Hospital treatment in residential care facilities is a viable alternative to hospital admission for selected patients

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Aim: To determine if hospital treatment in residential care facilities, led by a geriatric team, might be a viable alternative to inpatient admission for selected patients.

Methods: Case series with a new intervention were compared with historical controls receiving the conventional treatment. Treatment in residential care facilities (TRC) by the Residential Care Intervention Program in The Elderly (RECIPE) service was compared against the conventional treatment group, aged care unit (ACU) inpatients.

Results: A total of 95 patients in TRC and 167 patients in ACU were included. The mean Charlson Comorbidity Index score was 7 in both groups and demographics were similar, except more patients in the TRC group had dementia. Palliative care support was provided to 35.8% in the TRC group, compared with 7.8% in ACU, \( P < 0.001 \). Six-month mortality rates were similar at 30% for both groups. Rehospitalization rates at 6 months were similar at 41% for both groups. Length of care was significantly shorter for TRC (mean 2 days) compared with ACU (mean 11 days), \( P < 0.001 \).

Conclusions: Hospital treatment in residential care is viable for most patients, including those with dementia and those who need palliative care support. This model of care offers a valuable geriatric service to residents who would prefer to avoid hospital transfers, with no difference in mortality or rehospitalization rates for those treated in residential care, but a significant reduction in length of care. Geriatr Gerontol Int 2013; 13: 378–383.

Keywords: dementia, hospital in the home, nursing home, palliative care, residential care.

Introduction

Hospital in the Home (HITH) has been utilized in various Australian centers as a model to treat patients living in residential care facilities.\(^1,2\) It is well recognized that hospitalization for elderly people is associated with multiple hazards, such as polypharmacy, skin tears, pressure ulcers, falls and delirium.\(^3\) Studies have shown that delirium is significantly reduced by treatment at home,\(^4\) and patients are less likely to have sedative medications or physical restraints.\(^5\) In several studies focusing on pneumonia, timely treatment with intravenous antibiotics in the nursing home resulted in similar or reduced mortality rates compared with hospitalized patients.\(^5,7\) At the same time, patients and families are increasingly participating in advance care planning (ACP), with the option of avoiding hospital transfer being discussed, particularly for those with chronic illnesses.\(^8-10\) Better delivery of palliative care support to residential care facilities, in order to respect residents’ wishes for end of life care\(^11-13\) is needed, rather than defaulting to emergency transfer to hospital. Barriers that need to be overcome include limited access to palliative medications,\(^14\) difficulty recognizing when patients are dying and inexperience with palliative care for non-cancer conditions.\(^15\)

At the Northern Hospital in Victoria, Australia, a pilot program for hospital treatment in residential care facilities (TRC) as part of the Residential Care Intervention Program for The Elderly (RECIPE) service was launched in 2008. Treatment was provided by a dedicated geriatric team. The present study was a case series study in which a new intervention for one group was compared with historical controls receiving the conventional treatment; TRC by the RECIPE service was compared against the conventional treatment group, aged care unit (ACU) inpatients. It was hypothesized that TRC was a viable alternative to hospital admission for appropriately selected patients.
Methods

Ethics approval was obtained in 2008 from the Human Research and Ethics Committee at The Northern Hospital in Victoria. The residential care facility in-reach program was based in a metropolitan teaching hospital, and the catchment area was generally within a radius of 30 min by car. Patient recruitment for Treatment in Residential Care (TRC) was based on admission guidelines summarized in Figure 1. The patient or proxy decision maker would be required to give informed consent, and discuss the issues surrounding resuscitation status. Management plans were formulated by a dedicated hospital team, consisting of geriatricians, registrar and nurses.

The program also offered palliative care as appropriate. If the patient’s condition changed and management at the facility could not be continued, transfer into the acute hospital could be organized. If patients had an uncertain prognosis, TRC offered a trial period of active

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**Hospital in the Home (HITH)**

**TREATMENT IN RESIDENTIAL CARE**

A Northern Hospital Winter Initiative (1 July to 31 October 2008)

The service is available 7 days a week as of July 1 to October 31 2008.

