Falls after discharge from hospital: Is there a gap between older peoples’ knowledge about falls prevention strategies and the research evidence?

Anne-Marie Hill  
*University of Notre Dame Australia, anne-marie.hill@nd.edu.au*

Tammy Hoffmann

Christopher Beer

Steven McPhail

Keith D. Hill

*See next page for additional authors*

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Title

Falls after discharge from hospital: Is there a gap between older peoples’ knowledge about falls prevention strategies and the research evidence?

Authors

Anne-Marie Hill\textsuperscript{a}, Tammy Hoffmann\textsuperscript{b}, Christopher Beer\textsuperscript{c}, Steven McPhail\textsuperscript{d}, Keith D. Hill\textsuperscript{e}
David Oliver\textsuperscript{f}, Sandra G. Brauer\textsuperscript{g}, Terry P. Haines\textsuperscript{h}

\textsuperscript{a}Corresponding Author

Ms Anne-Marie Hill, School of Health and Rehabilitation Sciences, The University of Queensland,

Mailing Address (note different mailing address to author’s affiliation)

School of Physiotherapy, The University of Notre Dame Australia

Email: anne-marie.hill@nd.edu.au

\textsuperscript{b}Centre for Research in Evidence-Based Practice (CREBP)

Faculty of Health Sciences and Medicine, Bond University

\textsuperscript{c}Faculty of Medicine, Dentistry and Health sciences, University of Western Australia,
Centre for Functioning, Disability and Health Research, Queensland Health,

School of Public Health and Institute of Health and Biomedical Innovation, Queensland University of Technology,

School of Physiotherapy, La Trobe University,

Northern Health Bundoora

Institute of Health Sciences, City University, London,

School of Health and Rehabilitation Sciences
The University of Queensland,

School of Primary Health Care,
Allied Health Research Unit Kingston Centre,
Monash University,
Abstract

Purpose of the study

The aim of this study was to examine whether older people are prepared to engage in appropriate falls prevention strategies after discharge from hospital.

Design and Methods

We used a semi-structured interview to survey older patients about to be discharged from hospital and examined their knowledge regarding falls prevention strategies to utilize in the post discharge period. The study was part of a prospective cohort study, nested within a larger randomized controlled trial. Participants (n=333) were asked to suggest strategies to reduce their falls risk at home after discharge and their responses were compared to current reported research evidence for falls prevention interventions.

Results

Participants’ strategies (n=629) were classified into seven categories; behavioral, support while mobilizing, approach to movement, physical environment, visual, medical, and activities or exercise. Although exercise has been identified as an effective falls risk reduction strategy only 2.9% of participants suggested engaging in exercises. Falls prevention was most often conceptualized by participants as requiring one (35.4%) or two (40.8%) strategies for avoiding an accidental event, rather than engaging in sustained multiple risk reduction behaviors.
Implications

Results demonstrate that older patients have low levels of knowledge about appropriate falls prevention strategies that could be used after discharge in spite of their increased falls risk during this period. Findings suggest that health care workers should design and deliver falls prevention education programs specifically targeted to older people who are to be discharged from hospital.

**Key words:** Falls; Patient education; Patient discharge; Hospital
Introduction

Older people who have been discharged from hospital are at risk of adverse events such as functional decline, infection, medication complications, unplanned readmissions to hospital and falls in the post-discharge period (Forster et al., 2004; Mahoney et al., 2000; Sager et al., 1996; Witherington, Pirzada, & Avery, 2008). Health related quality of life has also been found to decline during the post-discharge period (Haines et al., 2009). The incidence of falls in the post discharge period has been shown to be higher than in the community dwelling population (Davenport et al., 2009; Mahoney et al., 2000) and a recent large prospective national study (n=5,511) in the United States reported that hospital admission is associated with an increased risk of hip fracture in the post discharge period (Wolinsky et al., 2009).

