementia; *Missing data for CFS: 78 patients, number of medications: 10 patients.

Table 3 – Comparison of In-Hospital Outcomes Between Respite and Permanent RACF Residents

	Respite (n=166)	Matched RACF Controls (n=332)	General RACF Group (n=4,575)
In-Hospital Mortality (prevalence)	25 (15.1)	54 (16.3)	374 (8.2) ^a
Hospital Length of Stay, days	5.0 (1.0-17.3)	2.0 (1.0-6.0) ^a	1.0 (1-5) ^a
1st quartile LOS (0-1 days)	42 (25.3)	121 (36.7) ^{a,b}	
2nd quartile (2-3 days)	17 (10.2)	74 (22.4) ^{a,b}	
3rd quartile (4-8 days)	38 (22.9)	84 (25.5)	
4th quartile (9-150 days)	69 (41.6)	51 (15.5) ^{a,b}	
Fall in Hospital	18 (10.8)	5 (1.5) ^{a,b}	-
Delirium	59 (35.5)	59 (17.7) ^{a,b}	-
Delirium (excluding patients initially presenting with “confusion”)	40 (24.1)	47 (14.2) ^{a,b}	
New Pressure Injury	6 (3.6)	9 (2.7)	-
MET Call	22 (15.1)	46 (13.9)	-
Discharge with Palliative Intent	5 (3.0)	4 (1.2)	-
Combined In-Hospital Mortality and Discharge with Palliative Intent	30 (18.1)	58 (17.5)	-

Data are n (%) or median (interquartile range). $p < 0.05$ vs respite group, ^a unadjusted, ^b adjusted for age, gender, presenting symptom and matching variable.

Abstract

Background: Residential respite is an important support for many community-dwelling older Australians and their caregivers. Respite clients are often very frail with high or specific care needs. Little is known about the comparative outcomes of hospital admission between permanent residential aged care facility (RACF) residents and residential respite residents.

Methods: Retrospective study of residential respite patients admitted to an Australian tertiary hospital between November 2014-September 2017. Comparison groups: all RACF patients admitted during same period (general RACF group), and control group matched (2:1) for aged, gender and diagnosis.

Main Outcome Measures: In-hospital mortality, hospital length of stay (LOS), in-hospital complications (including fall, delirium, pressure injury, Medical Emergency Team [MET] call). Comparisons adjusted for age, gender, presenting symptom and matching variable.

Results: 166 admissions from residential respite and 332 matched RACF controls identified from 4,575 admissions for permanent RACF residents. Mortality was significantly higher in respite group vs general RACF group (15.1% vs 8.2%, $p<0.001$) but not matched control group (15.1% vs 16.3% $p=0.795$). LOS was significantly higher in respite patients than either control group. Respite patients had significantly higher prevalence of in-hospital fall (10.8% vs 1.5% $p<0.0001$) and delirium (35.5% vs 17.7% $p<0.001$) than matched RACF controls. No significant differences were seen in in MET-call and pressure injury rates.

Conclusion: While residential respite recipients represent a minority of total residential aged care admissions, they are at high risk of poor outcomes. Prospective identification and timely intervention may improve quality of care for this vulnerable cohort.

Keywords: respite, mortality, residential aged care, delirium

Figure 1 – Identification of Respite Admissions

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Acknowledgements:

None

Word count of main text: 2,645 (excluding references, tables, figures)

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Title:

In-hospital morbidity and mortality among patients from residential respite care

Date:

2020-01-01

Citation:

Low, Z. Y., Storer, M., Tai, R. & Yates, P. (2020). In-hospital morbidity and mortality among patients from residential respite care. INTERNAL MEDICINE JOURNAL, 50 (1), pp.85-91. <https://doi.org/10.1111/imj.14354>.

Persistent Link:

<http://hdl.handle.net/11343/275218>