The impact of quality improvement initiatives on diabetes care among south Asian people

Emma Wilkinson, Gurch Randhawa, Tariq Rehman, Talib Abubacker

Article points

1. Studies suggest that quality of healthcare for south Asian people with diabetes is inadequate, despite their greater relative risk of diabetes.
2. Two primary care audits, carried out in 2004 and 2007, were compared to gain evidence of the patient experience at diabetes diagnosis and explore any differences between white and south Asian people with diabetes.
3. Introduction of the QOF and national guidance across the research timeframe was associated with increased numbers of people diagnosed with diabetes during the early years of implementation.

Key words

- Cultural competency
- Recording
- QOF
- South Asian

Authors' details can be found at the end of the article.

South Asian people have a greater relative risk of diabetes. However, previous research suggests that quality of healthcare for this group is inadequate. This article evaluates the impact of the QOF and national guidance on the identification and recording of diabetes and renal complications, and explores differences between south Asian and white European people at diabetes diagnosis through a comparison of primary care audits carried out at two time points in implementation of the QOF. Findings show that early recording of diabetes and renal function increased following introduction of these national interventions. As south Asian people were younger at diagnosis with lower blood pressure and better renal function, they are likely to benefit from continued improvements in early recording. GP practices are ideally placed to improve health through the use of routinely collected data and the opportunities that increased recording provides.

Previous UK studies have identified a greater relative risk of diabetes among south Asian people (those originating from India, Pakistan, Bangladesh and Sri Lanka) (Roderick et al, 1996; Burden et al, 1992). However, preliminary evidence has suggested that quality of healthcare for south Asian people is inadequate and compliance with medication is poor (Raleigh, 1997; Johnson et al, 2000). There was also a low uptake of hospital-based diabetes services among south Asian people, and evidence that they were subsequently referred later for renal care, were more likely to be lost to follow-up (Jeffrey et al, 2002) and have a poor knowledge of diabetes and its complications (Nazroo, 1997; Johnson et al, 2000).

National Service Frameworks (NSFs) for diabetes and renal services were introduced in the UK in 2001 and 2006, respectively (Department of Health [DH], 2001; 2006). These provide guidance to healthcare commissioners and providers on the minimum

Table 1. Primary care audit inclusion/exclusion criteria and variables.

Audit	Primary care audit: people with diabetes at diagnosis.
Designed by	Participating GPs/steering group.
Inclusion criteria	All south Asian and white people; diagnosed with diabetes during 2004 or 2007; people of participating GP practices in study sites.
Exclusion criteria	Diagnosis made outside 2004 or 2007; <16 years old; other ethnic groups.
Demographic data	Age (years); gender; ethnicity*.
Clinical data	Hypertension, systolic and diastolic blood pressure (mmHg), macrovascular disease – ischaemic heart disease; cerebrovascular disease; peripheral vascular disease, microvascular disease.
Laboratory data	Serum creatinine (µmol/L); estimated glomerular filtration rate (mL/min/1.73m^2)**; total cholesterol (mmol/L); serum triglyceride (mmol/L); HbA_{1c} (%); urine protein:creatinine ratio (mg/mmol creatinine); proteinuria; urine dipstick protein; urine dipstick glucose.
Medication	Antihypertensive agent; antiplatelet agent; lipid-lowering agent.

* Ethnicity classification was based on the Read codes used by primary care practices which align with those used for 2001 census data. White includes: white British, white Irish and white any other ethnic group. South Asian includes: Indian, Pakistani, Bangladeshi and Asian any other ethnic group. ** Estimate calculated using the four-variable Modified Diet in Renal Disease (MDRD) formula.

standards of care that should be offered across the UK. Significantly, the NSFs recognised the disparity between ethnic groups and focused on earlier detection and ethnicity as a risk factor to improve outcomes for diabetes-related renal disease across different population groups (DH, 2001; 2005).

Furthermore, the QOF indicators for diabetes in 2004 and estimated glomerular filtration rate (eGFR) reporting in 2007 were infrastructure developments, introduced to improve quality of care for all people with diabetes (DH, 2003; 2004; 2006).

