

Accidental falls and related fractures in 65–74 year olds

A retrospective study of 332 patients

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ABSTRACT – We investigated, by studying medical records, background factors and consequences of accidental falls of patients 65–74 years who attended the Department of Orthopedics' emergency clinic in Lund. We also assessed possible prevention measures. Fractures occurred in three quarters of the registered falls. Women were more prone to sustain fractures than men. Forearm fractures were commonest among women while hip fractures were commonest among men. One third of the patients were admitted to an orthopedic ward because of the fall. The patients who were less healthy had sustained fractures oftener and also needed more hospital care. Information regarding risk factors for falls and fractures were often missing in the patients' medical records. Impaired walking and balance, and medication increased the risk of falls. Such patients constitute a high risk group for future falls and fractures. A newly developed instrument is suggested as a routine in the emergency department to increase the awareness of risk factors for falls in the elderly. Satisfactory documentation is a prerequisite for further treatment and referrals to prevent falls and fractures.

Accidental falls are a common health problem in the elderly and one third of persons aged 65 years or more fall at least once yearly (Tinetti et al. 1994). Injuries occur in approximately half of the falls and 10% of them lead to serious injuries such as fractures, head injuries or injuries to the joints (van Weel et al. 1995). Those requiring hospitalization are often followed by an increased need for social service and/or rehabilitation measures

which are expensive to society (Alexander et al. 1992, Rizzo et al. 1998). Physical activities are restricted due to the fear of new falls in 25% of the patients (Rizzo et al. 1996). Patients who are at risk of falling and the risk factors in falls have been described in several studies (Jarnlo and Thorngren 1993, O'Loughlin et al. 1993, Campbell et al. 1995, Koski et al. 1996, Tinetti et al. 1996).

In this study we tried to identify background factors, previous falls, circumstances and consequences of the fall, medical history, medication and physical function in a group of elderly people who had fallen and sustained injuries that needed medical care in the Department of Orthopedics' emergency clinic. Another aim was to find indicators to prevent falls and fractures.

Patients and methods

To identify the patients, born 1922–1931, who had fallen during 1996, the medical records of the patients, who attended our emergency clinic and had an ICD-10 E-code corresponding to trauma and injuries after a fall (819G, 826 or 880–888) recorded together with the diagnosis, were studied retrospectively. Inclusion criteria were that the fall/s had occurred during 1996 and that all the patients lived in the catchment area (229,000 inhabitants, 16,500 born 1922–1931) of Lund University Hospital. Falls included falling off a bicycle. E-code 819G (cyclist and vehicle accident) was included to ensure finding all those who had

Table 1. Mean age, percentages of women and patients living in their own home, for all patients and in the subgroups of patients admitted to hospital, with a distal forearm fracture, with a hip fracture and without any fracture

	All patients n 332	Patients admitted to hospital n 96	Distal forearm fracture patients n 72	Hip fracture patients n 36	Patients without fracture n 92
Age, years (SD)	70 (3)	70 (3)	70 (3)	71 (3)	70 (3)
Women, %	71	67	86 ^a	58	63
Own home, %	93	88	100	78 ^b	92

^a p = 0.006 compared to all patients with another fracture,
^b p < 0.001 compared to the other patients

fallen. The E-codes were only used to identify those who had fallen and not to categorize the falls. Data on how the fall had happened were collected from the medical records.

527 visits were recorded during 1996 which also included visits to other emergency departments, visits due to falls prior to 1996, more than 1 visit for the same fall, patients living in other geographical areas and cyclists in collision with another vehicle. There were also cases, which were misclassified as falls. When all of them were excluded, 332 patients with 352 falls remained. 18 patients fell twice and 1 patient fell 3 times.

The medical records of the patients were examined to collect data regarding background factors, previous falls and fractures, circumstances and consequences of the fall, medical history, intake of medicines and physical function. Although some patients had had more than 1 fall during the year, only data from the first fall were collected. The medical history was considered to be of interest if the patient suffered from any condition, that might impair mobility or an illness that has been considered a risk factor for falling in other studies (Tinetti et al. 1994, Luukinen et al. 1995).

