

# Falls prevention in community care: 10 years on

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**Background:** A million older people living in Australia receive community care services each year due to experiencing functional or mental health difficulties. This group may be at greater risk of falling than similar-aged people not receiving services. However, there is limited falls prevention research for this population.

**Purpose:** The aim of this study was to identify the falls prevalence rates of older people from 10 Australian community care organizations and compare current falls prevention data to a study 10 years prior that utilized the same 10 organizations. This study also identified factors associated with falling for this population.

**Patients and methods:** This is a cross-sectional descriptive study, in which 5,338 questionnaires were mailed to a random sample of community care recipients aged  $\geq 65$  years.

**Results:** A total of 1,991 questionnaires were returned (37.3%), with 47.7% of respondents having fallen in the previous year, and 32.7% in the month prior to completing the questionnaire, similar to 10 years prior. Community care clients had a 50% higher falls rate than that reported for similar-aged people not receiving services, and this remained unchanged over the last 10 years. Eighty-six per cent of fallers had fallen once or twice, and 60% reported being injured. Thirty-six per cent of respondents reported not being able to get up independently, and only 27.4% of fallers were referred to a falls prevention program (significantly fewer than 10 years ago; 95% CI: 0.821–6.366,  $p=0.01$ ). Balance issues (odds ratio [OR]: 2.06, 95% CI: 1.288–3.290,  $p=0.003$ ) and perceived risk of falling in the future being “definite” (OR: 6.42, 95% CI: 1.890–21.808,  $p=0.003$ ) or “unsure” (OR: 3.31, 95% CI: 1.144–9.544,  $p=0.027$ ) were risk factors associated with falling. In contrast, individuals referred to a falls prevention intervention had a 47% reduced likelihood of having fallen (95% CI: 0.281–0.988,  $p=0.046$ ).

**Conclusion:** Community care clients should have their falls risk routinely assessed, and at-risk individuals be offered falls prevention advice and referral to fall prevention programs.

**Keywords:** aging, community care organizations, falls risk, home care, older people

## Introduction

The Australian population aged over 65 years is increasing both in numbers and as a proportion of the population as a whole.<sup>1</sup> In Australia, people aged  $\geq 65$  years who are experiencing functional and/or mental health issues can apply for assistance to stay living in their home through the government-funded aged care program. The community-based care services provided through this program include domestic assistance, personal care, nursing, transport, gardening, and social support. A million older Australians are receiving community aged care services each year.<sup>2</sup>

Experiencing functional difficulties increases a person's risk of falling.<sup>3,4</sup> Many older people receiving community aged care services will have experienced decreases in strength and balance, bouts of illness, and ongoing pain or injury, which also increase their risk of falling. A study by Smith and Lewin<sup>5</sup> exploring falls prevalence in a sample of community care clients in Australia a decade ago found 45% had fallen in

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the previous year. This is 50% higher than the 30% prevalence rate, which has been found in studies of the general community-dwelling older population.<sup>6,7</sup> In contrast, a 2002 study of 2,304 older Canadian home care recipients found only 27% had fallen in the last year, a rate in line with general older community-dwelling populations.<sup>8</sup> Other studies investigating falls prevalence among community care clients have only looked at the clients of a single community care organization,<sup>9</sup> or studied subpopulations, such as people with dementia receiving community care services,<sup>10</sup> or had shorter data collection periods (30–90 days) limiting the value of comparison of rates between studies.<sup>8,11</sup>

Factors identified as associated with an increased likelihood of future falls among older community care clients have included female gender, having had a previous fall, physical inactivity, balance problems, gait and mobility issues, frailty, and environmental hazards.<sup>7,8</sup> Similar factors have been found to be associated with increased falls risk in older community-dwelling adults more generally.<sup>3,12</sup>

