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BRIEF COMMUNICATION

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Perceived Fall Risk and Functional Decline: Gender Differences in Patient's Willingness to Discuss Fall Risk, Fall History, or to Have a Home Safety Evaluation

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The CDC reports that among older adults, falls are the leading cause of injury-related death and rates of fall-related fractures among older women are twice those of men. We set out to 1) determine patient perceptions (analyzed by gender) about their perceived fall risk compared to their actual risk for functional decline and death and 2) to report their comfort level in discussing their fall history or a home safety plan with their provider. Elders who presented to the Emergency Department (ED†) were surveyed. The survey included demographics, the Falls Efficacy Scale (FES) and the Vulnerable Elders Survey (VES); both validated surveys measuring fall concern and functional decline. Females had higher FES scores (mean 12.3, *SD* 5.9) than males (mean 9.7, *SD* 5.9 $p = .007$) in the 146 surveys analyzed. Females were more likely to report an increased fear of falling, and almost three times more likely to have a VES score of 3 or greater than males (OR = 2.86, 95% CI: 1.17-7.00, $p = .02$). A strong correlation was observed between FES and VES scores ($r = 0.80$, $p < .001$). No difference in correlation was observed between males and females, $p = .26$. Participants (77 percent) reported they would be comfortable discussing their fall risk with a provider; there was no difference between genders ($p = .57$). In this study, irrespective of gender, there appears to be a high association between subjects' perceived fall risk and risk for functional decline and death. The majority of patients are likely willing to discuss their fall risk with their provider. These findings may suggest a meaningful opportunity for fall risk mitigation in this setting.

INTRODUCTION

More than one-third of adults 65 years of age or older fall each year, and in half of such cases the falls are recurrent [1-4]. As the U.S. population ages, the numbers of fall related injuries will increase [5-7] and these injuries are associated with significant morbidity, reduced mobility, decreased functioning and loss of independence [8]. How does gender interact with these projections? Women live longer than men and virtually all countries have greater numbers of women in the older age strata [9]. These women are disproportionately affected by fall related injuries [10]. After controlling for age, the fall-related death rate in 2009 was 34 percent higher for men than for women [4]. However, women are more likely to be nonfatally injured in a fall; in 2009, women were 58

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†Abbreviations: ED, Emergency Department; FES-I, Falls Efficacy Scale; VES-13, Vulnerable Elders Survey; *SD*, Standard Deviation; CI, Confidence Interval; OR, Odds Ratio.

Keywords: Mechanical Fall, Fall risk, Fear of Falling, Emergency Department

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percent more likely than men to suffer a nonfatal fall injury [11]. Falls not only impact personal health, but also have a high monetary cost. In 1994, the total cost of all fall related injuries among adults 65 years of age and older was $27.3 billion, and by 2020 the cost is expected to reach $43.7 billion (in 2002 dollars) [12].

To begin effective countermeasures for this public health concern, it would seem prudent to understand the opinions of those at risk in our specific population. There is scant published emergency medicine literature regarding patient perceptions about their fall risk, their comfort level regarding discussions related to their fall history, or openness to discussing a home safety plan with their healthcare provider. Further, it is unknown if there are gender differences in these outcomes. In our network, injury from a mechanical fall is the most common reason for admission in those who are 50 years and older. We set out to evaluate gender difference in patient perception of fall risk compared to their actual risk for functional decline and death. In addition, we sought to evaluate gender differences in patients' comfort level in discussing falls with providers and the possibility of having home safety evaluations done.

METHODS

Study Design and Setting

A pilot prospective survey was completed using a sample of adult patients who presented to the ED of a suburban Level 1 Trauma Center with an annual adult ED census of approximately 75,000 visits. The author developed section of the survey was not validated but was adapted from an instrument used previously to assess awareness of falls risk in a sample of community members who attended a "50+ Wellness Expo" about promoting health and preventing falls. The study was reviewed and approved by the hospital's Institutional Review Board.

