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Evaluation of older people's knowledge, awareness, motivation and perceptions about falls and falls prevention in residential aged care homes: A tale of two cities

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Evaluation of older people's knowledge, awareness, motivation and perceptions about falls and falls prevention in residential aged care homes: A tale of two cities

Abstract

Falls prevention strategies can only be effective in reducing falls amongst older people if they are adopted and enacted in their daily lives. There is limited evidence identifying what older people in residential aged care homes (RAC) understand about falls and falls prevention or what may limit or enable their adoption of strategies. This study was conducted in two countries and explored older people's knowledge and awareness of falls and their preferences, opportunities and motivation to undertake falls prevention strategies.

A cross sectional survey was administered to participants (n=70) aged 65yrs and over, living in six RAC homes in Perth, Australia and six RAC homes in Swansea, Wales. Participants had limited knowledge about intrinsic falls risk factors and strategies to address these and frequently expressed self-blame regarding falling. Almost all [n=67, (95.7%)] participants felt highly motivated to maintain their current functional mobility and independence in everyday tasks. Key preferences for receiving falls prevention messages favoured a positive approach promoting wellness and independence [n=41 (58.6%)] via pictorial posters or brochures [n=37 (52.9%)] and small group discussions preferably with demonstrations [n=18 (25.7%)].

Findings from this study may assist organisations and staff to more effectively engage with older people living in RAC about falls prevention and design targeted resources to address the motivations and preferences of this population.

Keywords

Accidental falls, Frail elderly, Residential Aged Care, Patient education, Research

Introduction

Older people living in residential aged care (RAC) homes, “residents”, face a 50% chance of falling annually (Barker *et al.* 2009, Burland *et al.* 2013, Nyman and Victor 2011). The experience of falling can result in a devastating loss of independence from trauma such as hip fracture (Rapp *et al.* 2008, Rigler *et al.* 2011, Vlaeyen *et al.* 2015), with associated feelings of frustration, self-blame, vulnerability and depression (Ramsey *et al.* 2015). Consequently this physiological and psychological trauma may severely compromise a resident’s quality of life (Oliver *et al.* 2007, Oliver and Masud 2004, Rubenstein 2006). Therefore reducing falls through a range of multi-factorial falls prevention strategies is a common goal in RAC homes and provider organisations.

There is limited evidence in the RAC population regarding which falls prevention strategies are effective, but supplementation with vitamin D has been shown to reduce falls rates by 37%, 95% CI [0.46-0.86] (Cameron *et al.* 2012) and multifactorial interventions decreased falls by 33%, 95% CI [0.55-0.82] (Vlaeyen *et al.* 2015). Despite this, falls rates remain high (Cameron *et al.* 2012, Nitz *et al.* 2012, Oliver *et al.* 2007). Guidelines for falls prevention that influence clinical practice in both Australia and the UK suggest a multifactorial approach delivered by multidisciplinary staff. Recommendations include; an individual comprehensive falls risk assessment informing tailored falls and falls injury prevention interventions, review of medical

conditions and medications, environmental modifications, staff training in falls prevention and education for residents and their families (Australian Commission on Safety and Quality in Healthcare 2009, National Institute for Health and Care Excellence 2013). Multifactorial approaches may target interventions at resident, RAC home and RAC organisation levels (Cameron *et al.* 2012, Francis-Coad *et al.* 2017, Quigley *et al.* 2010) therefore resident input and engagement is imperative. A lack of resident consultation and engagement may contribute to the problem of low uptake and enactment of falls prevention strategies where initiation or action by residents themselves (such as using their prescribed walking aid) is required (Hill *et al.* 2015, Hill *et al.* 2016). This may also extend to intervention adherence in the longer term (Nyman and Victor 2011).

Findings from studies of community dwelling older people (living in their own homes) and hospitalised older people have reported perceived barriers and facilitators to the uptake of falls prevention strategies (Bunn *et al.* 2008, Dickinson *et al.* 2011, Haines *et al.* 2015, Hill *et al.* 2016). Barriers included fatalism, denial and under estimation of the risk of falling, poor health and function, low health expectations and self-efficacy, no history of previous exercise and fear of falling. The stigma of association with a program targeting older people (Bunn *et al.* 2008) and its perceived threat to personal identity were also reported as reasons for not participating (Ballinger and Clemson 2006). Several studies also noted that older people preferred messages for encouraging participation that focussed on promoting health and independence, rather than the negative consequences of falling (Dickinson *et al.* 2011, Hughes *et al.* 2008, Stevens, Noonan and Rubenstein 2010). Facilitators for participation in falls prevention strategies were providing social support, low intensity

exercise, greater education, involving the older person in decision making and the older person perceiving the program was relevant and beneficial in improving quality of life (Bunn *et al.* 2008, Hill *et al.* 2016). Providing flexible falls prevention intervention programs that met the needs of a diverse older population have been suggested (Dorresteijn *et al.* 2012, McInnes and Askie 2004) but the specifics of these programs are yet to be determined.

