

Slipping through the cracks: A cross-sectional study examining older adult emergency department patient fall history, post-fall treatment and prevention

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ABSTRACT

Falls are the leading cause of emergency department (ED) visits for fatal and non-fatal injuries among adults 65 years old and older. We aimed to better understand the fall history, risk for further falls, and actions taken to prevent further falls among this higher fall risk population. This cross-sectional study included older adults without cognitive impairment presenting to the Rhode Island Hospital ED from February to May 2017. Of the 76 participants, 35 self-reported no prior falls, and 41 self-reported at least one prior fall, of whom 20 fell on the day of ED presentation. Participants with vs. without self-reported prior falls were similar in age, gender, race, and substance use. Participants with prior falls scored lower on cognitive testing and had more comorbidities associated with falls. Only one quarter of those with prior falls reported making changes and few were evaluated by professionals to prevent future falls. This study highlights that older adult ED patients who sustain a fall are at higher risk for subsequent falls, and that greater fall prevention efforts are needed to protect this vulnerable group.

KEYWORDS: aging, emergency services, prevention, falls, injury

BACKGROUND

Falls by older adults are both preventable and predictable. They are the leading cause of fatal and non-fatal injuries among adults 65 years old and older¹ and constitute 13.5% of annual United States (US) emergency department (ED) visits in this age group.² Falls are a sentinel event in a senior's life because they frequently result in injury, hospitalization,³ loss of independence,⁴ and mortality.

Given that the population of older adults in the US is increasing and annual Medicare costs for adult falls are already estimated to be \$31.3 billion,⁵ there have been many efforts to institute fall prevention programs. Overall multifactorial fall risk assessment and management programs have been successful in reducing fall risk among the elderly (adjusted risk ratio 0.82, 95% CI: 0.72-0.94).⁶ The most successful programs target modifiable risk factors and are tailored to the individual patient. Although many older adults who have a fall seek care in EDs, there is a noticeable lack of research into

fall prevention specifically for ED patients. Therefore, the Society of Academic Emergency Medicine (SAEM) has specified falls as one of four high-yield research opportunities.⁷

In this investigation, we sought to better understand the characteristics of older adults with self-reported prior falls or a fall on the same day as the ED visit, as compared to older adults who present to the ED, but denied prior falls. In addition, we aimed to understand older adults' prior health-care interactions, care experiences, and their ideas for ED care improvement. We hypothesized that older adults with a history of falls would have unmet care needs that could be addressed in future ED-specific fall prevention protocols.

METHODS

This cross-sectional study was conducted at the Rhode Island Hospital ED, Rhode Island's only level I trauma center, from February to May 2017. Eligible individuals were a convenience sample of adults 65 years old or older who were present in the ED during data collection periods, were undergoing an evaluation of any sub-critical illness or injury, were able to communicate in English, were at low risk for cognitive impairment, and could consent to participate. The Six-item Screener, a six-point questionnaire validated in the ED setting⁸ to measure cognitive impairment, was used to determine cognitive impairment. For the purposes of the study, patients scoring ≥ 4 on the screener were considered to be at low risk for cognitive impairment and thereby study eligible. Participants did not have to self-report a history of prior falls to be eligible, as we planned to recruit patients with and without prior falls.

Research assistants (RAs) reviewed the ED electronic health record (EHR) to assess for potential study eligibility. Patients who met inclusion criteria by EHR (65 years old or older, English-speaking, not currently residing in the critical care bay) were approached during their ED stay to confirm study eligibility. Following consent, participants underwent an RA-administered questionnaire. Survey questions were drawn from prior studies about older adult health and health care experiences. Participants were asked about their demographic characteristics, self-reported fall history, comorbidities, current medications, activities of daily living (ADL) status, as well as questions about how to improve the ED care experience. The hospital's institutional review board approved this study.

Definitions

Fall: A fall was classified as coming to rest on the ground or other lower level, but not due to an external force (e.g. struck by car or assault), syncope, or serious illness (e.g. stroke, acute myocardial infarction).