All referrals are made by contacting the designated referral line (mobile phone number).

The team includes: Geriatricians, Registrar and Nursing staff

Access to Allied Health staff such Physiotherapy, OT, Speech Pathology and Social Work

**Eligibility criteria:**

- Patient and/or family consent
- Capacity within HITH to accept the patient
- Facility able to manage the care needs of the patient in the residential aged care facility (RACF)

**Appropriate Clinical Diagnosis which can include any of the following:**

- Dehydration
- Pneumonia
- Urinary Tract Infection
- Gastroenteritis
- Deep Venous Thrombosis
- Terminal care

**Treatment can therefore include any of the following:**

- IV antibiotics & IV fluids
- Anticoagulation
- Oxygen therapy (low flow)
- Appropriate Allied Health intervention
- Palliative support
- Referral to other appropriate support programs

**Exclusion criteria can include any of the following:**

- Lack of consent from patient and/or family.
- Behavioural disturbances, which may prevent the delivery of care in RACF, such as aggressive behaviour and frequent removal of IV, access device.
- History of recent falls, which may impact on the delivery of care in the RACF, please discuss with Aged Care Liaison Nurse.

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Figure 1  Admission guidelines for Treatment in Residential Care (TRC). Reproduced with kind permission from Dr Rabin Sinnappu, Hospital in the Home, The Northern Hospital, Victoria, Australia.
treatment, followed by palliative care if there was no response despite optimal treatment.

The acuity of the presenting complaint was triaged, in order to maximize service capacity. Overnight referrals were assessed the next morning, so those who physically presented after hours would wait overnight in the Short Stay Unit adjacent to the emergency department for assessment. TRC generally provided once daily visits for each patient. The service could not provide intensive management for unstable patients. Ultimately, the geriatrician and team members would use clinical judgement to determine if a patient was suitable for the TRC program. If there was conflict regarding disease management, further medical input and discussion were carried out in the hospital setting under the ACU. If there were acute behavioral or psychiatric disturbances, which posed unacceptable safety issues, then hospital admission was also recommended.

Inpatients treated under the ACU in the preceding year between July 2007 and October 2007, before the existence of the TRC program, were used as the comparison group. The ACU is an acute medical unit for inpatients who have been admitted from residential care facilities for the management of general medical conditions. Patient data, including demographics, was collected retrospectively through an individual medical record search. Data for the comparison group were obtained by interrogating the hospital information system database electronically. Patients were excluded if their medical records were not found. Main outcomes measured included: mortality, rehospitalization and length of hospital care. Patient demographics, characteristics and past medical history were obtained by manual chart review. The Charlson Comorbidity Index (CCI) was calculated according to a weighted scoring system based on their comorbid health conditions, using a spreadsheet macro formula created by Hall et al. Scores greater than 5 indicated a high level of comorbidity, and correlated with high rates of mortality and hospitalization. A total of 38 residential care facilities within our catchment area participated between July 2008 and October 2008. A total of 187 patient referrals to the TRC service were received; prior general practitioner (GP) involvement was noted in 111 referrals (59.3%), and 90 referrals (48.1%) were triaged to be seen within 24 h. Reasons for non-recruitment were determined and included severe psychiatric disturbance, functional level below premorbid status, medical instability and impending discharge rendering the referral unnecessary. Documentation of preferences for resuscitation and wishes for treatment location (e.g. facility versus hospital) were assessed.

Comparison data for TRC and ACU groups were analyzed using SPSS version 17.0 (SPSS, Chicago, IL, USA). Continuous data, which included age, CCI scores and length of hospital care, were compared by carrying out t-tests. Categorical data, which included palliation, mortality and rehospitalization rates, were compared by carrying out χ²-tests. Kaplan–Meier survival curves were constructed to compare 6-month mortality, and log–rank testing was carried out to determine any differences between groups. Cox regression was used to determine predictors of 6-month mortality. Linear regression analysis was carried out to determine factors associated with longer length of care. For all analyses, P-values <0.05 were considered statistically significant using two-sided tests.