Addressing these recommendations to facilitate engagement and participation in falls prevention strategies also requires older people to change their health-related behaviour. Health behaviour change models indicate that for a new behaviour to occur the person must be physiologically and psychologically capable of performing the behaviour, they must be provided with the social or environmental opportunity to perform the behaviour and they need to be motivated to perform the behaviour (Michie, van Stralen and West 2011). Previous studies have also suggested that consulting with older people prior to designing falls prevention interventions may assist in providing behavioural change approaches that are more acceptable to older people (Albert 2009, Bulsara *et al.* 2016, Hill *et al.* 2016).

The research on older peoples' perceptions of falls and their prevention has predominantly been conducted in community dwelling and hospital populations. Current evidence suggests that responses to falls prevention interventions are not likely to be the same across different populations of older people (Cameron *et al.* 2012, Gillespie *et al.* 2012). This may be due to variations in their capabilities, opportunities and motivations to engage with falls prevention strategies (Albert 2009, Dorresteijn *et al.* 2012, Hill *et al.* 2016). However, there is limited evidence identifying what older people who live in RAC homes think and understand about

falls and falls prevention and what may limit or enable their adoption of falls prevention strategies. Health care systems in different countries may also influence the opportunities available for residents to have knowledge of, and engage in falls prevention strategies. In the context of RAC homes education for residents is usually provided by professional allied health staff such as nurses and physiotherapists. Differences exist between the professional workforces in RAC homes in Australia and Wales, for example physiotherapists who play a significant role in falls prevention and are not employed in Welsh RAC homes (Australian Institute of Health and Welfare 2012, Rochira 2014). It is unknown whether this limits what information residents receive or the opportunity for residents to engage in falls prevention strategies. Understanding differences across countries, as well as populations, could lead to a more tailored approach to falls prevention in RAC homes.

The aim of this study was to explore resident's levels of knowledge and awareness of falls risks, knowledge about falls prevention, opportunities, motivation and confidence to adopt falls prevention strategies in RAC homes in Australia and Wales, UK.

Methods

Design

A mixed methods cross-sectional survey design (Creswell and Plano Clark 2007) using a customised questionnaire (Hill *et al.* 2011, Michie, Atkins and West 2014).

Questionnaire development

The 21-item questionnaire contained both open and closed-ended responses and is available on request. A 5-point Likert scale was used to measure subjective variables such as attitudes, beliefs about falls and falls prevention in RAC homes and confidence and motivation to adopt falls prevention strategies through extent of agreement to the responses generated (Hartley 2014). The questionnaire was developed using the domains of health behaviour change (Michie, Atkins and West 2014) and was also adapted from a validated questionnaire that measured knowledge and awareness about falls and falls prevention amongst a population of older people in geriatric rehabilitation wards of public hospitals (Hill *et al.* 2011). The questionnaire was piloted with five residents at a single RAC home in Australia. Feedback from the pilot led to modification of questions 5, 6, 8, 9 and 13 this included additional prompts, simpler wording and uniform terminology to improve clarity and understanding.

Participants and setting

A convenience sample was drawn from the population of older people meeting the eligibility criteria who lived at the six participating RAC homes in Australia and six in Wales. Eligibility criteria were that residents were over 65 years of age, had been residing at the facility for a minimum of three months, their English language skills were sufficient to respond to survey questions and they were cognitively able (eligible if Mini Mental State Exam >22/30 (Folstein, Folstein and McHugh 1975) or Abbreviated Mental Test Score >7/10 (Hodkinson 1972) to give informed consent. Care home staff and researchers conducted an initial resident screening for potential

participants based on the eligibility criteria. Residents meeting the eligibility criteria were then invited to participate in the study. All RAC homes were led by a Care manager and provided 24-hour care delivered predominantly by personal care assistants in a home-like environment. In Australia the six RAC homes ranged in size from 20-110 beds with a total capacity of 333 beds. These RAC homes provided the opportunity for residents to 'age in place' through the provision of a continuum of care delivery addressing low to high dependency needs. In Wales the six RAC homes ranged in size from 10-76 beds with a total capacity of 227 beds. These RAC homes provided care for residents with lower levels of dependency, however staff reported they were caring for increasing numbers of residents with higher levels of dependency due to both physical disability and cognitive impairment. RAC homes in Australia differed from those in Wales in that they employed professional nurses for regular day shifts seven days per week, and physiotherapists and occupational therapists most frequently on a part-time basis only (Australian Institute of Health and Welfare 2012). Where as RAC homes in Wales were supported by external district (community) nursing services on a needs only basis, with allied health consultations requiring complicated referral processes to external agencies (Cook *et al.* 2017, Rochira 2014).