Post-discharge interventions such as follow up home visits or intense post discharge care at home that aim to reduce the incidence of adverse events such as falls have been evaluated, but meta-analyses have concluded that there is inconclusive evidence about the effectiveness of these interventions (Shepperd, Parkes, McClaren, & Phillips, 2004; Mistiaen, Francke, & Poot, 2007).

Conceptually, the transition from hospital to home often marks a transfer of responsibility for control of patient health and well-being from hospital staff to the patient. Hence to prevent falls in this period, the older person and their caregivers are required to assume primary responsibility for participation in falls prevention activities. However, older people commonly fail to view falls prevention education as personally relevant (Ballinger & Payne, 2002; Hughes et al., 2008; Yardley et al., 2006) which may partially explain low adherence by older community dwelling people to recognized falls risk reduction strategies (Bleijlevens et al., 2008; Evron, Schultz-Larsen, & Fristrup, 2009; McInnes & Askie, 2004). Older people
have previously been found to have poor knowledge about falls prevention strategies (Snodgrass, Rivett, & Mackenzie, 2005; Zecevic, Salmoni, Speechley, & Vandervoort, 2006) and nominate barriers to engaging in strategies such as fear of exertion and social stigma (Evron et al., 2009; McInnes & Askie, 2004). Factors associated with low participation rates in exercise programs include low self efficacy and low self perceived risk of falling (Bunn, Dickinson, Barnett-Page, McInnes, & Horton, 2008; McInnes & Askie, 2004; Yardley et al., 2006) as well as pain, fear, low confidence to engage in physical activities and low physical or cognitive function (Sjosten et al., 2007; McInnes & Askie, 2004; Resnick et al., 2005). A meta-analysis that investigated older peoples’ perceptions of the barriers and facilitators to participating in falls prevention activities concluded that program designers had little knowledge about older peoples’ views about falls and their perceptions of barriers that prevented engagement with risk reducing behaviors (Bunn et al., 2008). Therefore, falls researchers now recommend that falls education should be designed with older peoples’ views and attitudes in mind and using sound education design principles (Bunn et al., 2008; Yardley et al., 2007).

Despite these findings, no studies were identified that explored whether older people themselves are aware that the post hospital period is a time of increased falls risk and that attention to suitable community falls prevention strategies such as exercise, is required post-discharge. In addition no studies have evaluated older peoples’ knowledge or self efficacy about falls and falls prevention strategies in the post discharge period. If older peoples’ knowledge of and self efficacy to engage in falls prevention strategies after discharge is low, then education that targets these gaps is required just prior to and during the post discharge period.
The Health Belief Model (HBM) (Rosenstock, Strecher, & Becker, 1988) is a framework that has been widely employed to examine individuals’ participation in health behaviors and is often used as a guide for the development of health education interventions (Janz & Becker, 1984). The constructs of the HBM conceptualize that perception, belief and knowledge about the threat to an individual’s health are understood within health education as assisting an individual to weigh the benefits of and barriers to engaging in the desired behavior and to subsequently develop self efficacy to initiate the desired behaviors (Rosenstock et al., 1988). Hence older peoples’ development of self efficacy to initiate active strategies to reduce their risk of falling after hospital discharge may be facilitated if they have awareness and knowledge about falls and falls prevention strategies.

In order to identify the educational requirements of this population this study aimed to identify and describe strategies that older people, at the time of discharge from hospital, believe will reduce their risk of falls in the post discharge period, and to compare participants’ suggested falls prevention strategies to current research evidence about falls prevention strategies for older community-dwelling people.
Methods

Design

A semi-structured survey was administered to participants (n=333) prior to their discharge from hospital. This study formed part of a prospective cohort study that was a 6-month follow up to a hospital-based randomized controlled trial (n=1206) (RCT) that investigated the effect of an education intervention on falls rates in hospital. The results of the inpatient RCT are described in detail elsewhere (Haines et al., 2010; Hill et al., 2009).

