

Quality improvement report

Sustaining better diabetes care in remote indigenous Australian communities

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Abstract

Problem Inhabitants of Torres Strait Islands have the highest prevalence of diabetes in Australia and many preventable complications. In 1999, a one year randomised cluster trial showed improved diabetes care processes and reduced admissions to hospital when local indigenous health workers used registers, recall and reminder systems, and basic diabetes care plans, supported by a specialist outreach service. This study looked at whether those improvements were sustained two years after the end of the trial.

Design Three year follow up clinical audit of 21 primary healthcare centres, and review of admissions to hospital in the previous 12 months.

Background and setting Remote indigenous communities in far north east Australia, population about 9600, including 921 people with diabetes.

Key measures for improvement Number of people on registers, care processes (regular measures of weight, blood pressure, haemoglobin A_{1c}, urinary protein concentration, and concentrations of serum lipids and creatinine), appropriate clinical interventions (drug treatment and vaccinations), and intermediate patient outcome measures (weight,

blood pressure, and glycaemic control). Admissions to hospital.

Strategies for change Audit and feedback to clinicians and managers; provision of clinical guidelines and a clear management structure; workshops and training.

Effects of change The number of people on registers increased from 555 in 1999 to 921 in 2002. Most care processes and clinical interventions improved. The proportion of people with good glycaemic control (haemoglobin A_{1c} ≤ 7%) increased from 18% to 25% in line with increased use of insulin (from 7% to 16%). The proportion of those with well controlled hypertension (< 140/90) increased from 40% to 64%. The proportion admitted to hospital with a diabetes related condition fell from 25% to 20%. Mean weight increased from 87 kg to 91 kg.

Lessons learnt In remote settings, appropriate management structures and clinical support for people with diabetes can lead to improvements in care processes, control of blood pressure, and preventable complications that result in admission to hospital. Control of weight and glycaemia are more difficult and requires more active community engagement. Priorities now include increasing the availability and affordability of good food, achieving weight loss, and increasing appropriate use of hypoglycaemic agents, including insulin.

Background

The Torres Strait Islands lie between Cape York, Australia, and Papua New Guinea. About 9600 people, mainly of Melanesian and Aboriginal descent, live on islands in the archipelago and on the tip of Cape York Peninsula (fig 1). The population has an extremely high prevalence of type 2 diabetes (about 26% of the adult population¹), high rates of preventable complications, and historically poor access to specialist diabetes services. The 21 communities are served by a primary healthcare staff of visiting general practitioners, nurses, and resident indigenous health workers.

Context

In June 1996, the health service convened a “diabetes summit” with community representatives and local and international experts in diabetes care and prevention. The diabetes strategy from the summit covered five main areas: improvement in clinical services, food



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supply, infrastructure for physical activity, programmes dealing with women's issues (gestational diabetes care, family demands for particular foods, and weight control), and tobacco control.² High food prices and poor availability of fresh fruit and vegetables were identified as important determinants of increased weight and obesity leading to diabetes.^{3,4}

In 1999 a randomised cluster trial of an improved chronic disease management system for people with diabetes (supporting local indigenous health workers to manage registers, recall and reminder systems, and care plans plus basic training in clinical diabetes care) was conducted over one year. At the same time, a diabetes specialist outreach service was established, which visited control and intervention sites equally. Diabetes care processes improved in all sites. The intervention sites showed significantly improved processes compared with control sites, and people with diabetes in intervention clinics were 40% less likely to have been admitted to hospital in the previous year for a diabetes related condition. Intermediate patient outcomes (weight, blood pressure, and glycaemic control), however, did not improve over the trial period.⁵ Results of the trial were presented to the health service managers, and workshops were held to introduce the recall systems to the control sites at the end of the trial. However, it was not clear whether these changes could be sustained over the subsequent years or whether intermediate patient outcomes would improve.

Key measures for improvement

We looked at processes of care (regular measures of weight, blood pressure, haemoglobin A_{1c}, urinary protein concentrations, serum lipid concentrations), clinical interventions (appropriate use of medications for control of glycaemia and blood pressure, lipid lowering and renoprotective drugs, recommended vaccines), and intermediate patient outcomes (control of glycaemia and blood pressure). We also noted admissions to hospital for diabetes related conditions over the previous 12 months.

Process of gathering information

We reviewed diabetes registers and audited clinic records of diabetes care on site. We searched for all hospital admissions for each person on the registers in the 12 months before the audit using the hospital based patient information systems.

Analysis and interpretation

The 1999 trial showed that simple care plans and recall systems (managed by local health workers) and a better organised management system could have a big impact on complications in a relatively short period of time. Intermediate patient outcomes (weight, blood pressure, and glycaemic control), however, did not change significantly in the initial 12 months. There needed to be more widespread adoption of structured care and a better link between routine checks and action.

