

With a sample survey ($N = 266$) of elderly adults residing in six housing developments in Massachusetts, we used logistic regression to: (a) identify covariates of fear of falling among all subjects and (b) identify covariates of activity curtailment among the subset of subjects who were afraid of falling. Fifty-five percent of respondents were afraid of falling; of those who were afraid, 56% had curtailed activity due to this fear. Factors associated with fear of falling were: being female, having had previous falls, and having fewer social contacts. Factors associated with activity curtailment among those who were afraid were: not communicating about falls; having less social support; and knowing someone who had fallen. Falls history appears an important contributor to fear of falling, whereas the impact of this fear on activities appears more a function of social support. These findings suggest different strategies for the primary and secondary prevention of fear of falling.

Key Words: Falls, Injury, Disability, Elderly, ADL

Covariates of Fear of Falling and Associated Activity Curtailment

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Falls are a common experience among the elderly population. It is estimated that approximately one third of those 65 years or older fall each year (Perry, 1982). Although only around 15% of these falls result in injuries requiring medical attention (Vellas, Bocquet, de Pemile, & Albarde, 1987), falls that do cause injury can be devastating. Even when the fall injury can be effectively treated, the event can have debilitating or fatal sequelae. Serious falls can result in permanent reduction in functioning and can precipitate loss of independence when the faller is admitted to a nursing home or long-term care facility (Kellogg International Work Group on the Prevention of Falls by the Elderly, 1987).

It is not surprising, therefore, that a substantial portion of elders are afraid of falling. Several community-based studies of independently living elders have estimated that between 25–50% of this population has this fear (Arfken, Lach, Birge, & Miller, 1994; Howland et al., 1993; Tinetti, Mendes de Leon, Doucette, & Baker, 1994). In many respects, fear of falling is a rational response to a likely and potentially dangerous event. A cautious concern with falling could be viewed as the first step in falls prevention. Yet the fear of falling itself can yield negative consequences. By effecting the frequency and intensity of physical activity, fear

of falling can lead to deconditioning and thereby possibly increase the risk for falling (Nevitt, Cummings, Kidd, & Black, 1989). Fear of falling can compromise social interaction (Howland et al., 1993), increasing risk for isolation, depression, and anxiety (Arfken, Lach, Birge, & Miller, 1994). Thus, while some level of fear of falling is reasonable and can promote effective coping skills for falls prevention, too much fear may compromise physical and mental well-being.

Prevalence studies of fear of falling in the general elderly population have delineated three subpopulations: those who are not afraid of falling, those who are afraid of falling but do not curtail activities because of their fear, and those who are afraid and curtail activities they value. In a study of 196 residents (≥ 58 years of age) in two Massachusetts senior housing projects, Howland and colleagues (1993) found that 47% were afraid they would fall in the coming year and 35% said there were activities they avoided because they were afraid they would fall. In a similar study of a sample of community-dwelling elders (≥ 72 years of age) in New Haven, CT, Tinetti and colleagues (1994) found that 43% reported fear of falling; of these, 24% reported fear without effect on activities and 19% reported fear with effect on activities.

There is some information about the covariates of fear of falling. Howland and colleagues (1993) found that fear of falling was associated with lower self-rated health and a history of previous falls. Arfken and colleagues (1994) found that the degree of fear of falling was associated with a variety of measures of physical frailty (including impaired balance, inability to walk ten blocks, lower self-rated health, and use of walking aids), as well as with a history of previous falls. We

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have less information, however, on factors that might mitigate fear of falling once it has occurred.

The purpose of this study was twofold: (a) to replicate previous studies of the covariates of fear of falling and (b) to examine whether activity curtailment among those who were afraid of falling was solely a manifestation of the level of this fear of falling or whether it was associated with other factors as well. The results of this study could increase understanding of the nature of fear of falling and assist in identifying fearful elders who are at risk for compromised quality of life.

