Incidence of hip fracture in New South Wales: are our efforts having an effect?

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ABSTRACT

Objective: To examine trends in hospital admission for hip fracture in New South Wales between July 1990 and June 2000.

Design: Analysis of routinely collected hospital separation data.

Setting: Public and private acute-care hospitals in NSW.

Participants: Admissions of patients aged 50 years and over with a primary diagnosis of fracture of the neck of femur (*International classification of diseases*, 9th revision [ICD-9] code 820 or ICD-10 codes S72.0–S72.2).

Main outcome measures: Number and rates of hospital admission for fracture of the neck of femur per 1000 population; inpatient mortality rates per 1000 admissions.

Results: Between July 1990 and June 2000, the number of admissions to NSW acute-care hospitals for hip fracture increased by 41.9% in men (from 1059 to 1503 per year) and by 31.2% in women (from 3160 to 4145 per year). However, age-specific and age-adjusted rates remained practically unchanged. The average length of stay for admissions for hip fracture decreased significantly from 19.2 days (95% CI, 18.5–19.8 days) in 1990–1991 to 14.2 days (95% CI, 13.8–14.6 days) in 1999–2000. No significant change was observed in the overall inpatient death rates per 1000 admissions.

Conclusions: The findings support recent reports that the increase in hip fracture rates during most of the past century may have ended. However, the number of admissions for hip fracture is still rising. Preventive measures to reduce the burden of this condition on the healthcare system and community need to be pursued and strengthened.

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FRACTURED NECK OF FEMUR is a common cause of morbidity and mortality in older people and is associated with considerable health expenditure in most industralised countries.[1] In Australia, hip fractures were estimated to account for 0.9% of total government health services expenditure for 1995–1996.[2] This does not take into account the long-term human and social costs. Only 50% of patients with a hip fracture regain the same degree of mobility that they had before the fracture.[3]

The rise in age-specific incidence of hip fracture over the past century has been well documented.[4-6] It is attributed to an increased risk of fall-related injuries, in turn influenced by social and lifestyle changes, reduced bone and muscle strength, more frequent use of medications, inadequate levels of calcium and vitamin D, less active lifestyles, and poorer general mobility.[7,8] This rising incidence led to the development of programs to reduce the burden of hip fracture and all injurious falls in older people.[9] These programs may have had some success, as the incidence of hip fracture appears to be stabilising and even decreasing in some countries.[10-12]

In New South Wales, before 1990, in line with international trends, the age-specific rates of hospitalisation for hip fracture in those aged 65 years and over were increasing.[13,14] It is important to examine more recent trends to help determine the effectiveness of campaigns to reduce the burden of ill-health associated with hip fracture, and to inform healthcare planning. This study examined trends in admission for hip fracture to acute-care hospitals in NSW between July 1990 and June 2000, using routinely collected hospital separation data. We also examined trends in length of stay and inpatient mortality rates.

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METHODS

Data sources

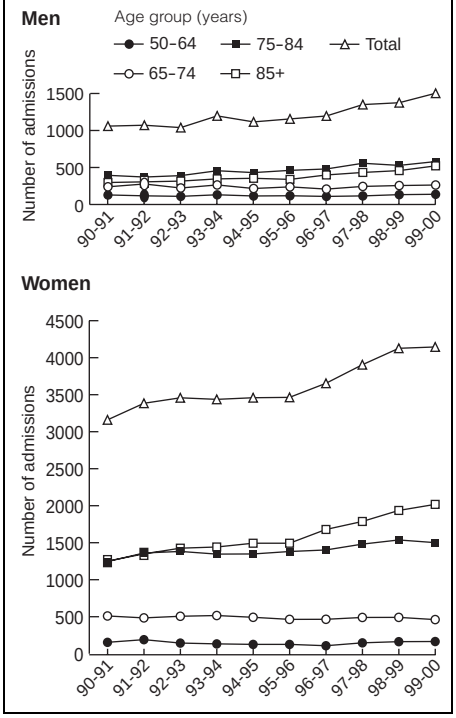
Data were obtained from the Inpatient Statistics Collection (ISC) covering all inpatient separations from acute-care hospitals in New South Wales between July 1990 and June 2000. The ISC is a financial-year collection, which enumerates periods of stay in hospital that end with discharge, transfer or death of a patient.[15]

Estimates of the total inpatient activity for each financial year between 1 July 1990 and 30 June 1993 were derived by weighting cases from sampled public hospitals, as described elsewhere.[15] From 1 July 1993, the collection became a census of all admitted patients for both the public and private sector. Diagnoses were coded using the *International classification of diseases*, 9th revision (ICD-9) until June 1998, after which the 10th revision (ICD-10) was introduced.[16]

