

Hospitalisations Due to Falls in Older Persons

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Abstract

This paper describes hospitalisations due to falls among people aged 65 years and over resident in the Eastern Region of Ireland. Of the 1,760 hospitalisations recorded for 2002, 78% were female and 68% were aged 75 years and over. Fractures accounted for 1,448 or 82% of cases with nearly half of them (683) sustained to the hip. Females were more likely to have a limb fracture whereas males were more likely to have a head injury.

The total inpatient costs of the 1,760 hospitalisations were estimated at €9.2 million. Hip fractures were the costliest injuries and they accounted for €5.9 million (64%) of these costs. There are also substantial additional costs implications for hip fractures as they constituted the majority (56%) of cases transferred to convalescent/long-stay health facilities.

In keeping with an ageing population, the problem of injuries in older people is likely to increase over time and as falls are the dominant cause of those injuries, all acute and long-stay health facilities need to develop and implement fall prevention strategies for older people.

Introduction

Falls are a major public health problem. They adversely affect the lives of many older people¹. Though preventable, they cause serious injury, immobility and death². Three-quarters of fall-related deaths and one-third of fall-related hospitalisations in Ireland and in the Eastern Region are to persons aged 65 years and older³. Fractures and head injuries are the most serious consequences of falls.

As well as the physical, social and psychological sequelae of a fall for the patient, injuries due to a fall place a severe burden on the health service in terms of hospital capacity and cost⁴.

Information on hospitalisations due to falls can provide a salutary picture of the nature and extent of this problem in older people. The purpose of this study is to quantify the main reasons for hospitalisations due to falls in older people, to describe the outcomes of the injury and to estimate the hospital costs of two serious injuries, hip fracture and intracranial injury.

Methods

This study examined hospital discharges during 2002 for patients, aged 65 years and over, admitted as an emergency inpatient for injuries sustained after a fall. The patients were residents of the Eastern Region (Counties Dublin, Wicklow and Kildare) who were treated in acute public HIPE-reporting hospitals in Ireland. Transferred cases were excluded so as to avoid multiple counting of hospitalisations.

Injury was defined as ICD-9 CM 800-994 for a principal diagnosis and fall was defined as external cause codes E880-E886 and E888. The variables examined were gender, age, area of residence, type of admission, source of admission, all recorded diagnoses, principal procedure, length of stay, destination on discharge. Some

casemix analysis was also conducted. These data were sourced from the HIPE & NPRS Unit, ESRI and from the Department of Health and Children.

Some volume and complexity issues arise from the use of these data in that an external code was not recorded in 5% of cases and, with the exclusion of 269 transfers, only the activity for the hospital providing the initial treatment was considered.

For rating purposes, population denominator data for the years 1994 to 2002 inclusive were compiled from the actual 1996 and 2002 Censuses of Population and estimated populations for the intercensal years were produced by means of linear interpolation. The WHO's European Standard Population was used for calculating age-standardised rates. Chi-square tests were applied to categorical data and t tests to continuous data. Linear regression was used for time trend analysis. All tests were two-tailed and a p value less than 0.05 was taken as the level of statistical significance. SAS was used for this analysis.

Results

In 2002, there were 14,521 hospitalisations due to injury among Eastern Region residents and 2,309 (15.9%) of those were among people who were aged 65 years and over. Unintentional injury due to a fall caused 1,760 (76%) of these 2,309 hospitalisations. Table 1 shows the numbers and percentages of all injury and fall related hospitalisations among older people for the years 1994 to 2002 inclusive. The proportion of hospitalisations due to injury in older people ranged from 15.2% in 1994 to 16.6% in 2000 and the proportion of those injuries caused by a fall ranged from 73.7% in 2000 to 80.8% in 1998. A significant trend over time was not established for the numbers of fall-related injury hospitalisations but their respective age-standardised rates displayed a significant decrease of 3% annually.

Of the 1,760 hospitalisations recorded for 2002, 1,364 (78%) were female and 1,189 (68%) were aged 75 years and over, Table 2. The number of female hospitalisations increased markedly with age, rising steadily from 184 in the 65-69 age group to 366 in the 85 years and over age group. A similar numerical pattern was not evident for males. Though the age-specific rates increased with age for both genders, female rates were significantly higher than their male equivalents for each age group ($p < 0.01$). Overall, the age-standardised rate was a significant 103% higher for females than it was for males - 15.1 and 7.4 per 1,000 population respectively ($p < 0.01$).

