

## Research paper

# Application of evidence-based fall-prevention strategies to culturally and linguistically diverse older adult populations in Australia

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### What is known on this subject

- Home exercise programmes, group exercise programmes, home visits and hazard assessments have been identified as being able to reduce falls among older adults.
- Studies of fall prevention are commonly conducted among homogenous samples, where people who do not speak the language spoken by health professionals or researchers are excluded.
- People from culturally and linguistically diverse backgrounds may have difficulties accessing and participating in fall-prevention services. Therefore the utility of these approaches in this population should be questioned.

### What this paper adds

- Changes in participation in functional activities are not detected immediately after completion of a programme about fall prevention for people from culturally and linguistically diverse backgrounds.
- People often employ a simplistic approach to fall prevention and believe that they know how to prevent falls. The fall-prevention programme increased their knowledge and helped them to identify the importance of exercise-based interventions in preventing falls.

## ABSTRACT

People from culturally and linguistically diverse populations will represent an increasing percentage of Australia's older adult demographic in the coming years. There is no information about how older people from these groups perceive the problem of falls or how they will respond to fall-prevention interventions. This study examined perceptions regarding falls, strategies for preventing falls, barriers to participation in fall-prevention strategies, and the response of an exercise- and education-based fall-prevention programme among older adults from culturally and linguistically diverse backgrounds living in Australia.

Older adults from Cambodian-, Croatian-, Turkish- and Arabic-speaking populations living in the south-east suburbs of Melbourne, Australia took part in a 15-week combined exercise and education programme with multidisciplinary input from community health-care providers. Pre- and post-tests were designed to assess past experience of falling, daily routine, self-perceived risk of falling, self-reported awareness of

interventions, strategies believed to be effective for preventing falls and barriers to using these strategies.

The participants initially felt that they knew how to prevent falls, and that strategies such as 'being careful' and 'using mobility supports' were the most effective means of preventing them. Following participation in the intervention programme, they recognised the importance of exercise-based interventions in preventing falls, but there was no immediate change in the rate of falls or participation in activities of daily living. The programme may have changed attitudes towards exercise as an effective means of preventing falls, but further research is required to determine whether the benefits of interventions developed and tested among homogenous populations translate to the diverse patient groups that are increasingly encountered in our communities.

**Keywords:** education, exercise, falls, migrant, multicultural

## Introduction

Falls are a considerable concern among older adults. Australian and overseas studies have identified that approximately one-third of community-dwelling people over the age of 70 years fall every year (Campbell *et al*, 1990; O'Loughlin *et al*, 1993; Tinetti, 2003; Hill *et al*, 2004). These falls can lead to physical injury, psychological harm (including fear of falling), and even death (Day *et al*, 2002; Friedman *et al*, 2002). In Australia it is predicted that, in the next 50 years, there will be a significant increase in the number of people over 65 years of age, and a threefold increase in the total cost of fall-related injury to AU\$ 1375 million per annum (Moller, 2003). Falls among older people are reported to be a similar problem in Turkey and Arabic-speaking countries (Donmez and Gokkoca, 2003; Cihan Atman *et al*, 2007; Adam *et al*, 2008; Keskinoglu *et al*, 2008; Acimis *et al*, 2009) and Asia (Melton, 1993; Chu *et al*, 2005; Kuo and Nitz, 2007; Moon and Mikami, 2009; Chew *et al*, 2010). The relationship between the rate of falls and ethnicity has not been widely studied. This area 'remains wide open for research', and there is little published work from 'the developing world, the Middle East, Asia, South and Latin America and the Caribbean, and Africa' (Todd *et al*, 2007, p. 9). A recent systematic review of 24 studies investigating older people's perceptions of facilitators of and barriers to participation in fall-prevention interventions found that only three studies examined the health-promotion needs of non-English-speaking groups (Bunn *et al*, 2008). Even these often gave very little attention to these groups (for example, merely listing whether or not the person's mother tongue was English, and excluding those unable to read or speak English) (Aminzadeh and Edwards, 2000). Another study included in the review did not provide adequate information to allow an understanding of differences in the perception of falls (Health Education Board for Scotland, 2003). Other recent studies have examined how Chinese culture affects understanding of falls and fall prevention in older Chinese adults living in English-speaking countries, and emphasised the importance of providing this information in the participant's own language (Yang *et al*, 2008; Horton and Dickinson, 2011). The perceptions of falls and the outcomes of fall-prevention interventions for diverse groups need further examination.

