Association of deprivation, ethnicity, and sex with quality indicators for diabetes: population based survey of 53 000 patients in primary care

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Abstract

Objectives To determine the effect of deprivation and ethnicity on the achievement of quality indicators for patients with diabetes and the extent of any inequalities between the sexes.

Design Population based cross sectional survey using electronic general practice records.

Setting 237 UK practices contributing to the QRESEARCH database.

Participants 54 180 patients with diabetes, derived from a population of 1.8 million patients.

Main outcome measures Adjusted odds ratios for 18 indicators for diabetes from the new general medical services contract for UK general practitioners and comparisons between patients from the most deprived and most affluent fifths (areas of high and low ethnicity) and between men and women.

Results The prevalence of diabetes was 3.0%, and there was a large variation between practices in achievement of indicators. Compared with patients from affluent areas, those from deprived areas were less likely to have body mass index and smoking status recorded. They were also less likely to have records for HbA_{1c} concentration; an HbA_{1c} value $<7.5\%$ or $<10\%$; retinal screening; blood pressure; testing for neuropathy or microalbuminuria, or flu vaccination. Compared with patients from areas of low ethnicity those from areas of high ethnicity were less likely to have many measures recorded. Women were significantly less likely to have records for body mass index; pulses; blood pressure values below 145/85 mm Hg; testing for microalbuminuria; serum cholesterol concentration; serum cholesterol values <5 mmol/l; and angiotensin converting enzyme inhibitors given in the presence of proteinuria or microalbuminuria.

Conclusions Practices in areas of high deprivation and high ethnicity will have to work harder to achieve the quality indicators for diabetes, and it is possible that those practices that most need the resources are the ones least likely to get them.

Introduction

The national service framework for diabetes set standards for the care of patients with diabetes,[1] and the new general medical services contract, implemented in UK general practice on 1 April 2004, specifies specific quality measures. The contract, however, takes no account of deprivation or ethnicity on target levels, and although there has been discussion on this, there is no clinical evidence on the importance of such an omission.

We determined the impact of deprivation and ethnicity on the achievement of indicators for patients with diabetes in a large general practice population. We also determined whether there was any evidence to support the inequalities between the sexes observed in patients with coronary heart disease.[2]

Methods

We identified patients with diabetes aged over 16 years who were registered with 237 practices included in the new general practice database QRESEARCH (version 3, downloaded on 10 May 2004). This database, which will eventually comprise 500 or more UK general practices, contains Townsend scores derived from the 2001 census (a proxy for material deprivation) and ethnicity, both linked to the output areas associated with each patient's postcode. Output areas consist of about 125 households and are nested within electoral wards. We defined local ethnicity as the percentage of non-white residents in each geographical area. We validated the resulting database by comparing against published data on such variables as prevalence of disease, prescriptions, population characteristics, and referral rates, and we found similar rates per 1000 population. We applied the new general medical services contract queries to the population registered on 1 April 2004 to determine whether each patient was eligible for each target and whether that target had been achieved. Each of the contract targets refer to the care recorded on computer within the past 15 months.

Statistical analysis

We derived proportions at practice level and calculated medians and 10th and 90th centiles as a measure of variation between practices. We used multilevel logistic regression to determine odds ratios, with 95%

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Interpractice variation in percentage of quality indicators for diabetes achieved and associations with deprivation and ethnicity

