Addressing inequalities and improving health outcomes in patients at high risk of diabetes complications – a pilot project

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ABSTRACT

Addressing inequalities and improving health outcomes in patients at high risk of diabetes complications – a pilot project.

Objective

To assess the improvement of health outcomes within Maori and non-Maori patients with diabetes, deemed to be at high risk of diabetes, based upon the premise of reduction of the financial barriers to medical services coupled with the provision of structured patient-centred, evidence-based care.

Methods

The study design was a prospective 'before–after' clinical intervention trial conducted in a primary care setting within rural New Zealand.

Participants

Forty adult patients with diabetes, receiving 'standard care', deemed to be at high risk of the complications of diabetes, were recruited. Fourteen (35%) were female and 36 (65%) male, with an average and median age of 54 years. With respect to ethnicity 22 (55%) were Maori, one (2.5%) Indian, one (2.5%) Asian and 16 (40%) were Pakeha.

Interventions

The interventions consisted of up to four free GP visits and 14 nurse visits over 12 months to a patient-centred, evidence-based diabetes service in primary care.

Outcome measures

The main outcome measures were changes in cholesterol, blood pressure, smoking status, estimated five-year cardiovascular risk, HbA1c and the completion rates of the structured 'Get Checked' annual diabetes review.

Results

All 40 patients received their structured diabetes annual review. The median cholesterol level was significantly reduced from 5.5 to 4.85 (P value <0.001). Median blood pressures were significantly reduced from 134/84 to 130/75.5 (P values 0.001 for systolic blood pressure reduction and < 0.001 for diastolic blood pressure reduction). The median HbA1c, fell from 9.6% to 8.75% (P=0.013). Two of the 10 smokers managed to quit within the 12-month project. The median estimated five-year risk of having a cardiovascular event (applies only to primary prevention = 31 patients, as nine had IHD) was significantly reduced from a median of 15% to 10.7% – an average of the relative risk reductions was 16.2% for the whole cohort, but for the Maori subgroup it was 23.2%.

Conclusion

At a practice level, the use of Information Technology (IT) allows identification of clinical risk factors. These factors can be utilised to generate a cohort of patients deemed to be at high risk of adverse clinical outcomes. When coupled with accurate ethnicity coding, funded, targeted patient-centred, evidence-based practice ('The Foundation Program' – see Box 1) can improve access to health care services and health outcomes.

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Introduction

The fact that 40% of New Zealanders die of heart disease has made cardiovascular disease prevention a national priority.[1] The outcomes are even worse in Maori and Pacific communities where cardiovascular disease is a very common cause of morbidity and premature mortality.

One of the contributory factors is diabetes, which is over-represented in these communities and is associated with a significant increase in mortality[2,3] (shortening life by an average of six to eight years) and morbidity (a common cause of blindness under 65,[4] lower limb amputation[5] and kidney failure[6]).

The landmark United Kingdom Prospective Diabetes Study (UKPDS) established that the risk of these complications could be reduced with tight glycaemic[7] and blood pressure control.[8] This large randomised, prospective, controlled trial examined the health outcomes following intensive glycaemic control and blood pressure control in 5102 newly diagnosed Type 2 diabetics. Another important trial, the smaller Diabetes Control and Complications Trial (DCCT) trial,[9] was a randomised, prospective, controlled trial that demonstrated improved outcomes with intensive glycaemic control in 1444 Type 1 diabetics.

The UKPDS, DCCT and other studies have proven that aggressive management of blood pressure, diabetes control, cholesterol,[10] smoking cessation, retinal screening[11,12] and podiatry review[13] significantly improve the quality and quantity of diabetic lives. This has contributed to the evidence base used by the New Zealand Guidelines Group to establish the targets for diabetes care and justify the structure and delivery of care.[14]

Current Government funding remunerates GPs for providing one structured annual review for their diabetic patients, at no cost to the patient – The 'Get Checked' initiative. This is an attempt to improve access to medical care for diabetic patients and ensure they have a structured review. This free annual check includes: height, weight, blood pressure, smoking status, HbA1c, cholesterol/lipids and protein creatinine index measurements. It also ensures that they have received their annual foot review and bi-annual retinal review.

In 2002 the 'Get Checked' data[15] revealed that only 35% of Maori people estimated to have diagnosed diabetes had a free check. Those that did were more likely to have elevated cholesterol, to smoke and have poorer glycaemic control than Pakeha patients with diabetes.

The Wairarapa project would focus on improved uptake of annual screening and actively seek to reduce the risk of micro- and macro-vascular complications of diabetes. The key risk factors under scrutiny include estimated five-year Cardiovascular Disease (CVD) risk and the UKPDS targets for risk reduction, BP, HbA1c, cholesterol and smoking cessation.