Many interventions have been identified as having a part to play in reducing falls among older adults. These have included group exercise programmes, home visiting and hazard assessment by a health professional, and multifactorial assessment and intervention schemes (Gillespie *et al*, 2009). However, investigations of falls are usually based on homogenous samples, and people who do not speak the language spoken by health

professionals or researchers tend to be excluded. Culturally and linguistically diverse populations are now commonplace in developed nations. In Australia, in 2006, older people born in non-English-speaking countries represented 21% of the older population, and it is recognised that they can 'face barriers in accessing appropriate health and aged-care services' (Australian Institute of Health and Welfare, 2007, p. 147). Health policy makers who are seeking to ensure access to appropriate services need to consider whether interventions that have been developed and tested among mainstream members of the population can be adapted to culturally and linguistically diverse populations.

There are many reasons why some health interventions may be unsuitable or ineffective for use with minority ethnic groups, including language barriers, cultural differences, variations in health profiles, expectations of healthcare, barriers to participation in specific programmes, and beliefs that falls cannot be prevented (Bunn *et al*, 2008). The aims of the present study were as follows:

- to understand how people from culturally and linguistically diverse backgrounds who are living in Australia perceived their risk of falls
- to identify what they considered to be effective fall-prevention strategies
- to identify how readily they planned to use these strategies
- to identify the barriers they encountered when trying to access information about fall-prevention strategies
- to evaluate their responses to a group-based exercise and education fall-prevention programme delivered in their own language.

## Methods

### Intervention

The No-Falls programme has been shown to reduce falls among older people born in Australia (Day *et al*, 2002). It was used as a model for the exercise and education component of the study reported here. The group exercise sessions were led by exercise physiologists who had received training in how to deliver the No-Falls programme. Each session lasted for approximately 1 hour per week for 15 weeks, was run as a circuit, and included exercises designed to improve flexibility, leg strength and balance. Exercises could be modified or replaced by less demanding ones, depending on the ability of each participant. A community worker who spoke the language of the participants was also present to assist with translation and provide encouragement. The sessions took place at the South Eastern

Region Migrant Resource Centre, and there was a maximum of 15 people in each group. Each group contained only participants who had the same language and/or cultural background.

Education sessions on specific aspects of fall prevention were provided in addition to the exercise sessions. A didactic approach to the provision of information was adopted, as this was consistent with education delivery approaches that had been used previously. Group discussion and questions to presenters were encouraged after provision of the information. All information sessions were provided by a relevant health professional and interpreted by a qualified interpreter. Transportation for the participants was provided where necessary.

Education materials were custom developed by relevant health professionals working for member organisations of the South East Healthy Communities Partnership. The topics addressed related to vision, dietary intake, footwear and foot care. The education materials relating to vision were developed in partnership by Vision Australia (Vision Australia, 2010), Vision 2020 (Vision 2020 Australia, 2011) and the Royal Victorian Eye and Ear Hospital. Vision assessments were also undertaken during these sessions by nurses or other relevant professionals from these services.

## Participants

A total of 59 community-dwelling older adults, aged over 54 years, from culturally and linguistically diverse backgrounds took part in this study. The participants were drawn from Croatian-, Cambodian-, Turkish- and Arabic-speaking backgrounds, and were living in the city of Greater Dandenong, Victoria, Australia. Participants were referred to the programme by staff at the South Eastern Region Migrant Resource Centre, which provides services to help refugee groups and migrants to address personal, cultural, ethnic and social challenges when integrating into Australian society (South Eastern Region Migrant Resource Centre, 2010). Participants eligible for Home and Community Care-funded services in Victoria, who were not already participating in a similar fall-prevention programme and who were assessed as being at risk of falls, were eligible to participate. Fall risk was determined according to whether the participant had reported a fall in the past six months, reported problems with balance, experienced difficulty in rising to a standing position from a chair, received a diagnosis of stroke or Parkinson's disease, or been prescribed four or more medications.

## Ethical issues

Ethical approval for this research was granted by the Southern Health Human Research Ethics Committee.

Participants' consent to participate in the programme was obtained verbally and implied by their attendance. Participants' general practitioners were also asked to confirm the individuals' suitability for exercise sessions. Data were collected and used under the auspices of routine care. All of the data used in the analysis were anonymised.

