



Preventing injury in older people: fear of falling and physical activity

**Health Series
Number 35**

Population Health Research Centre
ACT Health

November 2003

ACKNOWLEDGEMENTS

The authors of this report, Sally Rubenach, Louise Freebairn and Karen Lees, wish to acknowledge the efforts of the NSW Department of Health in undertaking the development and administration of the Older Persons Health Survey. ACT Health recognises and appreciates the effort involved in undertaking the adaptations necessary to ensure that the survey was relevant to the ACT.

ISSN 1325-1090

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Produced for the Population Health Research Centre by ACT Health and printed on recycled paper.

Enquiries about this publication should be directed to the Population Health Research Centre, Building 5, Level 1, The Canberra Hospital, PO Box 11, Woden ACT 2606, or via email to healthinfo@act.gov.au.

Publication No: 03/1521
<http://www.act.gov.au>
Telephone: Canberra 13ACT1 or 132281

Suggested citation: Preventing injury in older people: fear of falling and physical activity. Population Health Research Centre, ACT Health: Health Series No 35, ACT Government, Canberra ACT.

ACT publications in the Health Series can be accessed online at:
<http://www.health.act.gov.au/publications>

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Introduction

The health benefits of physical activity are wide ranging. Regular moderate-intensity physical activity is associated with a decreased risk for general all cause mortality,^{1,2,3} chronic disease,^{4,5} depression⁶ and general deconditioning.⁷ In addition physical activity has been shown to be beneficial in the management of disease and injury.

Physically active lifestyles are beneficial across the lifespan. Older people in particular can obtain significant health benefits from physical activity; with the loss of strength and endurance commonly attributed to ageing caused in part by deconditioning due to reduced physical activity.⁸ Increased physical activity in older people has been associated with improved cardiovascular function, prevention of injury from falls and maintenance of functional capacity. Active lifestyles also provide older people with opportunities to establish and maintain social networks, and have been associated with a lower prevalence of mental ill health.⁹

Although the benefits of physical activity are well known, the prevalence of sedentary lifestyles is increasing both in Australia and overseas. The 2000 National Physical Activity Survey showed that nationally, 54 per cent of the population did not undertake sufficient physical activity to confer a health benefit. In the ACT the prevalence of insufficient physical activity was only slightly lower than observed nationally at 48 per cent. Fifty-one per cent of ACT respondents aged 60 to 75 were either sedentary, or not undertaking sufficient physical activity.¹⁰

Results from the 2001 National Health Survey show that 56 per cent of females and 44 per cent of males aged 75 years and over in Australia reported having sedentary lifestyles. A further 30 per cent of males and 29 per cent of females aged 75 years and over reported low exercise levels. The remainder of this age group reported participating in moderate exercise levels, with only a very small percentage reporting high exercise levels.

The uptake of physical activity will be critical in maximising the well being of older people in the ACT. This is because muscle weakness and impaired balance, conditions more prevalent among older people, put an individual at high risk of both falling and sustaining an injury. The likelihood of falls and fall related injury drops significantly in older people who undertake daily physical activity.^{11,12}

While jurisdictions such as South Australia and Tasmania are already experiencing significant increases in injury, reflecting the larger proportion of older people in their populations, the ACT still has an opportunity to focus on the prevention of injury in older people. It is estimated that a 66% reduction in the incidence of fall related injury would be required to maintain cost parity for health services.¹³

Whilst there is information regarding the prevalence of self reported physical activity in older people, less is known about why older people do not exercise; what the perceived barriers to exercise are; and whether or not these can be modified. This paper presents a discussion of these issues, and identifies potential target groups for the promotion of physical activity in older people in the ACT.

Data sources, methods and respondents*

The (then) ACT Department of Health and Community Care commissioned the NSW Department of Health to include ACT residents in their Older Person's Health Survey (OPHS) in 1999. Five hundred and thirty-seven ACT residents aged 65 years or more completed the survey, administered using Computer Assisted Telephone Interviewing (CATI). The data have been weighted to represent the 1999 ACT population of people aged 65 and over.

The survey did not attempt to interview individuals residing in nursing homes, hostels and other private care facilities. Given that during 1999, approximately 10 per cent of people aged 70 years and over living in the ACT resided in these facilities,¹⁴ the omission of this group should be taken into account when interpreting the survey results.

