ORIGINAL

Falls among Hospitalized Patients in an Acute Care Hospital : Analyses of Incident Reports

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Abstract : Falls cause injuries such as fractures, skin lacerations, bleeding, and head injury, and could result in more severe medical conditions in hospitalized patients. We retrospectively investigated the incidence and characteristics of falls among hospitalized patients in an acute care hospital from incident reports by hospital staff between January and June 2013. There were 154 falls in 135 patients, 2 of which resulted in fracture. The average age of patients who fell was 63.9 (range 0 to 91) years. Many falls occurred at the bedside (68.2%). Approximately half of all falls were related to elimination (46.6%). The most common time of discovery of falls was 2 : 00-2 : 59 AM (14/154 ; 9.1%), followed by early in the morning when patients would actively move. Fall rates in our hospital were 1.39 falls per 1,000 patient days. The department of respiratory medicine and rheumatology had the highest fall rate (3.08 falls per 1,000 patient days), followed by the departments of neurosurgery and neurology (2.98 falls per 1,000 patient days). This study revealed the characteristics of falls in an acute care hospital, and suggests that their notification in the hospital might help reduce the incidence of falls in hospitalized patients. J. Med. Invest. 65 : 81-84, February, 2018

INTRODUCTION

Falls cause injuries such as fractures, skin lacerations, bleeding, and head injury, and individuals who have experienced a fall can develop a fear of falling again, leading to reduced mobility and loss of physical fitness. Falls are the leading cause of fatal and nonfatal injuries among the elderly. Prevention of falls is important not only in the community but also in hospitals, because hospitalized patients could develop more severe medical conditions after falls.

Most previous reports concerning falls in hospitals have been in rehabilitation hospitals or limited-service hospitals (1-11). An understanding of the incidence and characteristics of falls in an acute care hospital is important for prevention of falls. Thus, we retrospectively investigated the incidence and characteristics of falls among hospitalized patients in a university hospital from incident reports by hospital staff during a 6-month period.

METHODS

This study was conducted at Tokushima University Hospital, a 696-bed acute care hospital. We collected details of falls among hospitalized patients during admission from incident reports by hospital staff. A retrospective evaluation of 154 consecutive falls was performed during the 6 months from January 1, 2013 to June 30, 2013 by using incident reports and medical records. We included falls on level ground and falls from beds or chairs.

The following items were investigated : age, sex, number of falls per person, clinical department of patients, location of fall, activity at the time of fall, time of discovery of fall, discovery of fall, and injury sustained from fall. Fall rate is expressed as follows : (Number of patient falls)/(Number of all hospitalized patient days) × 1,000. The Ethics Committee of Tokushima University Hospital approved this study.

RESULTS

There were 154 falls in 135 patients who were hospitalized during this study period ; 15 patients fell twice, and 1 patient fell five times. The following analyses were carried out based on the data at the time of each fall, and for patients who experienced more than one fall, each fall was counted singly. Of the 154 falls, 95 occurred in males and 59 in females.

Age of hospitalized patients who fell during admission (Table 1)

Mean age was 63.9 (range 0 to 91) years ; 74.0% were ≥ 60 years of age. Fall rate was highest in patients in their 80s followed by those in those in their 90s and 70s.

Location and activity at the time of fall (Tables 2 and 3) and time of discovery of fall (Figure 1)

Most falls (122 falls, 79.2%) occurred in patient rooms, and most of these (105/122 falls, 86.1%) were at the bedside. The most frequent activity at the time of fall was elimination, including the move for elimination (68/146 excluding infants ; 46.6%). There were 8 infant falls, 6 of which were falls from the bed when their mothers or caregivers lowered the bed rail. The most common time of discovery of fall was 2 : 00-2 : 59 AM (14/154 ; 9.1%), followed by early in the morning.