Participants and Setting

Participants were a cohort of consecutively admitted patients from acute and rehabilitation wards who were discharged from Swan Districts hospital (a 194 bed metropolitan hospital in Perth, Western Australia) between February 2008 and March 2009. Patients admitted to the hospital were eligible for inclusion in the study if they were 60 years of age or older and they or their relative gave written consent to participate in the main RCT and in the follow up phase of the trial. Participants’ diagnoses included orthopaedic conditions, pulmonary conditions, stroke, cardiac conditions and a range of other diagnoses such as Parkinson’s disease and surgical procedures. Participant characteristics measured at discharge included age, gender, medical diagnosis on admission, discharge destination (community alone, community with partner, community with other, residential care facility), history of falls during the six months prior to hospital admission, mobility status on discharge (independently mobile, independently mobile with aid, other), cognitive status using the Short Portable Mental Status Questionnaire, (Pfeiffer, 1975) mood using the Geriatric
Depression Scale, (Yesavage et al., 1982) and highest education level attained (primary, secondary, technical college, university).

As part of the main RCT participants were randomised into one of three groups. Two groups [(group 1, n= 120, 36.1%), (group 2, n=116, 34.8%)] received an education intervention about reducing their risk of falling during admission in addition to their usual care and the third group (n=97, 29.1%) received usual care alone. The education design was a novel intervention. It was based on the results of a previous successful RCT that found that patient education was the most important component of a multifactorial intervention that reduced falls in subacute wards (Haines, Hill, Bennell, & Osborne, 2006). Briefly, the format consisted of a DVD and written workbook and suggested strategies that aimed to empower participants to reduce their hospital falls risk falls (such as instruction in methods of using the patient call bell and adapting to the physical ward environment, Hill et al., 2009). Both intervention groups received this multimedia package. Additionally participants in group 2 received ongoing individual follow up with a health professional. This health professional provided additional tailored education that aimed to empower participants to reduce their hospital falls risk by using personally developed strategies, such as using their walking aid and monitoring their levels of dizziness. Both arms of the interventions were designed and delivered using the guiding principles of the HBM (Janz & Becker, 1984). The intervention focused solely on participants’ risk of falling whilst in hospital and did not include education about the nature and risk of falls after discharge or information about falls prevention strategies in the post discharge period. This meant that the intervention excluded training in falls prevention strategies such as engagement in exercise or comprehensive home assessment and modification, that are recommended for use by community dwelling older people (Gillespie et al., 2009). However some general hospital strategies such as monitoring
levels of dizziness could be utilized by participants in the post discharge period. Participants in group 3 (the control group) received usual care alone.

Outcome measures

This investigation was conducted as a part of a broader face to face survey of participants at the point of discharge from hospital. As part of this survey participants were asked an open-ended question, namely; “Please state at least one strategy that you think might be able to reduce your risk of falls in the first 6 months after you go home from hospital.” If participants offered only one response, the interviewer encouraged an open-ended discussion and asked participants if they could add any further strategies. Participants’ responses to this question were recorded verbatim.

Procedure

Participants were asked the survey question during a semi-structured interview, which was administered up to 48 hours prior to discharge. The interviewer was an experienced aged care physiotherapist who was blinded to the participants’ group allocation in the prior RCT. Participants could have their carer or support person present during the interview. The interviewer encouraged an open-ended discussion and modified their communication style as needed for participants with cognitive impairment. Modifications included creating a safe environment, putting the participant at ease, and using interview techniques of simplifying the structure of the question, repeating as necessary and allowing ample time for the participant's response (Beuscher & Grando, 2009).
Analysis

Survey verbatim responses were coded using qualitative description (Neergaard, Olesen, Andersen, & Sondergaard, 2009; Sandelowski, 2000). This method employs qualitative content analysis using modifiable coding systems that correspond to the data collected, with limited quantitative summary of data with descriptive statistics. In this study, qualitative description of participants’ responses was combined with quantitative summary using number and percentages to present the data. The principal investigator (AMH) separated verbatim responses with multiple themes into individual response items. These response items were initially coded by using the direct wording of the response to group similar emerging themes into categories (Corbin & Strauss, 2008). Categories were labeled according to how the responses conceptualized preventing falls. A second investigator (DO) reviewed and refined the initial categories, which were then reviewed by two other investigators (TH, CB) before final labeling. The data were then re-examined and responses broken down into smaller concepts which were used to review the main category labels and to integrate the concepts into categories. Finally data were re-examined by three investigators to evaluate whether the final categories and concepts adequately described all participants’ responses. Any disagreements were arbitrated by a fourth investigator (THa).