Fractures were recorded as the principal diagnosis in 1,448 (82%) cases making it by far the most common type of injury, Table 3. Gender differences were significant as 87% of female hospitalisations had a fracture compared with 67% of males. Indeed, females were significantly more likely to have had a fractured limb whereas males were significantly more likely to have had a fractured vertebral column or fractured ribs.

The majority of limb fractures related to the hip with a significantly higher proportion recorded for females than for males - 41% v 31%. Similarly, female proportions were significantly higher for fractured radius/ulna (20% v 8%) and for fractured humerus (7% v 4%).

Even though head injuries were less common, significant gender differences were also recorded as they accounted for 23% of male cases as opposed to 9% of female cases. Males also had significantly higher proportions of intracranial injuries and unspecified head injuries.

Residents of nursing homes/long-stay accommodation accounted for 6.5% of hospitalisations and for 11% for hip fracture cases. Seventy-one (71) of the 1,760 hospitalisations resulted in death and fractured hips and intracranial injuries accounted for 82% of them. Demographic, treatment and outcome indicators for these two injuries are set out in Table 4. Cases with a hip fracture were significantly older than cases with intracranial injuries. They were also significantly more likely to have a surgical procedure, to be transferred to another hospital or to a convalescent home/long-stay accommodation, and to stay in hospital longer. Intracranial injury cases, on the other hand, were significantly more likely to either die in hospital or to be discharged home. The most complex and costliest hospitalisation was for a fractured hip which was on average €6,650 per case whereas that for an intracranial injury was considerably less at €3,750.

Discussion

Injuries pose a serious health risk for older people. In 2002, 16% of all injury hospitalisations in the region related to persons aged 65 years and over and 76% of these injuries were due to falls. The significance of falling will escalate substantially in the coming years in line with our ageing population. Recent population projections for the years 2002 to 2021 indicate that the numbers and percentages of older people in the region are due to increase from 136,329 to 221,947 and from 9.7% to 15.4% respectively⁵.

Falls can lead to considerable physical, social and economic costs. Though our age-standardised hospitalisation rates have decreased by a significant 3% annually since 1994, the predominance of a fall as a serious cause of injury and disability in this age group is unquestionable. It is unclear whether the reported drop in hospitalisation rates is a real effect or whether it can be partly explained by the growing trend towards ambulatory care for less serious injury. A population-based study of wrist and forearm fractures among people aged 75 years and over in Wales provides an incidence rate of 6.4 per 1,000 population⁶. In the Eastern Region in 2002 there were

144 hospitalisations for wrist fractures in people aged 75 years and over giving an hospitalisation rate of 2.5 per 1,000 population. It is very likely that many less serious fractures were not admitted to hospital and if this is so, then the observed reduction in hospitalisation rates is not likely to mirror incidence trends.

Casemix analysis of the 1,760 hospitalisations provided an average case cost of €5,200 and total hospital inpatient costs of €9.2 million. Research in the UK found that hospital inpatient care accounted for only half (49%) of the total treatment costs of falls and that long-term care costs accounted for a further 41%.⁷ When these proportions were applied to this study, the total health care costs of treating falls totalled €18.5 million including long-term care costs of €7.6 million. The inpatient costs of hip fractures alone amounted to €5.9 million as there were 683 cases costing an average of €8,650 each. Hip fractures must also have been a major contributor to the additional long-term care costs as they represented the majority (56%) of cases transferred to convalescent homes or long-stay accommodation.

Prevention of falling has to be the mainstay of injury prevention in older people especially among older women. Evidence-based prevention strategies have been described and implemented⁸. Risk factors are well known and they can easily be minimised. For example, impaired vision is now recognised as an important and independent risk factor for falls and it can accurately predict falls in this group⁹.

All acute and long-stay health facilities need a fall prevention policy where personal and environmental risk factors are evaluated and reduced. A similar preventive approach is required for community dwelling older people especially for those aged 75 and over. It is essential that organised fall prevention programmes be introduced now in the community, hospitals and long-stay health care facilities as part of the routine care of all older people. With 11% of hip fracture cases admitted directly from nursing/convalescent homes or other long-stay accommodation, intervention in such facilities is a priority.

