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The Incidence of Fall and Past History of Falling in Aged Hospitalized Patients

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Abstract

Background: Identifying elderly people with the risk of fall in hospitals is particularly important for prevention of falls. Review of literature suggested that the association between falls and some characteristics of geriatric inpatients. The aim of this study was to determine the predisposing factors of falling among the elderly hospitalized patients.

Methods: In this descriptive-analytic cross-sectional study, 1213 elderly hospitalized patients, 60 years old and above recruited to participate in the study. Of all participant 385 subjects met the inclusion criteria of the study. Data collected from a secondary study on falls which was conducted from March to December 2016. A demographic questionnaire and Johns Hopkins fall risk assessment tool were used to evaluate the falls incident and risk of fall among the elderly people. The scores were analyzed by SPSS software version 16. Chi square test and exact test of Fisher and logistic regression were employed for data analysis. Significance level was set at 0.05.

Results: The mean of age in the subjects was $71.68 + 8.32$ years old. Off all 385 eligible aged hospitalized patients, the rate of falls estimated to be 1.05 per 1000 bed-day. Approximately 12% of cases experienced at least one fall during hospitalization period. According to the results of logistic regression analysis, the most predisposing factors for falls in hospital was the past history of falling with odds ratio of 12.7. Moreover, older age (age $\geq$ 80 years old), use of medication/equipment, low cognitive ability, and polypharmacy with odds ratios of 2.63, 1.49, 2.26, 0.988, and 3.34 were related to the falling in the past, respectively.

Conclusions: The results of the study indicated that the incident of falls among geriatric patients were relatively low, due to clinical interventions in hospital to prevent falls or to routine underestimation and under report of falls.

Keywords: Falls, Fear, Aged, Hospitalization.

Introduction

Older patients are the most vulnerable population to falls. Inpatient geriatric falls are prevalent and a serious concern with patient care.[1] Falls are the most commonly reported type of incident in hospitals and the third most commonly reported type of incident in mental health hospitals.[2] World Health Organization defines fall as "an event which results in a person coming to rest inadvertently on the ground or floor or other lower level or surface with or without injury to the patient".[3] The cause of a fall may be intrinsic which means related to patient (e.g., fainting) or extrinsic which means related to environmental (e.g., wet floor) factors.[4]

A fall in hospital can be devastating. Falling affects the family members and carers of people who fall, and has an impact on quality of life, health and social care costs.[5] Falls represent significant cost to trusts and the wider healthcare system, with annual total costs to the NHS alone from falls among older people estimated by the national institute for health and care excellence (NICE) in 2015 at £2.3 billion.[6] Moreover, the proportions of falls resulting in injuries range from 30% to 50%,[7,8] with 10% to 15% resulting in serious injuries, such as cranial trauma or fractures.[9] Moreover, the rate of falls in hospital ranges from 3 to 14 per 1000 bed days in observational and intervention studies.[10]

Several studies have identified the characteristics and potential risk factors for fall.[11-13] Series of studies have reported that demographics (e.g., age, gender, ethnicity),[2,14-16] cognitive disorders[17] chronic diseases (e.g. parkinsonism, stroke, hypertension, depression, and diabetes mellitus),[16] medications (e.g., antidepressants, sedatives, antihypertensive, antipsychotics),[18] and other factors were correlated with falls in older adults patients 65 or older are the most vulnerable population to falls, but there were also some areas of divergence in these research results.[19] Moreover, in spite of growing literature on the incident and risk factors of falls in institutionalized geriatric patients, few reviews have focused on unique risk factors for falls among older adult patients in general hospitals. The different environment in the hospital can further affect their mobility and independence.[13,20] Different care settings are likely to be associated with admitted patient characteristics, interventional efforts at unit level, and environmental factors at a hospital level.[20] The purpose of this study was to provide normative data on fall prevalence in hospitals affiliated by Shahroud university of medical science.

Materials and Methods

In this descriptive-analytic cross-sectional study, 1213 elderly hospitalized patients, 60 years old and above recruited to participate in the study. Of all participant 385 subjects met the inclusion criteria of the study Subjects of the study were recruited from the hospitalized aged patients. Recruitment process was performed from March 2016 to January 2017 in Shahroud university of medical sciences affiliated hospitals. Including criteria were aged (60 years old and above) hospitalized patients who have been monitored for more than 8 hours (based on the instruction of the instrument) in emergency room, being hospitalized in one of general wards, being cognitive intact with score higher than 24 based on mini mental state exam (MMSE). Moreover, bedridden hospitalized elderlies or under complete bed rest (CBR) order subjects were excluded from the study. Due to absence of previous fall

statistics in elderly people in the hospital, the maximum falling probability in subjects of the study has been considered 50% in order to determine the sample size. Appling the following equation, researchers calculated the sample size as 385 subjects, with the accuracy of 0.05% and 1.96 confidence coefficient.

