Community-based intervention to optimise falls risk management: a randomised controlled trial

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Abstract

Background: falls are the leading causes of accidental death and fragility fractures in older adults. Interventions that assess and reduce falls risk are underutilised.

Objective: to evaluate the impact of a multifaceted community-based programme aimed at optimising evidence-based management of patients at risk for fall-related fractures.

Design: this was a randomised trial performed from 2003 to 2006.

Setting: community-based intervention in Ontario, Canada

Participants: eligible patients were community-dwelling, aged ≥ 55 years and identified to be at risk for fall-related fractures. A total of 201 patients were allocated to the intervention group or to usual care.

Intervention: components of the intervention included assessment of falls risk, functional status and home environment, and patient education.

Measurements: primary outcome was the implementation of appropriate falls risk assessment at 6 months. Secondary outcomes included falls and fractures at 6 and 12 months.

Results: the mean age of participants was 72 years, and 41% had fallen with injury in the previous year. Compared to usual care, the intervention increased the number of referrals made to physiotherapy [21% (21/101) vs 6.0% (6/100); relative risk (RR) 3.47, 95% confidence interval (CI) 1.46–8.22] and occupational therapy [15% (15/101) vs 0%; RR 30.7, 95% CI 1.86 to >500]. At 12 months, the number of falls in the intervention group was greater than in the usual care group [23% (23/101) vs 11% (11/100); RR 2.07, 95% CI 1.07–4.02].

Conclusions: compared to usual care, a multi-faceted intervention increased referrals to physiotherapy and occupational therapy but did not reduce risk of falls. Similar falls reduction interventions cannot be recommended based on the results of this study.

Keywords: falls assessment and prevention, knowledge translation, elderly
Introduction

Falls are the leading cause of accidental death among people aged 65 years and older and also account for significant morbidity, including fracture, impaired mobility, depression, admission to long-term care facilities, decreased quality of life due to fear of falling and death [1–5]. One-third of community-dwelling people aged 65 years and older and up to 50% of those aged 80 and older experience a fall each year [6, 7]. Estimates vary, but ~20% of falls among the elderly result in serious injury requiring medical attention, and at least 2–10% of these falls result in fractures [1, 2, 8–10]. Because of the morbidity and mortality associated with falls, they result in marked costs for the health care system and are a major health concern [11]. Given that the proportion of people aged 65 and older is increasing, this will likely lead to a greater burden of disease.

There are multiple risk factors for falls including gait and balance disorders, visual impairment, cognitive impairment and use of psychotropic medications such as benzodiazepines [10, 12]. And, the risk of falling increases with the number of risk factors that are present [10, 12].

Several systematic reviews of falls assessment strategies have been completed. In their Cochrane review, Gillespie and colleagues suggested that interventions targeting both intrinsic and environmental risk factors for falls can reduce the risk of falls in older people [13]. Chang and colleagues found a benefit of a multifactorial approach to assessing the risk of falls and subsequent targeted intervention [14]. A more recent systematic review of 19 trials found that evidence in support of multifactorial fall prevention strategies was limited, and implementation of these programmes trended towards an increase in falls [15]. Many of these interventions are complex and few studies report cost-effectiveness. Perhaps for these reasons, even simple interventions are considerably underutilised in practice with less than one-third of recommended care for falls being completed in practice [16].

These care gaps highlight the finding that an additional effort is needed to ensure that appropriate knowledge translation is achieved to optimise management of falls assessment and prevention. This study was designed to help fill this knowledge to practice gap. The primary objective of this study was to determine if a multicomponent, community-based, integrated care strategy optimised the evidence-based management of people at a high risk for falls and fractures.

Methods

Between March 2003 and January 2006, we conducted a randomised trial of a multifaceted community-based intervention to optimise care of patients at risk for fall-related fractures. The complete study protocol has been published [17].

Setting and study population

This study was completed in the Algoma District of Ontario, Canada, a geographically vast area with Sault Ste Marie (population 78,000) as its main city. The study represented a partnership among consumers, providers and other stakeholders interested in reducing the evidence-practice gap. It was conducted by the Group Health Centre (GHC), a not-for-profit health service community centre, in partnership with Sault Area Hospital (SAH), a facility with 250 active beds.