(Under the Australian National Health and Medical Research guidelines, it is permissible to report data for research purposes that were collected as part of routine care in the provision of a health service without the participant's specific consent. The Australian National Health and Medical Research Council states in the *National Statement on Ethical Conduct in Human Research* that a Human Research Ethics Committee may grant a waiver of consent for research using personal information if they are satisfied with a number of conditions, namely that involvement in the research is low risk, there is sufficient protection of privacy and there is an adequate plan to protect the confidentiality of data.)

## Research design

A pre- and post-test survey approach was used, as a randomised controlled trial was not feasible in this context, given that this evaluation took place as part of routine service provision. The questionnaire that was used was developed to address four key outcome areas:

- 1 self-perceived risk of falls and self-perceived knowledge of fall-prevention strategies
- 2 knowledge, perceived efficacy of, and barriers to implementation of fall-prevention strategies
- 3 number of falls
- 4 participation in activities of daily living.

Questions regarding self-perceived risk of falls and self-perceived knowledge of fall-prevention strategies were adapted from previous investigations among hospital patients (Hill *et al*, 2009). Likert-style scaling was employed to examine participant agreement with statements relating to self-perceived risk of falls, anxiety related to falls risk, motivation to prevent falls, self-rated awareness of fall-prevention strategies, and self-rated awareness of how exercise, footwear, nutrition and visual interventions can affect the risk of falls (see Table 4). At the pre-intervention assessment, participants were asked about their perceived knowledge of fall-prevention strategies and whether they were fully aware of how fall-prevention activities could affect their risk of falling. At the post-intervention assessment, questions were changed to examine whether the participants felt more aware, more at risk, or more

motivated since commencing the intervention programme, to take into account a possible response shift in these self-perceived responses.

- 1 At the pre-intervention assessment, participants were asked to identify strategies that they thought would prevent falls, and to identify which of these was most likely to reduce their risk of falling. They were then asked to rate their confidence, desire and intention to use this strategy, and to identify the factors that would help them to use it or prevent them from using it. These items in the questionnaire were custom designed to address the specific content areas selected. This line of questioning was repeated at the post-intervention assessment. However, some questions were changed in order to examine whether the participants felt more aware, more at risk, or more motivated since commencing the intervention programme, to take into account possible response shift in these self-perceived responses. Participants were then asked to list as many things as they could think of that they had done to reduce their risk of falls since commencing the programme, and to list other activities which they thought would also help. They were then asked to identify one approach that they had not yet used which they thought would reduce their risk of falling the most, and also to identify any barriers that they thought had prevented them from using this approach.
- 2 At the pre-intervention assessment, the participants were asked how many times they had fallen during the previous six months. They were then asked again at the end of the programme whether they had had any further falls. In this context a fall was defined as 'any event where a patient unexpectedly comes to rest on the ground, on the floor or another lower level' (World Health Organization, 2010).
- 3 Participation in the activities of daily living was assessed using the Frenchay Activities Index, which has been shown to be a reliable and valid measure, in older adults, of the frequency of participation in domestic, work and leisure activities of daily living (Turnbull *et al*, 2000). It is a self-reported measure and uses a four-point response scaling for each item.

The complete questionnaire, consisting of the various sections outlined above, was presented to the participants in a hard-copy format in their own language (Croatian, Cambodian, Turkish or Arabic). The translation of this questionnaire had been undertaken by a qualified interpreter service.

## Procedure

Staff at the South Eastern Region Migrant Resource Centre contacted potential participants and invited them to take part in this programme. Questionnaires were administered during the first and last sessions. Qualified interpreters and language aides were present to help the participants to complete the questionnaires. Information about the literacy levels of the participants was not available as part of this evaluation. The data were translated by qualified translators.

## Analysis

Self-perceived risk of falls and knowledge of fall-prevention strategies (Likert-style scaled questions) were compared between pre- and post-intervention assessments using ordinal logistic regression, clustering data by individual participant, using robust standard error estimates (White, 1980). This was a complete cases analysis. Responses to open-ended questions were analysed through a process of qualitative description (Neergaard *et al*, 2009). Coding was based on previously developed codes (Hill *et al*, 2011), and codes checked by a second investigator. Emergent categories were developed into group strategies thought to prevent falls, and barriers to participation in fall-prevention activities. The frequencies of responses in each category were tabulated.