Methods

Sample

We surveyed older adult residents of public senior housing developments in six communities in eastern Massachusetts. The sampling frame consisted of a list of all senior housing units eliminating those with tenants under the age of 62 years (e.g., younger residents who were eligible for SSI disability programs). Each of the qualified units was then assigned a number, and a random numbers table was used to select approximately 70 units from each housing authority development. In total, 427 units were selected at the six housing developments and eligible residents were invited to participate in the study.

The residents of selected units were subsequently contacted by a letter from the interviewer explaining that a study of older adults' health status was being conducted and that they would be contacted by a follow-up phone call to determine if they would be willing to participate. If a unit was occupied by more than one eligible resident, one respondent was randomly selected. Selected subjects were offered \$1.00 for participating and the chance to participate in a random drawing for an additional \$50. A separate drawing was conducted at each housing site. Participating subjects were then interviewed in their homes (or at another location of their choosing) following informed consent procedures. Prior to administering the questionnaire, interviewers were trained in interviewing the elderly participants.

The primary reasons for exclusion from the study were: (a) non-English speaking; (b) too young; (c) no one living in the unit; and (d) no phone. The most common reasons for refusal to participate were being sick or too busy.

Survey Instrument

Demographics—We documented each respondent's age, gender (0 = female; 1 = male), years of education completed, and whether they lived alone (1 = alone; 2 = not alone).

Fear of Falling Measures—The following three items developed by Howland and colleagues (1993) were used to assess fear of falling: (a) Afraid item: How afraid are you that you will fall and hurt yourself in the next year? (1 = very afraid to 4 = not at all afraid); (b) Are there things you don't do because you might fall?

and (c) Are there things you have stopped doing because you are worried that you might fall? Three fear groups were created using responses to these questions: (a) not afraid of falling; (b) afraid of falling but do not curtail activities; and (c) afraid of falling and curtail activities (don't do or stopped doing activities).

Falls-Related History—To determine history of falls, we asked respondents (a) whether they had experienced a fall in the last five years requiring medical attention; and (b) whether they had fallen to the ground within the last three months. We also asked respondents whether they knew a friend or relative who suffered a serious fall. This question did not define serious for the respondent. To determine respondents' level of comfort with discussing falls, we asked whether they would talk about a fall they experienced with their: (a) family; (b) friends; or (c) health care provider. To assess the extent to which respondents perceived control over the likelihood of falling, we asked them to rate the validity of each of the following statements: I can reduce my risk of falling; I can overcome my worry about falling; There are things I can do to keep myself from falling; Falling is something I can control. Response categories were: definitely true; mostly true; unsure; mostly false; and definitely false. One score was computed as a mean across the 4 items (range 1–20) with higher scores indicating less control over falling.

Physical Health and Functioning—Respondents were asked whether they currently used an assistive device to help them walk, experienced dizziness, had visual impairment (blindness or trouble seeing even with glasses), or whether they had ever been diagnosed with stroke. In a previous study, self-rated health status was strongly associated with fear of falling (Howland et al., 1993). Accordingly, in the present study, we used the SF-36 General Health Perceptions subscale (Ware, 1993). This scale comprises questions on self-assessed health status, respondents' health compared to others they know, perceived susceptibility to illness, and expectations for future health. Chronic body pain was measured using the SF-36 Pain subscale, which asks how much of the time pain had interfered with normal work during the last four weeks and about the intensity of body pain during this time (Ware, 1993).

Psychosocial Status—We used two scales developed by the Normative Aging Study (Bosse, Aldwin, Levenson, Spiro, & Mroczek, 1993). The Social Integration scale was included to measure the degree of contact with friends and relatives. Respondents were asked how often (1 = nearly every day to 6 = less than every year or never) they see or speak to seven categories of people (parents, children, grandchildren, brothers and sisters, other relatives, close friends, and doctor/nurse). A mean score was calculated, with higher scores indicating less contact. The Social Support scale was used to assess the extent to which respondents could depend upon family members or friends to help in a crisis (1 = completely to 5 = not at all). We also used the SF-36 Mental Health subscale (Ware, 1993).

as an overall measure of psychosocial status, with higher scores indicating higher levels of functioning.

