

Time trends and demography of mortality after fractured neck of femur in an English population, 1968-98: database study

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Abstract

Objectives To investigate time trends in mortality after admission to hospital for fractured neck of femur from 1968 to 1998, and to report on the effects of demographic factors on mortality.

Design Analysis of hospital inpatient statistics for fractured neck of femur, incorporating linkage to death certificates.

Setting Four counties in southern England.

Subjects 32 590 people aged 65 years or over admitted to hospital with fractured neck of femur between 1968 and 1998.

Main outcome measures Case fatality rates at 30, 90, and 365 days after admission, and standardised mortality ratios at monthly intervals up to one year after admission.

Results Case fatality rates declined between the 1960s and the early 1980s, but there was no appreciable fall thereafter. They increased sharply with increasing age: for example, fatality rates at 30 days in 1984-98 increased from 4% in men aged 64-69 years to 31% in those aged ≥ 90 . They were higher in men than women, and in social classes IV and V than in classes I and II. In the first month after fracture, standardised mortality ratios in women were 16 times higher, and those in men 12 times higher, than mortality in the same age group in the general population.

Conclusions The high mortality rates, and the fact that they have not fallen over the past 20 years, reinforce the need for measures to prevent osteoporosis and falls and their consequences in elderly people. Whether post-fracture mortality has fallen to an irreducible minimum, or whether further decline is possible, is unclear.

Introduction

Fractured neck of femur is a common cause of morbidity, use of hospital care, and death in elderly people. Age specific incidence rates have increased substantially in most Western populations in recent decades.¹⁻⁷ Even if age specific rates remain stable over time, the number of people who have a fracture will increase because of the increasing number of elderly people in the population.

Information about secular trends in outcome of fracture is sparse. We analysed data on hospital admissions between 1968 and 1998 to provide information about time trends in case fatality rates in a large defined population.

Methods

We used the Oxford record linkage study, which comprises anonymised abstracts of hospital statistics linked to data from death certificates. It covered two health districts and their constituent hospitals in the former Oxford NHS region (population 0.9 million) from 1968 to 1974, six health districts and their hospitals from 1975 to 1986 (population 1.8 million), and eight districts from 1987 to 1999 (population 2.5 million).

We used ICD (international classification of diseases) codes to identify fractures of the neck of femur. All admissions for patients under 65 years of age were excluded. The analysis was confined to emergency admissions where the fracture was the principal diagnosis. The study period covered admissions from 1 January 1968 to 31 March 1998, with linkage to death certificates up to 31 March 1999.

We calculated case fatality rates at 30, 90, and 365 days from the day of admission (day 0) and standardised mortality ratios at monthly intervals after fracture. The statistical methods are given in detail on bmj.com.

Results

A total of 32 590 people aged 65 years and over were admitted to hospital as emergencies with fractured neck of femur between 1968 and 1998, of whom 26 687 (81.9%) were women. The mean age of the patients was 81.5 (SD 7.4) years (men 79.6 (7.5) years, women 82.0 (7.4) years).

The age distribution of patients admitted with fractured neck of femur increased significantly over the study period ($P < 0.001$). For example, 611 (31.6%) of the patients admitted in 1968-73 were aged 85 years or over, compared with 3200 (41.0%) in 1994-8.

For both men and women, case fatality rates declined during the early part of the study period and then levelled off from the early 1980s (fig 1, and see bmj.com).

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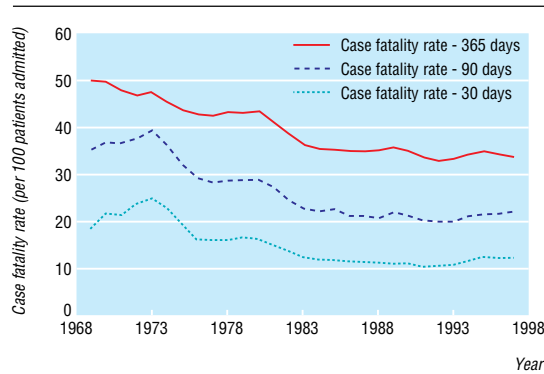


