Investigation of older adults' participation in exercises following completion of a state-wide survey targeting evidence-based falls prevention strategies

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Abstract

This paper examines whether involvement in an observational study may prompt participants to change their exercise behaviors. Data was collected from 394 older community dwellers in Victoria, Australia using a baseline survey, and 245 of these participated in a follow-up survey one year later. Survey domains were drawn from constructs of relevant health behavior models. Results showed that the proportion of respondents who were currently participating in exercises to prevent falls at follow-up was 12% higher than at baseline (Wilcoxon p value<0.001). Twenty-nine percent reported they had changed their perceptions about falls and their risk of falls, with comments focused on threat appraisal. Forty-four percent reported having taken strategies to reduce their risk of falling, with comments based on implementation of different preventive strategies. Respondents who held favorable views towards exercises for the prevention of falls appear to change their behaviors that might address falls when participating in observational studies.

Keywords: Falls, older adults, exercise, participation, threat appraisal, risk

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Falls are a significant cause of injury-related death and morbidity in the older population (CDC, 2013; Hornbrook et al., 1994). Approximately one-third of older adults fall annually (Dolinis, Harrison, & Andrews, 1997; Gillespie et al., 2012) and one-fifth of them will require medical attention (Lord, Ward, Williams, & Anstey, 1993; Tinetti & Williams, 1997). Exercise is the most efficacious single intervention amongst all evidence-based falls prevention activities that can be broadly applied in the community (Gillespie et al., 2012; Rose & Hernandez, 2010). However, older adults have been reported to have low levels of participation in exercise programs designed to prevent falls (Merom et al., 2012; Simek, McPhate, & Haines, 2012; Yardley, Donovan-Hall, Francis, & Todd, 2006).

Different approaches have been used previously to enhance participation by older adults in falls prevention exercise programs. For example, some researchers investigated the intention of older adults to participate in strength and balance exercises for the prevention of falls, adhering to the communication approach of "Don't mention the FALL word" i.e. without directly discussing the problem of falls with them (Yardley & Nyman, 2007). In contrast, other researchers have used a tailored educational approach where direct discussion about fall risks with the older adults was held prior to discussing specific falls prevention strategies with them (Hill, Etherton-Beer, & Haines, 2013). Both educational approaches reported an increase in intentions towards undertaking exercises or in raising awareness, confidence and motivation to engage in falls prevention activities. However, little is known about whether communication increases actual participation in exercises for the prevention of falls.

Another consideration in the field of health and physical activity promotion research is the potential "testing effect" that can be brought about by participation in the research itself. Testing effects arise because the mere act of collecting data changes the response that is being measured (Kirk, 2013). Typically this effect is considered with repeated measures of physical performance tests (e.g. measures of static standing balance), where performing the test provides the participant with practice in that test and they improve their performance with subsequent testing. However, it is also possible that performing one test or answering a particular question may impact on subsequent performance of other tests or responses to subsequent questions. This is important, both in interpreting data and as a means for bringing about health improvements and behavioral change. For example, a recent study has shown that mere participation in health related research resulted in participants having a greater awareness and knowledge of a specific health problem, and increased their desire to take preventive actions (Castillo, Jandorf, Thélémaque, King, & Duhamel, 2012). In particular, a pioneer study has provided evidence that asking questions (through participant completion of a blood donating behavior questionnaire) actually increased consequential health (blood donating) behaviors (Godin, Sheeran, Conner, & Germain, 2008). However, there are no previous investigations of whether participating in an observational survey on falls prevention amongst older adults might impact on their attitudes towards falls or their behaviors to prevent falls.

This study aims to examine whether participating in an observational study that involved a survey in investigating falls amongst older adults and their prevention can impact on their attitudes towards falls and their participation in strategies to prevent falls.

