THE NEW ZEALAND MEDICAL JOURNAL
Vol 115 No 1164 ISSN 1175 8716

Diabetes care by general practitioners in South Auckland: changes from 1990 to 1999

Tim Kenealy, Helen Kenealy, Bruce Arroll, David Scott, Robert Scragg and David Simmons

Abstract

Aim To compare self-reported practices and preferences for diabetes care by general practitioners (GPs) in South Auckland between 1990 and 1999.

Methods Mail questionnaires were sent to all GPs in South Auckland in 1990, and again in 1999.

Results The response rate was 88% (163/185) in 1990 and 76% (186/245) in 1999 (p = 0.3). In 1999, compared with 1990, GPs had more diabetic patients (median 33 vs 20, p <0.001), more GPs screened for diabetes using a fasting laboratory glucose (33.6% vs 22.9%, p = 0.04), more screened with capillary whole-blood testing meters (19.5% vs 1.3%, p <0.001), more felt confident to detect complications (95.1% vs 84.3%, p 0.001) and probably more felt confident to initiate insulin in Type 2 diabetes. Women in both years, compared with male GPs, were more likely to refer newly diagnosed diabetic patients to secondary services (68.0% vs 42.8%, p <0.001) and more likely to prefer 'shared care' for ongoing care (74.7% vs 58.7%, p = 0.007).

Conclusions There have been large changes in GP diabetes care in South Auckland from 1990 to 1999. GPs in 1999 seem more confident to care for larger numbers of diabetes patients. Significant differences in practice style exist between male and female GPs.

Concern about an 'epidemic' of diabetes led New Zealand to develop a national strategy for diabetes in 1997.[1,2] The implementation of the national strategy, including free annual checks, could further increase the role of general practice (particularly practice nurses) in diabetes care.

However, during the 1990s the health system in New Zealand underwent major changes[3] with unpredictable effects on the ability of general practice to deliver the systematic and continuous care needed by diabetic patients. Community services cards probably improved access to GPs for poorer patients. Increased educational requirements to maintain vocational registration, mandated by the Medical Council and supported by the Royal New Zealand College of General Practitioners (RNZCGP) and the Independent Practitioners Associations, may have increased GP skills and confidence in diabetes care. On the other hand, short-lived patient charges for community laboratory glucose tests and outpatient visits may have altered diabetes screening practices and referral practices; decreased practice nurse subsidies may have interfered with their role; and the exit of GPs from obstetric practice has reduced continuity of care. Furthermore, in the cities, 'accident and medical' clinics took over most after-hours primary care and later an increasing amount of 'during hours' care.

Meanwhile, there were major developments in the management of diabetes. Publication in 1993 of the Diabetes Control and Complications Trial,[4] and later the United Kingdom Prospective Diabetes Study series of papers,[5–7] greatly strengthened the evidence base confirming the value of vigorous treatment of diabetes.

Postal questionnaires sent to all GPs and practice nurses in South Auckland formed part of a major study of diabetes in the area in 1990.[8,9] In repeating the questionnaires, the aim of this study was to compare self-reported practices and preferences for diabetes care by GPs in South Auckland between 1990 and 1999.

Methods

The questionnaires were developed locally and piloted with small groups of GPs. The 1990 questionnaire consisted of 42 closed and open questions. For 1999, questions were eliminated if no longer relevant or the information could be obtained from another source, and new questions addressed topical concerns in implementing national diabetes guidelines. The final 1999 questionnaire contained 67 closed and open questions, including 38 of those asked in 1990.

In 1990, a list of all GPs known to work in South Auckland was compiled from Auckland Area Health Board records and by telephoning each practice. The questionnaires were mailed in June 1990. The responses were anonymous but tagged with a temporary identification code to track non-responders who were followed up by letter and then by telephone. The non-responding doctors came from the full range of practice sizes and localities.

In 1999, the list of GPs was obtained from a commercial mail-list company, and supplemented by phoning those in the current Telecom telephone directory but not on the commercial list. The questionnaires were posted in November 1999. We attempted to contact non-responders by phone, a second letter and a second phone call. The questionnaires were not anonymous.