Frenchay Activity Index item domains were compared between pre- and post-intervention assessments using ordinal logistic regression with clustering by participant and using robust stand error estimates. The rate of falls (falls per day) was compared between groups using negative binomial regression, clustering data by individual participant. The number of falls pre-and post-intervention was compared. We performed a simple arithmetic division of falls divided by time to calculate rates. A sample size of 59 provided 80% power using regression analysis to detect an association that explained 12% of the variance ( $R^2$ ) of the dependent variable (Portney and Watkins, 2000).

All analyses were performed using Stata IC version 11.0.

## Results

Initial data were submitted for 58 participants and final data for 47 participants. These are presented by group in Table 1.

The majority of the respondents were undecided as to whether they felt that they were going to fall at some time in the next year (see Table 2). The proportion who agreed or strongly agreed that they would fall at

**Table 1** Age and gender demographics of participants

	Total	Croatian	Cambodian	Turkish	Arabic
Number (pre/post)	58/47	12/12	19/13	16/15	11/7
Age (years)					
Mean (SD)	68.3 (7.9)	68.6 (9.6)	74.2 (6.9)	61.0(4.3)	70.3(2.6)
Not provided	22 (38%)	3 (25%)	7 (37%)	4 (25%)	3 (27%)
Gender					
Male	4 (7%)	0 (0%)	0 (0%)	0 (0%)	4 (36%)
Female	38 (64%)	9 (75%)	11 (58%)	12 (75%)	6 (55%)
Not provided	17 (29%)	3 (25%)	8 (42%)	4 (25%)	1 (9%)

some time in the next year (29%) was comparable to the proportion who had fallen in the past six months (34%). The majority of the participants reported being anxious about the prospect of falling, and felt motivated to prevent themselves from falling. Few participants felt that they were not fully aware of how they could prevent themselves from falling, or how specific strategies relating to footwear, vision, exercise and diet could reduce their risk of falling. There were few differences in the pattern of response to these items at the post-intervention assessment. There was a trend towards participants feeling more aware of what they could do to prevent themselves from falling ( $P=0.06$ ), and a trend towards participants feeling more aware of how their diet could affect their risk of falling ( $P=0.12$ ) (see Table 2).

The most common strategies that participants believed would reduce their risk of falling are presented together with examples of responses that were placed in each category (see Table 3). Two categories, 'behavioural' and 'approach to movement', were closely related in the types of responses, but were differentiated by whether the responses included reference to movement, thus placing the response in the latter category. Both of these categories provided non-specific statements about 'being careful' or 'moving carefully', without further explanation of what this actually meant. Strategies believed to reduce the risk of falling at the pre-intervention assessment were strongly focused towards these categories, together with the 'supports while mobilising' category. Few respondents thought that using supports while mobilising would be the most effective strategy. Instead they identified 'behavioural strategies' and 'approach to movement' as being the most effective. At the post-intervention assessment, activity- and exercise-based strategies were clearly the most commonly identified changes that had been implemented. They were also thought to be the most effective, even if they had not yet been used.

The majority of the participants at the post-intervention assessment did not identify any strategy

that they were not already using that could reduce their risk of falling (see Table 3). The majority of the respondents could not list any barriers to using any strategy that they felt would be most effective for preventing falls. A broad range of barriers was identified by those participants who did list barriers (see Table 4). The most commonly identified barrier, and the one most commonly identified at the pre-intervention assessment, related to health concerns. This response pattern changed at the post-intervention assessment to some extent, as although the majority of respondents still identified no barriers, the proportion who did so and who cited a health concern as a barrier decreased (see Table 4).

Participation in functional activities, as measured by the individual item Frenchay Activities Index, did not differ significantly overall, or for specific domains, between pre- and post-intervention assessments (see Table 5). There was no significant difference in the rate of falls per person-year overall (incidence rate ratio [robust 95% CI],  $P$ -value: 1.43 (0.69, 2.96)  $P=0.33$ ). However, there was variability evident between groups in the change in the rate of falls between the pre- and post-intervention assessments (see Table 5).

## Discussion

Before the intervention, many participants reported being fully aware of strategies for preventing falls, including strategies related to vision, feet and footwear, diet and exercise. However, when asked to name fall-prevention strategies, they tended to rely upon generic statements, such as 'Be careful'. Therefore it is likely that these populations may think that they know what they need to do to prevent falls, but are largely unaware of evidence-based strategies that might reduce their risk of falling.