Table 1.   Age of hospitalized patients who fell during admission

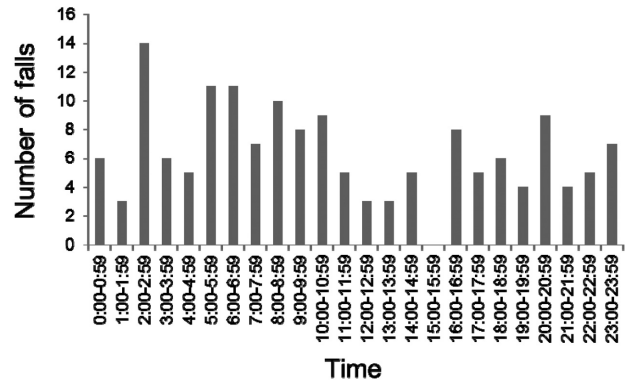| Age	Number (%) N = 154	Fall rate per 1,000 patient days
0-9	9 (5.8)	1.11
10-19	3 (1.9)	0.76
20-29	2 (1.3)	0.38
30-39	5 (3.2)	0.58
40-49	7 (4.5)	0.84
50-59	14 (9.1)	1.06
60-69	40 (26.0)	1.43
70-79	41 (26.6)	1.63
80-89	31 (20.1)	3.19
90-99	2 (1.3)	2.93

Figure 1.   Falls by time of discovery

Table 2.   Location of fall

Location of fall	Number (%) N = 154
Patient room ; bedside	105 (68.2)
Patient room ; toilet	9 (5.8)
Patient room ; other	8 (5.2)
Ward toilet	8 (5.2)
Corridor	6 (3.9)
Bathroom	5 (3.2)
Dayroom	3 (1.9)
Other patient room	3 (1.9)
Elevator hall	2 (1.3)
Other	5 (3.2)

Table 3.   Activity at the time of falls

Activity at the time of fall	Number (%), N = 146*
Elimination, including move for the elimination	68 (46.6)
Trying to pick up something	12 (8.2)
Standing up or walking	10 (6.8)
Transfer to wheelchair or bed	7 (4.8)
Taking a shower	6 (4.1)
Having a meal	4 (2.7)
Changing clothes	3 (2.1)
Washing face or brushing teeth	2 (1.4)
Carrying a cup of tea	2 (1.4)
Rehabilitation	1 (0.7)
Unknown	23 (15.8)
Other	8 (5.5)

* Excluding infant falls from beds

Table 4.   Fall rate by clinical departments

Clinical departments	Fall rate per 1,000 patient-days
Respiratory medicine and rheumatology	3.08
Neurosurgery	2.98
Neurology	2.98
Otorhinolaryngology	2.63
Digestive surgery	1.63
Psychiatry	1.55
Hematology	1.48
Gastroenterology	1.42
Thoracic and endocrine surgery	1.34
Endocrinology	1.24
Plastic surgery	1.18
Nephrology	1.10
Dermatology	1.09
Orthopedic surgery	1.08
Urology	1.01
Pediatrics	0.99
Ophthalmology	0.91
Oral surgery	0.76
Cardiovascular surgery	0.69
Cardiovascular medicine	0.68
Obstetrics and gynecology	0.10
Oral medicine	0.00
Pediatric surgery	0.00
Radiology	0.00
Anesthesiology	0.00
Emergency	0.00

Fall rate by clinical department (Table 4)

Total fall rates in our hospital were 1.39 falls per 1,000 patient days ; fall rates in each clinical department are shown in Table 4. The department of respiratory medicine and rheumatology had the highest fall rate (3.08 per 1,000 patient days) and the departments of neurosurgery and neurology had the second highest fall rates (2.98 per 1,000 patient days).

Discovery of falls (Tables 5)

Regarding discovery of falls, 38.3% (59/154) of falls were reported by the patients themselves, and about half of these were not reported at the time of the fall. Thirty-three falls (21.4%) were witnessed and reported by using the nurse call system by other patients in multiple-occupancy rooms or caregivers attending to the patients. Also, nurses discovered patients who had fallen during the rounds (17/154 ; 11.0%), particularly at night. In some cases, the bedside oxygen saturation monitor or sensor system alerted staff to falls (15/154 ; 9.7%).