Procedure

The survey was conducted in Australia (May 2015) and Wales (October 2016). All residents meeting the inclusion criteria were provided with information regarding the study and those who agreed to participate provided written consent. A trained research assistant (research assistants in both countries were trained by the first researcher, JFC) visited the RAC home on a negotiated day and time. Demographic

data including falls history was extracted from the resident's file prior to administration of the questionnaire. The research assistant met face to face with the resident in a private room to administer the questionnaire, each question was read (and repeated if necessary) and responses recorded verbatim on the data collection sheet. All participants were offered a copy of the questions in large 20-point font. A colour contrasted laminated sheet of Likert responses was also provided to residents for reference. After the survey was completed the researcher read back the responses to the resident for confirmation. These procedures were designed to compensate for age related changes in both vision and hearing (Bottomley and Lewis 2003) and to provide member checking, ensuring residents were truly represented (Creswell and Plano Clark 2007, Thomas and Magilvy 2011). The questionnaire administration took approximately 30 minutes per resident. All questionnaires were de-identified, placed in a sealed envelope by the research assistant and delivered to the university researcher for analysis.

Data Analysis

Quantitative responses collected from the survey describing residents' levels of knowledge and awareness of falls risks, and their confidence, motivation and perceived opportunities to adopt falls prevention strategies were entered into the statistical package SPSS version 22 (IBM SPSS Inc., Chicago IL, USA) and summarised using descriptive statistics. Parametric data (demographics) were described as means, frequencies and percentages and non parametric as medians and interquartile ranges. Differences between Australian and Welsh residents' levels of knowledge and awareness of falls risks, and their confidence, motivation and

perceived opportunities to adopt falls prevention strategies were examined using the non-parametric Mann-Whitney U test (Portney and Watkins 1993).

Qualitative open responses from the survey items were transcribed and scrutinised iteratively by the primary researcher (JFC) and second researcher (AMH). A third researcher (CEB) was available to arbitrate any disagreement and facilitate consensus.

Deductive content analysis was utilised (Elo and Kyngäs 2008) as previous knowledge around the research topic of older people's falls related health behaviours and recommended falls prevention strategies existed (Bunn *et al.* 2008, Cameron *et al.* 2012, Haines *et al.* 2015, Hill *et al.* 2016), but the theory was being tested in a different (RAC) population. A category matrix was constructed around the behaviour change framework (Michie, van Stralen and West 2011) of a resident's knowledge and awareness (capability) of falls and falls prevention, opportunity and motivation to engage in falls prevention strategies together with the recommended falls prevention strategies reported in literature and guidelines from Australia and the UK (Australian Commission on Safety and Quality in Healthcare 2009, Cameron *et al.* 2012, National Institute for Health and Care Excellence 2013). This category matrix was used to code residents' responses from the open survey items (Elo and Kyngäs 2008). Verbatim quotations were included to represent the voices of the residents, establishing confirmability. Creation of an audit trail, through detailed methodological process, demonstrated dependability (Polit and Beck 2013, Thomas and Magilvy 2011). Responses to questions seeking further categorical information, such as other preferences for engaging in falls prevention strategies, were subjected to quantitative content analysis. Data were extracted on the number and frequency of categories identified within each document (Neuendorf 2016). Quantitative survey results are presented in reports using tables and qualitative results in narrative.

Results

Demographics

Eighty four older people residing in six care homes in Australia and six in Wales (approximately 15% of the total population) met the eligibility criteria and 70 volunteered to participate (response rate of 83.3%). Participants were predominantly female [n=50 (71.4%)] and their ages ranged from 68-99 years of age [mean 85.5 (SD 8.2)]. The mean length of stay was 32.2 (SD 31.8) months (2.5 years). Sixty (85.7%) of the participants were ambulant and 55 (78.6%) of these used a walking aid to mobilise within the RAC setting. The predominant type of aid residents' used was a walking frame, however in Australia residents most often used the four wheeled variety with a seat [n=23 (57.5%)] and in Wales more than half the residents used frames with two wheels [n=17 (56.7%)]. Forty three (61.4%) residents had fallen since admission with most falls occurring in the residents' bedrooms [n=23 (32.9%)] and bathroom/toilet [n=18 (25.7%)]. Among those residents who had fallen, 19 (27.1%) had sustained a single fall and 24 (34.3%) multiple falls.

<Table 1 at end of document>

Residents' capability (knowledge and awareness) regarding falls and falls prevention

There were no significant differences between Australian and Welsh residents' levels of knowledge and awareness of falls risks, perceived opportunities, confidence and motivation to adopt falls prevention strategies (10 Items, Table 2).

<Table 2 at end of document>

Forty seven (67.2%) residents agreed or strongly agreed that older people who live in RAC homes were at risk of falling over and 55 (78.5%) thought that the older people who fell were likely to sustain a serious injury such as a sprain or fracture (Table 3). When asked about their perception regarding their personal falls and injury risk while living in the RAC home, less than half 48.6% (34) the residents strongly agreed or agreed that they would fall over and only a quarter [n=18 (25.7%)] of the residents thought they would be likely to sustain a serious injury if they fell.