Methods

Design

Data for this research were collected from a broader study that was conducted to investigate the acceptability of evidence-based falls prevention strategies, the likely barriers to and facilitators for individual action targeting state-wide strategies for the prevention of falls among community dwelling older adults in Victoria, Australia (Day et al., 2011). A baseline survey was performed to examine older adults' perceptions of group and home-based exercises to prevent falls, their intentions to participate and current levels of participation in these exercises, their perceptions of risk of falling in the next 12 months, and selected demographic variables e.g. socio-economic background, co-morbidities and self-reported difficulty with mobility tasks. Within this survey, researchers delivered pre-fabricated evidence-based information to the participants on exercise intervention for the prevention of falls. The broader survey also examined their perceptions and intentions to participate in other evidence-based falls prevention strategies such as multifactorial assessment programs, home assessment with modification recommendations and withdrawal from use of psychoactive medications (Gillespie et al., 2012). A follow-up survey was conducted one year later to re-collect data pertaining to exercise intervention as well as other outcomes of relevance to the broader study within which this work was undertaken (Day et al., 2011). The follow-up survey was conducted to investigate how the factors that were described in baseline survey can be related to actual participation. This paper focused on follow-up survey respondents' participation in exercises, their perceptions towards falls and fall risks, and strategies they felt they could use to prevent falls, as compared to their baseline survey responses.

Participants

Participants were community dwelling Australians aged $\geqslant$70 years from the State of Victoria with sufficient spoken English language proficiency (able to hold and maintain a

telephone conversation). The broader study sought to have equal numbers of those with and without one or more of a specific set of chronic diseases (diabetes, congestive heart failure, pulmonary disease, renal disease, depression or anxiety). Older people with these chronic conditions were sampled because these conditions were found to be associated with increased length of hospital stay in a previous investigation of hospital admission data in Victorian public hospitals (Vu, Finch, & Day, 2011). People with significant cognitive impairment, defined as a score of $\geqslant$13 on the 6-item cognitive impairment test at baseline or at the follow-up survey were excluded (Brooke & Bullock, 1999).

Survey instrument

Theoretical framework of the baseline survey was drawn primarily from an instrument derived from the Health Belief model (HBM) (Janz & Becker, 1984) that was used amongst hospital in-patients to examine perceived risk of falls and perceptions towards participation in falls prevention interventions (Haines & McPhail, 2011; A.-M. Hill et al., 2011; A. M. Hill et al., 2011). Additional input adapted from the relevant constructs of Protection Motivation Theory (PMT), Theory of Reasoned Action (TRA) and Theory of Planned Behavior (TPB) (Ajzen, 1991; Fishbein & Middlestadt, 1987; Janz & Becker, 1984; Rogers, 1975) were incorporated to form a conceptual model (Day et al., 2011) which guided the design of the baseline questionnaire. This model explained an individual's likelihood to undertake a falls prevention strategy by weighing up perceived benefits and costs of undertaking a falls prevention intervention. Questions that investigated exercise intervention for the prevention of falls were designed with reference to this model. The questions focused on an indiviual's perceived risk of falls and risk of harm from falls (adapted from HBM and PMT), importance to an individual of preventing harm from falling and perceived conflict with perceived social norms (adapted from TRA) , perceived efficacy of exercises to prevent

falls in general and specifically to the individual (adapted from HBM), self-efficacy to undertake falls prevention exercises, perceived benefits and costs of participation in falls prevention exercises including direct and indirect costs e.g. out of pocket expense or time spent (adapted from TPB), cues to action and other barriers or facilitators that may affect the uptake of group or home-based exercises to prevent falls (e.g. influence from health professionals, family or friends). The follow-up survey was similar to the baseline survey and contained customized questions to evaluate actual participation in falls prevention exercises, and changes to perceived threat appraisal of risk due to falls and strategies that respondents felt they could use to prevent falls. Questionnaires that pertain to this paper are available on request.

Pictures of exercises, Tai Chi positions and equipment typically used in group and home-based exercise program in falls prevention were sent to participants before the baseline survey. During the baseline survey, information regarding group and home-based exercises and their typical structure, content and purpose were explained to participants, along with the anticipated travel time and financial costs for metropolitan and regional residents. They were then asked to think about what it was like if they had previously attended such interventions and what it would be like to participate in these interventions in the next six months. Participants were encouraged to refer to these pictures and ask for clarification if required. No actual suggestions or referral were made by interviewers for the participants to do the exercises.

Threat appraisal related to fall risks in the next 12 months, perceptions that participation in group or home-based exercises would reduce risk of falling and intentions to participate in these exercises within the next six months were examined through use of 5-point Likert scaled items (strongly agree to strongly disagree, with undecided as a central point) in the baseline survey. Closed questions were used to collect data on current

participation in exercise and the occurrence of falls in the past 12 months in the baseline and follow-up surveys. A fall was defined as an event which resulted in a person coming to rest inadvertently on the ground or floor or other lower level (WHO).