Fig 1 Age and sex adjusted trends in case fatality rates for fractured neck of femur 30, 90, and 365 days after hospital admission, 1968-98

Logistic regression modelling showed that, between 1968-73 and 1979-83, significant downward trends occurred in the annual age adjusted case fatality rates for women at 30, 90, and 365 days (all $P < 0.001$), and for men at 90 days ($P < 0.05$). The study of rates had less statistical power in men than women because of lower incidence of fracture, and downward trends did not reach significance for the rates at 30 and 365 days for men in the earlier years (table). From 1984, annual rates did not decline further.

Mortality was significantly higher ($P < 0.001$) in social classes IV and V than in classes I and II. The odds ratio for IV and V to I and II was 2.47 at 30 days

(95% confidence interval 1.79 to 3.42) and declined to 1.75 (1.34 to 2.27) at one year. Mortality was also higher in class III, relative to classes I and II, for the case fatality rate at 90 days (1.47 (1.14 to 1.90; $P < 0.01$)) and at one year (1.31 (1.03 to 1.65; $P < 0.05$)). After adjustment for age group, marital status had no significant effect on survival in men, but mortality was significantly lower in married women than in single women at 90 days ($P < 0.01$) and at one year ($P < 0.001$).

For both men and women, case fatality rates increased greatly with increasing age (see bmj.com). For example, in the period 1984-98 at 30 days after admission, they rose with age in men from 4.4% (2.3% to 6.5%) at age 65-69 to 18.6% (15.9% to 21.4%) at age 85-89 and 31.4% (26.6% to 36.1%) at age 90 or over. In each age group, the rates were consistently higher in men than in women. The rates were also significantly higher in 1968-83 than in 1984-98 for most age-sex groups.

Figure 2 shows standardised mortality ratios for men and women separately during the 31 year period 1968-98. These calculations compare mortality in people with fractures with mortality in the general populations of men and women of the same age. At one month after hospital admission, mortality was 16 times higher in men and 12 times higher in women than in the general populations of men and women of similar age. By month 2, the standardised mortality ratios had declined substantially, but they were significantly higher in men than women in four of the first

Age adjusted, sex specific odds ratios for quinquennial time period and marital status, and age and sex adjusted odds ratios for social class, on case fatality rates after hospital admission for fractured neck of femur, 1968-98

Risk factor	No of admissions	Odds ratio (95% CI) for case fatality rates		
		Within 30 days	Within 90 days	Within 365 days
Time period				
Men:				
1968-73	338	1.00	1.00	1.00
1974-78	741	0.88 (0.63 to 1.22)	0.82 (0.61 to 1.09)	0.77 (0.59 to 1.01)
1979-83	976	0.75 (0.54 to 1.04)	0.72 (0.54 to 0.95)	0.80 (0.62 to 1.04)
1984-88	994	0.62 (0.44 to 0.86)	0.63 (0.47 to 0.83)	0.68 (0.52 to 0.88)
1989-93	1 295	0.59 (0.43 to 0.81)	0.59 (0.45 to 0.78)	0.68 (0.53 to 0.88)
1994-98	1 556	0.64 (0.47 to 0.87)	0.60 (0.46 to 0.78)	0.60 (0.47 to 0.77)
Women:				
1968-73	1 593	1.00	1.00	1.00
1974-78	3 557	0.74 (0.63 to 0.87)	0.72 (0.63 to 0.82)	0.84 (0.74 to 0.96)
1979-83	4 678	0.61 (0.52 to 0.72)	0.60 (0.52 to 0.68)	0.73 (0.64 to 0.82)
1984-88	4 731	0.44 (0.37 to 0.52)	0.44 (0.38 to 0.51)	0.56 (0.49 to 0.63)
1989-93	5 875	0.39 (0.33 to 0.46)	0.39 (0.34 to 0.45)	0.52 (0.46 to 0.59)
1994-98	6 253	0.46 (0.39 to 0.54)	0.43 (0.37 to 0.49)	0.55 (0.49 to 0.62)
Marital status				
Men:				
Single	343	1.00	1.00	1.00
Married	2 196	1.01 (0.71 to 1.43)	1.08 (0.80 to 1.45)	1.09 (0.85 to 1.40)
Widowed	1 376	0.97 (0.67 to 1.40)	1.18 (0.87 to 1.59)	1.19 (0.91 to 1.54)
Divorced or separated	66	1.13 (0.50 to 2.56)	0.93 (0.46 to 1.92)	0.77 (0.42 to 1.43)
Women:				
Single	2 383	1.00	1.00	1.00
Married	4 440	0.84 (0.70 to 1.01)	0.78 (0.68 to 0.90)	0.83 (0.74 to 0.94)
Widowed	11 678	1.00 (0.87 to 1.16)	0.98 (0.87 to 1.09)	1.00 (0.91 to 1.11)
Divorced or separated	177	0.70 (0.38 to 1.32)	0.83 (0.53 to 1.29)	0.77 (0.53 to 1.12)
Social class†				
I and II	803	1.00	1.00	1.00
III	591	1.34 (0.98 to 1.83)	1.47 (1.14 to 1.90)	1.31 (1.03 to 1.65)
IV and V	418	2.47 (1.79 to 3.42)	2.04 (1.54 to 2.70)	1.75 (1.34 to 2.27)