The survey included demographics and 10 questions about fall risk, such as environmental living conditions (e.g. living alone, having stairs, having pets), participant behaviors (e.g. medications taken, assistive gait devices used, alcohol consumption), and number of falls, which were compared to self-perceived fall risk. The survey included three sections: the shortened version of the Falls Efficacy Scale (FES) [13], the Vulnerable Elders Survey (VES-13), and the author created portion. The author developed questions were created by the study team and were evaluated for face validity. Internal pilot testing of the survey was completed on a group of volunteers to ensure soundness of the study questions, ease of readability and to assess an approximate amount of time required to complete all survey questions (Sample Survey Questions, Appendix 1) [14]. The shortened FES is a validated survey that was developed to assess fear concerns about seven daily activities using cross culturally valid items [13]. On a four point scale from "not at all concerned" to "very concerned" subjects were asked to rate their concern about falling when they are doing daily activities such as getting dressed/undressed, taking a bath or shower, and going up and down stairs [13] The score for the FES was determined consistent with scoring instructions by adding the scores on all the items together [13]. These total scores ranged from 7 (no concern about falling) to 28 (severe concern about falling) [13]. Also a validated survey, the VES-13, is a simple function-based tool for screening community-dwelling populations to identify older persons at risk for health deterioration. The VES considers age, self-rated health, limitations in physical function, and functional disabilities [15]. The VES is scored from 0 to 10 with values of zero attributed to those activities requiring "no difficulty", "a little difficulty", and "some difficulty". One point for each response of "a lot of difficulty" or "unable to do" is ascribed. Through the use of the VES, subjects were asked to rate their difficulty doing physical activities on actions such as stooping/kneeling, writing/grasping, doing housework, and walking. Additionally they were asked to answer what activities they get help for such as shopping, managing money, doing housework, and bathing. While the FES has been validated to measure fall concern, the VES-13 is validated and used to calculate risk of significant impairment, functional decline, and death. A VES score of 3 or greater equates four times the risk of decline and death compared with a VES score of 0 to 2 [15].

Study Population

Study participants were included if they were adults (50 years or older), English or Spanish-speaking, presenting to our ED, and who were physically and/or mentally able to complete the survey. Subjects were excluded if they were under the age of 50, non-English or non-Spanish speaking or not physically and mentally able to complete the survey. The patient was considered mentally and physically able to complete the survey if they had the capacity to understand the survey and were not critically ill. Participation in this study was strictly voluntary and subject responses were anonymous. Subjects were informed of their right to refuse to participate or to stop participating at any point. All responses to the questionnaires were kept strictly confidential.

Data Analysis

The distribution of all variables was examined. Normality was established using histograms, normal probability, and quantile plots. Because the distributions of continuous variables were approximately normal, bivariate comparisons with participant gender were assessed using the Student's t-test for continuous scaled variables, and X^2tests for categorical variables. FES and VES scores were assessed for correlation using Pearson's correlation coefficient, and these correlations were stratified by participant gender. Differences in correlation coefficients were estimated using the test for equality of two correla-

Table 1. Cross-classification of gender with survey items (percentages in parenthesis).