Results

Of the 187 referrals to the TRC service, after an initial geriatrician assessment, a total of 95 patients were recruited and consented to TRC. Reasons for non-recruitment to TRC included: 57 patients (57/83, 68.7%) who required management as hospital inpatients; 18 patients (18/83, 21.7%) only required management in the Emergency Department; and eight patients (8/83, 9.6%) remained at the facility with GP management. Out of the 57 patients admitted to the hospital ward, there were just seven cases where the person responsible (usually a family member) declined consent leading to hospital admission.

When patients were referred to TRC for a screening assessment, approximately two-thirds of all patients had no documentation of their wishes for treatment location. Preferences were found in 94 patients, mostly stated in advance care plans. There were 53 patients (53/187, 28.3%) who preferred treatment at the facility if possible, whereas 35 patients (35/187, 18.7%) wished to avoid hospital transfer altogether. Even though six patients (6/187, 3.2%) documented a preference for treatment in hospital, four of these patients actually consented to TRC intervention. Existing advance care directives to decline resuscitation were found in 27 (27/187, 14.4%) cases. An additional 50 patients (50/187, 26.7%) were documented as “not for resuscitation” when they were admitted to the TRC program.

The most common conditions treated in TRC were: pneumonia (30/95, 31.6%), urinary retention (12/95, 12.6%), exacerbation of chronic obstructive airways disease (8/95, 8.4%), urinary tract infection (5/95, 5.3%), volume depletion without specified cause (5/95, 5.3%) and advanced-stage dementia (4/95, 4.2%).

Adverse events did occur, requiring transfer from TRC to hospital for admission and further management, but the rate was low. In each of the six cases (6/95, 6.3%), TRC provided a rapid response for each individual patient. Complications were diverse, including a newly diagnosed brain tumor, acute renal failure, recurrent pulmonary embolism and large bowel obstruction.
Apart from one patient with pulmonary embolism with a predisposing past history, there were no other cases of venous thromboembolism. In the previous year, a total of 167 patients were admitted to ACU for ward management. The most commonly treated conditions by the ACU were: pneumonia (25%), stroke (11%), congestive heart failure (7%), exacerbation of chronic obstructive airways disease (5%), gastroenteritis (4%), urinary tract infection (4%) and fractures not requiring surgical management (4%).

**Patient characteristics**

Dementia was a more common diagnosis in TRC patients. Apart from this, other demographic characteristics were similar, see Table 1. Patients of non-English speaking backgrounds did not appear to be a barrier for TRC involvement. Primary languages spoken included Italian, Greek and Macedonian. There was a total of 14 different languages. Behavioral and psychiatric symptoms of dementia (BPSD) were found in 19 TRC patients (19/95, 20%), but the severity was not clearly documented. However, BPSD did not interfere with TRC treatment based on chart review.

The mean CCI score was 7.1 for TRC (SD = 1.9) and 7.2 for ACU (SD = 2.3; P = 0.586).

**Palliation**

There were 13 patient episodes (13/167, 7.8%) in ACU who received palliative care, and there were 34 palliative patients (34/95, 35.8%) in the TRC group, which was significantly higher (P < 0.001). In 10 of these cases, active medical treatment was initially provided, but later changed to palliation after a poor response.