Time to administer the survey ranged from 40 minutes to slightly more than an hour, with a mean time of approximately 50 minutes. The survey was conducted between September 1995 and June 1996.

Analyses

Bivariate Analysis—We conducted two sets of bivariate analyses. First, among all respondents we compared those who were afraid of falling with those who were not. Second, among only those who were afraid of falling, we compared those who curtailed activities because of this fear with those who did not. Variables on which these comparisons were made included: demographics (age, gender, years of education, living alone); falls-related history (degree of fear of falling, any fall in last three months, falls requiring medical attention in last five years, knowing a friend or relative who suffered a serious fall, talking to family about falls, talking to friends about falls, talking to health care providers about falls, falls control scale); physical functioning (dizziness, vision problems, stroke, use of walking aid, general health perceptions, body pain); and psychosocial status (mental health, social integration, social support). Chi-square and *t* tests were used, as appropriate.

Multivariate Analyses—We performed two separate logistic regression analyses. First, we used fear of falling, dichotomized as “yes” (very, somewhat, slightly = 1) or “no” (not at all = 0), as the dependent variable. Independent variables are listed above (see Bivariate Analysis) with the exception of degree of fear of falling. We entered as independent variables those with *p* values of 0.15 or less in the bivariate analysis with fear of falling.

The second regression used only subjects who were afraid of falling. The dichotomous dependent variable for this analysis was curtailment of activity (1 = yes; 0 = no) among those who were very, somewhat, or slightly afraid of falling. Degree of fear of falling was entered as an additional independent variable. We entered those independent variables with *p* values of 0.15 or less in the bivariate analysis with curtailment of activity.

We tested each regression model for goodness-of-fit using the Hosmer and Lemeshow statistic (if not significant, fit is good). The C statistic, measuring the agreement between actual and predicted values in a logistic regression (*C* = 0 if there is no agreement) is presented. Parameter estimates, odds ratios with 95% confidence intervals, and sensitivity and specificity results from the logits' classification tables are also presented for both logistic regression models.

Results

Respondent Characteristics

Characteristics of all respondents, including demographics and falls history, are shown in Table 1.

Table 1. Characteristics of All Respondents (*N* = 266)

Mean Age	76.3 (<i>SD</i> = 7.9) years
Age Range	62–93 years
% Male	23%
Mean Years of Education	10.5 (<i>SD</i> = 2.7)
% White	97%
% Living Alone	87%
% Fallen Last Three Months	17%
% With Fall Requiring Medical Attention Last Five Years	35%
% With Friends or Relatives Who Even Had Serious Fall	38%
% Using Walking Aid	36%
% Experiencing Dizziness	29%
% With Vision Problems	26%
% With Stroke	11%
Mean SF-36 General Health Score 0–100 (Excellent)	57.4 (<i>SD</i> = 24.4)
Mean SF-36 Chronic Body Pain Score 0–100 (None)	65.3 (<i>SD</i> = 28.0)
Mean SF-36 Mental Health Score 0–100 (High)	71.7 (<i>SD</i> = 22.0)
Mean Social Integration Score 7–42 (Low)	26.4 (<i>SD</i> = 5.4)
Social Support: Rely on Others	
Completely	56.0%
A lot	18.4%
Somewhat	8.7%
A little	10.9%
Not at all	5.6%

A total of 266 men (23%) and women (77%) between the ages of 62 and 93 (Mean age = 76.3, *SD* = 7.9) participated, for a response rate of 62%. The average level of education was 10.5 years of schooling (*SD* = 2.7), with a range of 0 to 18 years. The sample was 97% White and 10% were currently married. Out of a possible 16 common medical conditions (e.g., diabetes, hypertension), the sample had a mean of 3.87 (*SD* = 2.31) conditions. Thirty-six percent of the sample reported using a walking aid (such as a cane or walker).

