



## Original Article

# Factors Associated With Multiple Falls Among Elderly Patients Admitted to Emergency Department



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## SUMMARY

**Background:** Fall related injuries constitute a significant part of emergency department admissions of geriatric patients. Recurrent falls are also not uncommon. The aim of this study is to evaluate the factors that might be related with multiple falls among the elderly patients admitted to emergency department. **Methods:** The study was conducted between 1st May 2014 and 31 October 2014 at a tertiary education and research hospital in Istanbul, Turkey. All the patients over 65 years who admitted to emergency department due to falls were included. Patients and/or their relatives were asked to answer the questions searching for possible factors that may interfere with their multiple falls.

**Results:** During the study period 308 patients over 65 years old admitted to emergency department. 51% were between 65 and 79 years old and 49% were >80 years old. The women constituted the 70.1% of the cases. The majority of the cases described the mechanism of injury as stumbling and fall (72.4%). Factors related with multiple falls were as follows: being between 65 and 79 ages, being physically active before the fall event, having chronic cardiovascular and neurologic diseases and being on benzodiazepine and SSRI medication.

**Conclusion:** Physically active and relatively younger elderlies fall more frequently. As the most commonly described mechanism was stumbling and fall, the importance of environmental risk factors is emphasized. Patients with cardiovascular and neurological diseases should be further evaluated for increased fall risk and indications of benzodiazepines and SSRI's in elderly people should be well evaluated.

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## 1. Introduction

Fall related injuries constitute a significant part of emergency department (ED) admissions of geriatric patients. According to Centers for Disease Control reports, 2.5 million nonfatal falls among older adults were treated in EDs and more than 734,000 of these patients were hospitalized in 2013.<sup>1</sup> Recurrent falls are also not uncommon. One-third of individuals over 65 years falls at least once a year and it has been shown that this ratio reached 50% over 80 years.<sup>2,3</sup> Injuries due to falls in elderly generally result in minor soft tissue injuries probably due to low energy of the exposed trauma. Some authors reported that only 5–10% of all falls resulted in major injuries like fracture, head trauma, major

lacerations.<sup>4,5</sup> However falls are generally related with the reduced functionality.

Studies have shown that, after the first fall, decline in functional capacity of elderlies, causing them to enter a vicious circle. The possibility of nursing home facility placement and the frequency of hospital admissions have increased after falls among elderly people. The risk of recurrent falls has also increased after the first fall.<sup>2,6,7</sup> Mortality rate due to the impact of injury is low. However the complications related with the falls increase the risk of death.<sup>8,9</sup>

“Fear of Falling” or “Post-fall Syndrome” which is generally categorized as a post-traumatic stress syndrome is another psychosocial problem that has to be faced by most of the elder people. It is characterized by high levels of anxiety related to walking.<sup>10,11</sup> On the other hand less than half talk to their healthcare providers about their episode of fall.<sup>12</sup>

The most important point in the prevention of falls is the identification of environmental and personal factors that give rise

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to falls and to take precautions against these risk factors. Several studies showed that the most important consideration is the history of previous falls which places the patient at increased risk of future falls.<sup>13–15</sup> The aim of this study is to evaluate the incidence of multiple falls and the factors that might be related with multiple falls among the elderly patients admitted to emergency department due to a fall event.

## 2. Methods

This study is conducted between 1st May 2014 and 31 October 2014 at an ED of a tertiary education and research hospital in Istanbul, Turkey which is visited by more than 20,000 patients monthly. All the patients over 65 years who admitted to ED due to falls during the study period were included. Patients and/or their relatives were asked to answer the questions searching for possible factors that might interfere with their fall events. Besides the demographic data, people were asked about their education attainment, monthly incomes, physical status before the injury, living places, and the number of previous fall events in the last 12 months. And if they described even one episode of fall in the last 1 year other than this admission, we accepted it as multiple falls. The mechanism of injury and the places of falls were also noted.

The medical data in the ED were investigated about chronic diseases and medications at the time of admission. The type of injury, need for an operation, need for hospitalization and mortality rate in the ED after the injury, were recorded. Co-existing medical conditions were also noted. The institutional review board of the hospital approved the study protocol.