For the purpose of this paper, adequate physical activity is defined as participating in at least 30 minutes of moderate activity, walking on at least five days in the last week, or vigorous gardening or yard work (ie. 150 minutes or more of moderate physical activity a week).²⁴

The key concepts used to measure physical activity in this report are defined in Appendix 1. The questions included in the OPHS relating to physical activity and falls are included in Appendix 2.

Physical activity patterns of older people in the ACT

Respondents were asked to report the number of days in the week prior to the interview that they had engaged in physical activity. Specifically, they were asked to report on walking, moderate activity such as dancing, golf and lawn bowls and vigorous gardening or yard work.

Overall the median number of days that respondents walked (for at least ½ hour) in the previous week was two days. The median number of days spent participating in vigorous gardening or yard work (lasting at least ½ hour) equalled one day.

This information was used to calculate the proportion of older people undertaking physical activity. Overall, 51.8 cent (estimated n=12,257) of older people in the ACT were undertaking adequate physical activity to confer a health benefit (Table 1). Males were significantly more likely to be undertaking adequate physical activity (66.3%) than females (40.6%). The percentage of females undertaking adequate physical activity decreased with older age, while remaining fairly constant for males.

Note that the OPHS did not include a question relating to vigorous intensity physical activity such as jogging or aerobics (the vigorous activity question included in the OPHS related to gardening or yard work). Therefore the physical activity rates quoted in this paper are not directly comparable with those from the 2000 National Physical Activity Survey or 2001 National Health Survey.

* More detailed information regarding the survey methodology is provided in *Health of Older People in the ACT 1999, Health Series Number 28*. Population Health Research Centre, ACT Dept of Health and Community Care.

Table 1: Older people in the ACT undertaking adequate physical activity (%), by age and sex, ACT 1999

MALES (est. n=10,314)	Per cent	LL 95% CI	UL 95% CI
65-74 years	68.0	61.2	74.8
75+ years	63.2	52.2	74.2
All males	66.3	60.5	72.1
FEMALES (est. n=13,471)	Per cent	LL 95% CI	UL 95% CI
65-74 years	48.3	40.3	56.3
75+ years	30.4	22.5	38.3
All females	40.6	34.9	46.3
ALL (est. n=23,785)	Per cent	LL 95% CI	UL 95% CI
65-74 years	61.8	56.6	67.0
75+ years	38.2	31.5	44.9
All	51.8	47.6	56.0

Overall 61.8% of individuals aged 65-74 years undertook adequate physical activity, and 38.2% of those aged 75 years and over. Similar rates were observed in NSW (54.9% for 65-74 years, 41.7% for 75 years & over)¹⁵.

Individuals were asked to compare their physical activity levels with most other men or women of the same age. Over half of the men (56.4%) and women (52.5%) stated they were more active than their peers (Table 2).

Table 2: Physical activity rating- How physically active are you compared to most other men (if male) or women (if female) your age, ACT 1999

	MALES (%)	FEMALES (%)
Less active	10.7%	17.7%
About as active	32.9%	29.8%
More active	56.4%	52.5%
Total	100.0%	100.0%

Of the individuals who reported being more active than their peers: 81% of the males had reported undertaking adequate physical activity in the previous week (150 minutes or more); whereas only 54.5% of women in this group had reported doing adequate physical activity in the previous week.

Predictors of adequate physical activity

Regression analysis was conducted to determine which respondent characteristics were associated with undertaking adequate physical activity. Age, sex, fear of falling and self rated health status were all significantly associated with undertaking adequate physical activity (Table 3). Females were less likely than males to be undertaking adequate physical activity (O.R. 0.47). Older individuals were also less likely to be undertaking adequate physical activity, with the odds of undertaking adequate activity decreasing by 4% with each additional year of age.

Table 3: Logistic regression model* to predict participation in adequate physical activity, ACT, 1999

Variable	Significance (p)	Odds-Ratio	Odds-Ratio 95% CI
Age	0.00	0.96	0.93-0.99
Fear of falling v no fear of falling	0.01	0.55	0.36-0.85
Female v male	0.00	0.47	0.32-0.69
Self Rated Health (Excellent/Very good)	0.00	2.21	1.33-3.67
Constant	0.02		
Overall p value	0.007		

*Independent variables were entered using a stepwise method.