Prevalence of Fear of Falling and Activity Curtailment

Fifty-five percent (146/266) of all respondents were very (9%), somewhat (17%), or slightly (29%) afraid they would fall during the next year. Forty-three percent (114/266) curtailed activities, or had stopped doing things, because they might fall, including 27% (32/120) of respondents who said they were not afraid of falling. Of those who were afraid, 56% (82/146) curtailed activities due to this fear.

Falls history was also assessed. Seventeen percent of the sample reported having fallen to the ground in the past three months and 36% reported having had a fall requiring medical attention in the past five years. Thirty-eight percent had a friend or relative who had experienced a serious fall.

Bivariate Analysis

The results of the bivariate analysis for fear of falling and for curtailment of activities are presented in Table 2.

Covariates of Fear of Falling Among All Respondents—Those who were afraid of falling were significantly more likely than those who were not to be older (Mean age 77 years vs 75, $p = .05$). Females were significantly more likely than males to be afraid of falling (60.2% vs 36.7%, $p = .001$). The groups did not differ with respect to education or living alone.

Those who were afraid of falling were significantly more likely to have had a fall in the past three months (24.0% vs 8.3%, $p = .001$) and significantly more likely to have had falls requiring medical attention in the past five years (45.2% vs 23.3%, $p = .000$). They did not differ with respect to talking about their falls to friends, relatives, or health care providers, nor with

respect to knowing a friend or relative who had experienced a serious fall. Those who were afraid had a significantly higher score (equating with less control) on the falls control scale (Mean: 2.27 vs 1.81, $p = .001$).

Those who were afraid of falling were significantly more likely to report dizziness (35.2% vs 21.7%, $p = .016$) and vision problems (32.4% vs 19.2%, $p = .015$), but did not differ with respect to having been diagnosed for stroke. They were significantly more likely to use a walking aid (45.9% vs 25.0%, $p = .000$); have lower perceptions of their general health (Mean: 51.2 vs 64.8, $p = .000$); and experience significantly more chronic body pain (lower score equated with more body pain) (Mean: 57.5 vs 74.8, $p = .000$).

They also had significantly lower Mental Health Index scores (Mean: 66.9 vs 77.5, $p = .000$) and were significantly less likely to be socially integrated (higher score equated with fewer social contacts) (Mean: 27.1

Table 2. Bivariate Analyses Comparing Those Afraid of Falling to Those Not Afraid and (Among Those Afraid of Falling) Comparing Those Curtailing Activities to Those Not Curtailing Activities

Variables	Afraid of Falling			Afraid and Curtail Activity		
	Yes (<i>n</i> = 146)	No (<i>n</i> = 120)	<i>p</i>	Yes (<i>n</i> = 82)	No (<i>n</i> = 64)	<i>p</i>
1. Demographics						
Age	77.13	75.23	.05	77.8	76.3	NS
Gender	—	—	.001	—	—	NS
Males	36.7%	63.3%		63.6%	36.4%	
Females	60.2%	39.8%		54.8%	45.2%	
Years of education	10.5	10.4	NS	10.4	10.8	NS
Live alone	83.3%	85.0%	NS	89.0%	87.5%	NS
2. Fall-Related History						
Afraid of falling						.011
Slightly afraid	53.4%			42.7%	67.2%	
Somewhat afraid	30.82%			36.6%	23.4%	
Very afraid	15.75%			20.7%	9.4%	
Falls requiring medical attention last 5 years	45.2%	23.3%	.000	50%	39.1%	NS
Any falls last 3 months	24%	8.3%	.001	29.3%	17.2%	NS
Know friend/relative with serious fall	39.7%	35.8%	NS	47.6%	29.7%	.030
Talk to friends about falls	53.2%	59.3%	NS	43.2%	66.1%	.006
Talk to relatives about falls	50.7%	56.3%	NS	43.6%	59.7%	.059
Talk to doctor/nurse about falls	61.5%	57.6%	NS	57.5%	66.7%	NS
Falls control scale	2.27	1.81	.000	2.42	2.10	.032
3. Physical Status						
Dizziness	35.2%	21.7%	.016	40.7%	28.1%	NS
Vision problems	32.4%	19.2%	.015	37.0%	26.6%	NS
Stroke	12.6%	10.0%	NS	13.8%	11.1%	NS
Use walking aid	45.9%	25.0%	.000	57.7%	35.9%	.03
SF-36 General Health	51.2	64.8	.000	43.9	60.5	.001
SF-36 Body Pain	57.5	74.8	.000	50.7	66.2	.001
4. Psychosocial Status						
SF-36 Mental Health	66.9	77.5	.000	62.6	72.4	.008
Social Integration	27.1	25.7	.039	27.7	26.3	NS
Social Support (rely on friends/relatives)			NS			.024
Completely	50.7%	63.3%		43.9%	59.4%	
A lot	19.2	17.5%		15.9%	23.4%	
Somewhat	10.9%	5.8%		12.2%	9.4%	
A little	11.6%	10.0%		15.9%	6.3%	
Not at all	7.5%	3.3%		12.2%	1.6%	