Statistics

Chi-square tests and Mann-Whitney U-tests were used for the statistical analysis. A p-value ≤ 0.05 was considered statistically significant.

Results

Background factors and previous falls

The mean age was 70 years (SD 3) and 236 pa-

tients were women (Table 1). The percentage of women was highest in the group of patients with a distal forearm fracture. Most patients lived in their own home. Fewer hip fracture patients came from their own home. The patients without a fracture showed no difference in these respects compared to all the patients (Table 1).

Almost 30% of the 332 patients had attended the emergency clinic at least once before 1996 because of a fall. 10 women had fallen more than 3 times the last years. In 312 patients with information about previous falls, 20% led to a fracture.

Circumstances and consequences of the new falls

For approximately one third of the patients, the place and the cause of the fall were not noted. The time of the fall was noted in little more than half of all falls. Two fifths of the patients had fallen outdoors (Table 2). More than half of the patients who sustained a distal forearm fracture fell outdoors, while two thirds of the hip fracture patients fell indoors.

Table 2. Circumstances and consequences of the falls (n 332)

<i>Circumstances of the fall</i>
39% fell outdoors
30% slipped or tripped
16% fell to a lower level
no seasonal variation
<i>Consequences of the fall</i>
72% of the patients sustained a fracture
29% of the patients were admitted to a ward
94% of the patients with a fracture required hospitalization with a mean hospital stay of 9 days (SD 5)

Table 3. Distribution of fractures in the whole fracture group (n 240), and among women (n 178) and men (n 62)

Type of fracture	All patients		Women		Men	
	n	%	n	%	n	%
Distal forearm	68	28	58	32	10	16
Humerus	33	14	23	13	10	16
Other upper extremity	33	14	22	12	11	17
Vertebra	6	2	5	3	1	2
Pelvic	8	3	5	3	3	5
Hip	35	15	20	11	15	24
Foot	22	9	17	10	5	8
Other lower extremity	24	10	18	10	6	10
More than one	11	5	10	6	1	2
Total	240	100	178	100	62	100

Table 5. Risk factors for falls and fractures that were noted in the patients' medical records (n 332)

Risk factor	Noted %
Alcohol intake	4
Smoking	11
Low Body Mass Index	15
Physical inactivity	30
Living alone	46
Time of falling	55
Cause of falling	67
Place of falling	71
Medication	84
Medical history	85

Table 4. Percentage of patients who were healthy or had additional diseases (n 283) or took regular medication (n 278)

	All patients n 283	Patients admitted to hospital n 96	Hip fracture patients n 36
Healthy, %	33	9	6
One additional disease, %	33	30	33
Two or more additional diseases, %	34	51	61
Total comorbidity, %	67	81 ^a	94 ^a
On regular medication, %	48	75 ^a	89 ^a
Tranquilizers, %	10	22 ^a	33 ^a

^a p < 0.001 compared to the other patients

240 patients sustained fractures mostly in the upper extremity when they fell (Table 3). A few patients sustained more than 1 fracture, including 1 patient with a hip fracture. Women were more prone to sustain fractures (74%, p = 0.05). A distal forearm fracture was the commonest fracture in the whole group and among women. Hip fracture was the commonest fracture among men (Table 3).

96 falls led to hospitalization in direct relation to the fall, in almost every case (94%) due to a fracture. The mean hospital stay was 9 days (SD 5) (Table 2).

Medical history and medicine intake

Of 283 patients, where the medical history was noted, two thirds suffered from additional diseases. Cardiovascular conditions were often reported, as well as neurological diseases, mobility problems and diabetes. The use of medicines was re-

corded in 278 patients and almost half of them took medication regularly. Those who required hospital care and those who suffered a hip fracture showed a larger number of other diseases, more regular medication and more frequent use of tranquilizers (Table 4).