Falls can lead to serious injury such as fractures, head injuries, and even death,<sup>13</sup> and cost health systems billions of dollars to treat.<sup>14,15</sup> In the year 2012–2013, almost 100,000 older people were hospitalized due to a fall in Australia.<sup>13</sup> This accounted for 22% of all injury-related hospitalized cases.<sup>13</sup> Being hospitalized as a consequence of a fall increases the probability that an older person will enter residential care, with up to one in five going into residential care directly from hospital.<sup>16</sup> A specific aim of the community aged care program is the prevention of premature residential care admission.<sup>17</sup> Yet, despite falls being an obvious contributor to such admissions, there has been no research during the last decade which has examined whether the sector has been successful in reducing the rate of falls (given the substantial growth in successful randomized controlled trials in this period),<sup>6</sup> and whether other falls data (eg, number of times falling, injuries, referral to falls prevention programs) have improved or remained the same over time. Therefore, the aim of this study is to determine the falls rates of older people receiving services from 10 community care organizations and compare to data from 10 years prior to determine whether improvements have occurred. This study provides community aged care providers with information that will allow them to better target falls prevention strategies or referral.

## Patients and methods

### Study design

This was a cross-sectional descriptive study in which older people who were receiving services from 10 community

care organizations were surveyed by mail. Community care organizations in Australia provide services such as domestic assistance, personal care, nursing, gardening, and social support. These organizations traditionally receive funding from state or federal governments to provide services at home (or in the community) for older people with physical (function) or mental health problems, with the goal to help the older person to stay living independently.

### Sample population

The study population consisted of the 14,113 clients aged 65+ of 10 community aged care providers in the Perth metropolitan area (Western Australia), at the time of the study. This constituted 20% of the total Western Australian home and community care population at that time.<sup>18</sup> All organizations had been involved in a similar prevalence study conducted 10 years earlier,<sup>5</sup> and depending on their size, sent the study survey to either all of their clients who met the inclusion criteria or to a random sample. The inclusion criteria were receiving community care services from one of the included organizations, living in the community, and aged  $\geq 65$  years. Individuals who had a diagnosis of dementia were excluded. After excluding clients meeting this criterion or who did not meet the inclusion criteria, organizations randomly selected clients using the electronic random number generator in excel. The 65+ age group was chosen because eligibility for home and community care at the time of the study was  $\geq 65$  years. A total of 5,338 surveys were sent out in October/November 2015 to 38% of their older client population.

### Survey tool

The questionnaire was based on that used by Smith and Lewin<sup>5</sup> in the study 10 years prior; however, a small number of questions were added to address topics not originally examined, such as an older person's ability to rise from the floor independently. The new questionnaire included 45 questions, consisting of a combination of open and closed questions and used the falls definition recommended by the Prevention of Falls Network Europe (ProFaNE) collaboration, "an unexpected event in which the individual comes to rest on the ground, floor, or lower level" (p. 1619),<sup>19</sup> and it was professionally designed for ease of completion. All questions were self-report, and included sociodemographic data (eg, age, sex, living status), health status, medical or health condition(s), perceived mobility (use of walking aids), and perceived activity levels. Three questions were included regarding vitamin D: does your doctor test you regularly,

do you have a vitamin D deficiency, and do you take vitamin D supplements daily. Falls data included falls in the last month and year, injuries associated with these falls (allowing injury information for the last three falls), if so type of injuries sustained, medical assistance required for the last three falls, cause of fall, location of fall, and whether assistance was needed to get up from ground after a fall. The survey also asked whether clients had been referred to a falls prevention program in the previous 12 months. The questionnaire was then pilot tested with 13 older clients from three of the participating organizations, and their feedback were used to make some minor modifications before the questionnaire was used in the main study.

## Data collection

A letter explaining the purpose of the study, the questionnaire, and a replied paid envelope were mailed by each provider agency to their selected sample. Consent was assumed by completion and return of the questionnaire.

## Data from study 10 years ago

Eligibility criteria for the Smith and Lewin<sup>5</sup> study 10 years prior which included the same 10 organizations were similar to the current study: aged  $\geq 60$  years, living in the community, and receiving services; those with a diagnosis of dementia were excluded. Sampling was conducted in the same manner as the current study with smaller organizations mailing to all clients meeting the inclusion criteria, while larger organizations randomly sampled their population.