vs 25.7, $p = .039$), but did not differ with respect to social support.

Covariates of Activity Curtailment Among Those Afraid of Falling—None of the demographic variables (age, gender, education, or living alone) was associated with curtailment of activity among those afraid of falling.

Those who curtailed activities differed significantly ($p = .011$) from those who did not with respect to intensity of fear of falling: very afraid (20.7% vs 9.4%); somewhat afraid (36.6% vs 23.4%); slightly afraid (42.7% vs 67.2%). They did not differ with respect to their history of falls, but were significantly more likely to know a friend or relative who had experienced a serious fall (47.6% vs 29.7%, $p = .03$). They were also significantly less likely to talk to friends about falls (43.2% vs. 66.1%, $p = .006$) and marginally less likely to talk to relatives about falls (43.6% vs 59.7%, $p = .059$), but did not differ with respect to talking to health care providers about falls. Those participants who curtailed activities scored lower on the Falls Control scale (higher score equated with less control) than those who did not curtail activities (Mean score: 2.4 vs 2.1, $p = .03$).

Those who curtailed activities did not differ from those who did not with respect to experiencing dizziness, vision problems, or having been diagnosed for stroke. Those who curtailed activities were more likely than those who did not to use a walking aid (53.7% vs 35.9%, $p = .03$); they scored lower on the SF-36 General Health Perceptions subscale (Mean: 43.9 vs 60.5, $p = 0.001$) and lower on the SF-36 Body Pain subscale (lower score equated with more pain) (Mean: 50.7 vs 66.2, $p = .001$).

Those who curtailed activities had significantly lower scores on the SF-36 Mental Health scale (Mean: 62.6 vs 72.4, $p = .008$). They did not differ with respect to social integration but were significantly ($p = .024$) less likely to be able to rely on friends or relatives in times of crisis (social support): completely (43.9% vs 59.4%); a lot (15.9% vs 23.4%); somewhat (12.2% vs

9.4%); a little (15.9% vs 6.3%); not at all (12.2% vs 1.6%).

Multivariate Analyses

Fear of Falling Among All Respondents—Results of the logistic regression analysis for fear of falling are presented in Table 3. Twelve variables with p values of .15 or less were derived from the bivariate analysis for fear of falling and entered into the logistic regression model as independent variables. These variables were: age, gender, history of any fall within last three months, history of falls requiring medical attention in last five years, falls control scale score, history of dizziness, vision problems, use of walking aid, SF-36 General Health Index score, SF-36 Body Pain Index score, SF-36 Mental Health Index score, and Social Integration scale score. Of these, four were significant: gender (% male) (OR = .30; 95% CI: .15, .63), having experienced any fall within the last three months (OR = 2.5; 95% CI: 1.0, 6.2), having experienced a fall requiring medical attention within the last five years (OR = 1.9; 95% CI: 1.0, 3.6), and social integration (less contact with family and friends was associated with greater fear of falling) (OR = 1.1; 95% CI: 1.0, 1.1). The C statistic for this model was .786. Overall, the model classified 65.5% of subjects correctly (sensitivity = 64.5; specificity = 66.7). The Hosmer and Lemeshow Goodness-of-Fit statistic for this model was insignificant ($p = .60$), indicating a good fit for this model.