Prior fall: A “prior fall” is a fall that occurred anytime before presentation to the ED that day. This includes falls that occurred immediately prior to coming to the ED, as well as falls that occurred several days to years ago.

Fall on ED study visit day: This refers to any fall that occurred after midnight on the day of presentation to the ED.

Analysis

The survey responses were reported as the number and proportions of the total responses stratified by two groups, older adults presenting to the ED without any self-reported history of falls vs. those with at least one prior fall (on the day of the ED study visit and/or previously). Patients with

at least one prior fall were further stratified into those that had a prior fall vs. those who had a fall on the day of the ED study visit. Any patient who reported falling after midnight on the day of the ED visit was classified as having a “fall on ED study visit day”. Two study team members summarized participant suggestions on how to improve ED care and categorized them into major topics. The study team agreed on illustrative quotes that represented the relevant topics.

RESULTS

Characteristics of Study Subjects

Of 207 potentially eligible subjects, 82 met inclusion criteria and consented to being in the study, and 76 were included in the analysis (Figure 1). Of these, 35 self-reported no prior falls and 41 participants indicated that they had fallen previously (including 20 who had fallen on the ED study visit day).

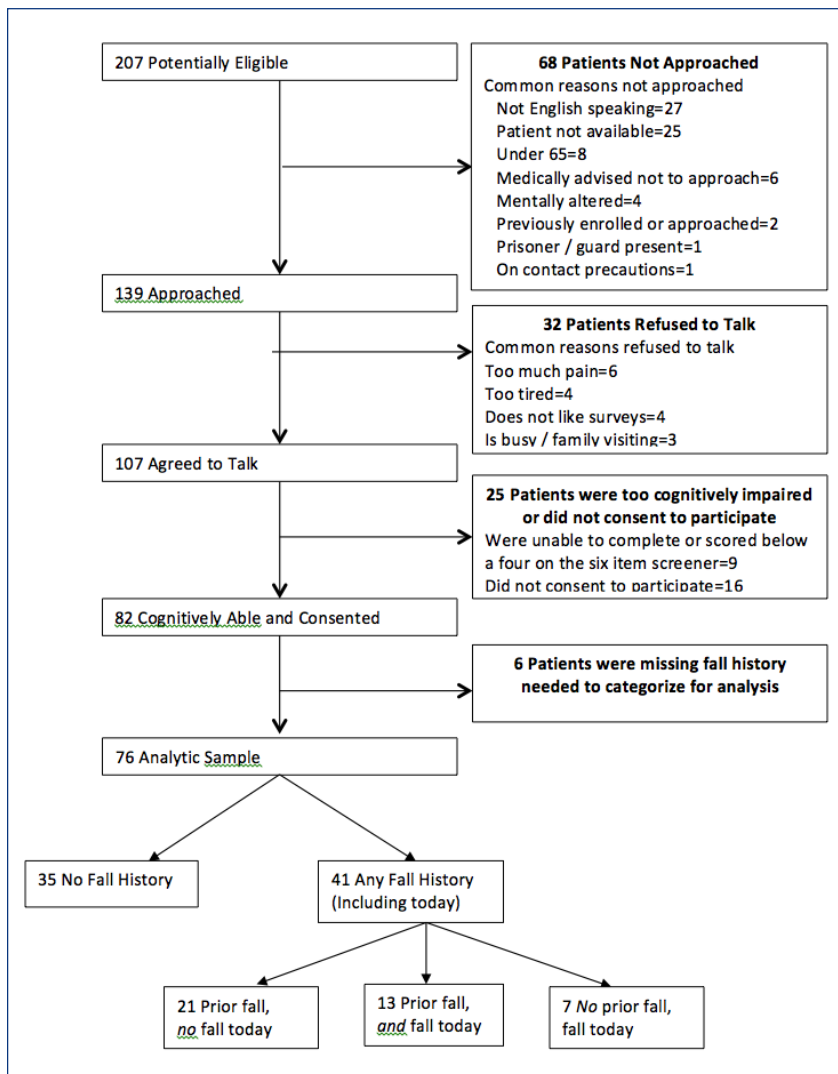
The mean age of participants was 75 years old among those with and without prior falls (Table 1). Participants were predominantly female, white, and high school graduates. More than two thirds reported having both private and governmental insurance and most were retired and not working. Less than 6% of participants reported living in assisted living or a nursing home. Participants with prior falls scored lower overall on cognitive scores on the Six-item Screener, but had a similar mean functional ability score on the Barthel’s ADL questionnaire.