## Ethics

Ethics approval was granted by the Curtin University Human Research Ethics Committee (HREC) and an HREC from one of the community care organizations.

## Statistical analysis

Statistical analyses were performed using Statistical Package for the Social Sciences (SPSS) (version 24). Descriptive statistics were generated for all quantitative data using the complete sample. Data were examined for normality of distribution, and where required, nonparametric tests were used. Comparisons between fallers and non-fallers were undertaken using independent group *t*-tests and chi-square tests. The binary outcome (faller versus non-faller) was used in the univariate and multivariate analyses to identify risk factors associated with falling. Initial univariate analysis involved identifying between-group (faller versus non-faller) differences. Sociodemographic, health conditions and symptoms, mobility and activity levels, medications, and falls prevention data were all included in

this analysis, which was not adjusted. A further univariate analysis adjusting for age and sex was then undertaken. Variables with  $p \leq 0.1$  in the univariate analysis were included in the multivariate logistic regression analysis,<sup>20,21</sup> using the hierarchical model.<sup>22</sup> Covariates that may have potentially correlated were checked using Spearman rank-order correlation, and for those highly correlated ( $r > 0.7$ ), the variable with the highest odds ratio (OR) associated with falling was used.<sup>23</sup> Potential confounders (eg, age, sex) were adjusted for in the multivariate logistic regression model, and *p*-values  $< 0.05$  were considered statistically significant.

## Results

### Sociodemographics

One thousand nine hundred and ninety-one questionnaires were returned, with a response rate of 37.3%. The mean age of the cohort was  $81.1 \pm 8.2$  years, and 74.6% of respondents were female ( $n=1,465$ ). Seventy-seven per cent lived in a house or unit ( $n=1,438$ ), 17.8% in an independent living unit in a retirement village ( $n=331$ ), and 3.4% in government housing ( $n=64$ ). Sixty-four per cent of respondents lived alone ( $n=1,164$ ); those who did live with someone predominantly lived with their spouse (71.3%,  $n=532$ ) or a relative (24.8%,  $n=185$ ). Eighty-nine per cent ( $n=1,546$ ) of respondents indicated they could walk outside their home; however, only 25.1% reported no trouble walking ( $n=469$ ). Fifty-seven per cent of respondents were receiving domestic assistance ( $n=1,577$ ), 8.3% social support ( $n=228$ ), and 6.7% personal care ( $n=184$ ). Ninety-seven per cent of respondents reported taking at least one prescribed medication ( $n=1,799$ ) regularly. Table 1 presents a comparison between the fallers and non-fallers for the total sample.

### Prevalence of falls

Forty-eight per cent of respondents reported falling during the previous year ( $n=949$ ), and of these, 32.7% reported having had a fall ( $n=310$ ) during the month prior to completing the questionnaire. Of those who reported falling in the previous month, 61.6% ( $n=185$ ) had fallen once, 24.5% twice ( $n=76$ ), and 13.9% three or more times ( $n=43$ ). Of those who had fallen at some time during the previous year, 41.9% reported falling once ( $n=398$ ), 24.3% twice ( $n=231$ ), and 12.3% thrice ( $n=117$ ). Fourteen respondents reported falling more than 12 times during the year, with two estimating 60 falls each. These two respondents also reported having balance problems related to their ill-health – one Parkinson's disease and arthritis and the other a stroke, memory loss, and weakness of the legs and back.