Open-ended questions were used to collect data on whether participation in the baseline survey affect how they felt about the issue of falls and whether they did anything to prevent falls. The specific wording of these questions were "how did your participation in the survey on falls last year change your feelings about falling or your risk of falling over?" and "how did your participation in the survey last year change your thoughts about the things you could do to reduce your risk of falling over?". No open-ended questions were asked to investigate other events that may have occurred over the last 12 months that participants felt may have changed their feelings about their risk of falls or thoughts about actions they could take to prevent falls.

Procedure

A research company commenced recruitment of potential participants in October 2010. 13,614 telephone numbers were randomly selected from the 2006 Victorian electronic residential telephone listings. This was the most readily available listing at the time and was used as the sampling frame. Consent to participate in the baseline survey was obtained from all eligible people in the household from these telephone numbers. Subsequent telephone calls were then made to those who gave consent to screen for cognitive impairment before proceeding with the baseline survey. The survey respondents were then asked if they would give consent for a follow-up survey upon their completion of the baseline survey. Telephone calls were made to them in 12 months' time to screen for cognitive impairment again prior to administration of follow-up survey. No replacement sample was made for non-responses, disconnected telephone calls, refusals, telephone numbers that were fax or business numbers,

or people who were hearing impaired, ill or away. Participants in the baseline survey were interviewed over the telephone by research assistants between December 2010 and February in 2011, while participants in the follow-up survey (recruited from baseline participants) were interviewed between January and March 2012. The study was approved by the Monash University Human Research Ethics Committee.

Interviewers were health professionals or research assistants that were affiliated with Monash University or the research company. They were trained by investigator (T.P.H.) in the administration of the surveys. Questions and relevant prompting materials were included in an online survey program (www.surveymonkey.com). The survey data was entered directly by the interviewers onto Survey Monkey at the time of telephone interview. Short responses to the open ended questions were transcribed verbatim. Extended responses were summarized and confirmed with the participant before recording. Regular meetings were held between the chief investigator and interviewers to ensure uniformed data collection process and to address potential problems that may occur during the administration of the surveys.

Data analysis

Differences in the baseline data were compared between all baseline survey respondents and those who also completed the follow-up survey to determine if a particular subgroup of respondents did not complete the follow-up survey (Table 1). This was performed to examine if there were any systematic drop-outs that could have affected the interpretation of uptake of falls prevention exercises at follow-up. Wilcoxon signed-rank tests were used to analyze matched-paired data amongst respondents who completed both surveys to determine the change in exercise participation at the follow-up, and other variables that may explain this change i.e. whether the participant had fallen in the last 12 months or perceptions of risk of falls and risk of sustaining a serious injury if they were to fall.

Univariable logistic regression was performed to identify baseline variables that were associated with commencement of participation in group or home-based exercises for the prevention of falls at the follow-up (Table 1). The alpha criterion for statistical testing was set at $p<0.05$. Data analyses were undertaken using STATA version 12 (College Station, TX, USA).

Qualitative data relating to the changes in self-appraisal of threat of falls, and perceptions about activities respondents could do to reduce their risk of falls from the follow-up survey were coded using a summative methodology of content analysis (Hsieh & Shannon, 2005). The data were coded to the constructs of the conceptual model developed for the baseline survey (Day et al., 2011). This coding was led by author (D.-C.A.L.) and reviewed in collaboration with (T.P.H.) to ensure adequate description of participants' responses.

Results

The flow of participants through the baseline and follow-up surveys was presented in a related research (Lee et al., 2013). There were 394 respondents in the baseline survey, of whom 245 (62%) completed the follow-up survey. The mean age of respondents in both surveys was 77 years. At the baseline survey, 59% of the respondents were female, 51% lived alone and 36% had fallen in the previous 12 months. Of the follow-up survey respondents, 60% were female, 49% lived alone and 34% had fallen in the 12 months between the surveys. Demographic characteristics, comparison of baseline data between all respondents and those who completed the follow-up survey are presented in Table 1. Baseline respondents taking part in the follow-up survey were more likely than all respondents to agree that participation in group exercises ($p<0.001$) or home-based exercises ($p=0.001$) would reduce their risk of falls. There were no other significant baseline differences between these two groups (Table 1). In addition, there was no systematic drop-out of baseline respondents who were/ were not

exercising (25%/75%) compared to those who completed both surveys that were/ were not exercising (26%/74%). (Table 1 about here)