Compared to participants who denied having a prior fall, those who had fallen previously reported more comorbidities, including memory loss, arthritis, hypotension, dizziness, heart disease and diabetes. Participants in both the self-reported prior fall and no self-reported prior fall groups were equally as likely to be taking fall risk-increasing medications; however, approximately one third of participants were unable or unwilling to provide an accounting of their current medications. Most participants in both groups did not smoke or drink alcohol.

Health Care Utilization History After Prior Falls

Table 2 summarizes the timing and frequency of prior falls and the health care use of the 34 participants self-reporting any prior falls, excluding those who reported falling on the day of the ED study visit. As shown, slightly over one third had fallen within the past year, and over one quarter

Figure 1. Participant Flow Diagram



had fallen more than once during this time period. Similar percentages reported having been evaluated initially in the ED vs. by their primary care provider after their last fall. Less than 10% reported being evaluated by a geriatrician, a physical therapist, occupational therapist or pharmacist after that fall, and none by a case manager. Over two thirds reported making no preventive changes after their prior fall.

Suggestions for ED Care Improvement

Table 3 summarizes participants' free text answers to the following question: "Do you have any suggestions how your care in the Emergency Department could be improved in general?" Most participants reported that they had no suggestions to improve care. Approximately one quarter of participants indicated that the wait time to see a provider and the wait time for tests to return could be improved. Many participants made suggestions about making the ED environment more comfortable for patients like themselves.

Communication improvements were suggested on multiple levels, including the desire to have more frequent updates on results, minimizing repeated questioning, and wanting a friendlier attitude from ED staff and physicians. Very few were unsatisfied with the medical care provided.

DISCUSSION

In this study of older adults presenting for emergency care, those who self-reported prior falls were more likely to have significant comorbidities that might indicate a predilection to having subsequent falls and performed worse on cognitive testing. Those who self-reported a prior fall

Table 1. Participant and visit characteristics (*continued next page*)

Characteristics	No Self-reported Falls (n=35)		Any Self-reported Fall (Not Including ED Study Visit Day) (n=34)		Fall on ED Study Visit Day (n=20)	
	N	Mean/%	N	Mean/%	N	Mean/%
Age (Mean, in years)	33	75.3	34	75.9	20	78.6
Gender (%)						
Female	20	57.1	21	61.8	16	80.0
Male	14	40.0	12	35.3	4	20.0
Race/Ethnicity (%)						
White Non-Hispanic	29	82.9	31	91.2	19	95.0
Black/African-American	2	5.7	1	2.9	1	5.0
White Hispanic	1	2.9	0	0.0	0	0.0
Black Hispanic	1	2.9	0	0.0	0	0.0
Asian	1	2.9	0	0.0	0	0.0
American Indian/Alaskan Native	0	0.0	1	2.9	0	0.0
Educational level (%)						
Less than high school graduate	1	2.9	6	17.6	4	20.0
High school graduate / GED#	22	62.9	16	47.1	9	45.0
Any college	4	11.4	5	14.7	4	20.0
College graduate	6	17.1	5	14.7	3	15.0
Health insurance status (%)						
Private	5	14.3	3	8.8	2	10.0
Governmental	3	8.6	4	11.8	5	25.0
Private and governmental	26	74.3	25	73.5	13	65.0
Employment status (%)						
Working full-time	4	11.4	4	11.8	3	15.0
Working part-time	4	11.4	2	5.9	0	0.0
Retired and not working	24	68.6	25	73.5	15	75.0
On disability and not working	2	5.7	2	5.9	2	10.0
Living arrangements (%)						
Nursing home resident	0	0.0	1	2.9	1	5.0
Assisted living resident	2	5.7	1	2.9	1	5.0
Lives with others, not in a facility	23	65.7	20	58.8	11	55.0
Lives alone, not in a facility	9	25.7	11	32.4	7	35.0
Triage acuity (%)						
ESI 1°	2	5.7	0	0.0	0	0.0
ESI 2	9	25.7	13	38.2	7	35.0
ESI 3	21	60.0	18	52.9	12	60.0
ESI 4 or ESI 5	1	2.9	1	2.9	1	5.0
Unassigned	0	0.0	1	2.9	0	0.0
Cognitive and functional ability						
Cognitive Six-item Screener score (%)						
4	3	8.6	6	17.6	6	30.0
5	6	17.1	5	14.7	5	25.0
6	24	68.6	22	64.7	8	40.0
Barthel's ADL score (mean)	33	19.0	31	18.3	19	18.4