All individual strategies that were suggested by participants were compared to the best available evidence for falls prevention strategies that are recommended for older community dwelling people based on a recent meta-analysis that evaluated interventions for falls prevention in the community (Gillespie et al., 2009). Effective strategies for reducing rates and risk of falls identified in this meta-analysis were multiple-component group exercise, Tai Chi programs and individually prescribed multiple-component home-based exercise,
assessment and multifactorial intervention (individual assessment with individualized intervention, usually involving a multi-disciplinary team), vitamin D (for people with lower vitamin D levels), home safety interventions for people with severe visual impairment and in others at higher risk of falling, an anti-slip shoe device in icy conditions, gradual withdrawal of psychotropic medications, first eye cataract surgery and cardiac pacing for people with carotid sinus hypersensitivity.

Direct comparison was not considered feasible as participants were asked for open responses rather than administered a structured survey based on a framework pertaining to the research evidence. Therefore responses were considered by an expert panel (AMH, THa, TH, DO, CB, KH) and consensus achieved to rate the suggested strategy as conceptually supported by the available research evidence or not conceptually supported by available research evidence.

Data for the whole cohort were first analyzed, then sub group analyses were performed to identify any differences in responses between participants who were part of the control group and those who had received an intervention in the hospital-based RCT, and between participants who had impaired cognitive function and those who had intact cognitive function based on discharge measurement.

Ethics

This study formed part of the larger trial which was approved by The University of Queensland ethics committee and local hospital committee. The trial was registered with the Australian New Zealand Clinical Trials Registry: ACTRN12608000015347.
Results

There were 350 participants enrolled in the RCT at the participating hospital for this study. One patient withdrew and 6 patients died during hospital admission leaving 343 patients in the follow up cohort. Ten participants were unable to be interviewed because of earlier than anticipated discharge from hospital. Therefore the research assistants interviewed 333 (97.1%) of the participants at discharge to administer the survey. There were 87 (26.1%) participants who were classified as having impaired cognition at discharge, based on obtaining a score of less than eight out of ten on the Short Portable Mental Status Questionnaire (Pfeiffer, 1975). Demographic characteristics of the participants are presented in Table 1.

Participants identified a total of 629 strategies that they thought would reduce their falls risk in the post discharge period. A single strategy was suggested by 118 (35.4%) participants, 138 (40.8%) participants suggested two strategies and 74 participants (21.1%) suggested three or more strategies. Three participants were unable to suggest any strategies for reducing their risk of falls.

The categories and concepts that were identified from the qualitative data are presented in Figure 1. The seven categories were:

i) Behavioral; participants suggested that behavioral strategies could reduce their risk of falls. Behavioral concepts suggested included taking care (“...being careful...”) seeking assistance (“...get help...”) and having a risk reduction attitude to activity (“...don’t take risks...”).
ii) Support while mobilizing; participants suggested using supportive equipment or items to remain upright and hence avoid falling. Concepts suggested included using a walking aid ("...use your walking aid all the time...") and using rails ("...use rails...").

iii) Approach to movement; participants suggested moving in a particular manner thus enabling participation in activities without falling. Movement concepts included general movement concepts ("...go slowly...") and specific movement concepts ("...don’t turn quickly...").

iv) Physical environment; participants suggested modification of their physical home environment thereby facilitating reduced risk of falls. Physical environment concepts included indoor ("...clear away clutter...") and outdoor concepts ("...keep garden free from obstacles...") and general concepts ("...look out for dog...").