To improve response rates, the questionnaires were kept as short and relevant as possible, multiple contacts were made by more than one method, and reply-paid envelopes were provided.[10,11] In addition, the 1999 questionnaire used coloured paper and offered a prize draw.[12]

SPSS 9.0 software was used for analysis. Means are compared by t-test for continuous data. Proportions of categorical data are compared with chi-square and ordinal data with Mann-Whitney U. Percentages reported are the proportion of valid responses only. Statistical significance is cited at $p \leq 0.05$, and all tests are two-tailed. Ethics approval was given by the Auckland Area Health Board Ethics Committee in 1990 and the Auckland University Human Subjects Ethics Committee in 1999.

Results

In 1990, 226 ‘GPs’ were identified; 41 were unavailable (due to maternity or prolonged leave, retirement, having moved from the area, or not being a GP) leaving 185 GPs eligible. In 1999, 273 ‘GPs’ in 149 practices were identified; 27 were unavailable for the same reasons, leaving 245 GPs eligible. The commercial list identified 72.2% of eligible GPs. The response rate in 1990 was 88.1% (163 in 101 practices), and was not significantly different from the 1999 rate of 75.9% (186 in 107 practices) ($p = 0.3$). Almost half the 1999 respondents (49%) had worked in South Auckland for 10 or more years, so would have received the 1990 questionnaire.

GPs were asked which one method they use most often to screen for diabetes, shown in Table 1. Twenty six GPs in 1999 and one in 1990 nominated multiple methods so are not included in the analysis for Table 1.

Close to half the GPs in each year say they routinely refer those with newly diagnosed Type 2 diabetes for additional assessment or education (Table 2). Referrals in both years are almost exclusively to one or more public services, but it was not possible to determine which components of care would be provided. GPs in each year estimated that they provided sole medical care for diabetes glucose control over the previous

two years for about half their Type 2 diabetic patients, ie with no specialist physician or specialist nurse input.

Table 1. Method most used for screening (results are percentages of valid responses)

	1990 (n 153)	1999 (n 149)	p*
Random	51.0	43.6	ns
Fasting	22.9	33.6	0.04
Fructosamine	15.7	1.3	< 0.001
2hr post prandial	6.5	0.7	0.007
GTT	2.6	1.3	ns
Capillary and meter	1.3	19.5	< 0.001
HbA_{1c}	not asked	1.3	-
Urine	not asked	0.7	-

*Chi-square for individual comparisons. Overall 1990 vs 1999, excluding questions not asked in 1990, p <0.0001 Mann-Whitney U

Table 2. GP education, skills, confidence and preferred care arrangements (results are percentages of valid responses unless stated otherwise)

	1990 (n 163)	1999 (n 186)	p
Had postgraduate diabetes education	27.7	31.7	ns
Want more diabetes education	89.7	78.2	0.005
Have means of patient recall	51.6	86.2	<0.0001
Diabetic patients per GP (median)	20	33*	<0.001
Glucose control solely by GP	50.5	45.8	ns
Manage obstetric patients	84.1	56.0	<0.0001
screen all for diabetes	87.2	11.0	<0.0001
Routinely refer newly diagnosed Type 2 diabetic patient to hospital or specialist clinic	52.5	47.3	ns
Like patients cared for:			
by self unless problems	37.9	36.3	ns
by shared care	62.1	63.7	ns
Prefer hospital clinic to continue follow up for:			
all	8.6	7.0	ns
none	2.5	4.3	ns
all type 1	39.9	37.3	ns
all with complications	67.5	63.8	ns
all poorly controlled	80.4	63.8	0.01
Confident to:			
start insulin	33.3	not asked	-
start insulin in Type 1 diabetes	not asked	28.0	-
start insulin in Type 2 diabetes	not asked	59.4	-
detect complications other than retinopathy	84.3	95.1	0.001
monitor insulin	85.0	90.7	ns
detect retinopathy	29.2	21.7	ns

*includes a median of five patients with Type 1, and 30 with Type 2 diabetes

In 1999, 61.8% of GPs were recording their clinical notes on computer; of these, 61.2% reported that computerised clinical notes helped their diabetes care, 33% said it made no difference, and 5.8% said the computer hinders care.