The Care Pathway Project

The Care Pathway Project was set up to improve knowledge of south Asian people's progression through type 2 diabetes and renal disease care pathways at three study sites. The Project explored the concept of access to quality care, i.e. how people gain access to diabetes and renal services and how the services are experienced by them. The premise is that services need to be relevant and effective if the population is to have access to improved health outcomes. Through a combination of observational methods, the exploratory research project, part of which is described in this article, set out to determine whether there were differences in access between the south Asian and white patient populations at key points through the care pathway.

This article presents one element of the Care Pathway Project: an audit of access to care early in the care pathway – at diagnosis of diabetes. The authors plan to publish future analyses describing the patient's experience at diagnosis and discuss the findings in relation to quality of care.

Design and methods

Scope of the audit

The aim of this primary care audit was to provide evidence of the patient experience at diabetes diagnosis and highlight any differences between white and south Asian people.

An objective was to compare the audit results for 2004 and 2007, in order to capture any changes that may have occurred during the research timeframe, which coincided with the introduction of the QOF for diabetes, part of the General Medical Services contract introduced in 2004. In this way, any general trends in quality improvements, as well as any persisting differentials between the groups, could be observed.

Study sites

The study was conducted at three sites: Luton, West London (Ealing) and Leicester. The sites were selected on the basis of their diverse multi-ethnic, multi-faith, sociodemographic profiles, research expertise, clinical expertise and experience of developing specific initiatives to improve access to diabetes and renal care for south Asian people.

Sample selection and recruitment

Primary care trusts at each site (now NHS Luton, Ealing and Leicester City) provided data on GP practices, list size, list breakdown by ethnicity (where available), and most recent QOF scores (from 2006). GP practices were targeted for recruitment on the basis that

Table 2. Summary of participating GP practices, practice population and sample of people newly diagnosed with diabetes (white European and south Asian) at the three sites in 2004 and 2007.

	Practice population 2004	People diagnosed 2004	% of practice population	% of sample	Practice population 2007	People diagnosed 2007	% of practice population	% of sample	Change in practice population	Difference ↓↑% population diagnosed
Ealing (7 practices)	41 743	141	0.34	35.25	39 557	85	0.21	27.69	–2186	↓
Leicester (6 practices)	35 240	117	0.33	29.25	35 798	103	0.29	33.55	558	↓
Luton (5 practices)	43 483	142	0.33	35.50	41 766	119	0.28	38.76	–1717	↓
Total	**120 466**	**400**	**0.33**	**100.00**	**117 121**	**307**	**0.26**	**100.00**	**–3345**	↓

collectively they would form a representative sample by providing a range of size, multi-partner/single-handed and quality scores, using QOF scores as a proxy indicator.

Practice population demographics also guided recruitment in order to achieve as equal a proportion of both white and south Asian groups as possible. However, as recording of ethnicity data in the past has been variable, it was not possible to obtain an accurate breakdown by ethnicity for each practice population. Sample selection was purposeful and pragmatic. The subsequent analysis and interpretation of results takes into account study limitations and external validity in relation to sample selection.

Audit method

Two retrospective audits of patient care at diagnosis of diabetes and referral were conducted using NHS records held by primary care. Practice databases held in EMIS, Vision and iSOFT Premiere were interrogated to provide an anonymised audit data set for the variables listed in *Table 1*. Data were entered into an Excel spreadsheet and transferred to SPSS for analysis.

The audits concerned the care of a sample of people who were diagnosed with diabetes at the three study sites during the periods 1 January to 31 December 2004 and 1 January to 31 December 2007. The inclusion and exclusion criteria and variables for which data were collected are shown in *Table 1*.

Data for the indicators listed in *Table 1* were entered into an Excel spreadsheet on a person-by-

Table 3. Composition of primary care audit sample.