**Table 1** Participant characteristics by falls status

Variables	Fallers (n=949)	Non-fallers (n=1,038)	p-value
Age (years)	80.74±8.57	81.44±7.94	0.063
Sex			0.361
Male	247 (26.3)	251 (24.5)	
Female	691 (73.7)	772 (75.5)	
Lives in home/unit/apartment	687 (72.4)	749 (72.2)	0.907
Lives alone	549 (63.0)	614 (65.7)	0.229
Health status			<0.001
Excellent	31 (3.3)	37 (3.6)	
Very good	156 (16.7)	244 (23.9)	
Good	362 (38.7)	426 (41.7)	
Fair	291 (31.1)	270 (26.4)	
Poor	95 (10.2)	44 (4.3)	
Ability to walk outside home	721 (85.8)	823 (91.9)	<0.001
Current perceived mobility			<0.001
No trouble walking	163 (18.1)	306 (31.7)	
Some trouble but do not use aid	222 (24.7)	268 (27.7)	
Need a mobility scooter outside home	58 (6.5)	43 (4.5)	
Use walking aid outside home	377 (41.9)	291 (30.1)	
Use walking aid inside home	67 (7.5)	45 (4.7)	
Use wheelchair inside home	7 (0.8)	7 (0.7)	
Other	5 (0.6)	6 (0.6)	
Current perceived activity level			0.003
Vigourously active at least 30 min 3/week	57 (6.5)	81 (8.6)	
Moderately active at least 30 min 5/week	215 (24.4)	270 (28.6)	
Moderately active at least 30 min 2–3/week	306 (34.7)	339 (35.9)	
Seldom active, prefer sedentary activities	303 (34.4)	254 (26.9)	
Medical conditions or symptoms			
Low blood pressure	150 (26.8)	124 (20.2)	0.008
Parkinson's disease	29 (5.9)	15 (2.7)	0.010
Stroke	97 (19.0)	76 (13.1)	0.007
Heart condition	294 (49.1)	294 (43.0)	0.030
Dizziness	244 (43.0)	166 (27.5)	<0.001
Memory loss	162 (31.0)	135 (22.6)	0.001
Balance problems	502 (72.4)	287 (43.8)	<0.001
Vertigo	155 (29.8)	107 (18.9)	<0.001
Arthritis	612 (80.8)	599 (73.7)	0.001
Weakness of the legs and back	562 (78.7)	495 (66.4)	<0.001
Taking prescribed medications	871 (97.8)	927 (96.0)	0.028
Vitamin D deficiency	186 (20.5)	173 (17.9)	0.010
Problems with vision	425 (47.8)	413 (43.8)	0.085
In hospital the week before the fall	40 (4.3)	6 (1.2)	0.002
Able to get up independently after fall			<0.001
Yes	519 (55.1)	319 (60.9)	
Unsure	81 (8.6)	71 (13.5)	
No	342 (36.3)	134 (25.6)	
Called an ambulance to get up	121 (13.0)	24 (3.5)	<0.001
Falls prevention referral in last 12 months	248 (27.4)	85 (10.5)	<0.001

(Continued)

**Table 1** (Continued)

Variables	Fallers (n=949)	Non-fallers (n=1,038)	p-value
Perceived risk of future falls			<0.001
Definitely	205 (22.8)	84 (9.2)	
Maybe	361 (40.2)	339 (37.3)	
Unsure	200 (22.2)	203 (22.3)	
Probably not	117 (13.0)	210 (23.1)	
Not at all	16 (1.8)	73 (8.0)	

**Notes:** Values are mean ± SD, n (%), or as otherwise indicated. Missing data occur where results do not reach n=949 for fallers and n=1,038 for non-fallers.

Of those who reported falling, 27.4% noted they were referred to a fall prevention program (n=248) during the past year, and 10.5% of non-fallers reported being referred to a falls prevention program (n=85).

### Injuries and medical assistance from falls

Sixty per cent (n=566) of the individuals who reported having fallen in the last year (n=949) reported they had sustained an injury. Bruises (80.4%, n=455), cuts and scratches (41.5%, n=235), injuries to the head or face (22.3%, n=126), and fractures of any part of the body (30.6%, n=173) were the most commonly reported types of injury.

Fifty-eight per cent of respondents who reported being injured did not seek medical assistance (n=330) from a qualified person. Of those who did, 45.0% said they had seen a doctor in the emergency department or hospital (n=255), 31.8% saw their local general practitioner (GP) (n=180), and 7.9% a physiotherapist (n=45).

### Location and cause of fall

Forty-nine per cent of the respondents who had fallen in the previous 12 months had fallen inside their home (n=466), 25.3% in their yard (n=240), and 12.9% in a public place (n=123). All other falls were reported as having happened elsewhere. Respondents gave multiple reasons for having fallen – tripped (25.5%, n=242), overbalanced or overreached (25.3%, n=241), and legs giving way (18.4%, n=175) being the most common, followed by not concentrating (16.2%, n=154) and rushing (10.6%, n=101).