†Analyses for social class are for 1968-88 only.

five months after admission. The ratios for both men and women remained higher throughout the full year after admission, but differences between men and women were not significantly different in months 6-12.

Discussion

The main strengths of this study are that it is a large, population based study of more than 32 000 patients; it covers a long time span to enable investigation of long term trends in mortality; and it uses a database that had incorporated systematic follow up through record linkage to data from death certificates. The main limitations of the study are that the clinical information recorded about individual patients was confined to basic diagnostic and demographic data, and no information on treatment or on the functional status of the patients who survived was included.

Our findings on mortality are broadly comparable with those in other studies of mortality after fractured neck of femur in defined Western populations.⁸⁻¹⁴

The incidence of fractured neck of femur has increased in recent decades.^{6 15} Incidence rates are higher in women than men but, as we show, case fatality rates and standardised mortality ratios after fracture were substantially higher in men than women. This contrasts with findings in illnesses such as coronary heart disease and stroke, which tend to have a higher incidence in men than women but higher fatality rates in women than men.¹⁶⁻¹⁹

We found that mortality after fracture was higher in social classes IV and V (lower socioeconomic status) than in I and II (higher status). Little is known about social class and post-fracture mortality: one study reported no association,²⁰ and another reported higher mortality in lower social classes.²¹ Population based all cause mortality is higher in social classes IV and V than in classes I and II. However, our findings probably reflect more than just the general health related disadvantages of classes IV and V. The fact that the mortality differential was greatest within 30 days indicates an effect that was specific to the outcome of the fracture. Social class data were collected by the Oxford record linkage study up to the late 1980s. Unfortunately, the Department of Health's reforms to NHS information systems in the 1980s caused this to stop.

Mortality rates after fracture fell significantly from the late 1960s to the early 1980s but have not declined further in the past 20 years. It is unclear whether mor-

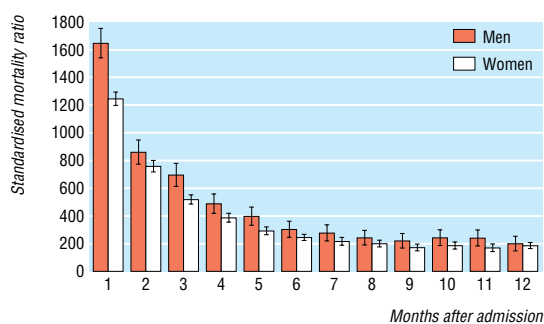


Fig 2 Standardised mortality ratios after hospital admission for fractured neck of femur in men and women, 1968-98. Bars are 95% confidence intervals

What is already known on this topic

Numbers of elderly people with fractured neck of femur are increasing in most Western populations