	2004	2007
Total	400	307
White European	159 (39.8%)	129 (42.0%)
South Asian	241 (60.3%)	178 (58.0%)
Male	220 (55.0%)	166 (54.1%)
Female	180 (45.0%)	141 (45.9%)

Table 4. Breakdown of primary care audit sample by ethnic group.

	2004			2007		
	South Asian	White European	Total	South Asian	White European	Total
Ealing						
1	1	14	15	5	18	23
2	18	0	18	23	0	23
3	27	1	28	13	0	13
4	5	9	14	1	9	10
5	38	0	38	3	0	3
6	17	3	20	9	2	11
7	1	7	8	1	1	2
Total	*107*	*34*	*141*	*55*	*30*	*85*
Leicester						
8	1	6	7	5	9	14
9	6	25	31	4	5	9
10	37	2	39	24	1	25
11	7	3	10	7	4	11
12	12	1	13	13	2	15
13	1	16	17	2	27	29
Total	*64*	*53*	*117*	*55*	*48*	*103*
Luton						
14	7	39	46	14	21	35
15	25	11	36	24	11	35
16	21	1	22	12	0	12
17	8	1	9	18	8	26
18	9	20	29	1	10	11
Total	*70*	*72*	*142*	*69*	*50*	*119*
Grand total	**241**	**159**	**400**	**178**	**129**	**307**

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1. Overall, fewer people were diagnosed with diabetes in 2007 (307 people) than in 2004 (400 people).
2. Practices with the larger numbers of people diagnosed in 2004 showed some of the biggest reductions in 2007, for example: 0.81–0.07% of the practice population (91% reduction).
3. Composition of the patient sample in terms of ethnicity and gender did not differ greatly when the two audit years were compared.

person basis, recorded anonymously, and then transferred to SPSS for analysis.

Results

Ease of recruitment of GP practices varied across the three sites and seemed to be influenced by a number of factors: awareness of the research and introduction via another GP or PCT; current engagement in research; communication between staff handling the request; confidence and knowledge within the practice to extract data from databases and workloads.

Table 2 summarises the numbers of people newly diagnosed with diabetes at each of the three sites in the two audit years.

Overall, fewer people were diagnosed with diabetes in 2007 (307 people) than in 2004 (400 people). This was a difference of 0.07% of the total practice populations, which equated to a difference of 21% between 2004 and 2007.

There was some variation across participating practices in the numbers of people diagnosed expressed as a percentage of the practice population: the average proportion of practice population diagnosed with diabetes was 0.37% in 2004 and 0.27% in 2007, but six of the 18 practices did not follow this downward pattern and showed an increase in the number of people diagnosed with diabetes.

Practices with the larger numbers of people diagnosed in 2004 showed some of the biggest reductions in 2007, for example: 0.81–0.07% of the practice population (91% reduction). Conversely, those with the lower numbers of diagnoses in 2004 showed some of the biggest increases in 2007, for example: 0.12–0.37% of the practice population (208% increase).

The inter-practice variance in people diagnosed with diabetes in 2004 differed from that in 2007: 0.12–0.81% of the practice population in 2004 versus 0.07–0.38% in 2007. The inter-practice range was also greater in 2004 than in 2007: 0.69% versus 0.31%.

Composition of the patient sample in terms of ethnicity and gender did not differ greatly when the two audit years were compared (*Table 3*). More men were diagnosed with diabetes than women, making up 54–55% of

Table 5. Comparison of indicators in South Asian and white European patients in the 2004 and 2007 audits.