also appear to be at risk for multiple subsequent falls, given that approximately one fourth had fallen more than once in the past 12 months. However, despite being at risk for subsequent falls, few patients reported having made preventive changes and few were evaluated by specialists who might offer care to reduce further fall occurrence.

The American College of Emergency Physicians (ACEP) soon will begin accrediting EDs that offer specialized geriatric care.⁹ Providing a standardized assessment for falls, as well as providing an ED environment that is tailored to older adults, are key criteria for accreditation. Suggested provisions include access to mobility aids, nonslip socks, pressure-reducing mattresses, bedside commodes, transition stools, and large-face analog clocks. Recognizing that ED physicians may lack the training and time to provide geriatric-tailored care, ACEP recommends that hospitals provide geriatric-trained professionals to complement the ED physician assessment, including physical therapists, occupational therapists, social workers, and pharmacists. As indicated by the responses from participants in this study, ED patients are cognizant of improvements that can be made to improve this care.

An interdisciplinary geriatric-focused team could greatly improve on the current status quo. Currently only 3.7% of older adults receive fall-guideline concordant care when they present to the ED after a fall.¹⁰ It is uncommon for the ED clinician to ask routinely and systematically about risk factors that frequently precipitate falls, including visual impairment, peripheral neuropathies, alcohol or medication use, appropriate footwear, and the safety of the home environment.^{11, 12} Prior research of community-dwelling older adults who present to the ED after falls shows that their 6-month fall risk was 29.5% higher than age-matched controls and functional ability, and balance confidence and depression all worsened over six months.¹⁰ Our study findings that the majority of ED patients were not evaluated by their primary care provider

Table 1. Participant and visit characteristics (continued from previous page)

Characteristics	No Self-reported Falls (n=35)		Any Self-reported Fall (Not Including ED Study Visit Day) (n=34)		Fall on ED Study Visit Day (n=20)	
Comorbidities associated with fall risk (%)						
Memory loss	4	11.4	10	29.4	5	25.0
Arthritis	11	31.4	23	67.7	12	60.0
Hypotension	3	8.6	8	23.5	2	10.0
Dizziness	11	31.4	17	50.0	7	35.0
Anemia	3	8.6	4	11.8	1	5.0
Parkinson's disease	0	0.0	1	2.9	1	5.0
Heart disease	10	28.6	14	41.2	4	20.0
Stroke	3	8.6	3	8.8	1	5.0
Diabetes	6	17.1	12	35.3	2	10.0
None	9	25.7	1	2.9	5	25.0
Substance use (%)						
Smoke ≥ 1 pack of cigarettes a week						
No	32	91.4	31	91.2	17	85.0
Yes	0	0.0	3	8.8	3	15.0
Drink ≥ 1 alcoholic drink per week						
No	29	82.9	27	79.4	14	70.0
Yes	4	11.4	5	14.7	6	30.0
Number of fall-risk increasing medications taken* (%)						
0	11	31.4	12	35.3	7	35.0
1	9	25.7	8	23.5	3	15.0
2	2	5.7	2	5.9	1	5.0
3	0	0.0	3	8.8	1	5.0

Note: Percentages do not add up to 100% due to refused, don't know, and missing responses.

#GED – General Education Diploma

*ESI – Emergency Severity Index – is a triage scoring tool used in Emergency Departments, with ESI 1 designation given to the most critical patients.