Quality indicators	Interpractice variation			Adjusted odds ratio* (95% CI)		
	Median	10th centile	90th centile	High deprivation *v* low deprivation (fifths)	High ethnicity *v* low ethnicity (fifths)	Women *v* men
Indicator recorded						
Body mass index	85.8	72.4	93.6	0.86 (0.78 to 0.95)	0.85 (0.76 to 0.96)	0.94 (0.90 to 0.99)
Smoking history	65.2	43.9	83.1	0.68 (0.62 to 0.74)	1.23 (1.12 to 1.35)	1.97 (1.90 to 2.06)
Advice given to smoker	89.5	42.9	100.0	0.96 (0.68 to 1.37)	1.15 (0.72 to 1.86)	1.00 (0.83 to 1.21)
HBA_{1c} concentration:	92.2	78.2	97.3	0.82 (0.73 to 0.93)	0.92 (0.67 to 1.26)	1.03 (0.97 to 1.10)
<7.5%	48.0	34.0	62.1	0.88 (0.82 to 0.95)	0.97 (0.87 to 1.07)	0.97 (0.93 to 1.00)
<10%	84.6	69.6	91.8	0.70 (0.64 to 0.77)	0.83 (0.75 to 0.92)	1.00 (0.95 to 1.05)
Blood pressure:	95.2	89.4	98.5	0.82 (0.70 to 0.96)	0.78 (0.66 to 0.92)	1.15 (1.06 to 1.25)
<145/85 mm Hg	59.1	43.3	73.1	0.96 (0.90 to 1.03)	0.96 (0.88 to 1.04)	0.93 (0.89 to 0.96)
Creatinine concentration	89.5	76.0	96.3	1.05 (0.94 to 1.17)	0.79 (0.70 to 0.89)	0.99 (0.94 to 1.05)
Angiotensin converting enzyme inhibitors received in presence of proteinuria or microalbuminura	66.7	0.0	100.0	0.93 (0.68 to 1.28)	0.77 (0.54 to 1.10)	0.74 (0.62 to 0.88)
Serum cholesterol concentration:	87.0	72.5	95.1	0.93 (0.84 to 1.02)	0.82 (0.74 to 0.92)	0.88 (0.83 to 0.92)
<5 mmol/l	59.8	44.5	74.6	0.99 (0.92 to 1.06)	0.88 (0.80 to 0.97)	0.58 (0.56 to 0.61)
Procedure carried out:						
Retinal screening	60.0	25.5	82.7	0.80 (0.74 to 0.86)	0.94 (0.87 to 1.03)	0.98 (0.94 to 1.02)
Pulses checked	53.3	5.7	83.6	0.99 (0.91 to 1.07)	0.79 (0.70 to 0.189)	0.94 (0.90 to 0.99)
Neuropathy test	27.1	0.0	80.4	0.90 (0.81 to 0.99)	1.17 (1.06 to 1.29)	0.95 (0.91 to 1.00)
Microalbuminuria test	39.1	2.7	71.9	0.84 (0.76 to 0.92)	0.88 (0.79 to 0.98)	0.91 (0.87 to 0.96)
Flu vaccination	72.1	57.1	80.9	0.91 (0.84 to 0.98)	0.76 (0.70 to 0.83)	0.98 (0.94 to 1.03)

*From multilevel logistic regression, adjusted for sex, five year age band, and fifth of deprivation (Townsend score) or fifth of ethnicity associated with output area of postcode as appropriate, with practice as random effect.

confidence intervals, for each indicator comparing patients from the most deprived fifth with those from the most affluent fifth and the fifth of highest ethnicity compared with that of lowest ethnicity, with practice defined as a random effect. We also compared men and women. Results were adjusted by age (five year bands) and sex and deprivation or ethnicity as appropriate. We used STATA version 8.2 for all the analyses.

Results

On 1 April 2004, 1 804 125 patients were registered with the 237 practices included on QRESEARCH. The practices were spread throughout all 28 strategic health authorities in England, three of the five strategic health authorities in Wales, and two health boards in Scotland. In total, 54 180 patients had diabetes, giving an overall prevalence of 3.0%. Of these patients, 53 678 were over 16 years of age and therefore included in our study.

The table shows the median proportion of patients, with 10th and 90th centiles, meeting each indicator across the practices. A median of 92.2% of patients had HbA_{1c} concentration recorded, although only 48.0% had values under 7.5%. Recording of serum cholesterol concentration and body mass index was high at 87.0% and 85.8%, respectively, whereas testing for neuropathy and microalbuminuria was low at 27.1% and 39.1%, respectively. We found a noticeable variation between practices in achievement for all of the targets: a 14-fold variation for recording foot pulses, a threefold variation for recording retinal screening, and a more than twofold variation for recording that smokers had received advice.

Compared with patients from affluent areas, those from areas of high deprivation were less likely to have body mass index and smoking status recorded. They were also less likely to have records for HbA_{1c} concentration, HbA_{1c} values under 7.5% or under 10%, retinal screening, blood pressure, neuropathy testing, microalbuminuria testing, or flu vaccination. We adjusted these findings for age, sex, and ethnicity (see table).

Similarly, patients in areas of high ethnicity were less likely to have many items recorded, although the pattern was slightly different from that of patients in areas of low ethnicity. Patients from areas of high ethnicity were less likely to have records for body mass index, blood pressure, pulses, or an HbA_{1c} concentration under 10%. They were significantly less likely to have records for creatinine concentration, serum cholesterol concentration, microalbuminuria testing, or flu vaccination. Patients in areas of high ethnicity, however, were more likely to have recorded smoking history and neurological testing. These results were adjusted for age, sex, and deprivation (see table).