### Rise from floor independently

Respondents were asked whether they could get themselves up off the ground without assistance. Fifty-seven per cent (n=839) reported they could, 10.4% were unsure (n=152), and 32.4% said they could not (n=476). Of the individuals who said they had not been able to get up by themselves after a fall, 16.5% reported a family member (other than spouse/partner)



had assisted (n=102), 22.7% an ambulance officer (n=140), and 16.5% spouse or partner (n=102). Others who had assisted included neighbor (12.3%, n=76), friend (5.7%, n=35), and passerby (2.4%, n=15).

## Comparison of falls data from study 10 years ago

Data from the 10 organizations a decade ago reported age in categories with the majority aged 71–80 years (35.5%) and 81–90 years (41.6%), similar to this current study. Other sociodemographic data (eg, sex, living status) were also similar with the proportions in the two studies being within 1%–2% points of each other. There was, however, a substantial difference in response rates, with the response rate in the current study being 37.3% whereas it was 47% in the Smith and Lewin study, despite that study mailing out half as many surveys as the current study. Falls data from the Smith and Lewin<sup>5</sup> study showed an annual falls rate of 44.9% compared to the rate of this study of 47.7% (95% CI: –0.244–5.840,  $p=0.068$ ), and a rate of 30.9% compared to this study's 32.7% (95% CI: –1.043–4.647,  $p=0.209$ ) during the month prior to completing the survey. As in the current study, the majority of community care respondents a decade ago reported falling only once or twice (68%). Despite the slight increase in falls rate between the two studies, 31% of respondents in the earlier study reported having been referred to a falls prevention program, whereas this figure was only 27.4% in the current study. The difference is statistically significant (95% CI: 0.821–6.366,  $p=0.01$ ).

## Factors influencing falls

The majority of variables tested in the univariate analyses were found to have a significant association with having fallen (Table 2). The only variables found not to be significant were age, sex, living in a home/unit/apartment, living alone, and problems with vision. The multivariable logistic regression model (Table 2), which included just three variables – balance problems, referral to a falls prevention specialist, and subjects' self-perception of falls risk – correctly classified 85% of faller cases and 69.6% of overall cases, and was statistically significant ( $\chi^2(17)=74.935$ ,  $p<0.001$ ). This model shows that those suffering from balance problems were 2.06 times (95% CI: 1.288–3.290,  $p=0.003$ ) more likely to have fallen than those who did not report balance problems. Those who perceived themselves as “definitely” being at risk of falling in the future were 6.42 times more likely to have fallen (95% CI: 1.890–21.808,  $p=0.003$ ), compared to those who thought they were at no perceived risk.

Similarly, the odds of having fallen in the past year were 3.31 times greater for those who perceived their risk of future falls as “unsure” (95% CI: 1.144–9.544,  $p=0.027$ ) compared to those who perceived no risk at all. Respondents who reported having been referred to a health professional or program to prevent falls in the past year were 47% less likely (95% CI: 0.281–0.988,  $p=0.046$ ) to have fallen than those who had not.

## Discussion

This study found the prevalence rate of falls among community care clients to be 47.7% which was not significantly different from the rate of 45% found among clients of the same service providers 10 years ago.<sup>5</sup> This rate is ~50% higher than that found in studies of community-dwelling older people (~30% fall annually),<sup>7</sup> not selected on the basis of their use of community care services, as well as Fletcher and Hirdes study of community care clients in which falls data were collected face to face rather than by anonymous questionnaire.<sup>8</sup> There are frequent anecdotal reports from Australian community care staff and families that older people are reluctant to tell anyone that they have fallen as they are concerned that this may lead to them being admitted to residential care. This may well account, at least in part, for the much lower prevalence rate found by Fletcher and Hirdes. Consistent with this hypothesis, a study in which clients from 22 community care organizations in the Netherlands were interviewed found that just 12.2% reported having fallen in the previous month,<sup>11</sup> compared to the 32.7% found in the present study.