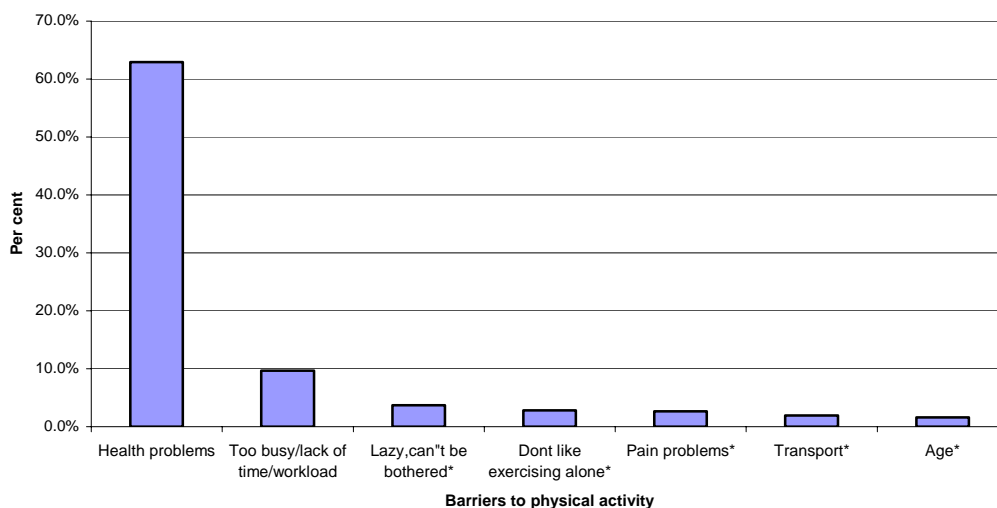
Respondents who reported a fear of falling were less likely to be undertaking adequate physical activity than those who reported no fear of falling (O.R. 0.55). A history of falling was not found to contribute significantly to the regression model.

Respondents who rated their health as excellent or very good were also more likely to undertake adequate physical activity than respondents who rated their health as poor (O.R. 2.21).

Barriers to physical activity

Health problems, reported by (62.9%) of respondents, were overwhelmingly the most common reason for not undertaking physical activity, followed by being too busy (9.7%) and being lazy (3.7%) (Figure 1).

Figure 1: Reasons given for older people in the ACT not undertaking physical activity, ACT 1999



*These values have a relative standard error between 25 and 50% and should be interpreted with caution.

Note: Data for Figure 1 are detailed in Appendix 3, Table 10.

Poor physical condition and health have frequently been reported as barriers to physical activity participation in older age groups.^{16,17,18} Other personal characteristics that have been identified as important factors in shaping physical activity patterns for older adults include fear of injury¹⁹ as well as a perceived lack of ability and misconceptions about exercise (eg. that it must be strenuous or uncomfortable to be effective).²⁰

The perceived health status of respondents who reported undertaking adequate physical activity is compared with that of respondents not undertaking adequate physical activity in Table 4. Increased physical activity was observed among respondents who rated their health status highly. Of those who indicated they were in excellent health, 63 per cent participated in adequate physical activity and 38 per cent did not. Only 33 per cent of respondents who rated their health as poor did adequate physical activity.

Table 4: Self rated health status by physical activity status, ACT 1999

	Inadequate PA (<150 mins)	Adequate PA (150 mins+)
Excellent	37.5%	62.5%
Very Good	39.0%	61.0%
Good	52.0%	48.0%
Fair	57.9%	42.1%
Poor	66.7%	33.3%

While the relationship between self rated health and physical exercise is as expected, it is of interest that a significant proportion of older people considering themselves in excellent health were not undertaking adequate physical activity.

Lack of knowledge regarding the amount and type of physical activity recommended to gain a health benefit can also be considered a barrier to exercise. Public health campaigns aim to improve general knowledge relating to health behaviours such as physical activity. Fifty-four per cent of respondents had heard of the “Exercise, you only have to take it regularly not seriously” campaign. No significant differences in levels of physical activity were observed between individuals who had heard of the campaign and those who had not heard of the campaign.