<Table 3 at end of document>

When asked why they thought older people fell over, residents commonly thought it was because of their behaviour [n=24, (34.3%)], often blaming themselves for the outcome. Residents reasoned that not paying full attention to what they were doing caused them to fall, an 89 year old Australian female resident reflected ‘sometimes we (residents) are not careful enough perhaps, walking too quickly or turning around too sharply...you go to move but find your feet haven’t (moved with you)!’ Overestimating their ability in performing the task at hand was suggested by some residents as a reason for falls, one 91 year old Welsh male resident reasoned that ‘each person has it in them that they want to do better, so they go beyond their limits’, another 74 year old female Australian resident reflected ‘they (residents) attempt to do things without help...we all think we are 21!’ A 93 year old female resident from

Australia linked personality as a contributor to falls, 'it's my personality I think, sometimes I'm a bit impulsive!'

Many residents in both countries described a series of extrinsic risk factors as causative of falls. Residents most frequently perceived that not using a prescribed walking aid to mobilise was highly likely to cause someone to fall, a 95 year old Welsh male resident stated 'some of them (residents) forget, they try to walk without their frame and sometimes the staff move them (frames) out of the way'. One 68 year old Australian male resident commented on their environment, 'it can be slippery floors, after a shower the water needs wiping up', another 80 year old Welsh female resident reflected on clutter 'if there's obstacles in your way and loose mats, they can be fatal, before I came in here I nailed mine (mats) to the floor!' Wearing inappropriate footwear such as 'slippers that aren't suitable can make you trip over anything' commented an 87 year old female Australian resident. There was less resident awareness regarding intrinsic falls risk factors [n=8, (11.4%)]. One 91 year old female resident from Wales stated that deteriorating vision was linked to falls 'our eyesight is not so good anymore and you need that' another 83 year old Australian female resident referenced weakness in the legs and poor balance 'your legs get shaky, wobbly; you tend to lose your balance'.

Residents thought that lowering their risk of having a fall and keeping safe was achievable through predominantly addressing extrinsic risk factors. Using a walking aid at all times was the most common response, one 80 year old Australian male resident emphatically stated 'the number one thing is don't walk without your frame, always use it' and another 85 year old Welsh female resident reflected 'I use my walker, it's very good for steadying me'. Equipment in the environment such as hand

rails were seen as important, one 91 year old Welsh male resident described his RAC home as ticking this box ‘there’s plenty of rails around the place, people should use them’. Residents highlighted the importance of wearing ‘good shoes’ with an 87 year old Australian female recommending ‘ones that don’t slip off or scuff the ground’ and another 89 year old Australian male resident adding that ‘lace ups are probably best’. Receiving timely assistance from staff as required was also reported as necessary for staying safe. Residents indicated that paying more attention to the environment and being careful were behaviour changes they should aspire to enact. One resident commented ‘you need to be aware of your surroundings, concentration is everything at our age’ (85 year old male, Wales) another resident shared her strategy ‘Use my brain! I stop and think before I move, make sure I know what I’m doing. It’s really up to me not to do anything stupid’ (89 year old female, Australia). In terms of evidence-based multifactorial falls prevention strategies including supplementation with vitamin D and getting medication reviewed regularly (Cameron *et al.* 2012, Vlaeyen *et al.* 2015) there was negligible resident awareness [n=2, (2.9%)].



Barriers to a resident utilising a nominated fall prevention strategy were reported as dependent on staff availability to assist, two female residents from Australia aged 85 and 74 years old respectively commented ‘if I feel unsafe I ask for help, but they are short staffed so they may not be able to help me’ and ‘we should have more staff on duty at certain times...at night time there are only two staff and at meal times lots are feeding people in their own rooms’. An 80 year old female resident from Wales also shared ‘I was given balance exercises by the hospital physio but the staff won’t do them with me. I don’t think they know how and they won’t let me do them myself because you do them on the stairs. I think it would be good if the physio came here to do them with me’. Ten (14.3%) residents suggested that staff should devote more attention to them personally. Three (4.3%) residents perceived low levels of staff knowledge and skills regarding falls prevention was a barrier, commenting that staff should receive more training to help them (residents) prevent falls and a 79 year old Australian female resident went further in saying ‘care staff need more training and education on their job in general...and some have poor English skills which is frustrating’. One 86 year old Welsh female resident reflected that ‘all things were not equal’ when referring to staff, stating ‘some (staff) know more than others you know, but some of them (staff) need to learn more’. Further barriers explicated included being distracted from the task at hand and having poorer memory resulting in them simply forgetting to engage in falls prevention behaviours. A 92 year old Welsh male resident gave examples of being distracted as ‘simply someone talking to you...or even bending over to pat a dog’. Another 80 year old female resident from Australia noted the impact of being forgetful on her safety, ‘my memory for one thing, sometimes even though you are aware how important it is to use it (walking aid) you

forget momentarily'. Sixteen (22.9%) residents stated they couldn't foresee any barriers.