Wairarapa DHB funded this innovative 12-month project to address the inequalities in access and health outcomes for 40 patients with diabetes deemed to be at high risk of diabetic complications.

Methods

'The Doctors Masterton' is a group practice serving 7219 enrolled patients in the rural town of Masterton. Of these, 249 (3.4% of the practice population) are known to have diabetes and form our Read-code based diabetes register.

Wairarapa DHB kindly agreed to fund 40 patients for this 12-month project. The 40 patients with diabetes deemed to be most at risk of diabetic complications were identified from the practice's computer system. High-risk patients were defined as patients with diabetes who repeatedly failed to access medical services and/or had one or more of the following risk factors:

- poor diabetes control (HbA1c>9%)
- poor blood pressure control (BP >150/90)
- high cholesterol (>6.0mmol)
- existing complications of diabetes e.g. retinopathy or nephropathy.

The 40 patients were invited to participate and their informed consent obtained (none declined). They were entitled to a maximum of four free GP diabetes clinic visits and 14 nurse visits over the 12-month period, to be used at the discretion of the GP and nurse. Irrespective of their registered GP, their diabetes care was provided by the same GP and nurse who were the 'Diabetes Leads' for the practice. The service relied on the Med-Tech 32 and supplementary software from Primary Care Information Technology Ltd for its IT support.

Prior to the inception of the project the patients received diabetes care from their chosen GP and one free annual review appointment (Government funded), as is common in New Zealand.

The service was a well-organised, multidisciplinary structured service within a primary care setting (The Doc-

Box 1

The Foundation Program *was developed for primary care in the Wairarapa at 'The Doctors Masterton' based on the principles and strategies employed in the UK to deliver improved chronic disease management within primary care in an affordable, achievable and sustainable way.*

Using principles similar to those applied in the PACE (Promoting Action on Clinical Effectiveness) program The Foundation Program takes a practice through the key steps necessary for the structuring, organisation and delivery of quality chronic disease management.

Read-coding is simplified. The creation and validation of disease registers, 'rules of the road' for data entry, clinical performance reporting and the application of succinct, primary care-orientated, evidence-based clinical guidelines are coupled with innovative IT tools created by Primary Care Information Technology Limited. This is used with the MedTech-32 PMS system to validate disease registers thus facilitating patient call and recall, data harvesting and practice population or targeted subpopulation CVD risk assessment.

These tools were used to identify patients to be recruited to the project and to provide patient call and recall. This ensured that they received the correct schedule of care and guided clinicians in their clinical interventions and assisted with auditing outcomes.

tors Masterton) provided by a diabetes lead GP in conjunction with practice nurse, diabetes nurse educator and Maori health care workers.

The protocol for the delivery of care relied upon the application of accessible primary care-orientated evidence-based guidelines (The Foundation Program). Patients were encouraged to participate in shared decision-making with the health care professionals who were committed to developing the concept of the 'expert patient'.

The principle outcomes measures were the changes achieved in cholesterol, blood pressure, smoking status, estimated five-year cardiovascular risk and HbA1c. The completion rate of the structured annual diabetes review was also assessed.

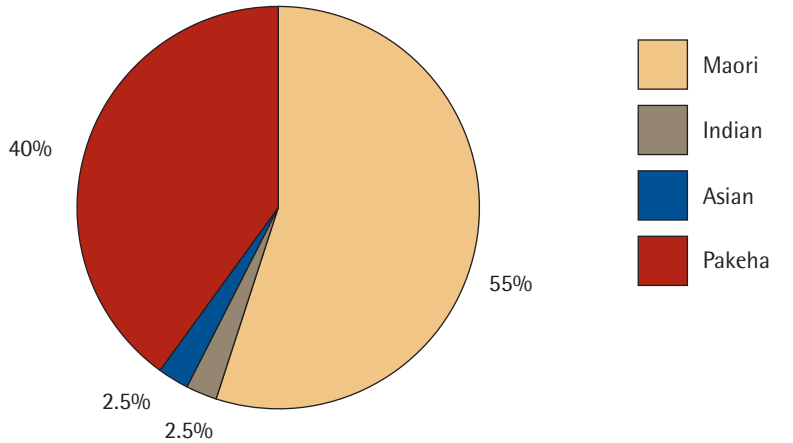
The statistical significance of the changes was calculated using the Paired Students t-Test.

Results

Patient demographics

Fourteen (35%) were female and 36 (65%) male, with an average and median age of 54 years. With respect to ethnicity 22 (55%) were Maori, one (2.5%) Indian, one (2.5%) Asian and 16 (40%) were Pakeha.