Table 5.   Discovery of falls

Discovery of the falls	Number (%) N = 154
Later self-report	30 (19.5)
Nurse call : Self-reported	29 (18.8)
Nurse call : Sharing patient	24 (15.6)
Nurse call : Others	9 (5.8)
Nurse round	17 (11.0)
Fall prevention sensor	10 (6.5)
SpO2 alarm	3 (1.9)
Surveillance monitor	2 (1.3)
Sound	8 (5.2)
Witness by staff	7 (4.5)
During nurse assistance	7 (4.5)
Patient call for help	3 (1.9)
During rehabilitation	2 (1.3)
Other	3 (1.9)

Examinations and injuries caused by falls (Table 6)

Among 154 falls, 13 falls (8.4%) resulted in the need for some form of investigation including plain radiographs, computed tomography scan of the head, or blood tests. In total, 50 falls (32.5%) resulted in some type of injury including 3 skin lacerations requiring suturing and 2 fractures (supracondylar humeral fracture and metatarsal fracture) in 4 patients.

Table 6.   Examinations and injuries caused by falls

	Number (%) N = 154
Examinations	13 (8.4)
Plain radiography	6 (3.9)
Computed tomography scan of the head	6 (3.9)
Blood examination	1 (0.6)
Injuries	
Pain / Swelling / Hematoma / Redness	23 (14.9)
Abrasion / Bleeding	19 (12.3)
Skin laceration (requiring suture)*	3 (1.9)
Disturbance of consciousness	3 (1.9)
Fracture*	2 (1.3)
Hyperpnoea	1 (0.6)
None	104 (67.5)

*1 skin laceration and 1 fracture occurred simultaneously in the same patient.

DISCUSSION

Reported fall rates vary from 2 to 6 falls per 1,000 patient days (1, 3-5, 12-15), and the present study showed a rate of 1.39 falls per 1,000 patient days in our hospital. Elderly individuals often have muscle weakness and balance disorders and thus a tendency to fall (16), which is consistent with our finding of increasing fall rate with increasing age of patients in our hospital. Exercises such as balance challenge or a higher level of exercises can prevent falls among the elderly (17). Chang *et al.* reported that the most effective intervention was a multifactorial fall risk assessment and management program, and that exercise programs were also effective in reducing the risk of falls (18).

Some previous studies reported that falls often occurred in the patients' rooms (1, 3, 13-14, 19-20). In our study, 79.2% of falls occurred in patients' rooms, and > 80% occurred at the bedside. Our study and other reports showed that about half of falls occurred around activities related to elimination (2, 19).

The most common time of discovery of falls is different according to the previous reports (19, 21). In the present study, the most common time for falls was 2 : 00-2 : 59 AM, followed closely by the time when patients would actively move on the ward.

The departments of respiratory medicine and rheumatology, neurosurgery, and neurology displayed high rates. Patients in the respiratory medicine and rheumatology department tend to have long term inactivity caused by their illness, such as respiratory diseases and connective tissue diseases. Patients in the neurosurgery and neurology departments often have paralysis, muscle weakness, gait disturbance, or cognitive dysfunction. The latter are thus assumed to have higher risk of falls and Hitcho *et al.* reported that neurology services had the highest fall rates (6.12 falls per 1,000 patient days).

Less than 20% of patients who fell in the hospital reported the fall at the time of occurrence. This hesitation to report falls could lead to deterioration of injuries, and we should therefore encourage patients to report falls and/or injuries immediately.

The limitations of this study are the retrospective study design and that we could not investigate other details such as level of consciousness, muscle strength, and medication received. Nevertheless, our study clarified the characteristics and circumstances of falls in our hospital, and suggests that notifying staff, patients, and patients' families of these findings could help in reducing the incidence of falls in hospitals.

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