However, when asked if staff or the RAC management could do anything else to help residents stay safe and prevent falls 47 (67.1%) residents perceived there was nothing else staff could do. This perspective was exemplified by two residents, who commented 'I think they (staff) do a lot, I don't know what else they could do to help' (87 year old male, Wales) and 'we're pretty well looked after here, they do a mighty job, I can't think of anything else they could do (to help prevent falls)' (86 year old female, Australia). Residents from both countries who responded that RAC management could assist them in remaining safe suggested improvements to their living environment; such as having non slip tiles, sensor mats and additional hand-rails in outdoor communal areas.

Residents' confidence, motivation and opportunity to engage in falls prevention strategies

Fifty six (85.7%) residents felt confident they could lower their risk of falling by using a self-selected prevention strategy, but this predominantly related to using their walking aid at all times. Almost all residents [n=67 (95.7%)] were highly motivated to maintain both their functional mobility, unassisted or minimally assisted, and their independence with everyday tasks such as washing and dressing. The majority of residents strongly agreed or agreed they were given the opportunities to maintain their functional mobility [n=66 (94.3%)] and independence with everyday tasks [n=67 (97.5%)] whilst residing at their RAC home. Opportunities such as exercise

programmes were offered at RAC homes in both countries with residents describing programme content. A greater variety of exercise programmes targeting physical functioning were offered more frequently in Australian RAC homes. Here residents participated in seated group exercises targeting strength and sitting balance [n=11 (27.5%)], combined group sitting and standing exercises [n=6 (15.0%)], yoga [n=9 (22.5%)] and outdoor walking [n=3 (7.5%)]. In Welsh RAC homes residents reported walking indoors as exercise [n=7 (23.3%)], which was mostly self-initiated incidental physical activity, outdoor walking [n=3 (10.0%)], chair exercises targeting joint range of motion [n=9 (30.0%)] and residents at one home attended a weekly Zumba (aerobic dance) class [n=2 (6.7%)].

Preferences for falls prevention messages

Forty one (58.6%) residents expressed a preference for receiving positive messages regarding falls prevention that focussed on achieving wellness and staying independent and safe (from harm). Residents expressed a need for prompts to engage in falls prevention interventions, with the strongest preference identified as using a pictorial format supported with simple text. Australian residents expressed a preference for a poster for their room [n=11 (27.5%)] whilst Welsh residents preferred a brochure [n=15 (50.0%)]. Both cohorts reported they would like face to face small group discussions, preferably with a demonstration, on the topic of falls prevention [n=18 (25%)]. When asked if residents would like their family members to receive falls prevention information 39 (55.7%) said no, citing they didn't want to trouble them. One 91 year old Welsh female resident commented 'they are too busy with their own family, I doubt they would be interested anyway'. Other residents perceived

family members didn't need to know, with an 86 year old female Australian resident responding 'it wouldn't make a difference... they know all these things (about falls prevention)'.

Discussion

Residents in both Australia and Wales reported similar perceptions and preferences regarding falls and their prevention. Our study found that residents had an alternative preference for the way messages aimed at engaging them in falls prevention strategies were delivered, combined with low levels of knowledge and awareness regarding the intrinsic etiology of falls and how to prevent them. Concepts of health behaviour change theory explain that knowledge and positive social reinforcement are fundamental determinants to behaviour change (Michie, Atkins and West 2014). Therefore these findings indicate it is unlikely that residents' would engage in evidence-based prevention strategies that require staff to assist, such as vitamin D supplementation and medication review (Cameron *et al.* 2012).

Residents perceived that older people in RAC homes were at higher risk of falling and injuring themselves but this was far less likely to apply to them personally. This perception that 'falls happen to others not me' has been reported amongst other populations of older people (Ballinger and Payne 2002, Haines *et al.* 2015, Hill *et al.* 2016) and highlights a deficit in capability. Ballinger and Payne (2002) explored older peoples perception of 'risk' in relation to falls. They suggested older people might perceive risk in a different way, interpreting it as a threat to their personal

identity and self-image. This offers a plausible explanation for why older people may be reluctant to view themselves as being at risk of falling and associating themselves with prevention strategies. Findings from a recent study also suggest that older people have low awareness in identifying when they maybe 'at risk' of falling and require prompting to undertake early intervention (Lette *et al.* 2017). This has been confirmed in studies of hospitalised older people who often try to be independent when they are still in the early stages of functional recovery and don't realise assistance is required in the absence of patient centered education (Hill *et al.* 2015, Hill *et al.* 2016). In our study resident falls occurred mostly in residents' bedrooms or bathrooms, as previously described (Nitz *et al.* 2012, Rapp *et al.* 2012), where residents tended to be alone often attempting to be independent with transfers or ambulation. This verifies the need for educational discussions and other types of learning strategies, such as handouts or family information nights, to be undertaken with residents to assist them in managing their independence safely. Residents also perceived falls to be their fault, attaching personal blame as identified in other populations of older people (Hill *et al.* 2016, Ramsey *et al.* 2015). This demonstrates a lack of resident awareness that falls are a result of staff, resident and environmental factor interaction as identified in other surveys of community dwelling and hospitalised older people (Hill *et al.* 2011, Hill *et al.* 2016, Lee *et al.* 2016), thus evidence-based education is required.