Analysis of matched-pair data amongst respondents who completed both surveys indicated that the proportion of respondents who were currently engaged in group or home-based exercises was 12% higher at follow-up than at baseline [baseline: 26% (n=61 out of 238 with data), follow-up: 38% (n=94 out of 245 with data), Wilcoxon *p*-value<0.001]. There was no significant differences detected in other aspects: the proportion of respondents who fell in the past 12 months [baseline: 34% (n=82 out of 244 with data), follow-up: 38% (n=93 out of 244 with data), Wilcoxon *p*-value=0.22], the proportion of respondents who agreed (strongly agreed or agreed) that they would likely fall in the next 12 months [baseline: 20% (n=49 out of 243 with data), follow-up: 17% (n=42 out of 245 with data), Wilcoxon *p*-value=0.25] or would seriously injure themselves if they were to fall [baseline: 19% (n=46 out of 244 with data), follow-up: 21% (n=51 out of 243), Wilcoxon *p*-value=0.28].

Inner ear dysfunction was the only independent baseline variable associated with commencement of either group or home-based exercises at follow-up (Table 1). There were associations detected between perceptions at baseline that participation in group-based (*p*=0.001) or home-based exercises (*p*=0.01) will reduce their risk of falls and current participation in either types of exercise at follow-up.

Qualitative data of the changes respondents reported in their perceptions about risk of falls and the behaviors they have adopted to prevent falls since participation in the baseline survey were investigated to enhance interpretation of overall results. Seventy one of 245 respondents (29%) in the follow-up survey responded to the open-ended question of "how did your participation in the survey on falls last year change your feelings about falling or your risk of falling over?" Each respondent could provide more than one comment. The comments

were coded and classified into five major categories that were divided into subcategories (Figure 1). The categories were: (1) *threat appraisal* which described awareness of falls and perception of risk related to falls, (2) *action to change* which described actual behavioral change to prevent falls, (3) *cues to action* prompting uptake of preventive action, (4) *no reason* specified, and (5) *initiation of a discussion with someone about falls*. There were 48 comments (51%) made in the *threat appraisal* category, which was further divided into four subcategories with increased general awareness and knowledge of falls, and perceived likelihood of falling as the main subcategories. *Action to change* (36 comments, 38%) was divided into six subcategories with "being careful in general" and "being more careful with the environment and specific activities" as the main subcategories. *Cues to action* (6 comments, 6%) were expressed by some respondents about their involvement in the baseline survey. (Figure 1 about here)

One hundred and eight follow-up respondents (44%) answered the open-ended question of "how did your participation in the survey last year change your thoughts about the things you could do to reduce your risk of falling over?" Each respondent could provide more than one comment. The comments were classified into three main categories which were divided into subcategories (Figure 2). The categories were: (1) *implementation of strategies to prevent falls*, (2) *threat appraisal* and (3) *no reason* specified. The largest category was *strategies* reportedly used to prevent falls which consisted of 140 comments (85%), of which "being more careful with the environment and specific activities" (43 comments, 26%), "being more careful in general" (39 comments, 24%) and uptake of exercises (14 comments, 8%) were the main subcategories. Eight respondents specifically commented on commencement of evidence-based falls prevention exercise to prevent falls. *Threat appraisal* is the second largest category which consisted of 23 comments (14%), with comments given

on increased general awareness and knowledge of falls (11%), and increased perception of their personal risk of falls (3%). (Figure 2 about here)

Discussion

Compared to baseline, there was a 12% increase in those who reported currently participating in group or home-based exercise to prevent falls at follow-up. Amongst the follow-up respondents, 24% of those who did not do exercise at baseline changed to exercising at follow-up, 29% of respondents reported a change in their feelings about falls or fall risks, and 44% reported a change in their attitudes or participation in activities to prevent falls.