v) Visual; participants suggested using vision to alert themselves to their immediate environment to avoid falling. Visual concepts included "look where I am going" and "...watch for different surfaces."

vi) Medical; participants suggested strategies that could influence their medical condition such that it increased their stability or well being, hence reducing their risk of falling. Medical concepts included managing dizziness ("...check that I don’t feel dizzy...") and medication concepts ("...be aware of effect of medications on balance...").

vii) Activity and exercise; participants suggested engaging in activity or exercises that could improve their physical capacity and hence reduce their risk of falling. Activity and exercise
concepts included general activity (“...be active...” and “...go for walks...”) and doing exercises (“...do strength and balance exercises...”).

When the 629 individual suggested strategies were evaluated to determine if they were conceptually supported by the evidence based interventions that were recommended by a meta-analysis of falls prevention trials (Gillespie et al., 2009) there were 21(3.2%) suggested strategies that appeared conceptually supported by the research evidence; performing strength and balance exercises, other activities such as attending a gym class or continuing bowling, attending a falls clinic, being aware of the effect of medications on balance and some medical strategies such as those for avoiding dizziness related falls. The remaining suggested strategies such as being careful, moving slowly or avoiding hazards did not appear to be conceptually supported by research evidence.

Sub group analysis results identified that participants from groups 1 and 2 [n=236, (70.9%)] who had received an education intervention in addition to usual care as part of the larger RCT suggested 445 (70.8%) strategies. Participants from group 3 [n=97, (29.1%)] who received usual care alone suggested 184 (29.2%) strategies. A single strategy was suggested by 33.9% of participants in groups 1 and 2 compared to 39.2% of participants in group 3, two strategies were identified by 43.2% of groups 1 and 2 compared to 35.1% of group 3 and three or more strategies were identified by 21.2% of groups 1 and 2 compared to 24.7% of group 3.

Subgroup analysis between participants with impaired cognition and those with intact cognition also showed relatively consistent proportions of responses between the two groups in each major category. Response proportions for participants with cognitive impairment are presented in Figure 1.
Discussion

This study is the first to explore the knowledge of older patients who were at point of discharge regarding falls prevention strategies. Even though older people have been shown to be at risk of falls in the post discharge period (Mahoney et al., 2000; Wolinsky et al., 2009), participants’ responses indicated a poor level of knowledge when their suggested strategies were compared with research evidence for falls. Exercise was the only recommendation in the recent meta-analysis of interventions for falls prevention (Gillespie et al., 2009) that was suggested as a potential strategy by participants. Although some of the strategies suggested by participants, such as using a walking aid, appeared sensible, less than 4% of the strategies suggested by participants were clearly supported by research evidence and less than 3% of participants suggested that exercises would be a suitable strategy for reducing falls risk in spite of the recent large meta-analysis reporting that exercise reduces the risk of falls (Gillespie et al., 2009).

Over half the participants had fallen in the 6 months prior to hospital admission but 35% of participants could only suggest one strategy for preventing falls after discharge, even when encouraged and given time to think of further strategies. Research from community settings supports the concept of falls as mainly occurring due to interacting multiple risk factors that may be reduced with multiple types of single and combined interventions, (Gillespie et al., 2009) yet in this study, less than one quarter of participants (21.1%) suggested three or more strategies to prevent falls. The single preventive strategies suggested by participants may indicate that the older person and their caregivers are not prepared to assume primary responsibility for participation in falls prevention activities after discharge as participants had not developed knowledge that falls risk can be reduced with sustained multi-factorial
strategies. This gap has also been reported in hospital studies that evaluated patients’ understanding of the falls prevention education they received in hospital, where older people surveyed reported that falls prevention education was inadequate and confusing (Carroll, Dykes, & Hurley, 2010; Tzeng & Yin, 2009). Additionally it has been reported in community studies that older people often do not accept the falls messages that have been delivered in community and public health programs during the past decade (Bunn et al., 2008; McInnes & Askie, 2004; Yardley et al., 2006) in part because of their perception that falls are associated with aging and subsequent negative social stereotyping (Ballinger & Payne, 2002; Evron et al., 2009).