The finding that individuals who reported impaired balance were twice as likely to have fallen is consistent with other studies of both home (community) care clients and older people in general which have also found balance problems to be a major falls risk factor.<sup>9,24</sup> It is widely reported that participating in an exercise program can reduce falls, and a systematic review by Sherrington et al that examined which types of exercise have been found to be most effective found those challenging balance and including at least 3 hours per week of exercise provided the greatest benefits.<sup>25</sup> Community care clients are known to have reduced physical activity levels, and many choose walking as their main form of exercise.<sup>26,27</sup> However, walking is not an exercise that in isolation can reduce falls,<sup>28</sup> and may even increase falls in at-risk populations if delivered in an unstructured manner.<sup>29</sup> The high falls rate found in this study, together with the increased risk associated with balance difficulties found in this and other studies, indicate the need for community aged

**Table 2** Analysis of factors influencing falls

Variables	Univariate analysis (no adjustments)			Univariate analysis (adjusted age and sex)			Multivariable analysis (adjusted age and sex)		
	Odds ratio	95% CI	p-value	Odds ratio	95% CI	p-value	Odds ratio	95% CI	p-value
Age (years)	0.99	0.979–1.001	0.063				0.98	0.957–1.007	0.154
Sex (female/male)	0.91	0.742–1.115	0.361	0.99	0.98–1.001	0.083	0.79	0.477–1.290	0.339
Lives in home/unit/apartment (yes/no)	1.01	0.831–1.232	0.907	0.99	0.811–1.213	0.935			
Lives alone (yes/no)	1.12	0.928–1.364	0.229	1.08	0.882–1.311	0.471			
Health status									
Excellent	Reference								
Very good	0.76	0.455–1.281	0.306	0.78	0.467–1.317	0.358			
Good	1.01	0.617–1.668	0.956	1.02	0.618–1.674	0.946			
Fair	1.29	0.776–2.132	0.329	1.31	0.788–2.167	0.3			
Poor	2.58	1.420–4.678	0.002*	2.51	1.38–4.565	0.003*			
Ability to walk outside home (yes/no)	0.54	0.395–0.731	≤0.001 <sup>^</sup>	0.52	0.383–0.712	≤0.001 <sup>^</sup>			
Current perceived mobility									
No trouble walking	Reference								
Some trouble walking but do not use aid	1.55	1.199–2.017	0.001*	1.59	1.221–2.067	0.001*			
Need a mobility scooter outside home	2.53	1.634–3.923	≤0.001 <sup>^</sup>	2.63	1.690–4.101	≤0.001 <sup>^</sup>			
Use walking aid outside home	2.43	1.906–3.104	≤0.001 <sup>^</sup>	2.73	2.122–3.519	≤0.001 <sup>^</sup>			
Use walking aid inside home	2.79	1.831–4.266	≤0.001 <sup>^</sup>	3.10	2.019–4.754	≤0.001 <sup>^</sup>			
Use wheelchair inside home	1.88	0.647–5.444	0.246	1.68	0.573–4.950	0.344			
Current perceived activity level									
Vigorously active 30 min 3/week	Reference								
Moderately active 30 min 5/week	1.03	0.685–1.533	0.904	1.13	0.771–1.665	0.526			
Moderately active 30 min 3/week	1.06	0.712–1.567	0.784	1.29	0.886–1.873	0.186			
Seldom active, preferring sedentary activity	1.27	0.846–1.901	0.250	1.70	1.161–2.480	0.006*			
Medical conditions or symptoms (yes/no)	1.27	1.183–1.365	≤0.001 <sup>^</sup>						
Low blood pressure	1.45	1.102–1.898	0.008*	1.49	1.130–1.958	0.005*			
Parkinson's disease	2.27	1.202–4.284	0.010 <sup>#</sup>	2.12	1.116–4.015	0.022 <sup>#</sup>			
Stroke	1.56	1.125–2.164	0.007*	1.53	1.096–2.124	0.012 <sup>#</sup>			
Heart condition	1.28	1.023–1.590	0.030 <sup>#</sup>	1.27	1.014–1.585	0.038 <sup>#</sup>			
Dizziness	1.99	1.557–2.536	≤0.001 <sup>^</sup>	1.97	1.546–2.521	≤0.001 <sup>^</sup>			
Memory loss	1.54	1.179–2.011	0.001*	1.57	1.195–2.057	0.001*			
Balance problems	3.37	2.685–4.229	≤0.001 <sup>^</sup>	1.22	2.648–4.179	0.001*	2.06	1.288–3.290	0.003*
Vertigo	1.82	1.373–2.414	≤0.001 <sup>^</sup>	3.33	1.382–2.443	≤0.001 <sup>^</sup>			
Arthritis	1.51	1.187–1.915	0.001*	1.84	1.188–1.945	0.001*			
Weakness of the legs and back	1.88	1.482–2.371	≤0.001 <sup>^</sup>	1.83	1.450–2.327	≤0.001 <sup>^</sup>			
Taking prescribed medications (yes/no)	1.83	1.060–3.166	0.028 <sup>#</sup>	1.81	1.045–3.145	0.034 <sup>#</sup>			
Vitamin D deficiency (yes/no)	1.15	1.039–1.272	0.010*	1.16	1.050–1.288	0.004*			
Problems with vision (yes/no)	1.18	0.978–1.413	0.085	1.19	0.990–1.436	0.064			
In hospital the week before the fall (yes/no)	3.66	1.539–8.683	0.002*	3.57	1.498–8.487	0.004*			
Able to get up independently after fall (yes/no)	1.22	1.085–1.378	0.001 <sup>#</sup>	1.23	1.091–1.389	0.001*			
Called an ambulance to get up (yes/no)	4.16	2.654–6.524	≤0.001 <sup>^</sup>	4.18	2.659–6.564	≤0.001 <sup>^</sup>			
Falls prevention referral in last 12 months (yes/no)	3.24	2.477–4.233	≤0.001 <sup>^</sup>	3.30	2.516–4.339	≤0.001 <sup>^</sup>	0.53	0.281–0.988	0.046 <sup>#</sup>
Perceived risk of future falls	0.64	0.583–0.697	≤0.001 <sup>^</sup>	0.64	0.580–0.695	≤0.001 <sup>^</sup>			
Definitely							6.42	1.890–21.808	0.003*
Maybe							2.51	0.886–7.080	0.083
Unsure							3.31	1.144–9.544	0.027 <sup>#</sup>
Probably not							1.80	0.627–5.140	0.276
Not at all							Reference		