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Table 1: Numbers and Percentages of Hospitalisations for All Injuries and Fall-Related Injuries to Older Persons, 1994 to 2002

	All Injuries to Older Persons		Fall-Related Injuries to Older Persons	
	N	% of All Injuries	N	% of All Injuries to Older Persons
1994	2,389	15.2	1,858	77.8
1995	2,478	16.1	1,827	73.7
1996	2,485	15.4	1,898	76.4
1997	2,538	15.4	1,987	78.3
1998	2,467	16.4	1,993	80.8
1999	2,377	16.1	1,850	77.8
2000	2,391	16.6	1,761	73.7
2001	2,375	16.1	1,751	73.7
2002	2,309	15.9	1,760	76.2

Table 2: Numbers and Age-Specific Rates per 1,000 Population of Fall Related Injury Hospitalisations by Age Group and Gender, 2002

Age Group	Male		Female		Total	
	N	Rate	N	Rate	N	Rate
65-69	94	4.6	184	7.9	278	6.4
70-74	76	4.9	217	10.7	293	8.2
75-79	81	7.7	295	17.7	376	13.8
80-84	82	13.7	302	26.5	384	22.1
85+	63	19.4	366	40.4	429	34.9
Total 65+	396	7.1	1,364	16.9	1,760	12.9

Table 3: Numbers and Percentages of Fall Related Injury Hospitalisations by Type/Site of Injury and Gender, 2002

Type/Site of Injury	Male		Female		Total		p value
	N	%	N	%	N	%	
Fractures	267	67.4	1,181	86.6	1,448	82.3	<0.0001
- Skull *	10	2.5	16	1.2	26	1.5	NS
- Vertebral Column	15	3.8	20	1.5	35	2.0	0.004
- Ribs	14	3.5	12	0.9	26	1.5	0.0001
- Pelvis	12	3.0	60	4.4	72	4.1	NS
- Limb	216	54.6	1,073	78.7	1,289	73.2	<0.0001
- - Upper Limb	57	14.4	383	28.1	440	25.0	<0.0001
- - - Humerus	14	3.5	90	6.6	104	5.9	0.02
- - - Radius/Ulna	31	7.8	267	19.6	298	16.9	<0.0001
- - Lower Limb	159	40.2	690	50.6	849	48.2	0.0003
- - - Hip	121	30.6	562	41.2	683	38.8	0.0001
- - - Tibia and Fibula	8	2.0	29	2.1	37	2.1	NS
- - - Ankle	17	4.3	50	3.7	67	3.8	NS
Dislocations and Sprains	22	5.6	27	2.0	49	2.8	0.0001
- Upper Limb	14	3.5	18	1.3	32	1.8	0.004
- Lower Limb	6	1.5	8	0.6	14	0.8	NS
Superficial Wounds**	25	6.3	76	5.6	101	5.7	NS
- Head	12	3.0	42	3.1	54	3.1	NS
- Lower Limb	8	2.0	29	2.1	37	2.1	NS
Intracranial Injuries *	36	9.0	35	2.6	71	4.0	<0.0001
Unspecified Head Injury	35	8.8	32	2.4	67	3.8	<0.0001
Total - Extremity Injuries	255	64.4	1,137	83.4	1,392	79.1	<0.0001
Total - Head Injuries	89	22.5	121	8.9	210	11.9	<0.0001
Grand Total	396	100.0	1,364	100.0	1,760	100.0	

* includes 8 intracranial injury with skull fracture cases.

** includes contusions, abrasions and lacerations to the skin.

Table 4: Selected Statistics for Fractured Hips and Intracranial Injuries, 2002

	Hip Fracture N=683	Intracranial Injury N=71	p value
Aged 75 years or over	560 (82.0%)	46 (64.8%)	0.001
Mean Age	81.9	77.3	<0.0001
Procedure	668 (97.8%)	42 (59.2%)	<0.0001
Died	44 (6.4%)	14 (19.7%)	<0.0001
Emergency Transfer to Another Hospital	122 (17.9%)	~	0.001
Non-Emergency Transfer to Another Hospital	172 (25.2%)	~	<0.0001
Convalescence /Long-Stay/Rehabilitation	156 (22.8%)	7 (9.9%)	0.01
Home	182 (26.7%)	45 (63.4%)	<0.0001
Mean / Median Length of Stay in Days	19.7 / 12	11.1/ 2	<0.0001
Average Cost per Case	€8,650	€3,750	

~ 5 or less cases.