

Hip fracture incidence in Lund, Sweden, 1966-1986

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The hip fracture incidence in the city of Lund and its rural surroundings was studied for the years 1966, 1972, 1981, and 1986. The total incidence increased from 3.3 to 5.1 per 1,000 inhabitants above 50 years of age. For persons more than 80 years old, the incidence almost doubled from 13.2 to 25.5, i.e., this group represented the entire increase in incidence. In the urban population, men with cervical fractures had an increased incidence. A smaller increase in incidence for both men and women was found in the rural area. Compared with larger cities, the incidence increase in the urban population in Lund was lower over time, but in 1986 the figures were comparable to those in Gothenburg in 1981. The total incidence in the mixed urban and rural population was as of 1981 higher than in Denmark and Finland, but lower than in Norway. If the incidence in the elderly continues to increase to 1995, there will be three times as many hip fractures as there were in 1966.

The increasing incidence of hip fractures noticed already by Alffram (1964) and Mårtensson (1962) continues in Scandinavia (Jensen and Tøndevold 1980, Frandsen and Kruse 1983, Johnell et al. 1984, Kreutzfeldt et al. 1984, Nilsson 1984, Zain Elabdien et al. 1984, Zetterberg et al. 1984, Falch et al. 1985, Hedlund et al. 1985, Lüthje 1985, Finsen and Benum 1987) and in the United Kingdom (Gallannaugh et al. 1976, Lewis 1981, Swanson and Murdoch 1983, Wallace 1983). These studies, however, cover mostly large cities, such as Copenhagen, Gothenburg, London, Malmö, Oslo, and Stockholm.

Sernbo et al. (1988) have shown a lower fracture incidence in a rural area than in a city, and Mannius et al. (1987) did not find any increasing incidence in a rural population.

Our study was performed in a mixed urban and rural population to analyze changes in fracture incidence from 1966 to 1986.

Patients and methods

All the recorded fresh fractures of the proximal femur (cervical and trochanteric hip fractures) from the catchment area of the University Hospital of Lund were reviewed from the periods January through December 1966, 1972, and 1986, as well as from April 1981 through March 1982. The data were culled from all available records. Patients from the catchment area were included even if they had suffered the fracture outside the area. All the patients from other areas were excluded. Patients with pathologic fractures and patients from the mental hospital were not included; this hospital has a larger catchment area than the University Hospital, and its area has been diminishing during the studied years.

Lund is situated in southern Sweden. In 1986, the population of the catchment area was 204,000. Nearly one third was more than 50 years of age. The population figures were collected from the Central Register of the Malmöhus County Council. Changes in the population area have been accounted for in the analysis.

Only patients over 50 years of age were included. This population group increased by 37 per cent for both women and men during the studied years. About 70 percent lived in the rural area, i.e., outside the city of Lund. This proportion was the same during the 4 studied years.

Women and men in the population over 80 years of age have increased by 92 and 42 per cent, respectively, since 1966.

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The age-corrected incidence per 1,000 inhabitants for each studied year was calculated for men and women, as well as for the two types of fractures in 10-year intervals (Table 1).

Results

The total incidence of hip fractures increased during 1966-1986 from 3.3 to 5.1 per 1,000 inhabitants (Figure 1). About 40 percent of the increase could be explained by demographic aging. The slope of the line was almost the same for women and men, but the incidence had doubled as regards men. In the city the total incidence continued to be higher than in the rural area. The incidence for both types of fractures also increased. The total incidence per 1,000 inhabitants for cervical fractures for the studied years was 1.95, 1.79, 2.45, and 2.79, respectively. For trochanteric fractures the corresponding figures were 1.37, 1.99, 1.97, and 2.3.