Many of the strategies suggested by participants indicated that they viewed falls as an accidental event to be avoided, with suggested strategies including use of aids and single home hazard reduction. Participants’ intentions to remove one or more hazards round the home may have had a positive effect in reducing falls, although studies have identified that this type of intervention should include a comprehensive individual assessment of the patient within their environment (Clemson, Mackenzie, Ballinger, Close, & Cumming, 2008; Gillespie et al., 2009). Participants’ responses suggest that this population hold similar views to older people in the community, with previous qualitative studies reporting that older community dwelling people suggest hazard reduction and use of aids as preventive strategies (Evron et al., 2009; Yardley et al., 2006). Participants also suggested avoiding risk and being careful suggesting they saw falls as consequential to their activities rather than being caused by risk factors reported in research studies - this disparity between older peoples’ understanding of falls and the biomedical view of falls understood by health workers has been highlighted in other studies (Ballinger & Payne, 2002; Zecevic et al., 2006). A consequence of this disparity between health professionals’ knowledge and patients’
knowledge is that health professionals may provide advice at discharge, such as advice to perform exercises that is not perceived by older people as being acceptable or relevant to their situation (Evron et al., 2009; Yardley et al., 2006).

The HBM when applied to falls prevention suggests that if older people have limited knowledge of suitable falls prevention strategies at point of discharge from hospital it may be that these people are unable to integrate their perceptions and beliefs with relevant knowledge to accurately or comprehensively weigh the costs and benefits of initiating and maintaining falls prevention behavior (Rosenstock et al., 1988). The HBM theorizes that patients need this knowledge as well as the knowledge about cues to actions to develop motivation and self-efficacy in order to subsequently initiate health behaviors (Janz & Becker, 1984). Participants’ poor levels of knowledge when viewed from a health systems perspective suggests that the transfer of responsibility for the patient’s health and well-being regarding falls prevention from hospital staff to the patient was not successful. This may form a barrier to the translation of evidence into clinical practice in the area of falls prevention after discharge (Glasziou & Haynes, 2005).

Participants also suggested falls prevention strategies that involved slowing down or restricting activities (such as “go slower...” and “...avoid activity...”). These findings are congruent with the strategies reported in smaller, community based qualitative investigations (Porter, Matsuda, & Lindbloom, 2010; Yardley et al., 2006). This conceptualization of falls prevention may result in older people at discharge perceiving falls prevention strategies as a threat to independence and autonomy (Ballinger & Payne, 2002; Evron et al., 2009; Yardley et al., 2006). Additionally since both hospitalisation and low levels of exercise are risk factors for functional decline in older people after discharge (Sager et al., 1996; Wang, van
Belle, Kukull, & Larson, 2002) then implementing strategies that rely on restricting activity may further increase the risk of disability and falls amongst this type of population (Gill, Allore, Holford, & Guo, 2004).

Participants who received a novel education intervention in hospital as part of the RCT provided similar responses to those in the control group, however the education intervention delivered to participants in the RCT was specifically targeted and tailored for the individual older patient in the hospital setting (Haines et al., 2010). The education provided instruction in hospital-specific strategies and emphasized the positive nature of falls prevention activities (Yardley et al., 2007) and subsequently showed a positive effect in reducing falls and falls injuries in cognitively intact patients (Haines et al., 2010). The intervention was not targeted or tailored for participants as they transferred to the post discharge setting. Previous investigations have reported that older community dwelling people have a low self-perceived risk of falls (Evron et al., 2009; Hughes et al., 2008; Yardley et al., 2006) and participants in this study had only received education to raise their awareness of the risk of falls in the hospital setting. Researchers in the area of patient education have found that both targeted and tailored approaches to education can be more effective in producing desired health behavior change for the population of interest than a generic approach (Brawley, Rejeski, & King, 2003; Greaney et al., 2008; Kreuter & Wray, 2003; Yap & Davis, 2008). Further education during the follow up period could be effective in reducing falls if it was targeted and tailored for the home setting following discharge (Mistiaen et al., 2007; Parker et al., 2002; Yardley et al., 2007).