Selected subjects were assessed for falls by John Hopkins falls risk assessment tool. JHFRAT have been codified by Poe and his colleagues in 2007 with a two-year overview study and experts observation.[21] Reliability of Persian version of this tool has been reported in the Hojati et al study with Cronbach's alpha of 0.732.[8] JHFRAT have seven sections that must be completed by a nurse for the subjects based on observations and clinical signs and questions.[22] At the end of the analysis, the section scores show the risk falls among the hospitalized aged people. If the score is less than or equal to five, the risk of falling is considered as low, and if the score is between 6 to13, the risk of falling is considered as moderate.[22] In addition scores more than or equal to 14 indicate the high risk of falls.[8,22] To assess fear of falls, the falls efficiency scale (FES), that indicate fear of fall during some specific activities, was completed. This scale has been presented by Tinetti in1990.[7,23] Reliability of this tool has been reported with Cronbach's alpha of 0.895 in Dadgari et al, study.[7,24] FES includes 10 questions with10 scores each. The elderly person has been asked to score him/herself from 1 to 10 on fear of falling, in which 1 represents the full trust to his/her abilities and not having any fear of falling, and 10 indicates having full fear of falls during the activities. The cut of point of the scale is 70. It means that the subjects who scored 70 or higher had fear of falling, while those with scores less than 70 did not suffer from fear of falls.[7] Finally, the scores have been analyzed by SPSS software version 16, with the significance level of Pvalue < 0.05. Chi square test and exact test of Fisher and logistic regression has been also used for data analysis. This article is extracted from a master degree dissertation and registered in Shahroud university of medical science research system under research code of conduct 94106 and research code of ethics IR.SHMU.REC1394.91

Results

The results this study indicated that 385 aged hospitalized patients were eligible to participate in this study. Off all participants of the study, 11 cases experiences fall during hospitalization. Given the average 3 days' length of hospitalization, the rate of falls estimated to be 1.05 per 1000 bed-day. The results on falls incidence are shown in table 1.

Table 1. Incidence of falls in hospital among hospitalized elderly patients

Fall incidence	Frequency	Percent
No	374	97.1
Yes	11	2.9
Total	385	100

Table 2 shows the number and percentage of history of falls prior to hospitalization. The table shows that 47 (12.2%) subjects had experience at least one episode of fall and 40 (10.4%) subjects had experience two or more falls before hospitalization.

Table 2. Past history of falling in hospitalized elderly patients

Falls number	Number	Percent
0	338	87.8
1	47	12.2
2	21	5.5
3	14	3.6
More	5	1.3

The results of subjects' demographic characteristics based are summarized in table 3. The table demonstrates that the mean of age in the subjects was 71.68 ± 8.32 years old. In addition, based on age category, 169 subjects (43.9%) were young old (between 60 to 69 years old), 146 subjects (37.9%) were middle old (70 to 79 years old) and 70 (18.2%) subjects were oldest old (80 years old and above). Other results of the study such as history of falls, elimination, medications, equipment used for patient care, mobility and cognition are summarized in table 3.

Table 4 shows the regression model for relationship between the studied variables and the history of previous falls in hospitalized elderly patients.

Results showed past history of falls in hospitalized elderly patients are more likely existed in age 80 years old and above, use of medication/equipment, low cognitive ability, high risk of falls, and polypharmacy with odds ratios of 2.63, 1.49, 2.26, 0.988, 12.71 and 3.34, respectively.

Discussion

The results of the study indicated that the incident of falls among geriatric patients were relatively low comparing to the average rate of inhospital falls which is reported to be 3-5 falls per 1000 bed-day. Other studies reported that the rates of falls in US hospitals range from 3.3 to 11.5 falls per 1,000 bed-day.[25,26] Another study reported that hospital fall rates have been range from 1.3 to 16.9 per 1000 bed-day.[27]

An important finding of the current study was the relationship between falling and increasing age. Base on the results of the study, subjects aged 70 or above were at higher risk of falls. A study reported that the subjects aged 80 to 89 had a higher risk of falls than the other age groups.[19] In addition, those subjects had experienced multiple falls. It is concluded that aged subjects are suffering more from different musculoskeletal disorders.[28] According to table 4, in this study a statistical relationship between falling history and fear of falling (Pvalue < 0.000) was reported, meaning that the elderlies with history of fall has more fear of falls, which is in coordination with most of similar studies results.[7,8,29,30] However, in Cleman's study history of fall is not a prediction for fear of falls26. Adding the other variables, the regression model has shown that if the falling history in an elderly is positive he has a chance of 2.8 times more than elderly without falling history (OR = 0.356). A relationship between falls and marriage status was also revealed in the current study; the subjects without spouse were at higher risk of falls than the others. It can be due to their loneliness and not having partner and having emotional and mental problems that, in turn, can increase the chance of depression and decrease physical function and self-confidence in activities of daily living.[31] Furthermore, they use sedative medications and mostly use their medications in inappropriate time which can result in less concentration and more functional decline.[30] All these reasons put the widowed or divorced elderlies at higher risk of falls.