We speculate our survey may have "planted" falls prevention exercise into the subconscious minds of some of our respondents, resulting in an action through the unconscious behavioral guidance of perception, evaluation, and motivation (Bargh & Morsella, 2008). This would explain why our analysis of quantitative data found a 12% increase in participation in falls prevention exercise programs while our qualitative data did not identify the same magnitude of effect (only eight respondents specifically mentioned doing exercise to prevent falls in response to participating in the baseline survey). Had this effect been of the same magnitude, we would expect some 80 respondents to have specified this in the qualitative component of our data collection. Instead, they reported a range of other behaviours to prevent falls. It is likely that participation in the survey has made them more receptive to cues to action. It is also possible that some respondents may have under-reported exercise behaviour when they were asked qualitatively what they thought about strategies that they could use to prevent falls. We suggest using a prospective rather than a retrospective method of data reporting may be more reliable when investigating a self-reported event e.g. uptake of exercise in older adults over an extended time. This may include

respondents using a monthly calendar to record their actions taken each month over the last 12 months to prevent falls.

Similarly, our quantitative analysis found there was no difference in self-perceived risk of falls or risk of harm if falls were to occur while our qualitative analysis found that participation in the baseline survey made a considerable proportion of respondents felt that they were now more aware of their risk of falls. This discrepancy may be due to the fact that we measured quantitatively respondents' perception of risk of falls at a specific 12 month time point, rather than a change over the last 12 months that the qualitative investigation has sought.

Our study contains limitations that need to be considered when interpreting our results. We found that the group of respondents who completed the follow-up survey was more likely to agree at baseline that participation in exercises would reduce their risk of falls compared to those who did not complete the follow-up assessment. Thus, the group who completed the follow-up survey was more positively pre-disposed to participating in exercise to prevent fall from the outset. This difference could just be statistical aberration as we did investigate over 30 variables (not all were shown in Table 1) to determine whether there were any systematic differences. However, we cannot rule out the possibility that respondents who completed the follow-up survey had an increased tendency to participate in exercises. This is because of the associations found between their perceptions of exercises at baseline and current participation in exercises at follow-up. Our qualitative data did provide evidence that participation in the baseline survey had an effect on attitudes towards falls and their prevention and uptake of falls prevention strategies. However, we do not have data for other changes that may have occurred in the last 12 months that respondents felt could have affected their participation in falls prevention strategies, for example, whether they received information from other sources. The other key study limitations were that within recruitment we were unable to

attain a 100% recruitment and follow-up rate, which makes extrapolation to the broader population more difficult, and our qualitative, open-ended questions were somewhat leading in that they were phrased in a way that assumed a change in perceptions or behaviors had taken place. However, approximately 56% of respondents did not feel these questions applied to them and offered no response to both of these questions.

Conclusion

We conclude that participation in an observational, survey-based falls prevention research project may have contributed to changed perceptions and behaviors in people who already held favorable views of exercises for the prevention of falls. This is important for understanding the interpretation of results from longitudinal falls prevention and exercise-based research, and how applicable findings may be to a general population who have not been exposed to similar survey questions. It is also important for clinicians seeking to prevent falls as it appears discussing falls and their prevention may lead to actual uptake of exercises in those who have positive perceptions towards exercises to prevent falls.

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Table 1

Demographic characteristics and other variables at baseline, and their univariable associations with commencement of participation in group or home-based exercises at follow-up to reduce risk of falls

	Baseline survey (all participants)	**n with data**	**Baseline survey (only those participants who completed follow-up survey)**	**n with data**	**Difference between the two groups[a] *p*-value***	**Univariable association between variable and commenced participation in any exercise at follow-up survey OR (95% CI) *p*-value***
n	394		245			
Age – mean (sd)	77 (7)	393	77 (6)	245	0.99	1.03 (0.97-1.09) *P*=0.33
Female gender	232 (59%)	391	148 (60%)	245	0.58	0.69 (0.34-1.42) *P*=0.32
Marital status		391		243	0.92	0.63 (0.31-1.27) *P*=0.20
Married	199 (51%)		121 (51%)			
Widowed	131 (34%)		80 (32%)			

