



How likely are older people to take up different falls prevention activities?

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ABSTRACT

Objective. To determine the extent to which older people are willing to engage in different falls prevention activities, and how this may vary in different sectors of the older population.

Methods. A survey sent to patients aged over 54 in ten general practices in the Southampton, Bristol and Manchester areas of the UK in 2006 yielded 5,440 respondents. The survey assessed willingness to attend classes of strength and balance training (SBT), carry out SBT at home, or accept support to reduce home hazards. Participants were asked their gender, age, education, home tenure, ethnic group, and how often they had fallen during the past year.

Results. Over 60% of the sample would consider doing SBT at home and 36.4% said they would definitely do SBT at home. Only 22.6% would definitely attend group sessions and 41.1% would definitely not attend. Older age, recent falls and lower socioeconomic status were associated with a greater willingness to carry out SBT at home (but not in classes) and accept help with home hazards.

Conclusions. Health promotion programmes should give prominence to home-based performance of SBT as a method of encouraging the entire older population to engage in falls prevention, including those most in need.

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Falling is the main cause of unintentional injury in older people (Kannus et al., 2005), leading to substantial morbidity and mortality (Todd et al., 1995). In the UK, resulting costs to the health care system total around £1 billion each year (Scuffham et al., 2003), while in the US annual health care costs of falls in older people have been estimated at around \$20 billion (Stevens et al., 2006). Falls and fear of falling are associated with distress, restricted mobility, and loss of independence (Bruce et al., 2002; Cumming et al., 2000; Delbaere et al., 2004; Murphy et al., 2002; Todd et al., 1995; Yardley and Smith, 2003; Li et al., 2003; Wijlhuizen et al., 2007; Zijlstra et al., 2007). More than one in three community-dwelling people aged over 65 fall each year (American Geriatrics Society, British Geriatrics Society, American Academy of Orthopaedic Surgeons Panel on Falls Prevention, 2001), with higher rates with increasing age. Falls prevention is therefore a major public health priority.

A range of different activities that may help to prevent falls have been proposed (American Geriatrics Society et al., 2001; Skelton and Todd, 2004), but it is not yet clear which activities are most cost-effective for which sections of the population (Weatherall, 2004; Lord et al., 2007; Campbell and Robertson, 2007). There are serious doubts about the effectiveness of targeted multi-factorial interventions with those at high risk (Gates et al., 2008). Interventions that include home-

based tailored programmes of strength and balance training (SBT) have been shown to be efficacious (Chang et al., 2004; Gillespie, 2004; Kannus et al., 2005; Sherrington et al., 2004). SBT involves carrying out exercises that increase muscle strength in the legs and improve balance. Multi-factorial interventions typically combine SBT with assessment and management of medical risk factors, and education and advice on reducing risks in the home (e.g. by fitting rails, removing hazards).

Personalised assessment and education for falls prevention is very resource intensive, and it has therefore been argued that it is only reliably cost-effective for those most at risk of falling due to older age or medical risk factors (Chang et al., 2004; Gillespie, 2004; Kannus et al., 2005). However, up to half of injurious falls occur in those who are not very old, frail and unwell, but among those older people who continue to be active despite some decline in their balance capabilities (Allander et al., 1998; Stel et al., 2003; Wijlhuizen et al., 2008). Since personalised assessment and advice is not necessarily cost-effective for this section of the population, there is a need for lower-cost interventions that will encourage and support all older people to undertake activities to reduce their risk of falling while remaining active (Chang et al., 2004; Kannus et al., 2005; Skelton and Todd, 2004; Rose, 1985). This approach would be consistent with a population risk shift strategy, rather than targeting only high risk groups. There is some preliminary evidence that community-based programmes can reduce falls (McClure et al., 2005; Luukinen et al., 2007; Voukelatos et al., 2007), and that programmes of SBT that are not tailored to the individual may be

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effective (Sherrington et al., 2004; Steinberg et al., 2000). However, the evidence is not yet conclusive, and the optimal way in which to deliver such interventions is not yet established.