Activity Curtailment Among Those Afraid of Falling—Results of the logistic regression analysis for activity curtailment among those afraid of falling are presented in Table 4. Thirteen variables with p values of .15 or less were derived from the bivariate analysis for curtailment of activity (among those afraid of falling), and these were entered into the logistic regression model as independent variables. These variables were: fear of falling, history of any fall within last three months, knowing a friend or relative who

Table 3. Results of Logistic Regression With Fear of Falling as Dependent Variable and Measure of Physical and Psychological Status Derived From Bivariate Analysis as Independent Variables (All Respondents, $N = 266$)

Independent Variables	Standardized Estimates	p Value	Odds Ratio	95% CI
Age	−0.027	.760	0.994	0.885, 1.034
Gender (% Male)	−0.275	.001	0.304	0.147, 0.628
Any Fall Last 3 Months	0.169	.050	2.498	1.013, 6.159
Fall With Medical Attention Last 5 Years	0.187	.045	1.896	1.00, 3.594
Falls Control Scale	0.154	.076	1.390	0.967, 1.998
Dizziness	0.017	.848	1.070	0.536, 2.137
Vision Problems	0.058	.499	1.269	0.636, 2.530
Use Walking Aid	0.102	.256	1.470	0.757, 2.856
SF-36 General Health	−0.162	.106	0.988	0.974, 1.003
SF-36 Body Pain Index	−0.155	.119	0.990	0.978, 1.003
SF-36 Mental Health Index	−0.127	.181	0.990	0.975, 1.005
Social Integration Scale	0.174	.034	1.106	1.004, 1.121

Note: C = .786. Percent classified correctly = 65.5 (sensitivity = 64.5; specificity = 66.7). Goodness-of-Fit Statistic = 6.379 with 8 DF ($p = .60$).

Table 4. Logistic Regression With Activity Curtailment as Dependent Variable and Demographics and Measures of Physical and Psychosocial Status Derived From Bivariate Analysis as Independent Variables (Only Subjects Afraid of Falling, *N* = 131)

Independent Variables	Standardized Estimates	<i>p</i> Value	Odds Ratio	95% CI
Degree of Fear of Falling	0.219	.101	1.706	0.901, 3.230
Any Fall Last 3 Months	0.021	.869	1.094	0.376, 3.177
Know Faller	0.273	.031	2.740	1.094, 6.863
Talk to Family About Falls	-0.121	.356	0.645	0.254, 1.635
Talk to Friends About Falls	-0.268	.043	0.379	0.148, 0.972
Falls Control Scale	0.068	.599	1.145	0.691, 1.900
Use Walking Aid	0.099	.419	1.434	0.599, 3.434
Dizziness	-0.022	.876	0.921	0.327, 2.592
SF-36 General Health	-0.194	.209	0.985	0.963, 1.008
SF-36 Body Pain Index	-0.232	.123	0.985	0.963, 1.008
SF-36 Mental Health Index	0.015	.912	1.001	0.980, 1.023
Social Support Scale	0.320	.018	1.574	1.082, 2.290
Social Integration Scale	0.059	.658	1.021	0.931, 1.119

Note: *C* = 0.811. Percent classified correctly = 65.6 (sensitivity = 68.1; specificity = 62.7). Goodness-of-Fit Statistic = 5.642 with 8 DF (*p* = .69).

had experienced a serious fall, talking to family about falls, talking to friends about falls, Falls Control scale score, use of walking aid, history of dizziness, SF-36 General Health Index score, SF-36 Body Pain Index score, SF-36 Mental Health Index score, Social Support scale score, and Social Integration scale score. Of these, three were significant: knowing a friend or relative who had experienced a serious fall (OR = 2.7; 95% CI: 1.1, 6.9), talking to friends about falls (those curtailing were less apt to talk to friends) (OR = .38; 95% CI: .15, .97), and social support (those curtailing activity were less apt to feel they could rely on friends or family for assistance) (OR = 1.6; 95% CI: 1.1, 2.3). The *C* statistic for this model was .811. Overall, this model classified 65.6% of subjects correctly (sensitivity = 68.1; specificity = 62.7). The Hosmer and Lemeshow Goodness-of-Fit statistic for this model was insignificant (*p* = .69), indicating a good fit for this model.