Table 3. Relationship of past history of falling with demographic variables in hospitalized elderly patients

Variables		History of fall				Pvalue
		No		Yes		
		Number	Percent	Number	Percent	
Age (Years)	60–69 (n=169)	156	46.2	13	27.7	
	70–79 (n=146)	121	35.8	25	53.2	0.038
	≥80 (n=70)	61	18	9	19.1	
Gender	Men (n=193)	172	50.9	21	44.7	0.261
	Female (n=192)	166	49.1	26	55.3	
Marriage status	Married (n=287)	253	74.9	34	72.3	0.810
	Living alone (n=98)	85	25.1	13	27.7	
History of fall	No (n=338)	254	75.1	84	24.9	<0.001
	Yes (n=47)	1	2.1	46	97.9	
FOF	No (n=338)	233	68.9	105	31.1	<0.001
	Yes (n=47)	12	25.5	35	74.5	
Urinary disorder	No incontinence (n=318)	209	61.8	109	32.2	
	Urgency or frequency (n=41)	25	53.2	16	34	0.181
	Urgency/frequency and incontinence	20	5.9	6	12.8	
Medication	No (n=78)	71	21	7	14.9	
	1 (n=109)	102	30.2	7	14.9	0.018
	≥2 (n=193)	161	47.6	32	68.1	
Equipment	No (n=218)	192	56.8	26	55.3	
	1 (n=137)	118	34.9	19	40.4	0.648
	2 (n=28)	26	7.7	2	4.3	
	3 (n=2)	2	0.6	0		
Mobility	No problem	168	49.7	9	19.1	
	Support or inordinate steps or audiovisual	94	27.8	17	36.2	0.183
	Support and inordinate or audiovisual and audiovisual	68	20.1	18	38.3	
	Support and inordinate and audiovisual	8	2.4	3	6.4	
Cognition	No problem (n=266)	241	71.3	25	53.2	
	Altered (n=32)	26	7.7	6	12.8	
	Impulsivity (n=26)	21	6.2	5	10.6	
	Altered & impulsive (n=3)	2	0.6	1	2.1	
	Lack of understanding (n=37)	32	9.5	5	10.6	0.352
	Altered & lack of understanding	12	3.6	3	6.4	
	Impulsive & lack of understanding (n=2)	1	2.1	1	2.1	
	Altered & impulsive & lack of understanding (n=3)	2	0.6	1	2.1	

Table 4. The logistic regression model of variables in hospitalized elderly patients

Variables	Reference	(Pvalue)	OR	95% CI for OR
Gender	Female	0.586	1.264	0.544 - 2.939
FOF	No	0.304	0.598	0.225 - 1.592
Age 60-69				
−70-79		0.506	1.475	0.470 - 4.631
−≥80		0.037	2.634	1.034 - 7.424
Urinary disorder	No	0.338	0.850	0.610 - 1.185
Medication	No	0.016	1.490	0.486 - 0.928
Equipment	No	0.010	2.261	0.238 - 0.826
Mobility	No problem	0.891	1.018	0.787 - 1.317
Cognition	No problem	0.034	1.012	1.017 - 0.660
Fall risk	Low	0.004	12.713	2.262 - 71.457
Polypharmacy	No	0.049	3.344	1.053 - 11.735

Despite the limited evidence available, this rate of falls is the lowest report of falls. This may be attributed mostly to clinical interventions in hospital to prevent falls which attracted health care professionals' attention to the issue of falls which, in turn, declines the rate of inpatient falls. Moreover, this may be due to routine underestimation and under report of falls.

This study is a pioneer report in estimating the rate of falls among elderly patients in Iran. Moreover, this study utilized JHFRAT to assess subjects' intrinsic and extrinsic factors for geriatrics falls in hospital for the first time in Iran. Despite these strengths, there is a possibility that falls were underreported, resulting in misclassification and an underestimate of rates. Although, falls as a never event case, should be reported by health care professional, there is possibility for keeping the event unreported, especially in uninjured cases. Moreover, fall rates in hospitals are known to vary considerably by unit type and patients admitted in wards. For example, neurosurgery, neurology, and medicine units tend to have the highest fall rates within hospitals while surgical and intensive care units tend to have lower fall rates than other units.[25] In this study, we excluded some wards (e.g. ICU, operation room and recovery room) from the study, which may be another reason for low rate of falls in our study.

Our findings agreed with the published literature which suggested that the range of falls may vary based on several influential factors such as ward environment, patients' characteristic's and administrative procedures.[3,4,26,27,32] Future researchers are recommended to consider all predisposing factors for falls with more attention to socioeconomic factors and social determinates of health especially among aged hospitalized patients. Further, we recommend continuation of falls prevention programs in hospital with specific attention to ongoing monitoring of high risk geriatric patients during their hospital stay.

Acknowledgement

Conflict of Interest

The authors declare that they have no conflict of interest.

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