The comparison of attitudes towards falls and self-reported awareness of fall-prevention strategies pre-

**Table 2** Frequency of agreement/disagreement with statements relating to perception of connection with the community, self-perceived risk of falls, and awareness of fall-prevention strategies

	Pre-intervention						Post-intervention						Comparison
	SA	A	U	D	SD	NR	SA	A	U	D	SD	NR	Ordinal logistic regression coefficient (robust 95% CI), <i>P</i> -value
I think that I am going to fall over at some time in the next year	6	11	24	4	6	7	3	15	14	9	4	2	0.03 (-0.69, 0.75), <i>P</i> = 0.94
Just thinking about falling over makes me feel anxious	10	30	2	5	6	5	10	25	5	4	3	0	-0.17 (-0.91, 0.58), <i>P</i> = 0.66
I am currently highly motivated to prevent myself from falling	16	26	5	4	0	7	16	26	2	1	0	2	-0.44 (-1.21, 0.33), <i>P</i> = 0.26
I feel that I am fully aware of things I can do to prevent myself from falling	18	19	13	3	0	5	19	28	0	0	0	0	-0.70 (-1.46, 0.04), <i>P</i> = 0.06
I feel that I am fully aware of how my footwear and feet can affect my risk of falling	20	26	3	4	0	5	20	26	1	0	0	0	-0.24 (-1.00, 0.52), <i>P</i> = 0.53
I feel that I am fully aware of how my vision can affect my risk of falling	23	23	4	2	0	6	18	29	0	0	0	0	0.06 (-0.71, 0.82), <i>P</i> = 0.89
I feel that I am fully aware of how exercise can affect my risk of falling	21	26	4	1	0	6	20	26	0	0	0	1	-0.13 (-0.91, 0.64), <i>P</i> = 0.74
I feel that I am fully aware of how my diet can affect my risk of falling	17	22	9	3	0	7	19	27	0	0	0	1	-0.62 (-1.39, 0.15), <i>P</i> = 0.12

SA, strongly agree; A, agree; U, undecided; D, disagree; SD, strongly disagree; NR, no response.

**Table 3** All strategies perceived as reducing risk of falls, and strategies believed to be most effective

Strategy category	Examples	Pre-intervention		Post-intervention		
		All strategies listed	Strategy believed to be most effective	All strategies listed Implemented	Not implemented	Strategy believed to be most effective
Behavioural	'Be more careful' (p. 10, Cambodian) 'Think before acting' (p. 22, Arabic)	14	10	8	5	1
Support while mobilising	'Wear suitable shoes' (p. 4, Turkish) 'Use walking stick' (p. 48, Cambodian)	28	4	16	2	3
Approach to movement	'Careful movement' (p. 26, Turkish) 'Be careful when climbing stairs' (p. 53, Cambodian)	22	8	14	8	3
Physical environment	'Better lighting' (p. 54, Croatian) 'Make sure nothing is on the floor' (p. 34, Turkish)	2	0	9	0	1
Visual	'Wear my glasses' (p. 11, Cambodian)	1	0	2	1	0
Medical	'Weight loss' (p. 37, Turkish) 'Be more careful with diet' (p. 2, Arabic)	7	1	11	2	0
Activity and exercise	'Do exercise regularly' (p. 24, Cambodian) 'Walking' (p. 32, Turkish)	7	4	32	8	8
No response provided		16	33	4	27	31

**Table 4** Barriers to participation in fall-prevention strategy identified as being most likely to be effective

Barrier category	Pre-intervention*		Post-intervention	
	All barriers	Most important barrier	All barriers	Most important barrier
Nothing	6	4	9	2
Health concerns	20	11	5	4
Pain	7	1	8	4
Motivation	1	0	2	2
Fear/fear of falling	0	0	2	0
Time/other commitments	2	0	3	1
Weather	0	0	1	1
Other people	1	0	1	0
Transport	0	0	4	2
Difficulty with walking/exercise	2	0	0	0
Not answered	31	43	19	31

\*Anticipated barriers.  
Barriers experienced.