**Mortality**

Patient mortality rates on discharge in both groups were similar at 12% (Fig. 2). Of the TRC patients receiving palliative care in the facility (34/95, 35.8%), subsequently 11 patients (11/95, 11.6%) had expected deaths. The causes of death included pneumonia, end-stage dementia, percutaneous endoscopic gastrostomy-related peritonitis, malignancy and peripheral vascular disease with critical ischemia. Within this group of palliative patients, 13 (13/34, 38.2%) already had advance

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**Table 1** Comparison of patient characteristics and outcomes between the treatment in residential care and aged care unit groups

<table>
<thead>
<tr>
<th>Patient characteristics</th>
<th>TRC (n = 95)</th>
<th>ACU (n = 167)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>83.5</td>
<td>82.8</td>
<td>0.517</td>
</tr>
<tr>
<td>Mean and standard deviation</td>
<td>(SD = 8.4)</td>
<td>(SD = 8.8)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>50 (52.6%)</td>
<td>99 (59.3%)</td>
<td>0.296</td>
</tr>
<tr>
<td>Non-English speaking</td>
<td>40 (42.1%)</td>
<td>80 (47.9%)</td>
<td>0.365</td>
</tr>
<tr>
<td>High-level (nursing home) care</td>
<td>68 (71.6%)</td>
<td>127 (76.0%)</td>
<td>0.425</td>
</tr>
<tr>
<td>Dementia</td>
<td>74 (77.9%)</td>
<td>76 (45.5%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Charlson comorbidity score</td>
<td>7.1</td>
<td>7.2</td>
<td>0.586</td>
</tr>
<tr>
<td>Mean and standard deviation</td>
<td>(SD = 1.9)</td>
<td>(SD = 2.3)</td>
<td></td>
</tr>
</tbody>
</table>

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care plans before presentation, whereas a further 19 (19/34, 55.9%) had limitation of medical treatment during TRC assessment. In the ACU group, out of the 20 deceased patients (20/167, 12.1%) just seven had documented palliative care before death. The causes of death included pneumonia, stroke, sepsis of unknown origin, cardiac failure, cellulitis, over-anticoagulation and adverse drug reaction.

The 6-month mortality was 30% in both TRC and ACU groups. Log–rank testing found no significant difference in 6-month mortality, \( P = 0.974 \). Univariate analysis using Cox regression found that a number of other factors were non-significant for predicting mortality at 6 months. These included age (odds ratio \( [OR] 1.0, 95\% \text{ confidence interval [CI]} \) 1.0–1.0, \( P = 0.469 \)), CCI score adjusted for age (OR 1.0, 95\% CI 1.0–1.2, \( P = 0.402 \)) and dementia (OR 1.26, 95\% CI 0.8–2.0, \( P = 0.318 \)). Predictive factors for overall mortality at 6 months using Cox regression found that being a nursing home resident (i.e. receiving a high level of care) was the only significant risk factor (OR 2.4, 95\% CI 1.3–4.6, \( P = 0.006 \)) for adjusting for age and CCI score.

**Rehospitalization**

Approximately one in five patients returned to hospital within 1 month. At 1 year, 43 patients (43/95, 45.2\%) in the TRC group and 78 patients (78/167, 46.7\%) in the ACU group were rehospitalized (defined as a return to hospital either to the emergency department or admission to the ward within 1 year). The time to first rehospitalization did not differ across the TRC and ACU groups; 66 days versus 78 days, respectively (\( P = 0.418 \)). Recurrent issues occurred in 26 TRC patients (26/95, 27.3\%) over a 12-month period. However, of those 26 TRC patients who returned to hospital with the same issue, 14 (14/26, 53.8\%) patient episodes were actually treated by TRC again. There were nine returning patients managed in the emergency department and discharged, and just three required hospital ward admission.

**Length of care**

Length of care was significantly shorter for TRC (mean 2 days) compared with ACU (mean 11 days; \( P < 0.001 \)). TRC provided substitutive care for 207 patient bed days over a 4-month period, as calculated with the addition of each TRC patient’s length of stay. Over the same duration of 4 months in the preceding year, ACU provided care for 1840 patient bed days.

**Discussion**

Treatment in residential care was a useful program to manage patients in their own residential care facility. There was no difference in mortality compared with patients managed in hospital under the acute aged care unit, even though palliative care was highly utilized in this group. All TRC patients who died had appropriate palliative support put into place before an expected death at their residential facility.