Thirty seven respondents (22.7%) in 1990 were women, as were 60 (32.4%) in 1999 ($p = 0.04$). The only difference found between women in 1990 and in 1999 was the number of patients with diabetes for whom they cared; median 10 in 1990, and 25 in 1999 ($p = 0.002$). However, the number of diabetic patients also increased for men (who saw significantly more in each year, data not shown) and for women and men combined (Table 2). The difference between women and men each year is probably a reflection of the greater number of women working part time. Data on 'tenths' were not requested in 1990, but in 1999, 53.3% of women worked fewer than eight 'tenths', compared with 8.1% for the men ($p = 0.001$). This data is also consistent with the number of total patients seen per doctor (data not shown).

There were, however, several differences between women and men GPs in each year and when both years were combined. Women GPs were much more likely than men to refer all newly diagnosed diabetic patients to a secondary service (68.0% women, 42.8% men, $p < 0.001$, years combined), and were much more likely to prefer routine shared care (74.7% women, 58.7% men, $p = 0.007$, years combined). Data were collected only in 1999 for women's position in the practice (principal/partner, employee, locum or other). The preference of women in 1999 for shared care was not statistically related to either tenths or position in the practice. Routine referral was not significantly related to position in practice but was significantly related to tenths; those preferring referral worked a mean of 7.3 (SE 0.41) tenths, while those not referring worked mean 5.9 (SE 0.56) tenths ($p = 0.049$).

Discussion

This study found that, compared with 1990, GPs in 1999 provided regular care for more people with diabetes and seemed more confident managing diabetes. Most GPs in both years felt confident to monitor insulin and detect complications (with a significant increase from 1990 to 1999). Fewer GPs preferred routine hospital clinic follow up. Probably more GPs in 1999 are confident to start insulin in patients with Type 2 diabetes, although the questions in 1990 and 1999 were not directly comparable. The number of GPs using fasting capillary glucose to screen for diabetes increased. There were differences in practice preferences between women and men, but these did not change from 1990 to 1999. Women were more likely than men to refer to secondary care patients with newly diagnosed diabetes, and to prefer shared care for long-term patient management.

The high response rates of 89% and 76% are a strength of this study, as validity can be limited by low response rates.[13] Our response rates are in line with other New Zealand general practice mail surveys,[14–16] and compare favourably with the average response rate of 61% in one British journal.[10] GPs are less likely to reply to surveys if they are older or are not active in the area of study,[10,12] though it was not possible to confirm these factors in this study. Postal surveys may be less susceptible to social desirability bias than interviews,[10] but do not overcome the known differences between self-reported and observed activity. Nevertheless, GP self perceptions of attitudes and behaviour are an important component of their willingness to learn and change their practice.

The number of diabetic patients per doctor has increased substantially from median estimates of 20 in 1990, to 33 per doctor in 1999. New diagnostic criteria for diabetes were published in New Zealand early in 1999.[17] While these criteria increase the number of people classified with diabetes,[18] the change was too late to explain the increased numbers of diabetic patients reported by GPs in 1999 compared to 1990. The number of people with diabetes is known to be climbing at an alarming rate.[19,20]

It is interesting to note that the GPs estimate they provide sole medical care for glucose control for about half their Type 2 diabetes patients. The only figure previously available is that they provide sole care for just over 60%, across all ethnic groups.[21] This later figure was obtained by analysis of sources from which patients were identified for a study in South Auckland in 1990–1, and is probably more objective than the GP estimates.

The unchanged and relatively low numbers of those who reported having 'postgraduate education' in diabetes appears anomalous in light of increasing diabetes-related activities. This could reflect inconsistent interpretations of the term – many GPs probably interpret postgraduate education as meaning formal university courses. We note that over three quarters of GPs in 1999 feel they need to learn more about diabetes (despite a statistically significant decrease from 1990 to 1999). During the 1990s, many GPs increased their participation in continuing medical education, facilitated by the Maintenance of Professional Standards (MOPS) programme of the RNZCGP, to meet the requirements for vocational registration with the Medical Council. However, topic choice was uncoordinated and learning on a specific topic was usually voluntary. We advocate a 'compulsory' component in the MOPS programme, covering developments in important areas such as diabetes, especially as GPs are not always good at 'knowing what they do not know'.[22]

