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Original article

Profile of inpatient falls in patients with dementia: A prospective comparative study between 100% single rooms and traditional multibedded wards

Sophie Knight [a], Inderpal Singh, MBBS, MD, MSc, MRCP UK (Geriatric Medicine), FRCP [b, *]

[a] School of Medicine, Cardiff University, Heath Park, Cardiff, Wales, UK
[b] Department of Geriatric Medicine, Ysbyty Ystrad Fawr, Aneurin Bevan University Health Board, Wales, UK

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ABSTRACT

Background: New hospital designs with single rooms have emerged in recent years, where increased risks of falls have been reported. The objective of this prospective study was to measure the incidence and outcome of inpatient falls (IFs) in high-risk dementia patients being treated in single rooms and multibedded wards (MB-Ws).

Methods: A total of 100 patients with dementia were recruited across the two hospital settings in South Wales. Baseline characteristics and falls data were collected for the total length of stay (LoS) in the hospital.

Results: There was no significant difference between the two cohorts as suggested by mean age, sex, activities of daily living, comorbidity burden, polypharmacy, or care needs. The number of patients who sustained an IF at the two sites was similar ($p = 0.83$). Time to first fall was not significantly different (single rooms = 12 ± 18.6 days, MB-Ws = 11.4 ± 12.4 days; $p = 0.89$). Fifty-three IFs were sustained by 16 patients in single rooms compared with 23 IFs by 15 patients in MB-Ws. Mean IF/patient treated in single rooms was 3.3 (range 1–9) and this was significantly higher than those treated in MB-Ws (mean 1.5; range 1–3, $p = 0.03$). One patient sustained hip fracture at each site; otherwise, there was no significant difference with regard to other injuries and mortality. Mean LoS for patients with dementia having recurrent falls in single rooms (58.86 ± 41.44 days) was significantly higher as compared with MB-Ws (26.13 ± 20.91 days).

Conclusion: Patients with dementia were at an increased risk of recurrent IF in single rooms compared with MB-Ws. Recurrent IF could be correlated with longer LoS but it is difficult to establish the cause and effect due to the low power of the study. There was no significant difference in terms of injury or mortality between the two settings.

1. Introduction

Worldwide populations are aging. The United Kingdom is facing a significant rise in the aging population and an associated rise in the prevalence of dementia.[1,2] The number of people in the UK aged 65 or over has now reached 11 million and it is estimated that over 800,000 people have dementia in the UK.[1,2] This number is projected to rise to over 1 million by 2025.[2] This inevitably places pressure on hospitals to provide safe inpatient stays for older patients, given that up to one-third of inpatients may have cognitive impairment.[2] Dementia is associated with impaired mobility and people with dementia are at two to three times higher risk of fall.[3–6] The fracture rate in people with dementia is more than three times higher as compared with the age- and sex-adjusted fracture rate in the general population.[3]

Inpatient falls (IFs) are the most commonly reported safety incidents and account for almost two-fifths of the patient safety incidents reported to the National Reporting and Learning System. A 2011 National Patient Safety Agency report estimated 282,000 falls/year including 900 severe incidents of patient harm and 90

* Corresponding author. Consultant Geriatrician, Department of Geriatric Medicine, Ysbyty Ystrad Fawr, Aneurin Bevan University Health Board, Wales CF82 7EP, UK.
E-mail address: inder.singh@wales.nhs.uk (I. Singh).

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deaths on National Health Service wards.[7] Rates from 2.9 falls/1000 patient-bed-days to 16 falls/1000 patient-bed-days have been reported from different types of patient accommodation in the community hospital, intermediate care provision, or acute settings.[7,8] The risk of IF is highest in single rooms,[9] and associated poor outcomes have been reported.[10]

There is a dearth of studies examining the impact of dementia and IF in single rooms as compared with the traditional wards.[11] The aim of this study is to investigate the incidence and outcome of IF prospectively in patients with dementia treated in single rooms compared with those with dementia treated in traditional multibedded wards (MB-Ws).

2. Methods

2.1. Study design

This is a prospective observational study to measure the impact of the hospital environment on patients with dementia.

2.2. Setting

Ysbyty Ystrad Fawr (YYF) is the first newly built, local general hospital commissioned in the UK to provide 100% single rooms with an en suite facility under the Aneurin Bevan University Health Board (south Wales, UK). It was opened in 2011 with the aim of minimizing hospital-acquired infections and enhancing privacy and dignity by providing single rooms.[12,13] The same Health Board also has another site, the Royal Gwent Hospital (RGH) in Newport, which is a traditional multibedded district general hospital. Both sites admit acute and subacute patients to the National Health Service bed irrespective of the income or personal status.