A research assistant provided study information to the nurses and physicians in the hospital’s Emergency Department and Fracture Clinic and to local health care providers. Advertisements for the study were also placed in the hospital and Group Health Centre. From Monday to Friday, the research assistant identified eligible patients from the Emergency registration database and the Fracture Clinic registry. Clinicians in either of these units could also call the research assistant directly about potential participants. Interested patients were also able to contact the research assistant directly. Patients were eligible for inclusion in the study if they were community dwelling, aged 55 years or older, able to give informed consent and were identified to be at a risk for fall-related fractures according to one of the following criteria:

1. attended the hospital Emergency Department with a fall and found to be at a high risk for falls as defined by a Timed Up and Go [18] result of more than 14 s;
2. were self-referred or referred by a health care provider because of a perceived high risk of fracture, and identified at a high risk for falls defined by a Timed Up and Go result of more than 14 s; or,
3. attended the hospital Fracture Clinic for a non-pathological fracture of the vertebrae, hip or wrist or had a BMD in the past year with a t-score of ≤−2.0.

Intervention

The intervention was multifaceted and consisted of providing patient-specific evidence-based recommendations targeted to reduce falls risk to both the patients and their primary care providers. Following randomisation, a research nurse assessed participants allocated to the intervention group in their home and completed the Berg Balance Scale [19], the InterRAI Screener [20, 21], a medication review and an assessment for orthostatic hypotension. The InterRAI Screener is used to assess the elderly individual to identify those who merit further assessment in order to prevent or stabilise early functional or health decline.

A complete list of patient medications was compiled from two sources: (i) the patient’s pharmacy records and (ii) home visits conducted by the study nurses. Medications associated with an increased risk of falls were identified, and primary care providers were asked to assess this list of flagged medications (Appendix in the supplementary data available at Age and Ageing online).

The criteria for appropriate referral for physiotherapy and occupational therapy services were based on the results of the InterRAI Screener and the Berg Balance Score. Physiotherapy interventions were tailored to each patient and
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included strengthening exercises, gait and balance training and referral to activities such as T’ai Chi classes. Occupational therapy interventions were also tailored to each patient and included home environmental assessment and cognitive testing. All therapists completed standard reporting forms indicating their recommended interventions and barriers to patient compliance with these recommendations.

Patients received personalised counselling from the research nurse about fall prevention including a written summary of the suggested management plan. They also received educational materials including a checklist for falls prevention.

Allocation and blinding

Eligible patients were randomised, using a computer-generated randomisation scheme under the supervision of the study biostatistician, into an immediate intervention protocol (IP) group or to usual care. All members of the usual care group received usual health care during the first 6 months and then were eligible to receive the intervention for a subsequent 6 months. Decision makers (including patient advocates) included in the study team believed that it was important to provide the intervention to the usual care group in order to facilitate completion of the study, in particular to enhance patient engagement and recruitment. The patients, treating physicians and outcomes collectors could not be blinded to the intervention status. All patients were followed up at 6 and 12 months after randomisation.

Outcomes and data collection

The main outcome was appropriate falls risk management at 6 months. Measurements of outcomes were obtained through patient records (obtained through the electronic medical record). Additional detail about targeted physiotherapy and occupational therapy services was obtained through standardised reports from the community-based therapists. A standardised chart review of the electronic medical record was the primary source of data for both study groups.

Secondary outcomes included falls, hospital admissions related to falls and fractures at 6 and 12 months. Falls and falls-related injuries were obtained from electronic medical records as well as patient diaries. Medication use was obtained through a chart review and a home visit assessment during the intervention period and through a chart review alone in the usual care group at 6 months. At 12 months, medication review during the home visit was also performed in the usual care group. Consistent with studies by Haines [22] and others [14, 15], we chose to look at outcomes at 6 months.

Sample size and analysis

The sample size was calculated based on local pilot data and a literature review. Prior to the development of this study intervention, we completed a chart review of a consecutive series of patients admitted to hospital with fall and fracture over a 6-month period. Of 112 patients, 40% received appropriate falls assessment at discharge or a follow-up at 1 month. This result is consistent with estimates from the literature. Assuming that 40% of patients would receive appropriate falls risk management within 6 months of randomisation and that the intervention would increase management by 20% which was considered the minimal clinically important difference, and, a two-tailed alpha of 0.05, power of 0.80, the patient as the unit of allocation and analysis, and assuming a loss to follow-up of 10%, a total sample size of 200 patients was needed.

Relative risks with 95% confidence intervals were calculated to assess outcomes between the IP group and controls at 6 month and 12 months. Fisher’s exact test was used to evaluate: (i) baseline differences between falls risk factors and (ii) differences in outcomes between the IP group and the usual care group at 12 months. Analysis was by intention to treat.