Clearly, the success of interventions that do not provide personal supervision and support must rely heavily on the motivation of the target population. Participation rates in falls prevention programmes are variable; while some interventions have been well received, typically less than half of those invited to take part accept, and subsequent adherence to the intervention is often partial (Robertson et al., 2001; Stevens et al., 2001; Day et al., 2002; Steinberg et al., 2000; Freiburger et al., 2007; Lord et al., 2005). Research is therefore needed to determine the extent to which older people are willing to engage in different falls prevention activities, and how this may vary in different sectors of the older population.

The aim of this study was to carry out the first population survey to investigate willingness of older people to undertake falls prevention activities, focusing on attitudes to three key activities: undertaking SBT as a group-based activity; undertaking SBT as a home-based activity; undertaking home modifications. In order to ensure that falls prevention is undertaken by all sections of the population, and particularly those most vulnerable or disadvantaged, it is also necessary to understand how attitudes may differ between older people in differing circumstances. We therefore examined whether age, gender, socioeconomic status, ethnicity and having recently fallen were related to attitudes to falls prevention activities.

Methods

Sample

Participants were recruited from ten general practices in the Southampton, Bristol and Manchester areas in 2006. Since respondents with socio-economic deprivation are less likely to respond to surveys (Picavet, 2001; Turrell et al., 2003), we purposely sampled practices with higher rates of socio-economic deprivation, to ensure that sufficient numbers of people from deprived social groups were represented in the survey despite lower uptake rates. Nine of the practices were selected because they contained greater numbers of people of lower socioeconomic status and from ethnic minorities than in the general population. To provide data on the whole socio-economic spectrum, the tenth general practice was selected from a relatively affluent area.

The survey was sent out to 11,090 people aged over 54. Screening attempted to exclude patients who were terminally ill, had severe mental illness, had moderate to severe dementia, had moved away or were recently deceased, but 647 questionnaire packs were returned undelivered or had been sent to people who were recently deceased. From the resulting adjusted sample of 10,443 people, 7772 people returned the questionnaire (74.42% of the adjusted total), with 5440 (52.09% of the adjusted total) returning it completed. UK regulations regarding data protection and ethics did not allow us to collect any data regarding the characteristics of non-respondents.

Measures

Participants were asked their gender and date of birth, and how often they had fallen during the past year. A fall was defined as "including a slip or trip in which you unexpectedly lost your balance and landed on the floor, ground or lower level" (Lamb et al., 2005). Participants were asked whether they would: a) attend a programme of professionally supervised strength and balance training sessions in a group; b) follow general instructions on how to do strength and balance training at home; c) accept advice and support to make their home safe (e.g. fit grab-rails, improve lighting, ensure carpets and rugs

cannot slip). These items were scored on a scale from 1 (definitely yes) to 4 (definitely no). Strength and balance training was defined as 'doing physical activities to build up the strength in your legs and body and also activities that improve your balance. These kinds of activities include lifting and stretching your legs, standing on your toes and bending over, some gentle forms of sports, keep fit classes, dancing, or T'ai Chi.'

Socio-economic status was assessed by a composite measure created from two items asking about housing tenure and the age they left education. Four categories were created: left education <16 years, rent housing; left education <16 years, own housing; left education 16–17; left education ≥18. Ethnicity was measured by the categories used in the Office for National Statistics 2001 census (Office for National Statistics, 2001).

Procedure

The study was approved by the Southampton and South West Hampshire Multi-centre Research Ethics Committee. Questionnaire packs entitled 'Public views on services for preventing falls', including a freepost return envelope, were sent by practices to all registered eligible patients. Up to two reminders were sent, one month apart.

The participant information sheet stated that informed consent would be assumed from completion of the survey. Piloting suggested that the more socio-economically deprived participants were unlikely to complete a long questionnaire, and so the length of the survey was kept to a single two-sided sheet. The information sheet and survey were translated into the languages principally used by members of minority ethnic groups in the participating practices; Urdu, Punjabi and Hindi. The translations were included in the questionnaire pack once, either in the initial mail out or one of the reminders. A letter translated into each of the three languages was included with all mailings informing participants that they could request the survey in these languages or could complete the survey by interview if preferred, with a translator if necessary.

Statistical analyses

Data were analysed using SPSS v15.0. (2006) For the purposes of the regression analyses, a median split was carried out on each of the three items assessing likelihood of undertaking falls prevention activities. Univariate logistic regression was used to generate odds ratios and confidence intervals for the associations between reported likelihood of undertaking each falls prevention activity and the predictors (demographic characteristics and falls in the past year). Three multivariate logistic regressions were then carried out to identify the combinations of these predictors associated with likelihood of undertaking each of the three falls prevention activities.