and post-intervention indicated that the intervention did not have a large effect on this outcome. This should not be interpreted as meaning that participant knowledge did not improve, as exposure to the education materials may have caused participants to realise how much they did not previously know, eliciting a recalibration response shift to these items (McPhail and Haines, 2010). Recalibration response shift occurs when the meaning that a person gives to a particular value-based response category (e.g. 'strongly agree') changes over time. This form of response shift is akin to the participant changing the goal posts. The shift in strategies perceived to be effective for preventing falls provides evidence that a change in knowledge did take place, as there was a large increase in the proportion of participants who identified the importance of exercise interventions as a strategy for preventing falls at the post-intervention assessment (Gillespie *et al*, 2009). However, the participants' pre-test perceptions, namely that they did not have a problem with falls and believed that they already knew what they needed to do to prevent falls, may be problematic in attracting these groups to future programmes.

The majority of the participants did not identify barriers to undertaking the fall-prevention interventions that they thought would be most effective at the

pre-intervention assessment. This is not surprising, given the number of participants who believed the strategy 'Be more careful' to be most effective at the pre-intervention assessment. Future research should consider investigating barriers to individual interventions, such as participation in a group exercise programme, rather than basing this on the intervention that participants believed would be most effective. This approach was not adopted in the present investigation, as it was anticipated that doing so would imply that certain interventions were effective, thus confounding this aspect of the investigation.

Motivation to prevent falls appears to have been unchanged by participation in this intervention. The majority of the participants at both baseline and follow-up assessments agreed that they were highly motivated to prevent themselves from falling. Although this appears to be a good outcome to begin with, it is not known whether *simply agreeing* with this statement is sufficient to prompt action, as compared with *strongly agreeing*. According to several theoretical frameworks for understanding participation in health behaviours, including the health belief model (Janz and Becker, 1984) and protection motivation theory (Maddux and Rogers, 1983), motivation is influenced by a number of factors, including perceived risk of harm from a fall,



**Table 5** Number of falls by participants (and falls rate/year) before and after the intervention

	Total		Croatian		Cambodian		Turkish		Arabic	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Total number of falls	33	19	5	3	10	8	9	4	9	4
Number of fallers	20	12	4	3	7	5	6	3	3	1
Falls rate per person/year (among those who answered)	1.10	1.13	0.83	0.34	1.05	1.70	1.12	0.87	1.63	2.13
Not answered	12	7	5	2	3	0	2	4	2	1

self-efficacy with regard to performing an intervention, and belief that the intervention will be effective if it is performed. Participants' confidence, motivation and intention to participate in fall-prevention strategies were high, yet they did not appear to increase as a result of participating in the programme, even though the interventions that these attitudes related to changed between the baseline and follow-up assessments. It is possible that the education component of the intervention needs to be specifically structured to address these aspects in future.

Previous research suggests that involving culturally and linguistically diverse older adults in fall-prevention activities can be problematic. Older adults who speak a language other than English at home are less likely to access services (Black *et al*, 2004; Jorm *et al*, 2010), and those who did receive fewer hours of service than their English-speaking counterparts, despite the need for interpreting, took an increased time to perform the same activities (Ward *et al*, 2005). Feelings of embarrassment due to having only limited English have been reported among Croatian older adults in relation to attending programmes at sporting facilities or neighbourhood houses (Haralambous *et al*, 2003). People from culturally and linguistically diverse backgrounds were also identified as being likely to have lower levels of physical activity (Bauman *et al*, 2002). In this study, we attempted to promote access to falls prevention services by delivering culturally specific programmes at a facility that the participants had already attended for other purposes. Of 58 respondents who completed the baseline questionnaire, 47 individuals completed the final questionnaire, indicating that adherence to the full programme was greater than 80%, thus making this approach a potentially viable one for future health service delivery planning.

Previous research has examined elements related to how people from culturally and linguistically diverse populations perceive falls. A qualitative study of Chinese older adults living in England found poor knowledge of fall-prevention interventions, and reported that cultural beliefs affected acceptance of fall-prevention interventions (Horton and Dickinson, 2011). An Australian study of Cantonese-speaking older adults living in Australia found that they had required further education about risk factors and fall-prevention strategies, preferably in Cantonese (Horton and Dickinson, 2011). These studies did not examine the response of older adults to an exercise- and education-based fall-prevention programme, or the views of older adults from other cultures.