To allow for computation of adjusted risks, multiple logistic regression was used to determine whether risk factors were predictive of falls. All risk factors were included in the initial model, non-significant factors were eliminated and the reduced model was tested for significance.

Ethics approval was received from the Joint Group Health Centre/Sault Area Hospital Research and Ethics Board. This trial has been registered with clinicaltrials.gov (ID: NCT00465387).

Results

Patient characteristics

A total of 590 patients were screened, 389 were excluded and 201 patients were recruited from March 2003 to January 2006, with 101 patients randomised into the IP group and 100 patients into the usual care group (Figure 1). One hundred seventy-six patients (88%) completed the study. The mean age of participants was 71.9 ± 7.2 years, 94% were women.
Primary outcomes

Falls risk management

At 6 months, more patients in the IP group received appropriate falls risk assessment and management interventions than did those in the usual care group (relative risk 13.4, 95% CI 11.0–2779). At 6 months, 21% of patients were referred to physiotherapy in the IP group compared with 6% in the usual care group [relative risk (RR) 3.47, 95% CI 1.46–8.22], while 15% were referred to occupational therapy compared with none in the usual care group (RR 30.7, 95% CI 1.86–506). After administering the intervention to the usual care group 6 months after randomisation, physiotherapy and occupational therapy referrals increased to 25% and 20%, respectively. The intervention did not lead to a decrease in the use of high-risk medications. The patients in the IP group were taking more medications associated with a high risk of falls compared to the usual care group at 6 months (RR 2.87, 95% CI 1.48–5.58). There was no difference in use of high-risk medications between the IP and usual care groups at 12 months (P = 0.15).

Secondary outcomes

Falls

There was no difference in falls reported between the IP and usual care groups at 6 months; however, the number of individuals reporting falls in the IP group was statistically greater at 12 months (RR 2.07, 95% CI 1.07–4.02) (Table 2). Logistic regression revealed that ‘fear of falling’ was the only baseline risk factor with a predictive relationship with the number of falls reported (P = 0.02).

Fractures

Although fewer individuals in the IP group experienced a fragility fracture, this was not statistically significant in the follow-up period (RR 0.17, 95% CI 0.02–1.35) (Table 2).

Hospital admissions

The number of patients admitted to hospital following a fall was similar in both groups at all time intervals (Table 2).

Discussion

This study demonstrated that a multi-component intervention programme for falls risk management led to an increase in the appropriate use of occupational therapy and physiotherapy services in the community but did not reduce the number of falls or fractures. A greater proportion of individuals experienced a fall in the IP group at 0–6 months.
and there was a significant increase (>10%) in the number of individuals in the IP group who experienced a fall 6–12 months after the intervention compared to the usual care group. Although we were unable to detect any statistically significant differences between the groups with respect to baseline characteristics (Table 1), there was a slightly higher prevalence of falls risk factors in the IP group, potentially contributing to increased falls.

Other recent studies have reported similar increases in falls following educational interventions. Rucker and associates [23] provided an educational intervention to reduce falls and fear of falling after fragility fracture and reported a 10% reduction in fear of falling (P = 0.55), but a 12% increase in the rate of falls (P = 0.059) within 6 months. This increase in falls is almost identical to that found in the current study. Similarly, a systematic review by Chang and colleagues [14] identified a 28% relative increase in falls associated with educational interventions (95% CI −5% to +72%). Gates and colleagues found that the combined risk ratio for the number of fallers during the follow up of 18 trials of multifactorial strategies was 0.91 (95% CI 0.82–1.02) [15]. Two recent randomised trials of multidisciplinary interventions aimed at decreasing falls also found no benefit to the intervention [24, 25]. Spice and colleagues found that a community-based nurse-led assessment did not decrease falls [26]. Experts have suggested that one reason for this may be that while recommendations were made in some of these studies, implementation of recommendations was left to other personnel not involved with the study [27]. In our study, however, the rehabilitation therapists were involved with the study and provided the assessment and interventions directly to the study group participants. Changing behaviour is difficult and this current study as well as the systematic reviews suggests that it is not clear which components of multifactorial strategies may be effective in reducing falls or in what dose and formulation they are effective. Moreover, it is not clear if the interventions enhance mobility and thus increase the risk of further falls. Finally, some have suggested that behavioural theories should be used to target those individuals who might benefit from these multidisciplinary interventions [28, 29].