Results

Responses to the three items asking whether respondents were likely to attend group sessions of SBT, undertake SBT at home or make home modifications are shown in Table 1. More people were willing to consider doing SBT at home than in a group; over 60% of the sample were willing to consider carrying out SBT at home and only 20% definitely would not do so. Conversely, only around 40% would consider doing SBT in a group while over 40% definitely would not. Cross-tabulation of preferences for doing SBT at home or in group sessions (not reported in Table 1) revealed considerable but not complete overlap. While 722 (16.7%) of the sample said they would definitely carry out both, 809 (18.7%) said they would only definitely carry out SBT at home, while 235 (5.4%) would only definitely carry out SBT in a supervised group session. Over half of respondents were willing to consider making home modifications.

Table 1

Percentage of respondents (with *n* in brackets) who would or would not attend group sessions of SBT, do SBT at home or make home modifications (recruited from Southampton, Bristol and Manchester areas of the UK in 2006)

Full sample	Definitely yes	Maybe yes	Maybe no	Definitely no
Attend supervised SBT group sessions	22.6 (998)	17.6 (777)	18.8 (831)	41.1 (1817)
Follow instructions on how to do SBT at home	36.4 (1670)	25.4 (1166)	17.7 (814)	20.5 (943)
Accept advice and support to make home safe	37.7 (11702)	19.9 (897)	15.8 (711)	26.6 (1201)

SBT = strength and balance training.

Bivariate associations with undertaking falls prevention activities

Substantially more women than men indicated that they were likely to attend group sessions, and more women also indicated that they would carry out SBT at home and accept home modifications (see Table 2). Older age was associated with much greater likelihood of accepting home modifications and also greater likelihood of carrying out SBT at home. Relative to the youngest age group, those aged 64 to 75 were somewhat more likely to attend group sessions, whereas the oldest age group were somewhat less likely to attend group sessions. A greater number of falls during the past year was associated with progressively greater likelihood of accepting home modifications. Recent falls were also associated with a greater likelihood of undertaking SBT in groups and at home.

Socioeconomic status was not associated with undertaking SBT in groups, but decreasing socioeconomic status was associated with progressively greater likelihood of undertaking SBT at home. With each decrease in socioeconomic status there was also a much greater likelihood of accepting home modifications. Ethnic group was associated with reported likelihood of attending group SBT, undertaking SBT at home and accepting home modifications. Black and Asian respondents were the most likely and white respondents the least likely to say they would undertake all these activities.

Table 2
Relationship of demographic variables and falls to likelihood of undertaking falls prevention activities (recruited from Southampton, Bristol and Manchester areas of the UK in 2006)

Independent variables	Total n	More likely to attend group SBT sessions		More likely to undertake SBT at home		More likely to accept home modifications	
		<i>n</i>	OR (95% CI)	<i>n</i>	OR (95% CI)	<i>n</i>	OR (95% CI)
Gender							
Men	2482	1079	Reference	677	Reference	691	Reference
Women	2846	1502	1.84 (1.63 to 2.08)***	980	1.45 (1.29 to 1.64)***	995	1.46 (1.30 to 1.65)***
Age category							
55–64	2440	1281	Reference	697	Reference	629	Reference
65–74	1530	791	1.17 (1.01 to 1.35)*	500	1.32 (1.15 to 1.53)***	535	1.72 (1.49 to 1.99)***
≥75	1305	534	0.71 (0.71 to 0.98)*	473	1.44 (1.23 to 1.68)***	538	2.20 (1.89 to 2.57)***
Falls in the past year							
None	3084	1404	Reference	865	Reference	824	Reference
One	1150	626	1.58 (1.36 to 1.84)***	392	1.34 (1.15 to 1.56)***	400	1.50 (1.29 to 1.74)***
Two or more	1038	529	1.65 (1.41 to 1.93)***	385	1.68 (1.44 to 1.97)***	439	2.33 (1.99 to 2.73)***
Socio-economic status							
Left education <16, renting	859	358	Reference	268	Reference	337	Reference
Left education <16, home-owner	1676	611	0.96 (0.78 to 1.17)	403	0.93 (.76 to 1.13)	415	0.68 (0.56 to 0.82)***
Left education 16–17	1329	881	1.01 (0.84 to 1.22)	547	0.92 (0.77 to 1.11)	515	0.58 (0.48 to 0.69)***
Left education ≥18	859	572	0.88 (0.72 to 1.08)	306	0.73 (0.60 to 0.90)**	287	0.45 (0.37 to 0.55)***
Ethnic group							
White	4406	2075	Reference	2481	Reference	1312	Reference
Black/black British	485	247	1.69 (1.36 to 2.10)***	173	1.64 (1.32 to 2.03)***	205	2.34 (1.88 to 2.90)***
Asian/Asian British	268	179	1.98 (1.51 to 2.59)***	96	1.34 (1.02 to 1.76)*	120	2.08 (1.59 to 2.73)***
Other/mixed ethnic group	100	56	1.37 (0.88 to 2.14)	37	1.10 (0.71 to 1.71)	38	1.47 (0.96 to 2.26)