Chart 1. Patient demographics



Annual reviews

All 40 patients received the structured 'Get Checked' diabetes annual review. This represented a significant increase in access for our Maori cohort when compared with the 'Get Checked' national data from 2002 in which only 35% of Maori people estimated to have diagnosed diabetes had a free check.

Table 1

Outcomes	Results		P Value
	Prior to project	On project completion	
Median HbA1c (%)	9.6	8.75	0.013
Median Cholesterol (mmol)	5.5	4.85	<0.001
Median Systolic BP (mmHg)	134	130	0.001
Median Diastolic BP (mmHg)	84	75.5	<0.001
Median estimated 5 year CVD risk (%)	15	10.7	<0.001

Table 2. Maori and Non-Maori subgroup analysis

Outcome	Maori outcomes		Non-Maori outcomes	
	Prior to project	Project completion	Prior to project	Project completion
Median HbA1c (%)	9.3	8.7	9.65	8.9
Median Cholesterol (mmol)	5.89	4.85	5.5	4.85
Median Systolic BP (mmHg)	140	130	130	130
Median Diastolic BP (mmHg)	91	78	80	74.5

Blood pressure

In the project both clinical and statistically significant reductions in blood pressure were achieved (Table 1). The median blood pressure falling from 134/84 to 130/75.5 (UKPDS derived target is <140/80).

This was a result of increased anti-hypertensive medication prescribing and patient concordance with treatment.

Cholesterol

The active management of dyslipidaemia produced a clinically and statistically significant fall in cholesterol levels (Table 1). The median cholesterol reduced from 5.5 to 4.85 (UKPDS target <5.0). This was achieved through diet and the uses of statins – the number of patients on cholesterol-lowering drugs increasing from 11 patients (27.5%) to 18 patients (45%).

Smoking status

Two of the 10 smokers managed to quit within the 12-month project. One with the help of nicotine replacement from the community 'QUIT' service and one patient succeeded unaided.

Glycaemic control

The median HbA1c, a measure of diabetes control, fell from 9.6% to 8.75% (P=0.013) – the UKPDS target is < 7.5%.

Cardiovascular disease risk

One of the startling results of the project was how these changes in blood pres-

sure and cholesterol translated in large reductions in Cardiovascular Disease (CVD) risk for the whole group – especially the Maori participants.

The median five-year risk of having a CVD event (applies only to primary prevention=31 patients, as nine had ischaemic heart disease) was clinically and statistically significantly reduced from a median of 15% to 10.7% (P<0.001). The median of the relative risk reductions was 24.6% (range –36% to +80%) and the average of the relative risk reductions was 16.2%.

In the Maori cohort (a cohort of 18 patients as four of the 22 Maori patients had ischaemic heart disease) the median five-year risk of having a CVD event was, clinically and statistically, significantly reduced from a median of 17.6% to 13.3% (P<0.001). The median of the relative risk reductions = 24.8% (range -12% to +54%) and an average of the relative risk reductions = 23.2%.

Discussion

The results from the project indicate that delivering significantly better outcomes for Maori and Non-Maori patients with diabetes is achievable within primary care in New Zealand.

The large reductions in cardiovascular risk for the whole group – especially the Maori participants – is an underestimate as the Framingham-based calculation does not allow for the added benefits of commencing aspirin or ACE inhibitors. As the quantification of cardiovascular risk is becoming increasingly important to patients, clinicians and health care planners, further work is needed in developing cardiovascular risk assessment tools which allow for these confounding variables.

The increasing shift to capitation-based funding, the new Services for Improved Access (SIA) funding and the proposed tying of GP funding to quality and outcome measures may help towards funding the Pilot Project approach to chronic disease management in the new environment of PHOs (Primary Health Organisations).

This pilot project has produced some startling results, but the limitations of the project design (non-randomised volunteers and the small sample size) produces potential confounding variables. In the light of this we would like the project to be a springboard for a more formal trial of a comparison between 'Get Checked' and our more enhanced programme. Furthermore, it may be useful to extend this programme of care and assess its impact in other areas of chronic disease management.

Conclusions

At a practice level the use of IT allows identification of clinical risk factors. These can be utilised to generate a cohort of diabetic patients deemed to be at high risk of adverse clinical outcomes. The project demonstrated that funded, targeted patient-centred, evidence-based care (The Foundation Program) significantly reduced the risk factors for the micro- and macro-vascular complications.

It also revealed that it is possible to improve access to medical services for diabetic patients and address the inequalities in health care outcomes for the Maori community, most notably cardiovascular disease.

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