Physical activity and falling

The likelihood of falls and fall related injury drops significantly in older people who undertake daily physical activity.^{21,22} In 1999 close to one third of respondents reported having fallen in the last twelve months. The prevalence of falling was higher in females than in males (Table 5).

Table 5: Percentage of people reporting any fall during 12 months prior to interview, age and sex, ACT 1999

	MALES	FEMALES
65-74	23.6%	31.7%
75+	27.5%	33.7%
All	25.0%	32.6%

Females also more likely than males to receive medical treatment after a fall, with 30.4 per cent of females reporting a fall that required medical treatment compared with 17.5 per cent of males. However, this association was not statistically significant due to the small number of respondents reporting a fall that required medical treatment.

A significantly higher proportion of respondents who had fallen in the last twelve months were not undertaking adequate physical activity (58.3%) when compared with respondents who had not fallen (44.2%) ($\chi^2(1)=10.6$, $p<0.05$) (Table 6). The same pattern of results was observed for falls requiring medical treatment, however the association was again not significant due to the small number of respondents reporting a fall that required medical treatment.

Table 6: Percentage of people reporting any fall during 12 months prior to interview by physical activity levels, ACT 1999

	No Fall in last 12 months	Fall in last 12 months
Inadequate physical activity	44.2%	58.3%
Adequate physical activity	55.8%	41.7%

The proportion of ACT respondents reporting a fear of falling increased with age for both males and females (Table 7). However, females (39.4%) were significantly more likely than males (16.5%; $\chi^2(1)=42.3$, $p<0.05$) to report having a fear of falling across both age groups. This reflects the higher prevalence of a history of falling in females, which was associated with a fear of falling ($\chi^2(1)=8.0$, $p<0.05$).

Table 7: Percentage of people that reported having a fear of falling, by age and sex, ACT 1999

	MALES	FEMALES
65-74 years	14.2%	36.9%
75+ years	20.8%	42.5%
TOTAL	16.5%	39.4%

Within the group of respondents who reported a fall, those who had sustained an injury requiring medical treatment were again more likely to report a fear of falling (46.0%) than those respondents who had not sustained an injury (33.5%) in their fall ($\chi^2(1)=3.8$, $p<0.05$).

Respondents who had fallen and who reported a fear of falling again were significantly less likely to be undertaking adequate physical activity (23.3%) when compared with respondents who had fallen but who did not report a fear of falling (52.4%; $\chi^2(1)=14.5$, $p<0.05$).

Overall, those individuals who reported a fear of falling were significantly less likely to be undertaking adequate physical activity (36.9%) than individuals who reported no fear of falling (57.8%; $\chi^2(1)=27.0$, $p<0.05$).

Willingness to exercise to reduce the risk of injury

One third of ACT respondents reported that they were willing to participate in a program of gentle exercise to reduce their chances of falling, 39 per cent were not willing to participate in exercise and 28 per cent reported that they were already doing exercise.

Of the respondents who reported that they were already exercising, one third (32.7%) were not actually participating in adequate physical activity. This is consistent with a recent study of adults aged over 75 years who considered themselves relatively active despite their lifestyles being classified as sedentary.²³ These results suggest that perceptions of activity levels are not consistent with current guidelines relating to physical activity. No significant age and sex differences were observed in the propensity to report already exercising while participating in inadequate physical activity.

Regression analysis was conducted to determine which respondent characteristics were associated with a willingness to exercise. Age, sex and fear of falling were all significantly associated with a willingness to exercise (Table 8). Older individuals were less likely to report a willingness to exercise, with the odds of being willing to exercise decreasing by 6% with each additional year of age. Females were more likely than males to be willing to undertake an exercise program (O.R. 1.61).

Table 8: Logistic regression model* to predict willingness to exercise, ACT, 1999

Variable	Significance (p)	Odds-Ratio	Odds-Ratio 95% CI
Age	0.00	0.94	0.91-0.98
Fear of falling	0.01	2.0	1.24-3.30
Sex	0.04	1.61	1.02-2.54
Constant	0.00		

*Independent variables were entered using a forward stepwise method.

Respondents who reported a fear of falling were more likely to be willing to undertake an exercise program to reduce their risk of falling again (OR 2.0, CI 1.24-3.30). Interestingly, fear of falling was found to be a more important predictor of willingness to exercise than having a history of falling.