Variable	Coding	Overall *n*=146	Male *n*=64	Female *n*=82	*p*-value
Age (mean, *SD*)		69.0 (11.4)	67.9 (10.5)	69.8 (12.1)	.33
Race/ethnicity	White Non-Hispanic	139 (95.2)	61 (95.3)	78 (95.1)	
	White Hispanic	4 (2.7)	1 (1.6)	3 (3.7)	
	Black Non-Hispanic	2 (1.4)	1 (1.6)	1 (1.2)	
	Black Hispanic	0 (0)	0 (0)	0 (0)	
	Other Non-Hispanic	1 (0.7)	1 (1.6)	10 (0)	.60
Live alone	No	113 (77.4)	53 (82.8)	60 (73.2)	
	Yes	33 (22.6)	11 (17.2)	22 (26.8)	.17
Have pets	No	83 (57.2)	32 (50)	51 (63)	
	Yes	62 (42.8)	32 (50)	30 (37)	.12
Number of current medications	0	15 (10.3)	6 (9.4)	9 (11)	
	1	17 (11.6)	11 (17.2)	6 (7.3)	
	2	15 (10.3)	7 (10.9)	8 (9.8)	
	3	14 (9.6)	7 (10.9)	7 (8.5)	
	4+	85 (58.2)	33 (51.6)	52 (63.4)	.38
Blood thinners	No	115 (78.8)	51 (79.7)	64 (78.0)	
	Yes	31 (21.2)	13 (20.3)	18 (22.0)	.81
Blood pressure medications	No	55 (37.7)	29 (45.3)	26 (31.7)	
	Yes	91 (62.3)	35 (54.7)	56 (68.3)	.09
Use assistive device	No	117 (82.4)	57 (89.1)	60 (76.9)	
	Yes	25 (17.6)	7 (10.9)	18 (23.1)	.06
Falls in previous year	0	95 (65.1)	48 (75.0)	47 (57.3)	
	1	23 (15.8)	8 (12.5)	15 (18.3)	
	2+	28 (19.2)	8 (12.5)	20 (24.4)	.08
FES (mean, *SD*)	Continuous	11.1 (5.8)	9.7 (5.4)	12.3 (5.9)	.007
VES	<3	93 (63.7)	50 (78.1)	43 (52.4)	
	3+	53 (36.3)	14 (21.9)	39 (47.6)	.001
General Health	Poor	9 (6.2)	3 (4.7)	6 (7.3)	
	Fair	43 (29.4)	18 (28.1)	25 (30.5)	
	Good	52 (35.6)	24 (37.5)	28 (34.1)	
	Very good	36 (24.7)	16 (25.0)	20 (24.4)	
	Excellent	6 (4.1)	3 (4.7)	3 (3.7)	.94
ETOH	No	104 (71.2)	36 (56.3)	68 (82.9)	
	Yes	42 (28.8)	28 (43.8)	14 (17.1)	<.001
Stairs in home	No	39 (26.7)	14 (21.9)	25 (30.5)	
	Yes	107 (73.3)	50 (78.1)	57 (69.5)	.24
Safety evaluation	No	58 (40.3)	20 (31.8)	38 (46.9)	
	Yes	86 (59.7)	43 (68.3)	43 (53.1)	.07
Talk with Healthcare provider	No	33 (22.9)	13 (20.6)	20 (24.7)	
	Yes	111 (77.1)	50 (79.4)	61 (75.3)	.57

tion coefficients. Stepwise logistic regression was used to assess the association of participant gender (male coded zero and female coded as one) with environmental living conditions, participant behaviors, falls risk and fear of falling. FES and VES scores were not included in the same model, since these variables are highly collinear. Significance level of $p = .2$ was used as a level for removal from the analysis to remove extra variables from the model, so

Table 2. Results of stepwise logistic regression analysis exploring the association between falls survey items and gender.

Variable	Coding	OR	95% CI	*p*-value
Age	Continuous	0.98	(0.94-1.02)	.329
Live alone	No	1.0	-	-
	Yes	1.85	(0.72-4.70)	.197
VES	VES <3	1.0	-	-
	VES 3+	2.86	(1.17-7.00)	.021
Alcohol consumption	None	1.0	-	-
	Some	0.34	(0.15-0.77)	.01
Home safety evaluation	No	1.0	-	-
	Yes	0.51	(0.23-1.09)	.082

Note: Abbreviation Key: VES (Vulnerable Elders Survey), VES 3+ = 3 or greater score on the VES

as not to keep many superfluous covariates [16]. Age was included in all models as a potential confounding factor. All risk estimates are reported as odds ratios (OR) with 95% confidence intervals (CI). All data management and analyses were performed using StataSoftware v.12.1 (Stata Corporation, College Station, TX).