Case definition

Cases included in the study comprised all patients aged 50 years and over admitted to acute-care hospitals in NSW with a primary diagnosis of frac-

1: Number of hospital admissions for hip fracture in New South Wales, 1990–2000



ture of the neck of femur (ICD-9 code 820 or ICD-10 codes S72.0–S72.2). We excluded non-acute-care hospitals and single-day-only admissions from the analysis to minimise multiple counting of cases resulting from transfers between hospitals for the same hip fracture. However, multiple counting could not be entirely eliminated, as patients admitted consecutively into acute-care hospitals could still be recorded more than once. The planned introduction of unique patient identifiers in NSW will help overcome this problem.

Statistical analyses

Hip fracture rates were calculated as the number of cases per 1000 population per year, by sex and age group. Population figures for each age group were obtained from the Australian Bureau of Statistics census for the years 1991 and 1996, and from estimates of the NSW population for other years of the study.[15]

Rates of hospitalisation were standardised to the 1990 population of NSW to adjust for any differences that may have arisen from a change in the age structure of the population. In-patient death rates per 1000 admissions for hip fracture were also calculated by sex and age group.

All analyses were carried out using SAS statistical software.[17]

RESULTS

Between July 1990 and June 2000, the number of admissions to NSW acute-care hospitals for hip fracture increased by 41.9% in men (from 1059 to 1503) and by 31.2% in women (from 3160 to 4145) (Box 1). The increase was highest among those aged 85 years and over in both men (75.8% increase) and women (61.3% increase). Women aged 65–74 years were the only group with a decrease in number of admissions for hip fracture (−10%).

Age-specific rates of hospital admission for hip fracture per 1000 population were higher in women than in men and decreased slightly over the study period for all age groups, except men aged 75–84 and women aged 85 and over (Box 2). However, no decreases were significant, except in women aged 65–74 years. Age-standardised admission rates for hip fracture were also practically unchanged for both men and women (Box 3).

The average length of stay for admissions to NSW acute-care hospitals for hip fracture decreased between July 1990 and June 2000 from 19.2 days (95% CI, 18.5–19.8 days) to 14.2 days (95% CI, 13.8–14.6 days). Accompanying this was an increase in the percentage of patients transferred to other institutions from 47.6% (95% CI, 46.1%–49.1%) to 53.9% (95% CI, 52.6%–55.2%).

Inpatient death rates increased, although not significantly, from 47.2 per 1000 admissions for hip fracture (95% CI, 40.8–53.6) in 1990–1991 to 50.8 per 1000 admissions (95% CI, 45.1–56.5) in 1999–2000. Age-standardised inpatient death rates remained stable over the same period.

DISCUSSION

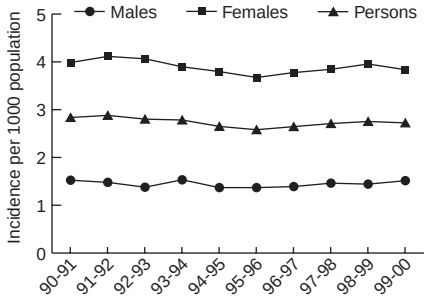
Our findings suggest that age-specific admission rates for hip fracture in NSW may have stabilised over the past decade. This finding is consistent with recent reports from other countries and states of Australia. In England, admis-

2: Age-specific rates of hospital admission for hip fracture per 1000 population in New South Wales, 1990–2000

Age (years)	1990–91	1991–92	1992–93	1993–94	1994–95	1995–96	1996–97	1997–98	1998–99	1999–00	Difference* (95% CI)
Men											
50–64	0.32	0.29	0.27	0.31	0.27	0.27	0.26	0.25	0.28	0.28	0.038 (−0.03 to 0.01)
65–74	1.25	1.41	1.11	1.28	1.02	1.11	0.99	1.12	1.17	1.21	0.044 (−0.17 to 0.26)
75–84	4.78	4.34	4.42	5.02	4.63	4.78	4.86	5.26	4.79	5.06	−0.28 (−0.9 to 0.35)
85 +	21.32	20.59	19.94	20.64	19.89	17.80	20.21	19.98	19.89	21.26	0.06 (−0.29 to 0.31)
Women											
50–64	0.38	0.47	0.35	0.32	0.30	0.30	0.26	0.32	0.35	0.34	0.043 (−0.037 to 0.12)
65–74	2.26	2.10	2.17	2.18	2.04	1.91	1.96	2.02	2.04	1.93	0.33 (0.068 to 0.59)
75–84	9.64	10.21	10.10	9.63	9.48	9.48	9.48	9.53	9.61	9.14	0.5 (−0.20 to 1.2)
85 +	33.72	34.73	35.11	33.73	33.41	31.72	34.12	34.10	35.39	34.94	−1.22 (−3.59 to 1.15)

* Difference in the rates of hospital admission between the first and the last year of the study period.