Discussion

Our findings suggest several things about fear of falling among community-dwelling elderly adults. First, there are a number of characteristics we measured that distinguish those who are afraid of falling from those who are not. Second, among those who are afraid of falling, those who curtail activities due to this fear are different in several respects from those who do not curtail activities. And, third, factors associated with fear of falling are different from those associated with curtailment of activity.

The contribution of personal falls experience to fear of falling was apparent. Those who suffered a previous fall were more likely to have a fear of falling. These results are consistent with a previous study (Howland et al., 1993) of fear of falling in a similar population. The association between fear of falling and social integration may reflect the constraining effects of fear of falling on social contact rather than the availability of friends and relatives.

Surprisingly, neither the degree of fear of falling nor

the experience of falls was associated with activity restriction. This finding suggests that activity curtailment is not just associated with extreme levels of fear. The presence of social support was, however, important. Those who could rely on others or talk with friends about falling were least likely to report activity curtailment. Thus, support of family and friends may be an important prerequisite for continuing to remain active even in the face of fear of falling. This support may serve as a buffer to the potentially debilitating consequences of fear of falling. It is possible this support is manifested as encouragement for remaining active. It is also possible that elders who know they can rely on others for help are more willing to assume the potential risks for falling inherent in remaining active. This relationship between curtailment of activities and social support may also be rooted in the consequences of falls for elders living independently. In focus groups conducted by Walker and Howland (1992), participating elders identified falls as a sentinel event in loss of independence. Indeed, it has been estimated that falls are a precipitating factor in 40% of nursing home admissions (Kellogg International Work Group on the Prevention of Falls by the Elderly, 1987). Because the availability of support may be a factor in determining whether an elderly person who is prone to falls is institutionalized, those who do not feel they can rely on friends and family in times of crisis may feel particularly vulnerable to losing their independence. In response, they may be more likely to curtail activities as a strategy for reducing opportunities for falling and maintaining independent living status.

Our results may have implications for the clinical management of fear of falling and suggest different strategies for the primary and secondary prevention of this fear. The results indicate that the experience of falling increases risk for developing fear of falling. Other investigators have also noted the relationship between fear of falling and previous falls (Arfken, Lach, Birge, & Miller, 1994; Howland et al., 1993; Tinetti, Mendes de Leon, Doucette, & Baker, 1994). Taken together, these observations argue for the

development of interventions for mitigating fall-related fear arousal among elderly patients receiving treatment for fall injuries (primary prevention). In addition to examination for physical risk factors for falling, components of such an intervention might include assessing and addressing anxiety and depression and attempting to change patients' sense of control over falls through cognitive restructuring (Lachman, Jette, Tennstedt, Howland, Harris, & Peterson, 1997). Our results also suggest the importance of social support in reducing the effects of existing fear (secondary prevention). Persons who are afraid of falling might benefit from encouragement from friends, relatives, and health care providers to talk about their fears and to develop supportive networks to assist in devising and implementing individual fall prevention strategies.

It is curious that knowing a friend or relative who had experienced a serious fall was significantly associated with activity curtailment whereas the respondent's own fall history was not. The effects on activity restriction of the vicarious experience of falls is intriguing and should be examined in future research. Optimally, older adults should be exposed to others who have experienced falls and effectively coped with their fear of falling by remaining active. In this way, vicarious experience might be used to reduce, rather than increase, activity restriction. This exposure might be accomplished through video intervention components, peer-leadership, or both.

It is noteworthy that the approximately 27% (32/120) of our sample who were not afraid of falling reported curtailing activities because they were afraid they would fall. It is possible that these subjects are no longer afraid of falling because the curtailment of activity has effectively coped with their fear. This hypothesis requires further study.