Women were significantly less likely to have records for body mass index (adjusted odds ratio 0.95, 95% confidence interval 0.90 to 0.99), pulses (0.94, 0.90 to 0.96), blood pressure values below 145/85 mm Hg (0.93, 0.89 to 0.96), microalbuminuria testing (0.91, 0.87 to 0.96), serum cholesterol concentration (0.88, 0.83 to 0.92), serum cholesterol values below 5 mmol/l (0.58, 0.56 to 0.61), or treatment with angiotensin converting enzyme inhibitors in the presence of proteinuria or microalbuminuria (0.74, 0.62 to 0.88). We found a borderline significant association for neurological testing, with women less likely to be tested than men (0.95, 0.91 to 1.00). Conversely, women were more likely to have smoking and blood pressure recorded (which could reflect checks to evaluate for suitability for oral contraceptives or hormone replacement therapy). These results were adjusted for age, deprivation, and ethnicity.

Discussion

The extent of ethnicity and deprivation in an area are important factors in the achievement of quality indicators for patients, as set out in the new general medical

What is already known on this topic

The new general medical services contract takes no account of deprivation or ethnicity on target levels

Women are least likely to receive adequate care for coronary heart disease

What this study adds

Practices in areas of high deprivation and high ethnicity will find it harder to meet targets in the new general medical services contract

Women are less likely than men to receive adequate care for diabetes

services contract. Our findings confirm the inequalities between the sexes reported by patients with diabetes and observed for patients with coronary heart disease.[2]

The association of deprivation and ethnicity with achievement of targets was substantial and was not explained by age, sex, or practice. Of the 17 quality indicators, 10 were adversely associated with deprivation and nine were adversely associated with ethnicity.

We found a large variation between practices in the recording of most of the indicators. Our study design prevented us from determining whether this was due to variation in the quality of care or to differences in the completeness of data entry, although electronic records tend to be more complete than paper records.[3] The prevalence of diabetes in our study was higher than that in other studies in primary care.[4] This might be because the data are recent and the prevalence of diabetes is increasing. Levels of recording of laboratory investigations were higher than clinical measures such as neuropathy testing. This might be because laboratory test results are now sent electronically to most practices and are automatically uploaded into the patients' clinical records, whereas clinical measurements are entered manually.

These data, reported at the start of the new general medical services contract, will be of interest both to practices as they plan their delivery strategies and to health service planners responsible for monitoring and remuneration. The large variation between practices in levels of outcomes achieved was expected, although the overall values were lower than expected, indicating the huge amount of work needed to provide optimum care for all patients. Practices in areas of high deprivation and high ethnicity will have to work harder to achieve the quality indicators for diabetes, and it is possible that those practices which most need the resources are the ones least likely to get them.

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Contributors: JH-C initiated and designed the study, obtained ethical approval, and undertook the data extraction, manipulation, and analysis; she is guarantor. SO'H contributed to the design, advised on the general medical services contract queries, and contributed to the paper. CC contributed to the design, advised and checked the statistical analysis, and contributed to the interpretation and the paper.

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Competing interests: QRESEARCH is a non-profit making organisation established to give good access to high quality data for research. JHC is one of the custodians of QRESEARCH; publication of this paper is likely to lead to increased awareness and usage of the database. Practices contributing data are not paid but receive feedback on quality measures. SO'H is a clinical design director for EMIS.

Ethical approval: Trent multicentre ethics committee

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Commentary: Socioeconomic inequalities in indicator scores for diabetes: poor quality or poor measures?

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Hippisley-Cox et al report on scores for quality indicators for diabetes among a large number of UK patients and practices and how these vary depending on sex, ethnicity, and material deprivation.[1] For many of the indicators, scores were worse for women and worse in practices with a high proportion of ethnic patients and those with high levels of material deprivation. This revelation of worse measures of care for women, poor people, and people from ethnic minority groups is not unique; there is a robust literature in America showing these same findings across numerous conditions,[2 3] and similar findings have been reported in England.[4] The question relevant to policy, particularly in light of the new general practitioner contract, is what do these differences in scores mean?

In America, these differences are usually interpreted as meaning that lower scores denote poorer quality of care. Should the same be true in the United Kingdom? For the most part, I think the answer is yes. The exception is the four measures reported on by Hippisley-Cox et al that are outcomes (proportion of patients with HBA_{1C} values under 7.5% or under 10%; blood pressure less than 145/85 mm Hg; serum cholesterol concentration less than 5 mmol/l). Although these are undoubtedly good outcomes to strive for (since they are strongly related to health outcomes such as fewer

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