		2004			2007		
	Ethnicity	**No.**	**Mean**	***P*-value**	**No.**	**Mean**	***P*-value**
Age at diagnosis (years)	White	159	62.51		129	62.13	
	Asian	241	53.52	0.000	178	52.26	0.000
Cholesterol (mmol/L)	White	141	5.3794		124	5.3775	
	Asian	205	5.3024	0.548	166	5.1655	0.157
HDL (mmol/L)	White	136	1.234		120	1.1696	
	Asian	200	1.1356	0.069	155	1.0984	0.053
Triglyceride (mmol/L)	White	135	2.259		119	2.1692	
	Asian	202	2.018	0.086	164	2.1779	0.964
Serum creatinine (µmol/L)	White	137	91.0934		113	88.6027	
	Asian	195	83.8205	0.159	139	80.786	0.005
eGFR ($mL/min/1.73m^2$)	White	8	66.9837		104	73.61	
	Asian	22	82.66	0.026	126	84.57	0.000
HbA_{1c} (%)	White	118	7.901		107	8.21	
	Asian	194	8.677	0.003	156	8.308	0.711
Systolic blood pressure (mmHg)	White	137	141.39		101	142.26	
	Asian	201	136.13	0.010	154	134.01	0.000
Diastolic blood pressure (mmHg)	White	136	82.06		101	82.06	
	Asian	201	82.72	0.611	154	81	0.006

eGFR = estimated glomerular filtration rate; HDL = high-density lipoprotein

the sample between 2004 and 2007 compared with 45–46% of women. There was a slightly higher proportion of white European people in 2007 compared with 2004, but generally the proportions of ethnic group and gender were similar in the two audit years.

There were, however, differences between practices in ethnic composition of the individual audit samples, which reflected the demography of the individual practices reported by staff. As records of ethnicity were incomplete in many of the practices it was not possible to obtain an accurate breakdown of each practice population by ethnicity. *Table 4* shows a breakdown of the practice samples by ethnic group. In a third of the practices, very few white people were diagnosed in both 2004 and 2007, reflecting the reported demographics of those practice populations.

Table 5 shows an analysis of age, blood pressure and laboratory-reported data by ethnic group in each audit year. Key findings were that south Asian people were 9–10 years younger at diagnosis than white Europeans in both audit years: by a mean of 8.9 years in 2004 and 9.87 years in 2007.

South Asian people had significantly lower systolic blood pressure in both audit years, and significantly lower diastolic blood pressure in 2007. Renal function was recorded as eGFR, and was significantly higher in south Asian people compared with white European people at diabetes diagnosis in both audit years.

An analysis of covariance showed that in the 2004 sample, age varied significantly with triglyceride (TG), HbA_{1c} and systolic and diastolic blood pressures. In the 2007 sample, age varied significantly with cholesterol, TG, serum creatinine, HbA_{1c}, eGFR, and systolic and diastolic blood pressures.

Serum creatinine was significantly lower in south Asian people compared with white

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Page points

1. HbA_{1c} was significantly higher in south Asian people than in white European people in 2004 compared with 2007, when the difference was not significant.
2. Recording levels of all laboratory audit variables increased for both population groups in 2007 compared with 2004.
3. Overall, introduction of the QOF in 2004 resulted in a greater number of diagnoses in 2004 compared with 2007.
4. In a sample of GP practices there was variation in speed of implementation and impact of the QOF and National Service Framework and that there were also practices with a high proportion of south Asian people where the impact on increasing diabetes diagnosis was most marked.

European people in 2007. However, caution is advised in interpreting the statistical inference for indicators where the data had particularly large standard deviation and standard errors.

HbA_{1c} was significantly higher in south Asian people than in white European people in 2004 compared with 2007, when the difference was not significant. Lipid levels were not significantly different between the two groups, although HDL levels were lower in south Asian people compared with white European people in both audit years.

Recording levels of all laboratory audit variables increased for both population groups in 2007 compared with 2004 (*Table 6*). Exceptions were serum creatinine recording levels, which decreased by 1.4% in south Asian people, and blood pressure recording, which decreased by 7.9% in white European people, over the two audit years.

For all but two of the nine clinical and laboratory tests reported here, the increase in recording between 2004 and 2007 was greater for white European people than for south Asian people.

The greatest change in recording of data at diagnosis was for eGFR and tests for proteinuria. The latter was reported in various different forms – microalbuminuria or proteinuria – so values for comparison have not been reported.

Table 6. Comparison of the changes in recording between 2004 and 2007 in south Asian people and white European people.