The National Health Service is the publicly funded health-care system for United Kingdom. It is the largest and the oldest single-payer health-care system in the world.

2.3. Data and measurements

In this prospective study, 100 consecutive patients with known dementia irrespective of age as criteria were observed at YYF (with 100% single rooms) and RGH (MB-Ws). Inclusion criteria were older persons with known dementia admitted with acute illness. Patients with dementia with a terminal illness or requiring palliative care were excluded. Patients were recruited between May and June 2015 and recruitment was stopped when 50 consecutive patients were recruited at each site. IFs data were collected from the entire admission record.

Nursing staff, physiotherapists, and doctors collected patient information and recorded it in the medical notes. This information was subsequently collated from clinical notes onto the standardized data-collection form by an individual study coordinator. Individual patient characteristics recorded from clinical notes included age, sex, dementia subtype, activities of daily living on admission measured by Barthel Index,[14] extended activities of daily living,[15] comorbidity burden measured by the Charlson Comorbidity Index,[16] number of medications, place of residence, carer support, who they live with, falls history, and reason for admission.

A fall was defined as an incident whereby the patient comes to rest on the floor or a lower level, with or without loss of consciousness. The standard hospital data for critical incidents of IF are recorded on Datix. Datix is web-based patient safety software for health-care risk management, which provides a comprehensive oversight of risk management activities including an incident of IF. Further analysis was undertaken for each incident of IF to measure fall-related adverse outcomes including an injury, hip fracture, length of stay (LoS), and both inpatient mortality and 30-day postdischarge mortality.

2.4. Statistical analysis

Data were anonymized and recorded onto a password-protected Microsoft Excel (Redmond, WA, USA) spreadsheet to protect patient confidentiality. Data analysis was performed using IBM SPSS 20 (Armonk, NY, USA) and Microsoft Excel. Data are presented as means ± standard deviation.

The incidence of falls is described as mean falls/inpatient faller and IFs/1000 patient-bed-days. Mean falls/inpatient faller was calculated by dividing the total number of falls by the number of patients who sustained IF. Falls incidence density/1000 patient-bed-days was calculated by dividing the total number of falls at each site by the total sum of bed-days used by all the patients included in the study at each respective site.

Independent t test was used to compare the mean value of the two independent groups (YYF and RGH) to establish any statistical differences between baseline characteristics, specific falls information, LoS, discharge destination, and mortality. A Chi-square test was used to compare observed and expected frequencies with regard to inpatients and previous history of falls prior to admission. The level of statistical significance at which the null hypothesis was rejected was chosen as 0.05.

This observational study was carried out to evaluate the impact of the new service provision (100% single rooms) in comparison with the existing service (MB-Ws), which is also provided by the same Health Board. All questions and forms required to carry out the study were sent to the Research and Development (R&D) Department at Aneurin Bevan University Health Board, in order to assess risks to patient identification and the Health Board. The R&D Department approved the study with no further need for ethical approval. The R&D Department's decision was justified on the basis that this observational study was carried out only to evaluate current service and no personal information other than hospital identification number, date of birth, and sex will be recorded for service evaluation purpose only and no personal identifiable information will be shared or published. The outcome data including LoS, mortality, and discharge to care home used in this study are currently being recorded by the Health Board routinely. Consent was still taken for this service evaluation in case patients need to be contacted or interviewed to complete any missing clinical data.

3. Results

A total of 100 patients were recruited into the study, with 50 patients at each site. The average age of patients in single rooms at YYF was 83.1 ± 8.5 years and age was not significantly different from those admitted at RGH with MB-Ws (85 ± 8.4 years, $p = 0.35$). There were a higher proportion of female patients at both sites: 27 at YYF and 34 at RGH ($p = 0.15$). As much as 76% (38/50) of patients at both sites were admitted from their own home, whereas the remaining 24% (12/50) were admitted from a nursing or residential home. All patients required assistance with extended activities of daily living and all received some form of community care, whether it is informal, formal, or both. There was no significant difference between the baseline characteristics of the two cohorts as suggested by mean age, sex, activities of daily living, comorbidity burden, polypharmacy, or overall carer support (Table 1).

The reason for admission varied and included predominantly medical indications, with some surgical indications. The most common reason for admission at both hospitals was falls (YYF, $n = 13$; RGH, $n = 16$). Other reasons for admission were confusion, collapse, general deterioration, shortness of breath, urinary tract