Case fatality rates increase sharply with age

What this study adds

Case fatality rates after fractured neck of femur have not declined appreciably during the past 20 years

Although the incidence of fractured neck of femur is much higher in women than men, case fatality rates are higher in men than women

High death rates, and the fact that they have not declined, reinforce the need for prevention of osteoporosis, falls, and fractures

tality after fractured neck of femur has declined to an irreducible minimum or whether there is still scope for further reduction. Investigators with access to long-standing, linked databases in other countries might determine whether post-fracture mortality rates have levelled off in their populations in recent years. More should be done than is current practice to compare outcomes in the NHS with outcomes in other countries and health care systems.²² The lack of recent decline in mortality, coupled with the fact that mortality after fracture is so high, mean that preventive programmes aimed at osteoporosis and at falls and their consequences in elderly people are particularly important.

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Conflict of interest: None declared.

Ethical approval: Not needed.

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Hysterectomy and sexual wellbeing: prospective observational study of vaginal hysterectomy, subtotal abdominal hysterectomy, and total abdominal hysterectomy

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Members of the study group and selected questions from the questionnaire appear on bmj.com

Abstract

Objectives To compare the effects of vaginal hysterectomy, subtotal abdominal hysterectomy, and total abdominal hysterectomy on sexual wellbeing.

Design Prospective observational study over six months.

Setting 13 teaching and non-teaching hospitals in the Netherlands.

Participants 413 women who underwent hysterectomy for benign disease other than symptomatic prolapse of the uterus and endometriosis.

Main outcome measures Reported sexual pleasure, sexual activity, and bothersome sexual problems.

Results Sexual pleasure significantly improved in all patients, independent of the type of hysterectomy. The prevalence of one or more bothersome sexual problems six months after vaginal hysterectomy, subtotal abdominal hysterectomy, and total abdominal hysterectomy was 43% (38/89), 41% (31/76), and 39% (57/145), respectively (χ^2 test, $P=0.88$).

Conclusion Sexual pleasure improves after vaginal hysterectomy, subtotal abdominal hysterectomy, and total abdominal hysterectomy. The persistence and development of bothersome problems during sexual activity were similar for all three techniques.

Introduction

Hysterectomy is the most common major gynaecological operation in the United Kingdom and United States.^{1,2} In the Netherlands, 32% of women will need hysterectomy during their lifetime.³ Historically the uterus has been regarded as the regulator and controller of important physiological functions, a sexual organ, a source of energy and vitality, and a maintainer of youth and attractiveness.⁴ Women are concerned

that hysterectomy may affect their sexual wellbeing or their sexual attractiveness. Hysterectomy has been reported as having adverse as well as beneficial effects on sexual wellbeing.⁵⁻¹⁰

Because hysterectomy disrupts the local nerve supply and anatomical relations of the pelvic organs, it has been thought that the function of these organs may be adversely affected. The idea that sexual wellbeing may differ according to type of hysterectomy is based on the hypothesis that the techniques damage the innervation and supportive structures of the pelvic floor differently. To what extent symptoms differ between total and subtotal hysterectomy has not been investigated.

If vaginal and abdominal removal of the uterus are both technically feasible, gynaecologists generally select vaginal hysterectomy because of reduced length of hospital stay, fewer complications, and reduced costs.¹¹⁻¹³ We compared the effects of vaginal hysterectomy, subtotal abdominal hysterectomy, and total abdominal hysterectomy on sexual wellbeing.

Participants and methods

We recruited consecutive women who had been offered hysterectomy for a benign indication between January 1999 and July 2000. Exclusion criteria were endometriosis and symptomatic prolapse of the uterus as indications for hysterectomy.

Our prospective observational study took place in 13 teaching and non-teaching hospitals in the Netherlands over six months. Gynaecologists were free to choose a surgical hysterectomy technique. Perioperative treatment was similar in all participating hospitals.

Objectives and outcome measures

We compared the effects of different hysterectomy techniques on sexual wellbeing. All patients completed