3: Age-standardised incidence of hip fracture in New South Wales, 1990–2000, in people aged 50 years or older



sion rates for fracture of the femur changed very little between 1992–1993 and 1997–1998.[10] In New Zealand, age-specific rates of hip fracture remained steady, and even decreased slightly in women, between 1989 and 1998.[11] Similar trends were also observed in South Australia over the same period.[12] While other factors might have contributed to these trends, they could indicate that strategies and programs implemented in these countries to prevent falls in older people since the early 1990s are beginning to have some impact on admission rates.[9] In NSW, preventive programs have focused on increasing awareness of the risk factors for falls, environmental modifications and promoting physical activity in older people.[18,19]

Increasing use of hormone replacement therapy (HRT) may have contributed to the observed, albeit non-significant, decrease in age-specific admission rates in women aged up to 74 years and the decrease in number of admissions in women aged 65–74 years. HRT is known for its protective effect and role in reducing hip-fracture risk. A South Australian study found that HRT use in women around the age of menopause increased significantly between 1991 and 1997.[20]

Despite the stabilisation of age-specific hospital admission rates for hip fracture, our findings indicate that, because of population ageing, the number of admissions for hip fracture is still rising, with a 41.9% increase in men and 31.2% in women over the study period. Similar increases have been observed worldwide, with global numbers expected to rise from an estimated 1.3 million hip fractures in 1990 to 7.3–21.3 million by 2050.[21] In Australia, the number of hip fractures is expected to double over 29 years and quadruple in 56 years.[2]

This increase in hip-fracture admissions is likely to impose a considerable burden on healthcare services, particularly acute-care hospitals. The strategy of reducing the average length of stay for hip fracture was designed to redress the increased demand for acute-care hospital beds. We found that average length of stay declined from 19.2 days in 1990–1991 to 14.2 days in 1999–2000, a trend that continued from the 1979–1990 period, when average length of stay declined from 31.5 days to 21.3 days.[15] The decline is probably due to more frequent transfer of patients to rehabilitation centres and nursing homes, and its sustainability is questionable, as the number of admissions for hip fracture continues to rise dramatically in an increasingly ageing population.

Priority should be given to pursuing the preventive measures that have been in place since the early 1990s, as well as developing new strategies to reduce the burden of hip fracture in the community. Greater use of vitamin D and calcium has been suggested as a cheap and safe preventive measure to improve both bone and muscle strength, particularly in those who are housebound or live in institutions.[22] Other evidence-based interventions include those aiming at promoting physical activity, improving medication management and minimising environmental hazards at home and in acute and residential care settings.[23]

Given the diversity and complexity of risk factors contributing to hip fracture in older people, perhaps a combination of all these approaches is needed. More research is also required to better understand how factors such as balance contribute to falls; to better predict who is at risk of falls and injury; and to evaluate the effectiveness of prevention programs in the community as well as in institutions.[24]

Our estimates of hip fracture rate for the years before July 1993 need to be treated with caution, as data from private hospitals were not included in the ISC. However, we believe this would have little influence on the overall trends, as the proportion of private hospital discharges is very small, and a weight variable was used to adjust for the probability of sampling during earlier years. The transition from ICD-9 to ICD-10 classification in 1998–1999 also did not seem to make a significant impact on the observed trends.

Caution is also warranted as femoral fractures can be coded incorrectly. An English data linkage study of hip fracture found coding confusion between fractures of the neck and other parts of the femur, leading the authors to recommend including all femoral fractures when examining hip fractures.[25] In our study, the impact of misclassification is difficult to determine. Many fractures of other parts of the femur have different aetiology to those of the neck of the femur and their inclusion would have resulted in an overestimation of hip fracture incidence.

The strengths of this study include its relatively long duration and the inclusion of both public and private hospitals. In addition, hospital admissions in this study can be used as a proxy for incident cases of hip fracture in NSW, as, almost without exception, all patients with a hip fracture are admitted to hospital.

Our findings are consistent with recent reports suggesting that the increase in age-specific hip fracture rates in many industrialised countries during most of the past century may have ended. However, the number of admissions for hip fracture is still on the rise, particularly among older age groups. Preventive measures which have been implemented since the early 1990s, including those aimed at reducing the risk of falls, need to be pursued and strengthened. Investment in innovative and multidisciplinary preventive strategies which take into account the various factors contributing to falls is also needed.

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COMPETING INTERESTS

None identified.

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