Study limitations and strengths

We acknowledge that our study was not powered to look at falls as the primary outcome. The increase in falls with the intervention could be an effect but might also be related to chance or confounding or information bias. For example, perhaps the intervention patients were better educated and attuned to falls risk and thus were more likely to document falls in their self-report diaries than the usual care group. Nevertheless, given that there was some evidence at study onset to support use of multifactorial risk assessment and subsequent targeting of interventions to high-risk patients, improving fall risk management was the main purpose of this study [13]. Moreover, recently consensus-based quality indicators for falls and mobility problems have been developed by the ACOVE group in the USA and include detecting history of falls, multifactorial falls risk assessment, medication review, functional status assessment, orthostatic vital signs, gait and balance assessment, cognitive assessment, home hazard assessment, all of which were included in this current study [24]. By this external standard, we improved the quality of care received with our intervention.

The strengths of this study included a randomised study design, an intervention targeted to at-risk patients and the successful partnership between numerous distinct community stakeholders. Multiple health care providers and community health service groups collaborated in a coordinated assessment and treatment programme to deliver evidence-based and timely interventions.

The limitations of this study included a short follow-up period of 6–12 months and the lack of blinding of outcomes assessors. The lack of blinding could result in bias such as overestimation of the impact of the intervention and better documentation of physiotherapy and occupational therapy services delivered than in usual care. Indeed, it was found that the medication review performed during the home visit led to the identification of more ‘at risk’ medications compared with the chart review alone. When medication review was done at home in both groups, there was no difference in use of at risk medications at 12 months. Data on falls and fractures were collected independently from patient diaries as well as hospital and Group Health Centre electronic health records.

In summary, it is critical that the health care community address the deficiencies that exist with respect to knowledge translation and management of fall assessment and management given their significant public health impact. This randomised, community-based study shows that the guideline-concordant management of falls risk can be enhanced with a multi-factorial intervention, but >6–12 months it is unlikely that our intervention could improve falls and fractures. We suggest that future studies look at an intervention with reminders to clinicians and patients and longer follow-up.

Key points

- A guidelines-based, multicomponent intervention targeted to patients at a high risk of falls increased assessment of patients by physiotherapists and/or occupational therapists.
- A multicomponent fall intervention for patients at a high risk of falls did not reduce the risk of falls.
- Strategies targeted to falls and fracture prevention require involvement of multiple stakeholders including patients, health care providers and managers.

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Conflicts of Interest
The authors declare they have no competing interests.

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Supplementary data
Supplementary data are available at Age and Ageing online.

References
Do self-reported ‘integrated’ continence services provide high-quality continence care?

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Abstract

Introduction: systematic collection of clinical outcome data remains the most difficult task in the measurement of clinical effectiveness. However, the examination of the relationship between organisational and clinical process of care may provide a surrogate measure of quality in care.

Methods: data from the 2006 National Audit of Continence Care for Older People were used to examine whether there was an association between organisational structure and standard of continence care for older people. ‘Quality’ scores were produced and the relationship between scores was examined.

Results: there were statistically significant correlations between organisational and process scores for continence care. Primary care scored higher than hospitals or care homes in regard to service organisation [median (IQR): 57 (45–68) vs 48 (36–65) vs 50 (38–55), \(P = 0.001\)]. Differences were less with clinical process scores for urinary incontinence (UI) [median (IQR): 42 (32–52) vs 40 (29–49) vs 43 (34–52), \(P = 0.06\)] and for faecal incontinence (FI) [median: 42 (34–53) vs 45 (36–55) vs 47 (41–53), \(P = 0.12\)].

Conclusion: those with an integrated service provide higher quality care to older people. The provision of high-quality care for continence appears to be dependent upon well-organised services with personnel who have the appropriate training and skills to deliver the care.

Keywords: quality of care, clinical effectiveness, older people, continence, elderly

Introduction

There is a paucity of effort to monitor the implementation of evidence-based guidelines regarding incontinence of either urine or faeces and their outcome [1]. In the National Health Service in England and Wales, a centrally commissioned clinical audit programme has been established to survey the effectiveness of care for a variety of conditions. Of these projects, the National Audit of Continence Care for Older People [2, 3] has reported wide variability in the standard of care for older people with urinary and faecal incontinence and upon the considerable differences in how care is provided, despite national guidelines on service provision. These guidelines promoted the concept of integrated continence services...