The differences in preferred practice style between men and women are related to known differences in consultation style.[23] Women develop experience and expertise in different areas of medicine[24] and in one study women felt less prepared in some areas than men (though this did not include diabetes).[25] Gender rates of patient referral to other services were not reported in the only study we located on GP referral patterns in New Zealand.[15] Male/female practitioner differences may have implications for future planning of primary and secondary care integration as the proportion of women GPs continues to increase. We have reported elsewhere on the implications of our surveys for continuity of care, especially those due to changes of practice composition and male/female GP differences.[26]

Practical recommendations for diabetes screening in New Zealand have recently been published.[27] When GPs request a laboratory test for either fasting or random glucose, they rely for interpretation on automated comments returning from the laboratory along with the glucose result. These comments were not standardised across the country at the time of these questionnaires. For example, in the year 2000 the upper end of the 'normal' random glucose reference range varied around the country from 7.5 to 9.5 mmol/l.[2] Furthermore, many GPs were screening for diabetes using meters that are principally designed for patients to self-monitor. However, these meters are arguably too inaccurate for routine screening purposes, and the new recommendations discourage their use. It is also interesting to note that fructosamine use had largely disappeared by 1999 without being replaced by HbA_{1c} to screen for diabetes.

The apparent decrease in screening for gestational diabetes is confounded by a change in obstetric supervision, in which few of the GPs managing obstetric patients now have primary responsibility for pregnancy care in late second trimester when most screening is performed. Nevertheless, a South Auckland audit in 1994–5, which did not distinguish between care providers, confirmed screening rates for gestational diabetes were inappropriately low.[28]

The reason for asking GPs whether they thought that using computer records helped or hindered diabetes care was because of anecodotal concerns about increased difficulty of providing systematic care for diabetes patients when recording notes on computers without specific diabetes modules, compared with using available paper systems.[29,30] It is reassuring that few GPs thought the computers hindered care compared with whatever methods they previously used.

The GPs report a marked increase in availability of recall systems, which parallels their increased computerisation. In late 1999, 95% of GPs in South Auckland had a computer in the practice (personal communication, T Kenealy, 2002). For most of these practices, the diabetes registers were formed initially by the audit nurses from the Diabetes Care Support Service.[9] Given that registers are an essential first step to audit, and audit is a key part of the continuous quality-improvement cycle, the practices are in a much stronger position to improve quality of care than they were in 1990.

Yet more changes are currently facing primary care, including Primary Health Organisations and rearranged funding. It will be important to periodically monitor the impact of changes on the diabetes care provided by GPs and practice nurses.

Author information: Tim Kenealy, HRC Training Fellow; Helen Kenealy, Medical Student; Bruce Arroll, Associate Professor of General Practice, Division of General Practice and Primary Health Care, University of Auckland; David Scott, Physician and Diabetologist, Auckland; Robert Scragg, Senior Lecturer, Department of Community Health, University of Auckland; David Simmons, Professor of Rural Health, Department of Rural Health, University of Melbourne, Shepparton, Victoria, Australia

Acknowledgements: The Health Research Council of New Zealand funded the 1990 study and in 1999 supported Tim Kenealy with a Training Fellowship and Helen Kenealy with a Summer Studentship. Thanks to Alistair Stewart for statistical advice.

Correspondence: Dr Tim Kenealy, Department of General Practice and Primary Health Care, University of Auckland, Private Bag 92019, Auckland. Fax: (09) 373 7006; email: t.kenealy@auckland.ac.nz

References:

1. Ministry of Health. Strategies for the prevention and control of diabetes in New Zealand. Wellington: Ministry of Health, 1997.
2. Kenealy T, Scragg RS, Braatvedt G. Diabetes 2000. Health Funding Authority. Wellington: Health Funding Authority, 2000.
3. Grant CC, Forrest CB, Starfield B. Primary care and health reform in New Zealand. NZ Med J 1997;110:35–9.

4. Diabetes Control and Complications Trial Research Group. The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. N Engl J Med 1993;329:977–86.

5. UK Prospective Diabetes Study (UKPDS) Group. Effect of intensive blood-glucose control with metformin on complications in overweight patients with type 2 diabetes (UKPDS 34). Lancet 1998;352:854–65.