*Beers criteria fall-risk increasing medications: anticonvulsants, antipsychotics, benzodiazepines, nonbenzodiazepine / benzodiazepine receptor agonist, hypnotics, eszopiclone, zaleplon, zolpidem, tricyclic antidepressants (TCAs), selective serotonin reuptake inhibitors (SSRIs), opioids

after their most recent fall and did not make preventive changes, could explain in part why outcomes for this vulnerable population can be dire. An ED-initiated fall prevention protocol, better communication between ED and outpatient providers, and an interdisciplinary approach to falls are necessary to improve post-fall care and help prevent future falls and their sequelae.

Limitations

While this study provides information on older adults lacking in the prior research on this topic, there are several limitations. First, given the convenience sample recruitment, inclusion only of English-speaking patients, and small sample size, it is not possible to generalize these study results

Table 2. Fall and post-fall care history among those self-reporting prior falls before the ED visit

	Any Self-reported Fall (Not Including ED Study Visit Day) (n=34)	
	n	Mean/%
Time since last fall		
Less than 1 month ago	2	5.9
1 month to less than 6 months ago	7	20.6
6 months to less than 12 months ago	9	26.5
12 months or more ago	13	38.2
Don't know	2	5.9
Times fallen in the past 12 months		
Once	21	61.8
Twice	5	14.7
Three times	2	5.9
Four times	1	2.9
Five times or more	1	2.9
Don't know	2	5.9
Last visit to the ED after a fall		
Less than 1 month ago	3	8.8
1 month to less than 6 months ago	1	2.9
6 months to less than 12 months ago	4	11.8
12 months or more ago	11	32.6
Don't know	7	20.6
Care provider seen after prior fall		
PCP	14	41.2
Geriatrician	1	2.9
ED provider	15	44.1
Orthopedist	4	11.8
Physical therapist	3	8.8
Occupational therapist	2	5.9
Case manager	0	0.0
Pharmacist	2	5.9
Other	1	2.9
Assessments after prior fall		
Vision	5	14.7
Footwear	4	11.8
Home safety evaluation	5	14.7
Visiting nurse	3	8.8
Don't know	3	8.8
Preventive changes made after last fall		
No	23	67.6
Yes	9	26.5
Don't know	2	5.9

Table 3. ED post-fall care improvement suggestions

Themes	Quotes
Timeliness	"too long of a wait time", "faster", "hurry up and wait, over two hours after tests, still sitting"
Environment/ Comforts	"mattresses could be better", "pillows", "too noisy, hard to get comfortable", "hard to get good rest", "if they could make it less cold in the hospital, that would be great", "shouldn't have to pay for parking"
Communication/ Interactions	"communication more frequent what will be done", "doctors could have better attitude", "some staff are friendly, some are not", "more coordinated, they come in and ask the same questions", "so many people coming in and out and no one knows anything"
Medical Care	"came in for heart problem, didn't put on leads", "specialist was requested, no one came"
None	"No", "N/A", "wonderful", "don't fix what's not broke"

to all older adults presenting to the ED, particularly given that those with cognitive impairment were excluded. These patients represent a particularly high-risk group for falls and their care preferences are important and should be queried in future surveys. Additionally, participants were predominantly white and were presenting to a large academic level I trauma center. Adults with different racial/ethnic backgrounds presenting to smaller, community hospitals in other regions of the country may have responded differently. The purpose of the study was to better understand older adults' perceptions of their medical care, as such we did not collect information that was gathered by the ED provider such as the participant's neurological exam, musculoskeletal exam, or gait evaluation.

CONCLUSIONS

In this study, older adult patients without cognitive impairment who self-reported a prior fall infrequently made changes to prevent future falls and had not been evaluated by professionals who might reduce subsequent fall occurrence. Because these patients are at higher risk for repeat falls, functional decline, and death, efforts aimed at fall prevention both in and outside the ED setting are needed. Future research should evaluate the effectiveness of geriatric-trained professionals in providing standardized fall assessments aimed at prevention in this setting.

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