Residents' demonstrated gaps in knowledge of intrinsic risk factors contributing to falls. Similar to other studies we found residents' knowledge on how to prevent falls explicated as taking more care, using a walking aid and minimising environmental hazards (Hill *et al.* 2011, Yardley *et al.* 2006). It has also been reported that amongst older people in general, many may lack awareness that strategies to prevent falls even

exist (Snodgrass, Rivett and Mackenzie 2005). Very few residents were aware of falls research evidence findings such as vitamin D deficiency, muscle weakness, joint stiffness, cognitive impairments, side effects of medications or taking multiple medications (Cameron *et al.* 2012, Francis-Coad *et al.* 2017) contributes to falls. This highlights a gap in the translation of falls research evidence reaching the end-user (Glasziou and Haynes 2005) in RAC settings and demonstrates a need for informed falls prevention education for those residents who are able to engage in some learning interactions. A lack of resident awareness regarding what staff could do to assist them in preventing falls, further supports the need for resident education and may combat feelings of fatalism reported by others (Bunn *et al.* 2008, Hill *et al.* 2016).

Furthermore threats to a resident's current physical or psychological capability such as illness, injury or bereavement may limit their capacity to engage in falls prevention strategies placing them at greater risk of falling. This requires repeated education for residents to request assistance, framed in an enabling manner, and for staff to provide assistance in the short term.

Residents reported feeling confident to undertake a selected falls prevention strategy, which in most cases was using their walking aid at all times. However simply using a walking aid for every day activities is unlikely to provide the level of challenge required to improve a resident's balance to the level necessary to help lower the risk of falls (Sherrington *et al.* 2011). Provision of vitamin D supplementation and complex level interventions are required in this setting (Cameron *et al.* 2012, Quigley *et al.* 2010, Vlaeyen *et al.* 2015). Therefore residents (and their families) need to be provided with this information on a regular basis to avoid falls and the consequential self-blaming that occurs. It was apparent that providing the allied health professional

expertise required to deliver effective exercise therapy for those residents who could undertake such interventions, that are strongly evidence based in RAC homes, is very limited (Cameron *et al.* 2012). This was particularly evident in Welsh RAC homes where allied health professional staff, in particular physiotherapists, were not employed meaning there were fewer opportunities for residents to participate in carefully prescribed exercise programmes targeting physical functioning, such as improving standing balance and strength, to lower their risk of falling (Rochira 2014). Additionally in Australia there were limited nursing staff to discuss vitamin D supplementation and medication review if this was not done by the resident's own doctor. This requires addressing at a health system level. Residents' in both countries reported limited social opportunity to engage in falls prevention strategies as staff were not always available to help and residents did not want to bother their family. This lack of social support such as staff assistance and family approval (Bunn *et al.* 2008, Hill *et al.* 2016, Michie, Atkins and West 2014) might limit residents in engaging in falls prevention behaviours.

We found residents were highly motivated to maintain their independence in both mobility and ADLs, thus successful uptake of falls prevention messages maybe better re-framed around the meaningful goals of independent mobility and ADL function as reported amongst studies of community dwelling older people (Ballinger and Clemson 2006, Bulsara *et al.* 2016).

Preferences for falls prevention education

More than half the residents' perceived falls prevention messages highlighting negative consequences were less appealing suggesting an alternative is required. Residents expressed a preference to receive messages about falls prevention framed positively, emphasising safety and wellbeing similar to studies conducted with community dwelling older people (Bulsara *et al.* 2016, Dickinson *et al.* 2011, Hughes *et al.* 2008, Stevens, Noonan and Rubenstein 2010). The preferences described in this study may assist interdisciplinary staff when designing and presenting falls prevention education for residents that is more appealing, meaningful and relevant. Our findings concur with that of older people in hospital and community settings suggesting falls prevention resources be made available in different formats (Khong *et al.* 2016, Lee *et al.* 2016). This may assist residents to engage with the content as alternative presentation formats address both learning style preferences and sensory impairments. It has also been suggested that older people should be given both written and verbal information educating them on falls prevention to improve adherence and maintain interest (McInnes and Askie 2004).