	White European people		South Asian people	
Indicator	**2004–2007***	**Change in %**	**2004–2007***	**Change in %**
Cholesterol	88.7–96.1	↑ 7.4	85.1–93.3	↑ 8.2
HDL	88.7–96.1	↑ 7.5	83.0–87.1	↑ 4.1
Triglyceride	84.9–92.2	↑ 7.3	83.8–92.1	↑ 8.3
Serum creatinine	86.2–87.6	↑ 1.4	80.9–78.1	↓ 1.4
Proteinuria	25.8–51.9	↑ 26.1	27.0–46.3	↑ 19.3
Albumin:creatinine	25.2–40.3	↑ 15.1	24.9–37.9	↑ 13.0
Urine dip stick test	30.8–31.0	↑ 0.2	42.3–38.4	↑ 3.9
HbA_{1c}	74.2–82.9	↑ 8.7	80.5–87.6	↑ 7.1
eGFR	5.0–80.6	↑ 75.6	9.1–70.8	↑ 61.7
Blood pressure	86.2–78.3	↓ 7.9	83.4–86.5	↑ 3.1

* Percentages with test data recorded at diagnosis within each group.
eGFR = estimated glomerular filtration rate; HDL = high-density lipoprotein

Discussion

Impact of QOF on diagnosis of diabetes

Overall, introduction of the QOF in 2004 resulted in a greater number of diagnoses in 2004 compared with 2007. This may be due to the quick adoption of a change in practice (increased identification and recording of diabetes) by the majority of practices, as well as identification of more pre-existing but undiagnosed diabetes, compared with 2007 when most people with pre-existing diabetes would have been picked up.

It is suggested that the impact of the QOF in increasing identification of people with diabetes was seen early on in the majority of practices, particularly those reporting a large proportion of south Asian people. The smaller number of practices where the effects were seen later are likely to be those where implementation took longer or where the demographic was more mixed. Practices where there was little or no change may have had similar systems for identification and recording already in place, so that implementation of recording for the QOF made little difference. The fact that there was less inter-practice variance in identification of diabetes in 2007 suggests that, by that time, changes to practice were more widely established within this sample of practices.

Criticism of the QOF has included the suggestion that it rewarded practices for work they were already doing, and so was not driving up quality in the way it was intended. These results, however, show that in a sample of GP practices there was variation in speed of implementation and impact of the QOF and NSF and that there were also practices with a high proportion of south Asian people where the impact on increasing diabetes diagnosis was most marked. In these practices the QOF and NSFs can be said to have improved access to diabetes care for south Asian people.

Ratio of men and women with diabetes

The ratio of men to women diagnosed with diabetes was similar to that in prevalence data from other research (Harvey et al, 2002), and the relative proportion of south Asian to white people broadly reflected the ethnic mix reported

by participating practices. Recording of ethnicity in primary care has been variable in the past (Kumarapeli et al, 2006) and incentives to improve the recording of ethnicity through the QOF were only implemented in 2007. At the time of the current study, data were not available to provide an accurate picture of any ethnic differences in diagnosis within each practice, nor therefore across the sample as a whole.

Blood pressure and kidney function

As discussed earlier, south Asian people were 9–10 years younger than the white Europeans at diagnosis, and this age differential seemed to explain some of the significant differences between the two groups in terms of lower blood pressure and higher kidney function indicated by eGFR values. The younger age of diabetes onset correlates with that observed by other researchers (Mather and Keen, 1985; UK Prospective Diabetes Study Group, 1994; Barnett et al, 2006). In the context of this study, the fact that south Asian people developed diabetes at a younger age than white European people means that if south Asian people are to have equal access to the care pathway for diabetes, clinicians in primary care need to be proactive in identifying diabetes earlier in people from ethnic minorities.

South Asian people had significantly lower blood pressure and significantly higher renal function in both audit years compared with white European people. This is likely to be associated with the age differential as described above. In the context of access to the diabetes care pathway, detection of diabetes in a younger south Asian population with lower blood pressure and preserved renal function presents an opportunity for diabetes care to prevent the development of hypertension and other related complications, such as diabetic nephropathy.