Divorced Separated Never married	34 (9%) 10 (3%) 14 (4%)		23 (9%) 7 (3%) 8 (3%)			
Lives on their own	199 (51%)	393	121 (49%)	245	0.45	1.57 (0.78-3.16) *P*=0.21
Country of birth Australia Other countries	290 (81%) 70 (19%)	360	182 (81%) 44 (19%)	226	0.86	0.75 (0.31-1.80) *P*=0.52
6-item Cognitive Impairment Test score[b] mean (sd)	2 (3)	387	2 (2)	245	0.06	0.94 (0.83-1.07) *P*=0.38
Congestive heart failure	15 (4%)	389	10 (4%)	244	0.75	0.63 (0.07-5.54) P=0.68
Another form of heart disease[c]	112 (29%)	388	73 (30%)	243	0.58	1.47 (0.72-3.02) *P*=0.29
Stroke[d]	41 (10%)	392	20 (8%)	245	0.06	1.69 (0.54-5.25) *P*=0.37
Cancer	91 (23%)	391	57 (23%)	244	0.96	1.66 (0.75-3.68) *P*=0.21

Osteoporosis or osteopenia	87 (22%)	392	55 (22%)	245	0.88	1.6 (0.73-3.53) *p*=0.24
Depression or anxiety	65 (17%)	392	37 (15%)	245	0.31	1.35 (0.55-3.34) *P*=0.51
Arthritis	222 (57%)	392	145 (59%)	245	0.19	1.48 (0.72-3.04) *P*=0.28
Diabetes	63 (16%)	390	41 (17%)	244	0.65	0.69 (0.24-1.95) *P*=0.48
Lung disease[e]	60 (15%)	391	39 (16%)	245	0.68	1.53 (0.61-3.82) *P*=0.36
Inner ear dysfunction affecting balance	48 (12%)	392	30 (12%)	245	1.00	3.52 (1.38-9.02) *P*=0.01*
Cataracts	84 (21%)	392	55 (22%)	245	0.53	0.45 (0.16-1.25) *P*=0.13
Other visual impairment	90 (23%)	391	64 (26%)	245	0.06	0.98 (0.44-2.14) *P*=0.95
Joint replacement	69 (18%)	392	45 (18%)	245	0.61	2.05 (0.91-4.62) *P*=0.08
Broken bone since turning 60	80 (20%)	391	39 (20%)	245	0.77	0.57 (0.20-1.58) *P*=0.28

Taking any psychoactive medication	50 (13%)	384	28 (12%)	242	0.27	2.17 (0.83-6.67) *P*=0.11
Hospital admission for at least one night in the past 6 months	76 (20%)	386	54 (22%)	241	0.09	0.46 (0.15-1.42) *P*=0.18
Health insurance[f]	250 (64%)	385	155 (65%)	239	0.97	0.82 (0.40-1.68) *P*=0.59
Perception of participation in group exercise will reduce their own risk of falling		382		244	<0.001*	0.85 (0.59-1.23) *P*=0.39
Strongly agree	69(18%)		48(20%)			
Agree	183(48%)		129(53%)			
Undecided	52(14%)		33(14%)			
Disagree	76(20%)		33(14%)			
Strongly disagree	2(1%)		1(0.4%)			
Intention to do or continue with group exercise I will start/continue with participating in group exercise within the next 6 months		379		240	0.12	0.72 (0.51-1.03) P=0.07
Strongly agree	34(9%)		24(10%)			
Agree	90(24%)		59(25%)			
Undecided	58(15%)		39(16%)			

Disagree	178(47%)		108(45%)			
Strongly disagree	19(5%)		10(4%)			
Perception of participation in home exercise will reduce their own risk of falling		381		238	0.001*	0.85 (0.58-1.23) *P*=0.38
Strongly agree	61(16%)		41(17%)			
Agree	183(48%)		128(54%)			
Undecided	55(14%)		31(13%)			
Disagree	80(21%)		38(16%)			
Strongly disagree	2(1%)		0			
Intention to do or continue with home exercise		372		234	0.34	0.84 (0.59-1.19) *P*=0.32
I will start/continue with participating in a home exercise program within the next 6 months						
Strongly agree	31(8%)		21(9%)			
Agree	68(18%)		46(20%)			
Undecided	82(22%)		53(23%)			
Disagree	174(47%)		100(43%)			
Strongly disagree	17(5%)		14(6%)			

*Statistical significance at $p<0.05$

Notes

[a] Based on linear regression for continuous variables, logistic regression for dichotomous variables, ordered logistic regression for ordinal variables or chi^2 for categorical variables.