We acknowledge several limitations to this study. First, our conclusions are speculative because our study was cross-sectional and thus subject to alternative interpretations of causal order. Prospective studies are required to determine if activity curtailment is a cause or result of lack of social support. Second, our response rate was only 62% and we have limited information on nonrespondents. Thus, bias could have affected our results. The direction of this potential bias is difficult to assess. As noted previously, the most frequent reasons given for nonparticipation were "too busy" or "too ill." Being busy may be a marker for a higher level of functioning and being ill may be a marker for a lower level of functioning. Accordingly, our respondents may not represent the true range of function in the population sampled. Moreover, we sampled residents of publicly subsidized housing in a northeastern state and almost all respondents were White. Thus, our results may not be generalizable to the whole population of

community-dwelling elders, within Massachusetts or within the country.

Previously, fear of falling was considered a phobic response to a serious fall-related injury (Tideiksaar, 1989). It is only recently that focus has centered on the prevalence and consequences of fear of falling in the general population of community-dwelling elders. At present, we have only a nascent understanding of the etiology and potential effects of this fear on physical and psychosocial functioning. Nonetheless, the several community-based studies that have been conducted indicate that fear of falling is common and associated with a number of measures of physical and mental function. The extent to which fear of falling is protective, or as we suggest in this article, a potential cause of falls and social dysfunction is a question beyond the scope of this report and requires further study. This investigation is, to our knowledge, the first that examines factors associated with curtailment of activity among those who are afraid of falling. Although the design of our study limits interpretation of causal direction, we believe our findings can be useful in raising awareness and generating hypotheses for future research.

References

- Arfken, C. L., Lach, H. W., Birge, S. J., & Miller, J. P. (1994). The prevalence and correlates of fear of falling in elderly persons living in the community. *American Journal of Public Health, 84*, 565-570.
- Bosse, R., Aldwin, C., Levenson, M. R., Spiro, A. III, & Mroczek, D. (1993). Change in social support after retirement: Longitudinal findings from the Normative Aging Study. *Journal of Gerontology: Psychological Sciences, 48*, P210-P217.
- Howland, J., Peterson, E. W., Levin, W. C., Fried, L., Pordon, D., & Bak, S. (1993). Fear of falling among the community-dwelling elderly. *Journal of Aging and Health, 5*, 229-243.
- Kellogg International Work Group on the Prevention of Falls by the Elderly. (1987). The prevention of falls in later life. *Danish Medical Bulletin, 34*, 1-24.
- Lachman, M. E., Jette, A., Tennstedt, S., Howland, J., Harris, B. A., & Peterson, E. W. (1997). A cognitive-behavioral model for promoting regular physical activity in older adults. *Journal of Psychology, Health and Medicine, 2*, 251-261.
- Nevitt, M. C., Cummings, S. R., Kidd, S., & Black, D. (1989). Risk factors for recurrent nonsynopal falls: A prospective study. *Journal of the American Medical Association, 261*, 2663-2668.
- Perry, B. C. (1982). Falls among the elderly living in high-rise apartments. *Journal of Family Practice, 14*, 1069-1073.
- Tideiksaar, R. (1989). *Falling in old age: Its prevention and treatment* (pp. 89-92). New York: Springer Publishing.
- Tinetti, M. E., Mendes de Leon, C. F., Doucette, J. T., & Baker, D. I. (1994). Fear of falling and falls-related efficacy in relationship to functioning among community-living elders. *Journal of Gerontology: Medical Sciences, 49*, M140-M147.
- Vellas, B., Bocquet, H., de Pemile, F., & Albarde, J. (1987). Prospective study of restriction of activity in old people after falls. *Age and Aging, 16*, 189-193.
- Walker, J. E., & Howland, J. (1992). Exploring dimensions of the fear of falling: Use of focus group interview. *Gerontology: Special Interest Section Newsletter. American Occupational Therapy Association, 15*, 1-3.
- Ware, J. E. (1993). *SF-36 Health Survey: Manual and Interpretation Guide*. Boston, MA: The Health Institute.

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