RESULTS

A total of 149 surveys were administered; three surveys were excluded due to incomplete responses and 146 surveys were included in the analysis. Participant characteristics by gender are presented in Table 1. The mean age of participants was 69 years with no age difference by gender, $p = .33$. A majority of the participants were female ($n = 82$, 56.2%) and most were white non-Hispanic ($n = 139$, 95.2%). Over a third (35.6% $n = 52$) of participants reported their health to be poor or fair with similar distributions by gender. Women as a group had higher mean FES scores (mean 12.3, *SD* 5.9) than men (mean 9.7, *SD* 5.9 $p = .007$).

Total VES scores ranged from zero to 10 with median VES of one. Fifty-three of the respondents (36.3 %) had a VES score of 3 or greater (VES-3+). Females were nearly three times more likely than males (OR = 2.86, 95% CI: 1.17-7.00, $p = .02$) to have significant impairment with 47.6 percent of the females having a VES score greater or equal to three, compared to only 21.9 percent of males, $p = .001$. Stepwise logistic regression model (see Table 2) showed that females were more likely than males to report living alone (OR = 1.85, 95% CI: 0.72-4.70, $p = 0.19$) and less comfortable discussing a home safety evaluation by a healthcare provider (OR = 0.51, 95% CI: 0.23-1.09, $p = .082$), however both estimates did not achieve statistical significance at the $p < .05$ level. They were also 49 percent less likely to report consuming alcohol (OR = .51, 95% CI: 0.15-0.77). A strong correlation was observed between FES and VES scores ($r = 0.80$, $p < .001$). This correlation was found to be equally robust when stratified by participant gender (Figure 1). No difference in correlation was observed between males and females, $Z = .71$, $p = .26$.

DISCUSSION

In our study, the majority of subjects reported they would feel comfortable discussing their fall risk with a provider. This is particularly relevant considering it is estimated that the US population aged 65 and older is expected to more than double between 2012 and 2060, from 43.1 million to 92.0 million [17]. A sizeable impact on public health could potentially be realized if providers could take advantage of the opportunity to intervene and mitigate fall risks in the elderly. Because even falls that do not lead to injury often begin a downward spiral of fear that leads to inactivity and decreased strength and balance that often results in loss of independence in normal daily activities, they are of importance [18]. Unfortunately, those who survive their fall, may fall again. We have a responsibility in our treatment plans to ensure we have assessed and not ignored this risk. Our role in the preventive aspects of this public health dilemma would optimally be to positively impact patient-centered health outcomes in a meaningful way.

It was important to the authors that there was concordance between subjects' perceived and actual risk. When patients do not perceive their risk it is hard to appeal to their interest in participation in interventions that alleviate it. Hopefully this concordance will allow future interventions to be directed to the risk rather than to raising awareness of it. Women were more likely to report an increased fear of falling, consistent with their higher risk of actual functional decline as measured by a VES (3+) score. These findings are particularly concerning since women were more likely to report living alone.

It is encouraging to find that there is receptiveness by both men and women to the conversation about fall risk. In our sample, however, while not statistically significant,