Notes: <sup>#</sup>p<0.05. \*p<0.01. <sup>^</sup>p<0.001.

care organizations to be proactive and actively promote to their clients, or better still provide, exercise programs that include a focus on balance training.

Respondents who considered that they would definitely fall or were unsure whether they might fall were also found in the present study to have a higher likelihood of having fallen in the last year. Increased concern about falling in the future has been found to be associated with getting older in a Canadian study.<sup>30</sup> An Australian study reported that both over- and underestimation of the risk of falling is common among older people and that these tendencies were highly associated with psychological characteristics, such as anxiety and neurotic personality traits.<sup>31</sup> A particular concern about the overestimation of falls risks is that it may create a fear of falling which can cause limitation of activities which require mobility. Many studies, including ours, that have found an association of fear of falling with a higher likelihood of having fallen, cannot because of being cross-sectional ascertain whether the fear was a result of, or had in fact contributed to, an increased risk of falling through a mediator such as a reduction in physical activity and an increased likelihood of a reduction in their physical capability such as strength and balance.<sup>5,8,9</sup> Prospective studies such as the very recently reported study by Auais et al have however supported the hypothesis that reduced confidence in the ability to perform activities without falling is associated with an increased likelihood of mobility and physical performance limitations in the future.<sup>32</sup> Such results indicate a need to find effective interventions to reduce fear of falling. A Cochrane review of exercise intervention trials found a small-to-moderate reduction in fear of falling immediately post-intervention, but the risk of bias was considered high in the majority of studies and a need for higher-quality trials was identified.<sup>33</sup>