A history of falling, adequacy of physical activity and self-rated health status were not found to contribute significantly to the regression model.

Preferred activities

Respondents who expressed willingness to participate in an exercise program to reduce their risk of falling were asked to indicate their preferred type of activity. The most preferred activities for both males and females were walking, a gentle exercise program at home or in a group, and dancing (Table 9).

A small percentage of males reported a preference for outdoor activities and swimming and a small percentage of females expressed a preference for tai chi or yoga.

Table 9: Preference for each type of program for those willing to undertake exercise to reduce risk of falling, by sex, ACT 1999

	MALES	FEMALES	ALL PERSONS
Gentle exercise (home) to reduce falls	75.8%	74.9%	75.2%
Walking to reduce chances of falling	74.5%	67.1%	69.8%
Gentle exercise (group) to reduce falls	28.9%	51.1%	43.1%
Dancing considered to reduce falls	17.0%	19.4%	18.5%
Swimming	7.2%	-	5.1%
Tai chi/yoga	-	6.0%	4.2%
Outdoor activities	7.5%	-	3.7%

All males, and 99 per cent of females stated that they would not be willing to exercise using weights, exercise bikes or treadmills.

Women (51.1%, 95% CI 45.3-57.0%) were significantly more likely to report a preference for a gentle exercise program in a group than men (28.9%, 95% CI 23.4-34.5%). No other significant age or sex differences were observed.

Summary

This paper presents a profile of the physical activity of older men and women in the ACT and discusses the relationship between a fear of falling, physical activity, and a willingness to undertake further physical activity.

Current public health guidelines indicate that “sufficient” participation in physical activity to confer a health benefit comprises at least 150 minutes of moderate intensity activity, accrued over at least five sessions per week. Our survey of 537 people aged 65 years and over in the ACT showed that according to these guidelines, only half were undertaking adequate physical activity. Women were significantly less likely than men to be participating in physical activity at adequate levels to confer a health benefit.

Consistent with previous research, many respondents identified poor health as a barrier to participating in physical activity. Fears of injury, perceptions of lack of ability and misconceptions about exercise have also been identified previously as barriers to physical activity.

The association between a fear of falling and reduced activity is of particular public health concern, given the high prevalence of fear of falling in older people in the ACT – women in particular (40%), and the importance of physical activity in maintaining good health and preventing injury in an ageing population.

The ACT survey showed that respondents who had experienced a fall in the last 12 months and were afraid of falling again were significantly less likely to be undertaking adequate physical activity than those who had fallen, but were not afraid of future injury. The importance of a fear of falling was also evident when examining the characteristics of respondents associated with a willingness to exercise. This analysis showed that fear of falling was more important than an actual history of falling, in determining a willingness to exercise to prevent future injury, with those afraid of falling more willing to exercise.

Walking and gentle exercise programs in the home were the most preferred types of physical activity for both males and females in both age groups, with more women preferring gentle exercise programs in a group. Respondents were not willing to exercise using weights, exercise bikes or treadmills.

In summary, the results from this survey highlight the vulnerability of older women in the ACT who are afraid of falling, and emphasise the importance of fear of injury in relation to current and future activity levels. Older ACT women in general are participating less in physical activity than males; experiencing falls at significantly higher rates; and more commonly express a fear of falling. Importantly, women were more likely to express a willingness to exercise to reduce their risk of falling. The assessment of a fear of falling in this survey was simplistic, suggesting even a crude measure may be effective in identifying women at risk of inactivity for recruitment to exercise programs.

Appendices

Appendix 1

Physical Activity – Physical activity is defined as ‘any bodily movement produced by skeletal muscles that results in energy expenditure’²⁴. Examples of physical activity include walking, gardening, walking up stairs, playing sport and work-related activity. Exercise is a subset of physical activity and is defined as planned, structured and repetitive bodily movement undertaken to improve, or maintain, one or more components of physical fitness. Physical activity comprises duration, frequency, intensity, type and context.

Duration of Physical Activity – Duration is defined as the length of time spent participating in physical activity, as self-reported by the respondent, within a reporting period. The Older Persons Health Survey used a reporting period of one week, designated as the seven days prior to interview.