[b] 0 – 28, higher scores are more impaired

[c] Includes coronary heart disease, cardiomyopathy, ischaemic heart disease, hypertensive heart disease, inflammatory heart disease, disease affecting one or more valves of the heart, heart murmur

[d] Includes mini-strokes, aneurysms, transient-ischemic attacks

[e] Includes asthma, emphysema, chronic obstructive pulmonary disease, chronic obstructive airways disease

[f] Private insurance or Department of Veterans Affairs coverage

OR= odds ratio

CI= confidence interval

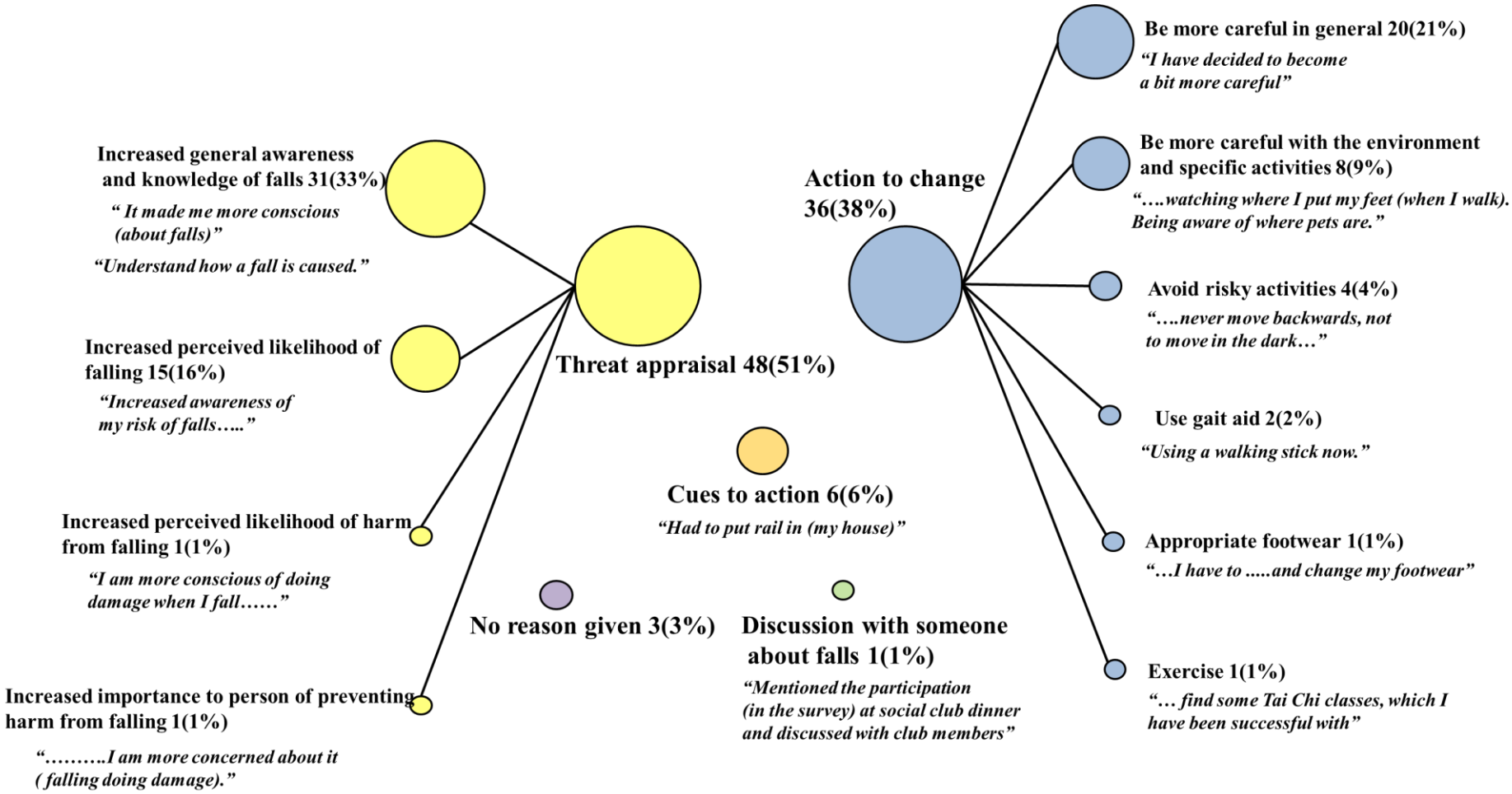

Figure 1. Change in perceptions about falls and risk of falls since participation in the baseline survey number of comments (percentages)