The data were analyzed by using NCSS (Number Cruncher Statistical System) 2007 & PASS (Power Analysis and Sample Size) 2008 Statistical Software (Utah, USA) program. For the analyses, besides descriptive statistical methods (frequency, percentage, minimum, maximum, mean and standard deviation), Pearson's Chi-square test, Fisher-Freeman-Halton exact test and Fisher's exact test were used for the comparisons of qualitative data. Backward stepwise logistic regression analysis model was applied for possible independent factors. Statistical significance were assumed for  $p < 0.05$  and  $p < 0.01$ .

## 3. Results

During the study period 308 patients over 65 years old admitted to ED because of a fall. The mean age was  $78.52 \pm 7.63$ . 51% were between 65 and 79 years old ( $n = 157$ ) and 49% ( $n = 151$ ) were  $\geq 80$  years old. The women constituted the 70.1% ( $n = 216$ ) of the cases. Half of the cases had less than 1000 TRY monthly income that can be considered very low. In terms of education attainment, 24.7% ( $n = 76$ ) were illiterate, and only 8.8% ( $n = 27$ ) were graduated from university. The study group was mostly expressed that they were living with a first degree relative (73.1%,  $n = 225$ ). Nearly 17% of the cases ( $n = 52$ ) were living alone (Table 1).

Comparisons of descriptive data showed that the lower the monthly income, the rate of staying in a nursing home is increasing ( $p = 0.005$ ). Patients with monthly income of  $>2000$  TRY mostly live alone ( $p = 0.034$ ). When the educational attainment, monthly income and living place were examined as a risk factor for multiple falls, there was not any significant relation. The  $p$  values were 0.599, 0.704 and 0.985 respectively.

Multiple falls were also not related with cender ( $p = 0.780$ ). However we have found that patients over 80 years old experienced multiple falls more than the patients between 65 and 79 years old ( $p = 0.018$ ).

In terms of physical status before the fall episode, 62.7% ( $n = 193$ ) of the patients were physically active, 8.1% ( $n = 25$ ) were

**Table 1**  
Descriptive evaluation of the patients.

		n	%
Age (year)	65–79	157	51.0
	$\geq 80$	151	49.0
Gender	Female	216	70.1
	Male	92	29.9
Monthly income	<1000 TRY	156	50.6
	1000–2000 TRY	131	42.5
	>2000 TRY	21	6.8
Educational attainment	Illiterate	76	24.7
	Literate	21	6.8
	Elementary school	115	37.3
	Mid-school	32	10.4
	High school	37	12.0
Living place	University	27	8.8
	Alone	52	16.9
	First degree relative	225	73.1
	Care-giver	10	3.2
	Nursing home	21	6.8

TRY, Turkish Lira.

able to walk with assistance, 26.3% ( $n = 81$ ) were able to walk with devices and the rest 2.9% ( $n = 9$ ) were immobile. There was significant difference between the multiple falls and physical status ( $p = 0.001$ ). This difference was resulted from the physically active group (Table 2).

When examining the patients' past medical histories, cardiovascular and metabolic diseases were the most commonly observed chronic diseases. There were patients with possible psychological diseases. However none of them was examined by a psychiatrist and the diagnoses were accepted as unclear, therefore not listed as a risk factor in our group. The most commonly used drugs among the study group were anti-hypertensive, anti-diabetics and selective serotonin reuptake inhibitors (SSRI) respectively (Table 3).

The most common injuries were minor head traumas, soft tissue injuries, and hip-femur fractures. The type of injuries and the final destinations were summarized in Table 4.

When the places of fall and the mechanisms of fall were compared there was not any significant difference ( $p = 0.636$ ). Similarly comparisons of the mechanism of falls and the final destination of the patient were statistically insignificant ( $p = 0.095$ ). However discharge from the ED rates were significantly high in physically active patients ( $p = 0.006$ ). Physically active patients and the ones who were able to walk with devices had more operation rates.  $p$  values were 0.007 and 0.005 respectively.

**Table 2**  
Fall related distributions.

		n	%
Physical status before the fall event	Physically active	193	62.7
	Walk with aid	25	8.1
	Immobile	9	2.9
	Walk with device	81	26.3
Mechanism	Stumbling and fall	223	72.4
	Vertigo	51	16.6
	Syncope	24	7.8
	Acute stroke	5	1.6
	Fall from bed	5	1.6
Number of falls in 12 months	1 fall	167	54.2
	2 fall	54	17.5
	3 fall	20	6.5
	>3 falls	67	21.8
	Patients with multiple falls	141	45.8
Place of fall	Room	153	49.7
	Bathroom	58	18.8
	Stairs	21	6.8
	Outside the house	76	24.7

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