Frequency of Physical Activity – Frequency is defined as the number of times a respondent self-reported participating in physical activity, within the reporting period.

Intensity of Physical Activity – Intensity is defined as the self-perceived and self-reported intensity at which a respondent participated in physical activity, for example, ‘moderate’ or ‘vigorous’. Examples of moderate activity include brisk walking, social tennis and gentle swimming. Vigorous intensity activities included vigorous gardening or yard work.

Type of Physical Activity – Type is defined as specific physical activities undertaken and self-reported by respondents, for example, walking, gardening and yard-work.

Context of Physical Activity – Context refers to the wider circumstances in which a person participates in physical activity. For example, incidental activity, transport, leisure-time or occupational. The majority of the data in this report refer to leisure time physical activity, which refers to activity performed during an individual’s discretionary time. An element of personal choice is inherent to this definition²⁵.

Physical Inactivity – Respondents reporting no participation in physical activity have been classified as being physically ‘inactive’ or ‘sedentary’.

Appendix 2

PHYSICAL ACTIVITY

How physically active are you compared to most other [men (if male)/women (if female)] your age?

1. Much less active
2. A bit less active
3. About as active
4. A bit more active
5. Much more active
6. Don't know
7. Refused

How many days in the last week have you walked for at least half an hour in total?

_____ days in last week

777 Don't Know

999 Refused

How many days in the last week did you do moderate activities such as dancing, golf, lawn bowls for at least half an hour in total?

_____ days in last week

777 Don't Know

999 Refused

How many days in the last week did you do vigorous gardening or yard work for at least half an hour in total?

_____ days in last week

Have you heard of the exercise and physical activity campaign, 'Exercise – you only have to take it regularly not seriously'?

1. Yes
2. No
3. Don't know
4. Refused

Are there any reasons that keep you from being more physically active?

1. Yes
2. No
3. Don't know
4. Refused

What are they? (Multiple response)

1. Health problems eg. arthritis, heart problems, bad knees
2. Weather – too hot, too cold, too wet
3. Don't like exercising alone
4. Pain problems
5. Feel unsafe on the streets
6. Worried about the dogs in the area
7. Afraid of falling over
8. Transport problems
9. Anything else (specify)
10. Don't Know
11. Refused.

FALLS

In the last 12 months have you had a fall?

1. Yes
2. No
3. Don't know
4. Refused

In the last 12 months have you had a fall which required medical treatment for injuries?

1. Yes
2. No
3. Don't know
4. Refused

Are you afraid of falling?

1. Yes
2. No
3. Don't know
4. Refused

Would you say you are somewhat, fairly or very afraid of falling?

1. Not at all
2. Somewhat afraid
3. Fairly afraid
4. Very afraid
5. Don't know
6. Refused

Do you currently use any personal alert or alarm in case you have a fall or other emergency?

1. Yes
2. No
3. Don't know
4. Refused

Would you consider doing a program of gentle exercise in order to reduce your chances of falling?

1. Yes
2. No
3. Already do exercise
4. Don't know
5. Refused

Would you consider: (multiple response)

1. Walking
2. Gentle exercise at home
3. Gentle exercises in a group
4. Dancing
5. Any other exercise which you would like to do? (specify)
6. Don't know
7. Refused

Appendix 3

Table 10: Reasons given for older people in the ACT not undertaking physical activity, by sex

	Males	Females	Persons
	% (CI)	% (CI)	% (CI)
Health problems	61.4 (52.8, 70.0)	64.0 (56.6, 71.3)	62.9 (57.4, 68.5)
Too busy/lack of time/workload	9.6 (4.4, 14.8)	9.7 (5.2, 14.2)	9.7 (6.2, 13.1)
Age	0.9 (-0.8, 2.5)	*	1.6 (0.2, 3.1)
Lazy, cannot be bothered	5.7 (1.6, 9.8)	2.4 (0.1, 4.7)	3.7 (1.5, 5.9)
Don't like exercising alone	*	4.3 (1.2, 7.3)	2.8 (0.9, 4.7)
Pain problems	*	3.1 (0.4, 5.7)	2.7 (0.8, 4.5)
Transport	*	3.0 (0.4, 5.6)	1.9 (0.3, 3.5)

*RSE >50%, therefore results have not been included as they may not be reliable.

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