CASE FATALITY RATES: EFFECT OF SOCIAL DEPRIVATION – FULL REPORT

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EXECUTIVE SUMMARY

Objectives

For selected diseases and operations, to determine whether outcomes, measured as case-fatality rates after admission, are influenced by socio-economic status.

Procedure

The project has been organised into the following stages:

- Choice of a deprivation measure.
- Creation of a linked file of national Hospital Episode Statistics (HES) for England, including linkage to ONS mortality data; and linkage of the deprivation score to each HES record.
- Calculation of case fatality rates for people in each socio-economic group and comparisons between the groups.
- Assessment of pilot results and proposals for further investigation.

Choice of preferred measure

We have used the Index of Multiple Deprivation 2000 (IMD 2000). This is the measure of deprivation constructed by Mike Noble and his team at Oxford University and it is the measure now favoured by Government departments and used by the DETR. These are ward-based indices.

Creation of file incorporating IMD 2000

Using the postcodes on each HES record, we have linked the IMD 2000 scores at ward level to each individual record on the linked HES-ONS file (technical details available on request).

Analysis

Age-standardised case-fatality rates were calculated for each condition, comparing patients grouped into quintiles of their IMD scores.

Conclusions

For the diseases and operations studied, there was surprisingly little difference in case-fatality rates between the different deprivation groups.

HOSPITAL CASE-FATALITY RATES AND DEPRIVATION

Introduction

Social deprivation is known to be associated with increased mortality and morbidity. However, little is known about how deprivation is associated with outcome after hospital care. This pilot study aims to examine the relationship between deprivation and short-term mortality after hospital care. This initial analysis considers three common, acute conditions – stroke, myocardial infarction and fractured neck of femur – and two operations – coronary artery bypass grafting (CABG) and percutaneous transluminal coronary angioplasty (PTCA).

The background to the study is (a) to determine whether outcomes are affected by socio-economic status, and (b) to advise on whether socio-economic factors need consideration in comparing 'league tables' of Trust mortality.

Methods and results

Data were obtained from the new linked file of HES records from April 1998 to March 2002. For each diagnosis or operation, records of patients' first hospital admission were extracted from the file. Case-fatality rates were calculated for deaths that occurred within 30 days of admission.

The Index of Multiple Deprivation 2000 (IMD 2000), assigned for each patient to the patient's address at ward level, was used as the measure of socio-economic status. For each clinical condition, the admissions were grouped into quintiles based on the patients' IMD2000 score. Case-fatality rates were calculated taking the number of admissions as the denominator and the number of deaths occurring within 30 days of admissions regardless of the place of death as the numerator. The case-fatality rates for the quintiles were indirectly age- and sex-standardised, taking all admissions for the condition as the standard. Confidence intervals for these rates were calculated (using the Poisson distribution of the observed numbers of deaths).

The conditions selected for this initial analysis were:

1. Stroke	(ICD10: 161-164): immediate admissions only
2. Acute myocardial infarction	(ICD10: 121): immediate admissions only
3. Fractured neck of femur	(ICD10: S72): immediate admissions only
4. CABG	(OPCS4: K40-46) elective admissions
5. CABG	(OPCS4: K40-46): immediate admissions
6. PTCA	(OPCS4: K49-50): elective admissions
7. PTCA	(OPCS4: K49-50): immediate admissions

Results

The age- and sex-standardised case-fatality rates by quintiles of deprivation for the seven conditions are listed in tables 1 to 7. Admissions for stroke had a relatively high case-fatality rate but showed little evidence of any trend with deprivation. In contrast, case-fatality rates after immediate admissions for myocardial infarction and for fractured neck of femur increased with increasing deprivation. However, the magnitudes of the difference were small: an increase in case-fatality rates from the least to the most deprived quintiles of 11% for myocardial infarction and 13% for fractured neck of femur.

Case-fatality rates after CABG showed little variation with deprivation. For PTCA there was no general trend between quintiles of deprivation and case-fatality rates. There was, however, some suggestion that the least deprived quintile had lower case-fatality rates than the other quintiles, but this comparison was based on smaller numbers of deaths than the other patient groups.

Conclusions

For the conditions considered in this initial analysis, we found little or no association between quintiles of deprivation and short-term mortality after hospital admission. Case-fatality rates after immediate admissions for myocardial infarction and for fractured neck of femur showed some trend with deprivation but the magnitude of the effect was small. This contrasts with the much more substantial variation found in population-based incidence and mortality for many diseases.

It is not yet possible to generalise about whether or not deprivation should be taken into account in analysing and interpreting variation in case-fatality rates for other conditions. This needs to be assessed on a case by case basis.

Further work

To perform similar analyses for a wider range of diseases and for common and important operations to build up a full profile of which conditions do show associations between outcomes and deprivation and which conditions do not.

ANNEX: TABLES SHOWING RELATIONSHIP BETWEEN CASE-FATALITY RATES AND DEPRIVATION FOR SELECTED CONDITIONS

Stroke and deprivation: number of admissions, number of deaths within 30 days of admission (regardless of place of death), and age- and sex-standardised case-fatality rates (CFR) with 95% confidence intervals (CI) – [*excluding HES records without a full set of identifiers*].