In the 72 patients (4 patients had sustained an additional fracture) with a distal forearm fracture, neither the health nor the medication were noted in one quarter of the cases. However, these patients appeared to have other diseases and use medication less often than the others.

Differences between patients with or without fractures were not seen regarding other diseases and medication.

Identification of risk factors

Many of the risk factors for falls and fractures were not noted (Table 5). Data about smoking and drinking habits were usually not available. Im-

paired walking and balance, and medication were more often noted. These factors can be affected by prevention measures.

Discussion

The age group of 65–74 years old was chosen as a reasonable target group of elderly to identify risk factors for preventive measures of falls and fractures. In subjects, 65 years and older, more than half of the injuries are caused by a fall and 75% of all injuries that lead to hospitalization are due to falls (Grisso et al. 1990). In an adult population the incidence of falls increases with age (Alexander et al. 1992, Mathers and Weiss 1998). Hospitalization and subsequent measures are expensive for society (Alexander et al. 1992, Rizzo et al. 1998). All these reasons make it worthwhile to prevent old people from falling and keep them out of the hospital so long as possible.

Women fall more often than men (Grisso et al. 1990, Rozycki and Maull 1991) and sustain injuries more often when they fall (O'Neill et al. 1994). In our study, two thirds were women and the same percentage of women was seen in another Swedish study of fall injuries (Johansson 1998).

Whether or not a fall results in a fracture is due to bone quality and the force of the fall (Nevitt et al. 1993). Population-based studies have shown that fractures occur in between 5% and 10% of the falls (Luukinen et al. 1995, van Weel et al. 1995). Johansson (1998) states that 50% of those who visit any doctor after a fall have suffered a fracture.

Home accidents in people of 65 years and older have been studied (Graham and Firth 1992). Falls were the cause of accident in two thirds of the cases and two thirds of the falls led to an injury. Less than 10% of the subjects who had fallen were referred to an accident and emergency department. If one assumes that the same proportion of people came to our emergency clinic after a fall, then our patients represent the persons who sustained serious injuries after a fall.

Almost one third of our patients were admitted to an orthopedic ward after the fall, similar to the observations by Davies and Kenny (1996). Half of their admitted patients had no bone or soft-tissue

injury, compared to more than 90% of ours. In Davies and Kenny's study, all patients, not only orthopedic ones, were included, which may explain the difference.

Most of the falls resulting in a distal forearm fracture occurred outdoors, suggesting that these patients are active and mobile. Our findings are in accordance with those of others (Graafmans et al. 1996, Bath and Morgan 1999). They found that falls outdoors can be expected to occur more often in comparatively young elderly people, who are healthier and more mobile than an older age group.

Hip fractures were seen in only 15% of the patients with fractures. The age group studied may explain the low rate because the mean age of hip fracture patients is almost 80 years (Thorngren 1997). Patients are more likely to sustain hip fractures when they are older, since they are more prone to fall sideways instead of forwards on their hand (Jarnlo and Thorngren 1993, Nevitt et al. 1993, O'Neill et al. 1994). However, the hip fracture patients in our study were less healthy, suggesting that a hip fracture at the age of 70 may be an indicator of a general functional decline, also found by Jarnlo and Thorngren (1993).

Several medical conditions and illnesses, and use of medication have been identified as risk factors for falls in various studies (Tinetti et al. 1988, O'Loughlin et al. 1993, Campbell et al. 1995, Koski et al. 1996) and these were confirmed by our study. The patients with the severest injuries appeared to be less healthy. However, conclusions cannot be drawn, due to the incomplete information, especially in the group of patients with minor injuries, who were discharged directly from the emergency clinic.

Awareness and documentation about risk factors for falls and fractures are not satisfactory. This must be emphasized and made familiar to the staff of the emergency department. One way is to implement a practice guideline for emergency department management of falls in the elderly, recently developed in the USA (Baraff et al. 1997). It includes identification of risk factors for falls and fractures, as well as a guideline for intervention and referrals. Early interdisciplinary intervention can significantly reduce falls in a high-risk population (Close et al. 1999).

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