There have been many randomized controlled trials demonstrating that a range of single, multiple, and multifactorial interventions can reduce the risk of falling for community-dwelling older people.<sup>6</sup> These include exercise (with a strength and balance component), tai chi, home safety assessment and modification conducted by occupational therapists for people at high risk of falling, and cataract surgery of the first eye, to be successful in reducing the rate of falls.<sup>6</sup> Withdrawal of some medications has also resulted in reduced falls risk.<sup>6</sup> Respondents in the present study who had been referred to a falls prevention program were 47% less likely to have reported having fallen than individuals who had not been referred. However, only one in five respondents who had fallen had been referred to a falls prevention service/program,

and this was significantly fewer than 10 years ago. It is difficult to directly ascribe the cause of this change to one specific factor. However, at least part of this decline in falls prevention referrals may stem from the changes made to the health system in Western Australia during this time period. Previously, there was a community physiotherapy service (CPS) falls prevention program aimed at preventing falls for older community-dwelling people. GPs were able to refer patients directly to this service. However, changes were made and the CPS merged into a general rehabilitation program, and in 2014, GPs were no longer able to directly refer to these services, due to the subacute requirements of activity-based funding in the public system. Referrals could only be accepted from public health service providers (eg, hospitals). CPS also had a number of structural and operational changes which may have also affected their ability to accept services. Data have shown the overall falls rates in Western Australia have risen between 2003 and 2012 (rate: 21.9–27.9 per 1,000 population)<sup>14</sup> during this period of change to specific falls prevention programs. Our results indicate the importance of community care organizations referring their clients to a falls prevention service/program as soon as they identify a fall has taken place or when they have identified someone as being at high risk of falling using a validated screening tool. It appears essential for community care organizations to have the ability to refer directly and not have to wait for their clients to be hospitalized, in order to receive falls prevention assistance.

This study has some limitations. First, the response rate for the study was 37%. Bias may therefore have occurred as nonresponders may have shown somewhat different results. While it is possible that individuals who had fallen were more likely to have responded to the survey as they felt it was directly relevant to them, which would have resulted in an overestimation of the fall rate, it is also quite possible that some people who had fallen did not complete the survey as despite assurances that they were anonymous they were concerned about the consequences of admitting they had fallen, and this would have resulted in underestimation. Second, nearly one-fifth of respondents did not answer the questions about their ability to get up after a fall suggesting these results should be treated with some caution. A third limitation is the cross-sectional nature of the study; that is, the information about risk factors was collected at the same time as the falls data making it hard to assess the likelihood of relationships being causal as risk factor profiles may change over time.<sup>11</sup> Falls data that are collected retrospectively and based on recall have been shown to underestimate falls by

~20%.<sup>34,35</sup> Also, although the current and the 10 years prior survey achieved similar participant profiles on comparison data, many factors may have influenced differences between the two cohorts. Therefore, caution should be used in the interpretation of this comparative data.

The study also had a number of strengths. The study target population can be considered to be representative of the Australian community aged care population as a whole as it included ten agencies that provide a range of services across the Perth metropolitan area which includes socioeconomically and ethnically diverse communities and constituted 20% of the whole community care population. The use of an anonymous questionnaire allowed people concerned about admitting a fall to family or service provider to admit to having fallen. The study was also designed to minimize the burden on this older population while allowing a large sample size.

## Conclusion

The prevalence rate of falls among community care clients was 48% which was little different from the rate of 45% found among clients of the same service providers 10 years ago.<sup>5</sup> This rate is ~50% higher than that found in studies of community-dwelling older people not receiving community services. Balance problems and seeing oneself as at high risk of future falls or not being sure about one's risk were associated with a higher likelihood of having fallen, while having been referred to a falls prevention service/program was associated with a reduced likelihood of having fallen. Despite this, only 27% of fallers had been referred to a falls prevention program. Incorporation of balance exercise programs into their service offerings and early referral to falls prevention programs need to be considered as best practice in Australian organizations providing community aged care services.

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## Disclosure

The authors report no conflicts of interest in this work.

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