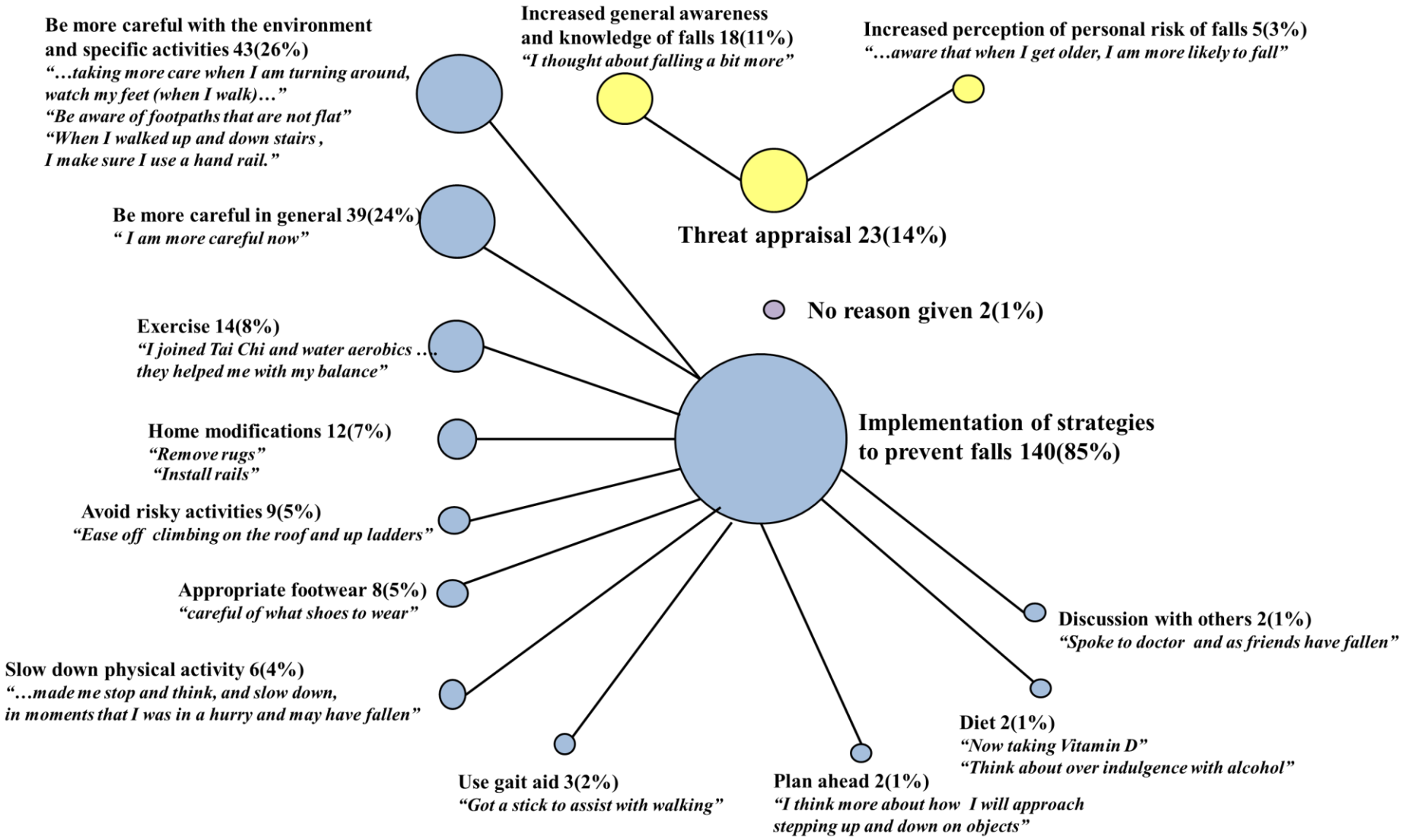

Figure 2. Change in attitudes and behaviours to reduce risk of falls since participation in the baseline survey number of comments (percentages)