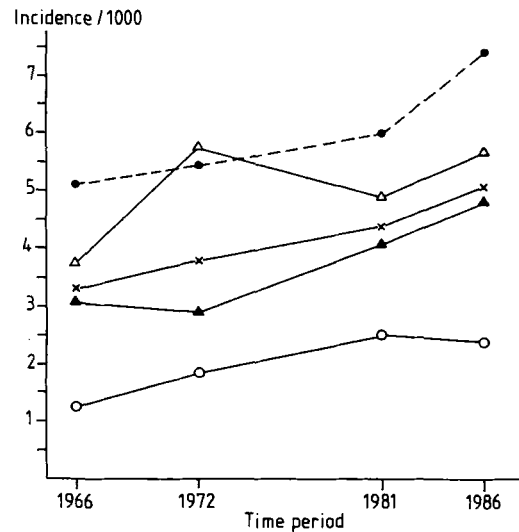


Figure 1. Hip fracture incidence per 1,000 inhabitants above 50 years of age 1966-1986 for total material (x), women (●) and men (○), urban (△) and rural (▲) populations.

Table 1. Population and hip fractures in the Lund area 1966-1986.

Age groups	Population		Cervical		Trochanteric	
	Female	Male	Female	Male	Female	Male
1966						
50-59	8 138	7 681	4	-	-	2
60-69	7 007	6 218	13	4	7	2
70-79	4 689	3 635	30	2	19	1
80-	2 403	1 705	23	5	18	8
Total	22 237	19 239	70	11	44	13
1972						
50-59	8 982	8 787	4	1	1	3
60-69	8 675	7 981	7	2	10	7
70-79	6 375	4 930	23	8	29	9
80-	3 159	1 999	37	9	37	5
Total	27 191	23 697	71	20	77	24
1981						
50-59	9 437	9 500	6	2	2	3
60-69	8 611	7 901	14	4	6	3
70-79	7 245	5 619	39	12	29	9
80-89	3 436	1 903	28	13	32	9
90-	503	237	9	6	12	2
80-	3 939	2 140	37	19	44	11
Total	29 232	25 160	96	37	81	26
1986						
50-59	9 604	9 691	4	2	-	2
60-69	8 963	8 335	17	5	10	7
70-79	7 463	5 838	32	8	17	7
80-89	3 987	2 160	61	15	57	14
90-	617	267	14	1	15	2
80-	4 604	2 427	75	16	72	16
Total	30 634	26 291	128	31	99	32

Cervical fractures

In both women and men the incidence increased somewhat over the studied period, especially in the oldest age groups (Figure 2). The fracture incidence for both women and men increased with increasing age, but showed a tendency to decrease in those above 95 years of age.

Trochanteric fractures

There was no striking change in fracture incidence over the period except for the oldest age groups in both sexes (Figure 2). With increasing age the incidence of trochanteric fractures continued to increase also in the very old age group, in contrast to the incidence of cervical fractures, when calculated in 5-year intervals.

Comparison of urban and rural populations

The incidence of cervical fractures increased over time for both sexes, proportionally most for men in the city, but also for women in the rural area (Table 2). There was a tendency for all years towards more trochanteric hip fractures in the city compared with the rural area, especially for women.

Age differences in fracture incidence

In the mixed urban and rural population more than 80 years of age, the largest proportional increase in incidence over time was in men with a cervical fracture; but also women with a trochanteric fracture had a large increase. The total incidence in this old group nearly doubled over time from 13.2 to 25.5 per 1,000. The proportional increase was higher in women than in men, but about the same for the two types of fractures.

In the total group under 80 years of age, men had twice the incidence as regards both cervical and trochanteric fractures.