The immediate effects of the interventions used in this study did not indicate that the participants were experiencing fewer falls or participating more frequently in activities of daily living. The pre- and post-intervention analysis was limited by the time constraints on data collection, and it is more reasonable to

expect that the benefits of participating in this programme would be manifested over a longer period of time. This may have implications for determining whether the benefits, particularly in terms of reduction in the number of falls, reported from similar programmes tested among Australian-born participants continued over time (Day *et al*, 2002). A long-term follow-up evaluation using a more robust research design would be necessary to address this issue.

This evaluation was also limited by the fact that it was, in essence, a quality assurance project. Data collection took place within the context of usual care practices rather than a more rigorous research context. Furthermore, data collection was incomplete because some participants did not respond to certain sections of the questionnaires, such as those dealing with age and gender. Similar approaches to data collection have previously been used, with success, by the investigators. However, these approaches were less successful with the groups in this study, despite the help of translators, interpreters and language aides. Further pilot testing and refinement of data collection approaches when dealing with culturally and linguistically diverse populations is recommended before undertaking similar investigations in future.

Research that involves translation and interpreters brings with it many challenges. Various procedures involved in the use of interpreters and translated documents have been found to be desirable, including, for example, pilot testing interview questions in the participants' language, back translation, and taking measures to prevent the interpreter from becoming an invisible part of the research process (Edwards, 1998; Squires, 2009). However, even gold-standard conventions such as back translation have not been universally accepted to counteract the problems involved in cross-cultural research. Rather they have been criticised because they do not guarantee conceptual equivalence (Larkin *et al*, 2007). Even a technically accurate translation may not convey the precision of the original (Bradby, 2002).

The quality-assurance nature of this evaluation meant that there were insufficient resources for back translation and pilot testing in the participants' own languages. Interpreters and language aides helped the participants to complete the questionnaire, which may have influenced the results. For instance, statements such as 'Be careful', which was cited as a common strategy for preventing falls, could be thought to reflect an artefact of interpretation. However, this same statement has been observed to be a common response in non-culturally and linguistically diverse populations (Hill *et al*, 2011). Results cannot always be validated in this way, and the use of translated documents and interpreters may have affected the results of this evaluation, potentially creating missing data, abbreviated responses to open questions, or even incorrect responses.

The number of falls recorded is likely to be inaccurate, whether the falls are self-reported or reported by a family member. Retrospective self-recall of falls after one year has been found to be inaccurate in over one-third of people when comparing falls with a daily falls diary (Peel, 2000). Falls are more likely to be remembered if an injury has occurred. Relying on family members to recall falls is also inaccurate, as they may not be present at the time of a fall, they may forget, and some older adults conceal falls from their children in order to avoid worrying them (Horton and Dickinson, 2011). In this project it was thought that the individual concerned is the most aware of the number of falls he or she has had. Asking the individual is the most straightforward way to obtain information, so self-reporting was adopted. Falls diaries and other methods were beyond the scope of the quality assurance briefing for this project.

The research design lacked a control or comparator group of individuals who were not from culturally and linguistically diverse backgrounds. Thus it is not known whether it is just people from culturally and linguistically diverse backgrounds who exhibit the patterns of response that were seen in the present project, or whether this is more broadly representative of older adults in Australia.

A strength of this study was its use of ordered logistic regression analysis in preference to parametric approaches such as the *t*-test when comparing Likert-scaled responses and Frenchay Activities Index scores between pre- and post-test assessments. Ordered logistic regression permits comparison of ranked data where no assumption is made about the relative distance between response categories, whereas a *t*-test approach would assume that response categories are equally spaced. For example, the distances between 'disagree' and 'undecided' and between 'agree' and 'strongly agree' are assumed to be equal when using a *t*-test, but they do not have to be equal when using ordered logistic regression.

## Conclusion

Falls are a continuing threat to the safety, health and independence of older adults in Australia. Interventions that have been developed with reference to evidence-based strategies provide an important means of addressing this problem. Further research is needed to establish whether these programmes are able to translate the benefits that are seen in highly controlled research settings and homogenous participant populations into the highly variable settings and diverse populations that are encountered in real life.

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#### CONFLICTS OF INTEREST

Terry Haines is the director of a company, Hospital Falls Prevention Solutions. He has received payment for providing expert testimony and honoraria for a keynote address at the Australian and New Zealand Falls Prevention Society Conference, Dunedin, New Zealand, in November 2010.

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