Index of multiple deprivation quintile of admitted population	Admissions	Deaths	CFR	95% CI
Quintile 1 (least deprived)	50644	13847	26.3	25.8 - 26.7
Quintile 2	52301	14150	26.4	25.9 - 26.8
Quintile 3	53236	14650	27.3	26.8 - 27.7
Quintile 4	53172	14051	26.9	26.4 - 27.3
Quintile 5 (most deprived)	53418	13213	26.2	25.7 - 26.6
Total	**263501**	**70054**	**26.6**	**26.4 - 26.8**

Myocardial infarction and deprivation: number of admissions, number of deaths within 30 days of admission (regardless of place of death), and age- and sex-standardised case-fatality rates (CFR) with 95% confidence intervals (CI) – *[excluding HES records without a full set of identifiers].*

Index of multiple deprivation quintile of admitted population	Admissions	Deaths	CFR	95% CI
Quintile 1 (least deprived)	43636	8344	18.3	17.9 - 18.7
Quintile 2	45463	8836	18.7	18.3 - 19.1
Quintile 3	46226	9267	19.7	19.3 - 20.1
Quintile 4	46673	9094	19.8	19.4 - 20.2
Quintile 5 (most deprived)	47252	8879	20.3	19.9 - 20.7
Total	**230028**	**44528**	**19.4**	**19.2 - 19.5**

Fractured neck of femur and deprivation: number of admissions, number of deaths within 30 days of admission (regardless of place of death), and age- and sex-standardised case-fatality rates (CFR) with 95% confidence intervals (CI) – *[excluding HES records without a full set of identifiers].*

Index of multiple deprivation quintile of admitted population	Admissions	Deaths	CFR	95% CI
Quintile 1 (least deprived)	34963	2991	8.2	7.9 -8.5
Quintile 2	36519	3143	8.3	8.0 -8.6
Quintile 3	37184	3218	8.6	8.3 -8.9
Quintile 4	37464	3448	9.3	9.0 -9.6
Quintile 5 (most deprived)	38117	3260	9.2	8.9 -9.5
Total	**184936**	**16092**	**8.7**	**8.6 -8.8**

Elective coronary artery bypass and deprivation: number of admissions, number of deaths within 30 days of admission (regardless of place of death), and age- and sex-standardised case-fatality rates (CFR) with 95% confidence intervals (CI) – *[excluding HES records without a full set of identifiers].*

Index of multiple deprivation quintile of admitted population	Admissions	Deaths	CFR	95% CI
Quintile 1 (least deprived)	11070	261	2.2	1.9 -2.5
Quintile 2	11199	235	2.0	1.7 -2.3
Quintile 3	11075	196	1.8	1.5 -2.0
Quintile 4	11126	218	2.0	1.7 -2.3
Quintile 5 (most deprived)	11520	237	2.2	1.9 -2.5
Total	**57399**	**1177**	**2.0**	**1.9 -2.2**

Immediate coronary artery bypass grafting and deprivation: number of admissions, number of deaths within 30 days of admission (regardless of place of death), and age- and sex-standardised case-fatality rates (CFR) with 95% confidence intervals (CI) – *[excluding HES records without a full set of identifiers].*

Index of multiple deprivation quintile of admitted population	Admissions	Deaths	CFR	95% CI
Quintile 1 (least deprived)	1152	53	4.6	3.4 - 5.8
Quintile 2	1155	38	3.1	2.1 - 4.1
Quintile 3	1147	54	4.7	3.4 - 5.9
Quintile 4	1142	53	4.8	3.5 - 6.0
Quintile 5 (most deprived)	1167	39	3.5	2.4 - 4.6
Total	**5794**	**237**	**4.1**	**3.6 - 4.6**

Elective percutaneous transluminal coronary angioplasty and deprivation: number of admissions, number of deaths within 30 days of admission (regardless of place of death), and age- and sex-standardised case-fatality rates (CFR) with 95% confidence intervals (CI) – *[excluding HES records without a full set of identifiers].*

Index of multiple deprivation quintile of admitted population	Admissions	Deaths	CFR	95% CI
Quintile 1 (least deprived)	7215	21	0.3	0.2 - 0.4
Quintile 2	7291	33	0.4	0.3 - 0.6
Quintile 3	7399	24	0.3	0.2 - 0.4
Quintile 4	7401	34	0.5	0.3 - 0.7
Quintile 5 (most deprived)	7700	33	0.5	0.3 - 0.6
Total	**37591**	**148**	**0.4**	**0.3 - 0.5**

Immediate percutaneous transluminal coronary angioplasty and deprivation: number of admissions, number of deaths within 30 days of admission (regardless of place of death), and age- and sex-standardised case-fatality rates (CFR) with 95% confidence intervals (CI) – *[excluding HES records without a full set of identifiers].*

Index of multiple deprivation quintile of admitted population	Admissions	Deaths	CFR	95% CI
Quintile 1 (least deprived)	2755	73	2.0	2.0 -3.1
Quintile 2	2684	103	3.7	3.0 -4.4
Quintile 3	2654	92	3.4	2.7 -4.1
Quintile 4	2630	89	3.4	2.7 -4.1
Quintile 5 (most deprived)	2719	85	3.5	2.7 -4.2
Total	**13468**	**444**	**3.0**	**3.0 -3.6**