SBT = strength and balance training; OR = odds ratio; CI = confidence interval.

N.B. A median split on each dependent variable grouped respondents into those who definitely would or might consider attending SBT in groups (score <4) vs. those who definitely would not (score =4), and those who were positive (score <3) about carrying out SBT at home and making home modifications vs. those who were negative (score ≥3).

* *p* < 0.05.

** *p* < 0.01.

*** *p* < 0.001.

Multivariate associations with likelihood of undertaking falls prevention activities

Table 3 shows the combinations of variables predicting each of the three falls prevention activities. Likelihood of attending group sessions of SBT and carrying out SBT at home was associated with female gender and having fallen in the past year. The oldest age group reported that they were somewhat less likely to attend group sessions, but both older age groups reported greater likelihood of doing SBT at home than the youngest respondents. After controlling for these variables, socioeconomic status was no longer related to the likelihood of carrying out SBT, but being black or Asian was associated with a higher reported probability of doing SBT.

Likelihood of accepting home modifications was also associated with female gender. The older the age group and the greater number of falls, the greater the reported likelihood of accepting home modifications. Lower socioeconomic status was associated with a greater reported likelihood of accepting home modifications. Being from a minority ethnic group was also associated with a much greater reported probability of accepting home modifications.

Discussion

Carrying out SBT at home proved to be the most popular method of falls prevention. Older age and recent falls were associated with a greater reported likelihood of undertaking SBT at home, as would be expected. Older age and recent falls were also associated with a much greater reported likelihood of accepting home modifications, suggesting that this fall prevention strategy is viewed as most relevant by those at highest risk. The finding that older people may be willing to participate in these interventions is encouraging, since there is good trial and meta-analysis evidence that they can be effective in preventing falls in these higher risk groups.

It is also encouraging that home-based SBT appears to be acceptable to many people who have not yet reached retirement age or have only recently retired, as previous research has suggested that this age group

Table 3

Multivariate predictors of likelihood of undertaking falls prevention activities; estimated odds ratios for each predictor (with 95% CI in brackets; recruited from Southampton, Bristol and Manchester areas of the UK in 2006)

Dependent variable	Attend group sessions of SBT (n=3925)	Undertake SBT at home (n=4076)	Accept home modifications (n=4001)
Independent variables			
Men	Reference	Reference	Reference
Women	1.81 (1.58 to 2.06)***	1.39 (1.22 to 1.59) ***	1.40 (1.22 to 1.60) ***
Age group 55–64	Reference	Reference	Reference
Age group 65–74	1.16 (1.00 to 1.36)	1.36 (1.16 to 1.58) ***	1.66 (1.42 to 1.94) ***
Age group ≥75	0.79 (0.67 to 0.95)**	1.36 (1.15 to 1.61) ***	2.03 (1.71 to 2.41) ***
No falls in past year	Reference	Reference	Reference
One fall in past year	1.40 (1.19 to 1.65)***	1.24 (1.06 to 1.46) **	1.33 (1.12 to 1.57) ***
Two falls in past year	1.46 (1.23 to 1.74)***	1.51 (1.28 to 1.80) ***	1.95 (1.64 to 2.31) ***
Left education <16, renting	Reference	Reference	Reference
Left education <16, home-owner	1.06 (0.86 to 1.30)	1.01 (0.82 to 1.24)	0.75 (0.61 to 0.92) **
Left education 16–17	1.10 (0.90 to 1.35)	1.06 (0.87 to 1.29)	0.69 (0.57 to 0.84) ***
Left education ≥18	0.98 (0.79 to 1.22)	0.91 (0.73 to 1.13)	0.62 (0.50 to 0.77) ***
White	Reference	Reference	Reference
Black/Black British	1.59 (1.24 to 2.05) ***	1.56 (1.21 to 1.99) ***	2.06 (1.60 to 2.66) ***
Asian/Asian British	2.01 (1.48 to 2.72) ***	1.43 (1.06 to 1.93) *	2.40 (1.77 to 3.27) ***
Other/mixed ethnic group	1.46 (0.90 to 2.37)	1.01 (0.62 to 1.65)	1.44 (0.89 to 2.35)