The investigators considered the inclusion of people with cognitive impairment important in increasing the generalizability of the study’s results, given the prevalence of cognitive
impairment in the wider older population (Australian Institute of Health and Welfare, 2006) and the value of understanding the experience of older people with cognitive impairment by obtaining data from their own perspective (Moore & Hollett, 2003). Approximately 26% of participants had impairment in cognitive ability as indicated by cognitive measurement at discharge. This may have limited their capacity to conceptualize and explain relevant strategies although their responses appeared consistent with the cognitively intact group across all categories. However, these participants did not benefit from the education that was provided as part of the inpatient RCT (Haines et al., 2010). Patients with cognitive impairment may require more support from their carers or support persons to recognize cues to action and to develop self efficacy to engage in their suggested strategies after discharge (Janz & Becker, 1984). Further studies should investigate whether these support persons may also require falls prevention education about strategies that can be used during the post discharge period.

Limitations

There are limitations to extrapolation of findings from this investigation. Participants were recruited from one hospital, limiting generalization of the results to other older populations. We categorised participants’ responses according to the level of published evidence. Many apparently sensible interventions to prevent falls such as watching out for hazards do not currently have a clear evidence base due to a lack of research into these seemingly commonsense strategies, however there is also a lack of evidence to suggest that they are ineffective. Individualized falls risk assessments followed by individualized interventions has been shown to be an effective strategy to reduce falls in the meta-analysis we used (Gillespie et al., 2009) to compare participants suggested strategies with the research
evidence. Therefore some individual strategies suggested by participants may have been appropriate to reduce their falls risk, although only concepts relating to physical environment, support while mobilizing and medication review fit these criteria.

In conclusion, older people admitted to hospital with a wide range of diagnoses have low levels of knowledge about appropriate falls prevention strategies that could be used after discharge from hospital in spite of their increased falls risk during this period.

Recommendations

There is an urgent need for future research that develops and evaluates education that provides older people with the knowledge they require to reduce falls risk but regain function and independence during the post discharge period. Health workers who provide older people with this education may need training to design and deliver effective education programs and older people themselves should be consulted as active partners in this process.
Acknowledgments

THa and AMH were principally responsible for study conception and design. AMH was responsible for project organization and data collection. AMH and THa were principally responsible for data analysis and drafting of the manuscript. THo, CB, SM, KH, DO, SB contributed to study conception, data analysis and critical appraisal of the manuscript.

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References


Glasziou, P., & Haynes, B. (2005). The paths from research to improved health outcomes. Evidence Based Nursing, 8, 36-38. doi:10.1136/ebm.10.1.4-a