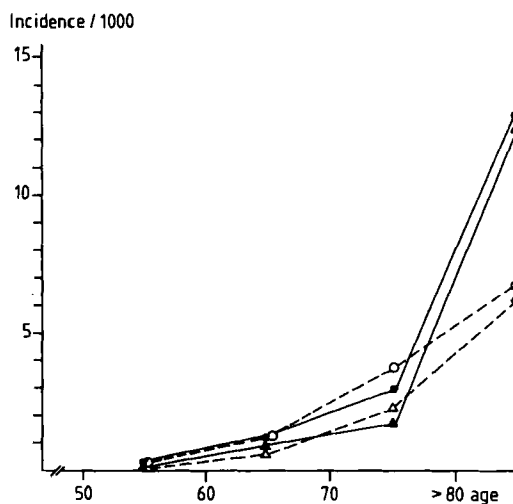


Figure 2. Age-corrected incidence in patients with cervical (○) or trochanteric (△) hip fractures in 1966 and 1986 (closed symbols).

Ratio cervical to trochanteric fractures

The proportions between patients with cervical and trochanteric fractures were 1.39, 0.93, 1.24, and 1.21 for the observed years. With increasing age, there was a tendency towards even proportions in the total population between cervical and trochanteric fractures for all the studied years (Table 3). The even proportions were also found in the rural area, except in the oldest age group, where there were more cervical fractures. In the city, however, the highest value was noted for persons aged 70-79 years.

Females in the rural population and males in the city had increasing ratios over time because of increasing numbers of cervical hip fractures.

Table 2. Incidence per 1,000 for hip fracture patients older than 50 years in Lund 1966-1986. C= city of Lund, R= rural area

	1966		1972		1981		1986	
	C	R	C	R	C	R	C	R
Cervical								
women	3.3	3.1	4.0	1.9	3.6	3.1	3.6	4.4
men	0.2	0.7	1.2	0.7	1.8	1.4	2.4	0.8
total	2.0	1.9	2.8	1.3	2.9	2.3	3.1	2.7
Trochanteric								
women	2.6	1.7	4.0	2.3	2.9	2.7	3.6	3.0
men	0.6	0.7	1.7	0.8	1.0	1.0	1.0	1.3
total	1.8	1.2	3.0	1.5	2.1	1.9	2.6	2.2
Men	0.8	1.4	2.9	1.5	2.8	2.4	3.4	2.1
Women	5.9	4.7	7.9	4.2	6.5	5.9	7.3	7.5
Total	3.8	3.1	5.8	2.9	5.0	4.2	5.7	4.9

Table 3. Age-related ratio cervical/trochanteric fractures in 1966, 1972, 1981 and 1986 for different age groups

Age	50-59	60-69	70-79	80-89	>90
1966	2.00	1.89	1.60	1.08	
1972	1.25	0.53	0.82	1.07	1.18
1981	1.60	2.00	1.34	1.00	1.07
1986	3.00	1.29	1.67	1.07	0.88

Ratio women to men

In 1966, there were only four male fractures in the city, so the proportion of women to men was very high (Table 4). However, the ratio has dropped during recent years in the urban population, whereas it seems to rise in the rural population.

Discussion

In general, the proportional increase in the fracture incidence over the studied period in our area had been higher for men than for women, and also higher for cervical than for trochanteric fractures. Only the oldest age groups with trochanteric fractures had an increased incidence. Proportionally, the greatest increase over time occurred in men with cervical fractures.

Totally, we found a higher incidence of hip fractures in the city than in the rural area. This accords with the findings of Falch et al. (1985), Finsen and Benum (1987), Mannius et al. (1987) and Sernbo et al. (1988). On the contrary, Swanson and Murdock (1983) found a higher value in the environs of Dundee, Scotland: viz., 3.88 compared with 3.16 in the city proper.

When analyzing the patients over 80 years of age, we found that almost the whole increase in hip fracture incidence in Lund could be attributed to this group. They constitute a group that is increasing quite rapidly – having more concomitant diseases and needing more hospital resources than younger patients (Ceder et al. 1980). In Lund in 1966, this group comprised more than half of all the hip fractures. We believe that we have to focus on this old group concerning resources for care in the hospital, for rehabilitation, and for prevention.