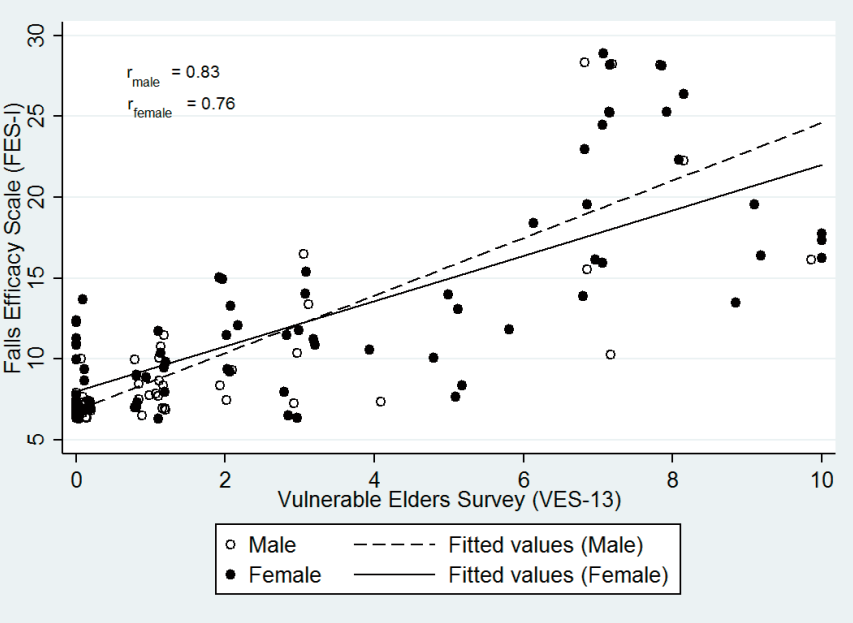

Figure 1. Correlation between FES and VES Surveys by Gender

it appears that women were less comfortable speaking with their health care provider about having a safety evaluation of their home performed by a health care professional. There are other differences that may cause gender-specific higher risks for elderly adults. For example, in this study, women (although not statistically significant) were more likely to live alone, yet men were more likely to report consuming alcohol, both variables that can add to the risk of falling. These findings suggest that future studies should consider developing and assessing the effectiveness of gender-specific interventions.

A strength of our study was utilization of validated instruments to evaluate the risk for functional decline and death and the participant's perceived increased risk of falling. While it may be debatably wise, we essentially used the FES survey as a surrogate for perceived risk, and the VES survey as a surrogate for actual fall risk. However, our study also has some limitations to be cognizant of when evaluating the results. First, while the author originated survey component had been used in a prior survey study we certainly cannot claim the same validity as the other survey components. Additionally, we only surveyed subjects in Northeastern Pennsylvania and the majority of our participants identified as White Non-Hispanics. It is unclear what outcomes might have differed if the diversity had been more robust and thus these results may not be generalizable to other communities.

An additional factor to consider is the choice of methodology we chose for our analysis. It is unknown what the outcomes might have been had a different *p*-value for removal as a study variable was set or if Pearson's R correlation had been used to correlate the FES and VES. Finally, study enrollment was only completed during research assistant availability. This could have introduced a selection bias, but it is difficult to determine the magnitude of this effect. This study was also limited by the number of subjects surveyed. The sample size hindered our ability to complete analyses in underrepresented subset of our sample. In particular the trend of women being more likely to live alone and less likely to feel comfortable discussing a home safety evaluation may be a result of sample size and had the study been adequately powered the trend may have reached significance.

CONCLUSIONS

In this study, irrespective of gender, there appears to be a high association between subjects' perceived risk of falling and their risk for functional decline and death. The majority of subjects, regardless of gender, are likely to be willing to discuss their fall risk with their provider. This suggests a meaningful opportunity for fall risk prevention.

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Appendix 1 Sample Survey Questions

Yes/No:

Do you live alone?

Do you have a cat or dog?

Does your home have stairs?

Were you told/prescribed to use an assistive device by a health care provider?

Do you use an assistive device (e.g., cane, walker, wheelchair) regularly?

Would you be comfortable speaking with your healthcare provider about your fall risk?

Would you be comfortable speaking with your health care provider about having a safety evaluation of your home performed by a health care professional?

Open Ended:

About how many times have you fallen in the past twelve months?

If you have fallen in the past twelve months, how many times did you seek medical treatment for the falls?

About how many alcoholic beverages (wine, beer, other liquor) do you consume in a week?