doi:10.2105/AJPH.2007.115055


doi: 10.1177/0894318403251793251793


Table 1. Participants’ characteristics at point of discharge from hospital

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Participants (n=333)</th>
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<tbody>
<tr>
<td>Age (yrs), mean±SD</td>
<td>79.2 ±8.4</td>
</tr>
<tr>
<td>Female, n (%)</td>
<td>205 (61.6)</td>
</tr>
<tr>
<td>Discharge destination, n (%)</td>
<td></td>
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<tr>
<td>Community alone</td>
<td>111 (33.3)</td>
</tr>
<tr>
<td>Community with partner</td>
<td>129 (38.8)</td>
</tr>
<tr>
<td>Community with other</td>
<td>40 (12.0)</td>
</tr>
<tr>
<td>Residential hostel</td>
<td>29 (8.7)</td>
</tr>
<tr>
<td>Residential nursing home</td>
<td>24 (7.2)</td>
</tr>
<tr>
<td>Mobility, n (%)</td>
<td></td>
</tr>
<tr>
<td>Uses no aid</td>
<td>127 (38.1)</td>
</tr>
<tr>
<td>Uses walking aid</td>
<td>177 (53.2)</td>
</tr>
<tr>
<td>Uses wheelchair to mobilize</td>
<td>7 (2.1)</td>
</tr>
<tr>
<td>Unable to mobilize without assistance</td>
<td>22 (6.6)</td>
</tr>
<tr>
<td>Mood</td>
<td></td>
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<tr>
<td><strong>GDS, a mean±SD</strong></td>
<td>4.3 ± 2.8</td>
</tr>
<tr>
<td><strong>GDS ≤ 4 n (%)</strong></td>
<td>199 (60.3)</td>
</tr>
<tr>
<td><strong>GDS &gt; 4 n (%)</strong></td>
<td>131 (39.7)</td>
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**Cognition**

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<table>
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<tr>
<td><strong>SPMSQ, b mean±SD</strong></td>
<td>8.4 ±2.0</td>
</tr>
<tr>
<td><strong>SPMSQ ≥ 8 n (%)</strong></td>
<td>246 (73.9)</td>
</tr>
<tr>
<td><strong>SPMSQ &lt; 8 n (%)</strong></td>
<td>87 (26.1)</td>
</tr>
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**Health related quality of life**

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<tr>
<td><strong>EQ-5D VAS, c mean ± SD</strong></td>
<td>68.1 ± 16.3</td>
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**Diagnosis, n (%)**

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<tbody>
<tr>
<td><strong>Stroke</strong></td>
<td>33 (9.9)</td>
</tr>
<tr>
<td><strong>Other neurological</strong></td>
<td>18 (5.4)</td>
</tr>
<tr>
<td><strong>Orthopedic</strong></td>
<td>49 (14.7)</td>
</tr>
<tr>
<td><strong>Cardiac</strong></td>
<td>24 (7.2)</td>
</tr>
<tr>
<td><strong>Pulmonary</strong></td>
<td>68 (20.4)</td>
</tr>
<tr>
<td><strong>Other geriatric management</strong></td>
<td>71 (21.3)</td>
</tr>
</tbody>
</table>
Other surgery | 21 (6.3)
---|---
Other medical condition | 34 (10.2)
Other (including arthritis, major trauma) | 15 (4.5)

Highest education level attained

<table>
<thead>
<tr>
<th>Level</th>
<th>Count (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>102 (30.8)</td>
</tr>
<tr>
<td>Grade 10</td>
<td>138 (41.7)</td>
</tr>
<tr>
<td>Grade 12</td>
<td>28 (8.5)</td>
</tr>
<tr>
<td>Technical college</td>
<td>47 (14.2)</td>
</tr>
<tr>
<td>University</td>
<td>16 (4.8)</td>
</tr>
</tbody>
</table>

missing 2

Fall during 6 months prior to admission, n (%) | 190 (57.1)

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*a* Geriatric Depression Scale, range 1-15, score greater than 4 indicates presence of depressive symptoms

*b* Short Portable Mental Status Questionnaire, range 1-10, greater
score indicates better cognitive function

c European Quality of Life visual analogue scale, range 0-100,

higher indicates better self perceived health related quality of life
Figure 1. Participants’ suggested strategies to reduce falls after discharge

- **Behavioral**
  - Concentrate on what I am doing...
  - Be more careful...
  - Seek assistance...
  - Wear good shoes...
  - Use aid correctly...

- **Support while mobilizing**
  - Use walking aid...
  - Use other aids...

- **Approach to movement**
  - General
  - Turning
  - Standing
  - Walking

- **Physical environment**
  - Manage hazards inside home
  - Manage hazards outside the home

- **Visual**
  - Visual cues

- **Medical**
  - Avoid/manage dizziness
  - Medication/medication

- **Activity and exercise**
  - Activity
  - Strength/balance exercise