Most studies have grouped the age above 80 years

together in the analysis. This gives the impression that the fracture incidence increases with age even in the highest age groups. We studied the 5-year intervals, and we found a tendency for the fracture incidence to decrease in the oldest patients with cervical fractures, but not in patients with trochanteric fractures. This very old group seems to be a more healthy subset than the younger groups. Our values from 1972 showed a decrease for the highest age groups for both types of fractures. Thus, a very high numerical age of a person does not seem to be an increased threat to sustain a hip fracture. Gallannaugh et al. (1976) and Zetterberg et al. (1984) also found a decrease in incidence in the highest age groups.

The total incidence for women in Lund and its surroundings in 1981 was comparable to the figures from Kreutzfeldt et al. (1984) and Hedlund et al. (1985), whereas Nilsson (1984) showed lower values. For men, our incidence figures in 1981 accorded with these three authors.

Zain Elabdien et al. (1984), Zetterberg et al. (1984), and Falch et al. (1985) had higher values, whereas Frandsen and Kruse (1983) and Lüthje (1985) had lower values for men and women than in the total, mixed urban and rural population in Lund 1981.

Since 1981 the total incidence in Lund has increased for women, but not for men. The figures from the city of Lund were constantly higher than in the countryside, and were in 1986 comparable to the figures from Gothenburg in 1981 (Zetterberg et al. 1984). This, perhaps, shows that the increasing hip fracture incidence also occurs in smaller cities with a delay of some years.

For the mixed population over 80 years of age, the figures in Lund in 1981 were higher than in Finland (Lüthje 1985) and also higher than for men in Denmark (Frandsen and Kruse 1983, Kreutzfeldt et al. 1984). For women the figures were lower than those from Frandsen and Kruse (1983) and comparable to those from Kreutzfeldt et al. (1984). In 1986, the figures for women in Lund exceeded the figures of Frandsen and Kruse (1983).

The increase in incidence since the 1960s was much higher in Gothenburg (Zetterberg et al. 1984) and Uppsala (Zain Elabdien et al. 1984) than in Lund until 1981.

The catchment area for the mental hospital has changed during the studied period. In 1986, there were 11 patients with hip fractures from our population in the mental hospital. These patients would have increased our incidence figures by a few decimals if they had been included. The number of hip fractures in the mental hospital was fairly constant during 1970 to 1980 (Hansson et al. 1982), but has since decreased. To be able to make comparisons, this group of patients was excluded during all the years.

Table 4. Ratio women/men 1966-1986 for the rural, urban, and total population

	Rural	Urban	Total
1966	3.45	11.25	4.75
1972	3.04	3.79	3.36
1981	2.59	3.32	2.81
1986	3.68	3.13	3.55

The ratio cervical to trochanteric fractures, seen totally, is decreasing as the years go by, and likewise this is the case with increasing age, in both the urban and the rural populations. The exceptions are men in the urban and women in the rural population, where the figures are rising over time. Falch et al. (1985) and Zetterberg et al. (1984) also found a decreasing ratio cervical to trochanteric fractures with increasing age. This might be an indication that trochanteric fractures are due more to bone fragility owing to age than the cervical ones (Aitken 1984).

If the same incidence as in 1986 prevails, the expected number of hip fractures in 1995 will be 350, which has taken into consideration the prognostic increase of people more than 50 years of age. If, however, the increase in fracture incidence since 1966 does

continue, the number of hip fractures in the year 1995 will be 405. This would mean that the number of hip fractures will have tripled in 30 years, and especially in the oldest age groups.

In conclusion, the peak of increasing incidence during the studied period is in men with cervical fractures residing in the urban area. Somewhat less increase was found among women and men in the rural area. In total, the incidence in Lund was higher than in some other studies, but, in general, it was lower than the figures from larger cities. The rising incidence indicates that the number of hip fractures in Lund will have tripled from 1966 to 1995. This will place a great demand on care resources both inside and outside the hospital, especially for persons aged 80 years or more.

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