Strengths and Limitations

A high proportion of older people who live in RAC homes have cognitive impairment, with measured levels averaging 68% (Francis-Coad *et al.* (in press), Onder *et al.* 2012). Of the residents in the RAC homes we surveyed, only around 15% met the eligibility criteria for participation thereby limiting the sample representativeness. However to our knowledge this is one of the first studies reporting the thoughts of older people in RAC homes on falls and their prevention. Our study focused on residents with normal cognition, but even though these findings are only

representative of one section of the RAC population, these views are important for designing tailored approaches to falls prevention in RAC settings. Seeking the views of residents with cognitive impairment and family members of all residents regarding falls and falls prevention would also provide meaningful insights for intervention engagement but this was beyond the scope of the current study. It would also be beneficial to interview care staff to ascertain what falls prevention education and assistance they perceive they are providing to residents. These topics will form the subject of future research.

Recommendations

Findings from this study can be shared between the two countries to inform falls prevention education and resource design. Developing interventions for residents should seek their input and partnership through out the process to facilitate intervention uptake and longer term adherence. Future research should also seek to include care staff together with residents presenting with cognitive impairment and their families in this partnership. Identifying deficits in residents' capability, opportunity and motivation has informed how falls prevention behaviour may be changed (Michie, Atkins and West 2014). We propose that resident informed behavior change techniques underpin the design of falls prevention education to facilitate residents' engagement with tailored falls prevention strategies (Table 4).

<Table 4 at end of document>

Conclusion

Findings from this study may assist RAC organisations and staff to more effectively engage with residents about falls prevention and provide targeted resources to address the needs and preferences of this population. Health professionals should provide residents with clear and current information about evidence for falls and strategies most beneficial for falls prevention so that their knowledge levels can be raised, particularly in reference to awareness and subsequent modification of their personal falls risk factors. Health professionals should also consider re-framing falls prevention messages informed by the goals and motivations of residents and offer delivery in alternative formats. Providing residents with relevant meaningful falls prevention education and resources may assist them, with staff support if required, to adopt and enact falls prevention strategies in their daily lives.

Ethics

Ethical approval from The University of Notre Dame Australia (Reference number 015033F) and College of Human and Health Science/College of Medicine, Swansea University (Reference number 030419) human research ethics committees was granted for this study. Consent to participate was also sought from the residential aged care provider organisations. All participation was voluntarily sought following the presentation of verbal and written information to participants. Written consent to participate was obtained from all who volunteered, with participants being free to withdraw from the study at any time.

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Statement of conflict of interest

The authors declared no conflict of interest in relation to this study.

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Table 1. *Demographic Characteristics*

Characteristic	Australia n=40 (100%)	Wales n=30 (100%)	Combined n=70 (100%)
Gender, Female n (%)	30 (75.0)	20 (66.7)	50 (71.4)
Age (years)			
Mean (SD)	85.3 (SD 7.6)	85.7 (SD 9.0)	85.5 (SD 8.2)
Range	68 - 99	69-99	68-99
Length of stay at RAC (months)			
Mean (SD)	40.8 (SD 36.1)	18.5 (SD 16.0)	32.2 (SD 31.8)
Range	3 - 144	3 - 48	3 - 144
Ambulant n (%)	33 (82.5)	27 (90.0)	60 (85.7)
Uses walking aid n (%)	28 (70.0)	27 (90.0)	55 (78.6)
Walking stick	1 (2.5)	2 (6.7)	3 (4.3)
Crutches / Pick-up frame	2 (5.0)	5 (16.7)	7 (10.0)
3 or 4 Wheeled walker	23 (57.5)	3 (10.0)	26 (37.2)
2 Wheeled walker	2 (5.0)	17 (56.7)	19 (27.1)
Uses wheelchair n (%)	10 (25.0)	6 (20.0)	16 (22.8)
Transfer, independent n (%)	35 (87.5)	29 (96.7)	64 (91.4)
Hoist transfer	5 (12.5)	1 (3.3)	6 (8.5)
Fallers since admission n (%)	28 (70.0)	15 (50.0)	43 (61.4)
Number of falls n (%)			
1 fall	12 (30.0)	7 (23.3)	19 (27.1)
2 falls	6 (15.0)	3 (10.0)	9 (12.9)
3 – 10 falls	10 (25.0)	4 (13.3)	14 (20.0)
More than 10	0 (0)	1 (3.3)	1 (1.4)
Fall location n (%)			
Bedroom	15 (37.5)	8 (26.7)	23 (32.9)
Bathroom / Toilet	13 (32.5)	5 (16.7)	18 (25.7)
Indoors (other) ¹	9 (22.5)	14 (46.7)	23 (33.0) ²
Outdoors	1 (2.5)	1 (3.3)	2 (2.9)

Notes. ¹Falls location: Indoors other includes kitchen, dining room & corridors, falling between rooms, down stairs. ² Missing two respondents for both Australia and Wales.