HbA_{1c} levels

HbA_{1c} levels were higher in south Asian people at diabetes diagnosis compared with white European people in 2004, but not in 2007. This suggests that introduction of the QOF and NSFs encouraged earlier detection of diabetes in south Asian people during the intervening period.

Ethnicity data

Ethnicity data are invaluable for primary care organisations, enabling them to identify and take action on any observed inequalities in access, in this case to diabetes diagnosis. The use and application of practice level data goes some way towards building a sound evidence base with which to understand and improve the health of local populations. The "micro-level" analysis here points to how accurate data on ethnicity for the whole practice population could contribute to an evidence base within a practice to enable evaluation of improvements over time and effective targeting of resources.

There were increases in recording of most of the diabetes-related variables, notably those concerned with renal function, in particular eGFR, across both south Asian and white European groups. These increases reflect the standards of care contained in the QOF and NSFs for diabetes and renal services, introduced during the period 2004–2007. The results show that although recording for both groups increased across most indicators, the increase was slightly less for the south Asian group than the white European group. The reason for this may be that south Asian people were younger with fewer comorbidities, and had less frequent contact or opportunities to support recording. Nevertheless, large increases in recording of kidney function were seen in both groups, which suggests that practice staff have successfully incorporated renal recording into diabetes care for both groups.

Recording for monitoring purposes

Improvements in recording for both south Asian and white European people indicate that the QOF and NSFs have had an equivalent or equitable effect on improving care in both populations. Increased recording may provide more potential opportunities for patient–provider interaction to support diabetes management, which requires organisational infrastructure for implementation. It may be that introduction of the QOF and NSFs has helped to raise awareness of the ethnicity dimension in diabetes care, as well as to build the necessary capacity to collect and extract the

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"Accurate recording and application of ethnicity data are key to understanding any culturally related patterns that affect access to care."

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Competing interests
The authors do not have any competing interests.

Authors
Emma Wilkinson is Research Fellow at the Institute for Health Research, University of Bedfordshire, Luton; Gurch Randhawa is Professor of Diversity in Public Health and Director of the Institute for Health Research, University of Bedfordshire, Luton; Tariq Rehman is Consultant Physician, Diabetes and Obesity, Luton and Dunstable Hospital NHS Foundation Trust, Luton; and Talib Abubacker is a GP, Bell House Medical Centre, Luton.

data within practices and this has contributed to the results reported here.

Reducing inequalities

In relation to reducing inequalities and increasing opportunities for culturally competent diabetes care, the pattern of new diagnoses between the two audit years suggests that there was a positive effect on identifying people with undiagnosed diabetes, including south Asian people, early on in 2004. Moreover, implementation of the QOF as well as collaboration in the study itself by some predominantly south Asian practices, who have previously been "hard to reach", supports the idea that the QOF has reduced inequalities on different levels through the increased capacity of practices to collect and extract data about their practice population.

Culturally competent systems are "built on an awareness of the integration and interaction of health beliefs and behaviours, disease prevalence and incidence, and treatment outcomes for different patient populations" (Betancourt et al, 2003), and accurate recording and application of ethnicity data are key to understanding any culturally related patterns that affect access to care. The QOF and NSFs have increased levels of early recording in diabetes care across different patient populations. This is likely to be underpinned by increased organisational capacity to manage and report on data, albeit for performance and pay purposes, and presents opportunities for culturally competent diabetes care. What remains unclear, however, is whether practices have the skills or motivation to interrogate practice data in a proactive way to maximise these opportunities.

Conclusion

Early recording of diabetes and renal function has increased following the introduction of national interventions to improve access and quality of care in the diabetes renal disease care pathway. As south Asian people are younger at diagnosis, with lower blood pressure and better renal function, they are likely to benefit from continued improvements in early recording.

Primary care organisations are in a key position to improve health through the use of routinely collected data and the opportunities that increased recording provides. ■

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