6. UK Prospective Diabetes Study (UKPDS) Group. Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). Lancet 1998;352:837–53.

7. UK Prospective Diabetes Study Group. Tight blood pressure control and risk of macrovascular and microvascular complications in type 2 diabetes: UKPDS 38. BMJ 1998;317:703–13.

8. Wilson P, Simmons D. The development of community orientated recommendations for diabetes care in south Auckland. The South Auckland Community Diabetes Planning Group. NZ Med J 1994;107:456–9.

9. Simmons D, Kenealy T, Scott DJ. Implementing the South Auckland Diabetes Plan: barriers and lessons. NZ Med J 2000;113:364–6.

10. Sibbald B, Addington-Hall J, Brenneman D, Freeling P. Telephone versus postal surveys of general practitioners: methodological considerations. Br J Gen Pract 1994;44:297–300.

11. Young JM, Ward JE. Improving survey response rates: a meta-analysis of the effectiveness of an advance telephone prompt from a medical peer. Med J Aust 1999;179:339.

12. Deehan A, Templeton L, Taylor C, et al. The effect of cash and other financial inducements on the response rate of general practitioners in a national postal survey. Br J Gen Pract 1997;47:87–90.

13. Templeton L, Deehan A, Taylor C, et al. Surveying general practitioners: does a low response rate matter? Br J Gen Pract 1997;47:91–4.

14. Gribben B, Bonita R, Broad J, et al. Geographical variations in the organisation of general practice. NZ Med J 1995;108:361–3.

15. Dovey SM, Barton GR, Tilyard MW, Gurr E. New Zealand general practitioner referral patterns. NZ Med J 1993;106:465–7.

16. Tracey JM, Shaw VS. Women in general practice in New Zealand. NZ Med J 1999;112:50–2.

17. Colman PG, Thomas DW, Zimmet PZ, et al. New classification and criteria for diagnosis of diabetes mellitus. The Australian Working Party on Diagnostic Criteria for Diabetes Mellitus. NZ Med J 1999;112:139–41.

18. Florkowski DC, Thompson A. Comparison of differing diagnostic criteria for diabetes: experience from a New Zealand community laboratory. NZ Med J 1999;112:339–41.

19. Simmons D, Jackson G. The epidemic of type 2 diabetes in Auckland. Public Health Quarterly Report 1998;4:1–3.

20. Simmons D. Diabetes and its complications in New Zealand: an epidemiological perspective. NZ Med J 1996;109:245–7.

21. Simmons D, Shaw L, Kenealy T, Scragg R. Ethnic differences in diabetes knowledge and education: the South Auckland Diabetes Survey. NZ Med J 1994;107:197–200.

22. Tracey JM, Arroll B, Richmond DE, Barham PM. The validity of general practitioners' self assessment of knowledge: cross sectional study. BMJ 1997;315:1426–8.

23. Bertakis KD, Helms LJ, Callahan EJ, et al. The influence of gender on physician practice style. Med Care 1995;33:407–16.

24. Britt H, Bhasale A, Miles DA, et al. The sex of the general practitioner: a comparison of characteristics, patients, and medical conditions managed. Med Care 1996;34:403–15.

25. Baker LC. Differences in earning between male and female physicians. N Engl J Med 1996;334:960–4.

26. Kenealy T, Arroll B, Kenealy H, et al. General practice changes in South Auckland from 1990 to 1999: a threat to continuity of care? NZ Fam Physician 2002: in press.

27. Kenealy T, Braatvedt G, Scragg R. Screening for type 2 diabetes in non-pregnant adults in New Zealand: practice recommendations. NZ Med J 2002;115:194–6.

28. Yapa M, Simmons D. Screening for gestational diabetes mellitus in a multiethnic population in New Zealand. Diabetes Res Clin Pract 2000;48:217–23.

29. Royal New Zealand College of General Practitioners. Diabetes Mellitus Pack. Wellington: Royal New Zealand College of General Practitioners, 1993.

30. Royal New Zealand College of General Practitioners. Diabetes Mellitus: providing coordinated and comprehensive care in general practice. Wellington: Royal New Zealand College of General Practitioners, 2000.