The CCI scores were similar, suggesting that equally frail populations were managed in both settings. Patient and family preference might help to determine if treatment within the nursing home would be useful for a particular patient. Frail patients who also had dementia and were living in nursing homes were particularly appropriate for treatment in their own environments, thus avoiding the need for hospitalization with all its inherent problems and potential complications, such as pressure sores, delirium and falls.3–5

The length of stay was significantly shorter under TRC. However, it should be noted that this was a case series, and the types of intervention were different in each setting. TRC patients were discharged as soon as the intravenous or subcutaneous infusions were complete. TRC patients also frequently received single visits for an acute assessment, but subsequently they were managed by the GP and the RECIPE service, thus avoiding an unnecessary emergency department presentation. This might partly account for how the difference in treatment location resulted in a shorter length of hospital care.

The strongest predictor of death was found to be being a nursing home resident (i.e. receiving a high level of care). This is in comparison with patients who were not from nursing homes and thus receiving a low level of care from a hostel. Overestimating survival would occur more in the high-level care group, as they have a poorer functional level and would have a worse prognosis than those requiring low-level care.

Behavioral and psychiatric symptoms were anticipated to be an issue, mainly with intravenous cannulation for acutely agitated or severely restless patients. However, this only affected a few patients. Alternatives, such as oral or transdermal medications, were prescribed. For example, one patient experienced constant difficulty with morphine infusion through a syringe driver, thus transdermal fentanyl was used instead. By providing alternatives, such as oral or transdermal medications, appropriately selected patients with BPSD could be managed in their own environment.

A particular strength of the TRC program is the integration with chronic disease management services, such as RECIPE, which ensures continuity of care. Rapport with the patient and family is conducive to better long-term management, as well as advance care planning. Even though rehospitalization rates were unchanged, many were treated by TRC again. Another benefit was that the TRC arm also had a much lower length of stay than patients admitted to hospital, which is a cost saving to the hospital.
In the present study, all of the inpatients treated under the ACU were included in the comparison group. It was not possible to retrospectively determine which of these ACU patients would have been eligible for the TRC program, because selection of patients was a clinical decision made at the bedside and multiple factors influence the management plan. As such, the findings presented here describe the experience in a hospital geriatric ward for the average patient, and compared that against the experience of specially selected residential care patients treated under the TRC program.

This was an observational study carried out in one metropolitan teaching hospital, so the findings might not be generalizable in other hospital service models. Functional decline could not be assessed retrospectively, which could be relevant for patients living in low-level care. Delirium was not documented routinely in patients’ notes. It would have been of interest to know whether the incidence or severity of delirium was reduced by treatment in the facility, and if this influenced outcomes. There could be some deaths that were not reported to our hospital records, but it would overestimate survival equally in both groups. Future studies could look at quality of life scales, and patient and family satisfaction, as these are useful measures where the goal is palliation instead of survival. Future studies could also include analysis for cost-effectiveness. However, it is noted that the program utilized existing services from both HITH and RECIPE teams, and did not require any additional staff.

Hospital treatment in residential care offers a valuable geriatric service to residents who would prefer to avoid hospital transfers. There was a significant reduction in the length of care compared with patients admitted to hospital, although no difference was detected in mortality or rehospitalization rates between the two groups. Expansion of geriatric medicine in this field would allow greater access to hospital care for patients with dementia, and did not require any additional staff.

Acknowledgments

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Disclosure statement

The authors declare that there was no financial support or relationship that may pose conflicts of interest.

References

2 Cartledge S. Hospital in the nursing home. *Hosp Healthc* 2004; 52–53.
8 Harvey P. Chronic Disease Management in Residential Aged Care Facilities. *A Thesis Submitted for the Degree of Doctor of Medicine*. Melbourne, Victoria, Australia: The University of Melbourne, Department of Medicine, Austin Health and The Northern Hospital, 2005.