Table 2. *Comparison of residents' awareness of personal risk, knowledge, confidence and motivation regarding falls*

Item	SA ¹	A	U	D	SD	p value
1. I think that older people who live in care homes like this one are at risk of falling over	7/6 ²	22/12	1/5	7/6	3/1	0.8
2. I think that if an older person who lives here falls over they are likely to get a serious injury	6/6	29/14	3/4	1/4	1/2	0.3
3. I think that I will fall over at some time whilst living here	3/8	15/8	14/4	5/9	3/1	0.5
4. I think that if I were to fall over I would be likely to get a serious injury	5/1	15/9	15/11	4/8	1/1	0.1
9. I am confident I could use my preferred strategy to lower my risk of falling	18/14	20/4	1/2	1/2	0/2	0.8
11. I am very keen to lower my risk of falling whilst living here by using these strategies	19/17	20/10	1/2	0/1	0/0	0.6
12. I am very keen to maintain my mobility (or transfers) without help (or with minimal help) from the staff	22/18	16/11	2/0	0/1	0/0	0.7
13. I am very keen to maintain my independence with everyday	28/16	11/12	0/1	1/1	0/0	0.1

tasks I can manage without help from the staff

14. I have the opportunity to maintain my mobility (or transfers)	13/14	26/13	0/1	1/2	0/0	0.5
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whilst living here

15. I have the opportunity to maintain my independence with	14/13	25/15	1/0	0/2	0/0	0.7
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everyday tasks I can manage whilst living here

Notes. 1. SA Strongly Agree, A Agree, U undecided, D Disagree, SD Strongly Disagree. 2. Australian cohort / Welsh cohort

Table 3. Residents' awareness of personal risk, knowledge, confidence and motivation regarding falls

Items	Awareness of personal risk	SA ¹	A	U	D	SD
1	I think that older people who live in care homes like this one are at risk of falling over					
	Combined ²	13 (18.6)	34 (48.6)	6 (8.6)	13 (18.6)	4 (5.7)
2	I think that if an older person who lives here falls over they are likely to get a serious injury (such as a sprain, broken bone or bumped head).					
	Combined	12 (17.1)	43 (61.4)	7 (10.0)	5 (7.1)	3 (4.3)
3	I think that I will fall over at some time whilst living here					
	Combined	11 (15.7)	23 (32.9)	18 (25.7)	14 (20.0)	4 (5.7)
4	I think that if I were to fall over I would be likely to get a serious injury					
	Combined	6 (8.6)	24 (34.3)	26 (37.1)	12 (17.1)	2 (2.9)
	Confidence					
9	I am confident that I could (insert the most important strategy mentioned eg use my walking aid at all times in question 8) to lower my risk of falling ³					
	Combined	32 (51.4)	24 (34.3)	3 (4.3)	3 (4.3)	2 (2.9)
	Motivation					

11 I am very keen to lower my risk of falling whilst living here by using these strategies (referring to the ‘most effective’ strategy that the participant has just identified)

Combined 36 (51.4) 30 (42.9) 3 (4.3) 1 (1.4) 0

12 I am very keen to maintain my mobility (or transfers) without help (or with minimal help) from the staff

Combined 40 (57.1) 27 (38.6) 2 (2.9) 1 (1.4) 0

13 I am very keen to maintain my independence with everyday tasks I can manage without help from the staff

Combined 44 (62.9) 23 (32.9) 1 (1.4) 2 (2.9) 0

Opportunity

14 I have the opportunity to maintain my mobility (or transfers) whilst living here

Combined 27 (38.6) 39 (55.7) 1 (1.4) 3 (4.3) 0

15 I have the opportunity to maintain my independence with everyday tasks I can manage whilst living here

Combined 27 (38.6) 40 (57.1) 1 (1.4) 2 (2.9) 0

Notes: 1. Likert Scale number (percentage) SA=strongly agree, A=agree, U=undecided, D=disagree, SD=strongly disagree. 2.

Combined refers to Australian and Welsh data 3. Missing data for item 5, n=6.

Table 4. *A proposal for resident falls prevention education design*

Resident informed education preferences	Behaviour Change Technique	Explanation of Behaviour Change Technique
Re-frame messages in positive format highlighting wellness and independence	Framing / Reframing	Suggest the deliberate adoption of a perspective on behaviour in order to change emotions about performing the behaviour
Deliver education in a range of formats: Posters, brochures	Add objects to the environment	Add objects to the environment to facilitate performance of the behaviour
Face to face small group discussions with demonstrations (including intrinsic risk factor awareness and modification)	Provide instruction on how to perform the behaviour / Demonstration of the behaviour	Advise or agree on how to perform the behaviour Provide observable sample of performance of the behaviour, directly or indirectly eg. via pictures
Provide prompts as reminders to undertake falls prevention strategies using pictures and simple text and verbally by staff	Prompts / Cues /Habit formation	Introduce environmental or social stimulus with the purpose of prompting or cueing the behaviour / rehearsal and repetition of the behaviour