CI = confidence interval.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

reject some forms of falls prevention as only relevant to those who are older and more frail (Yardley et al., 2006). The acceptability of SBT to this age group indicated by this survey means that it may be possible to teach people the habit of engaging in activities that will reduce their falls risk in future years, at a time in their life when learning to perform balance exercises may pose fewer concerns and difficulties – however, the feasibility and effectiveness of such a falls prevention strategy has yet to be demonstrated.

Carrying out SBT in groups was less widely endorsed, and was most popular with younger, female respondents with higher socio-economic status. This finding could be regarded as surprising, as older people might be expected to value professional supervision and encouragement (because of concerns about falling and injury), and those older people who are socially isolated might also value the peer interaction and support. However, previous interview-based research suggests that while some older people do appreciate these aspects of group provision, the effort and cost of travelling to attend groups can be a barrier to participating (Schutzer and Graves, 2004; Whitehead et al., 2006; Yardley et al., 2006); people with lower socioeconomic status in particular may not have easy access to transport. Moreover, a substantial proportion of older people may simply prefer the convenience, privacy and autonomy afforded by exercising in their own home (Ballinger and Payne, 2000; Yardley et al., 2006; Brawley et al., 2003).

Lower socioeconomic status was associated with a slightly greater probability of undertaking SBT at home, and a much greater likelihood of accepting home modifications. Previous research has also found low income to be associated with acceptance of home modifications by older people with disabilities (Gosselin et al., 1993) – presumably because those who are less affluent are more likely to appreciate assistance with making the necessary modifications. Even after controlling for socioeconomic status, being from an ethnic minority substantially increased the likelihood of endorsing the falls prevention activities. While this finding might be taken as evidence of a strong demand for falls prevention among ethnic minorities, it is also possible that those people from ethnic minorities who were more motivated to undertake falls prevention were more likely to reply to the survey.

Limitations

Likely reasons for non-response include viewing falls prevention as irrelevant, and difficulty completing the survey due to physical or

cognitive impairment (Vass, 2007). Since both of these reasons for non-response are likely to be associated with lower intended take-up of the interventions, it would be prudent to assume that this survey may have overestimated the likely take-up of falls prevention activities. The problem of non-response may also have biased our findings in relation to socioeconomic status and ethnic group, since this selection bias may have operated more strongly within these groups (Lorant et al., 2007; Turrell et al., 2003; Van Loon et al., 2003). While we did succeed in recruiting respondents from these typically under-represented groups, those who participated may have been those who were more motivated. However, there is evidence that the effects of non-response on survey findings are not large, and seldom influence the patterns of association observed (Lorant et al., 2007; Van Loon et al., 2003).

When interpreting the self-reports of our respondents it is important to acknowledge that self-reported intentions to undertake falls prevention activities might not be realised in practice. Intentions to carry out health behaviours are typically a necessary but not sufficient condition for actually performing the behaviour (Webb and Sheeran, 2006), and so rates of performance of the behaviour are likely to be significantly lower. Future work will need to confirm that these reported preferences are actually what people take up and adhere to.

Conclusions

These findings suggest that health promotion programme should give prominence to home-based performance of strength and balance training as a method of encouraging the entire older population to engage in falls prevention. From our survey it seems that home-based exercise has the widest appeal, and is also most attractive to those older and more socially deprived people who have the greatest need for undertaking falls prevention measures.

Conflict of interest statement

The authors declare that there are no conflicts of interest.

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