Strategy for change

We presented results of the first trial to staff and managers at a workshop conducted early in 2001 and discussed barriers to routine structured care and iden-

Table 1 Changes in diabetes care processes, Torres Strait, 1999-2002. Figures are numbers (percentages) of patients with diabetes who underwent each check in 12 months before audit

Measure	1999	2002	% Difference (95% CI)
No on registers	555	921	66*
Weight	305 (55)	602 (65)	19 (9 to 30)*
Blood pressure	387 (70)	711 (77)	11 (4 to 18)*
Eyes	164 (30)	584 (63)	215 (87 to 246)*
Feet	306 (55)	544 (59)	7 (-2 to 17)
Lipids	307 (55)	642 (70)	26 (16 to 37)*
Urinary protein†	261 (47)	588 (64)	36 (23 to 50)*
Serum creatinine	370 (67)	706 (77)	15 (7 to 23)*
Haemoglobin A _{1c} ‡	358 (65)	519 (56)	-13 (-20 to -15)*

*Significant change at P<0.05.

†Amylase creatinine clearance ratio.

‡In previous six months.

Table 2 Changes in interventions in primary health care for people with type 2 diabetes, Torres Strait, 1999 and 2002. Figures are numbers (percentages) of patients

Intervention	1999	2002	% Difference (95% CI)
Self monitoring	35/555 (6.3)	130/921 (14.1)	224 (156 to 320)*
Hypertension on treatment	252/315 (80.0)	577/631 (91.4)	14 (7 to 21)*
Albuminuria on ACE inhibitor	49/67 (73.0)	118/139 (84.9)	16 (-1 to 36)
Microalbuminuria on ACE inhibitor	71/109 (65.1)	151/229 (65.9)	1 (-14 to 19)
Insulin treatment	41/555 (7.4)	143/921 (15.5)	210* (151 to 293)
Annual influenza vaccination	304/555 (54.8)	624/921 (67.8)	24* (13 to 35)
Pneumococcal vaccination every 5 years	352/555 (63.4)	677/921 (73.5)	19* (10 to 29)

*Significant at P<0.05.

tified opportunities for improvement. Barriers included lack of training in immunisation and basic clinical procedures among some staff. In some sites there was no clear line of responsibility for community level diabetes management and referral. Health workers attended training to update clinical skills over the next 12 months, and workshops were held with health centre managers to agree on clear roles and responsibilities for chronic disease management. An "implementation manual" for such management for the district was produced with input from staff.⁶

There was a gradual reduction in the frequency of specialist outreach visits during 2002 because of increased demand for specialist services from other sites outside the Torres Strait District. Local service providers assumed more responsibility for routine diabetes care.

Table 3 Changes in intermediate patient measures, Torres Strait, 1999 and 2002. Figures are means (SD) unless stated otherwise

Measure	1999	2002
Age (years)	53.3 (13.6)	52.4 (14.0)
Time since diagnosis (years)	7.7 (5.3)	7.9 (6.2)
Weight (kg)	86.8 (18.21)	91.3 (20.0)*
Body mass index	32.5 (6.5)	32.9 (6.3)
Haemoglobin A _{1c} (%)	9.2 (2.2)	9.0 (2.3)
No (%) with good glycaemic control (haemoglobin A _{1c} <7%)	66/358 (18.4)	127/519 (24.5)*
No (%) with well controlled hypertension (<140/90 mm Hg)	127/315 (40.3)	402/631 (63.7)*
Systolic (mm Hg)†	132.6 (17.4)	129.9 (20.2)*
Diastolic (mm Hg)†	79.1 (17.1)	76.92 (11.2)*

*Significant change at P<0.05.

†Changes in blood pressure reported for all participants, not just those with hypertension.

Table 4 Admissions to hospital in 12 months before audit among people with diabetes, Torres Strait, 1999 and 2002

	1999 (n=555)		2002 (n=921)		Relative risk (95% CI)
	No (%) of patients	No of episodes	No (%) of patients	No of episodes	
Infections related to diabetes	80 (14)	119	91 (10)	187	0.69 (0.52 to 0.91)
Other admissions related to diabetes	57 (10)	88	94 (10)	147	0.99 (0.73 to 1.36)
Total admissions related to diabetes	137 (25)	207	185 (20)	334	0.81 (0.67 to 0.99)
Other admissions not related to diabetes	63 (11)	110	132 (14)	201	1.26 (0.95 to 1.67)
Total admissions	156 (28)	317	252 (27)	535	0.97 (0.82 to 1.15)

Effects of change

At the final audit (September 2002), numbers on registers had increased to 921 and most care processes had improved, except for haemoglobin A_{1c} tests in the previous six months (table 1). The proportion receiving appropriate treatment for high blood pressure and albuminuria had increased. There were small increases (from a low base) in the number of people who were self monitoring and taking insulin treatment (table 2).

The proportion of people with well controlled hypertension (<140/90 mm Hg) increased from 40% to 64%, and the proportion with good glycaemic control (haemoglobin A_{1c} ≤7%) increased from 18% to 25%. Mean haemoglobin A_{1c} improved slightly from 9% to 9%, in line with an increase in insulin treatment. However, mean weight increased significantly from 87 kg to 91 kg, although mean age and duration of diabetes was unchanged (table 3).

The proportion of people admitted to hospital in the previous 12 months with a diabetes related condition declined from 25% in 1999 to 20% in 2002, although admissions for conditions not related to diabetes (maternal causes, cancer, injury) increased, in line with the general trend in the state. Fewer admissions for infections, including foot infections, accounted for most of the observed decline (table 4).

These results compare favourably with preventive practices in diabetes care reported recently from the United States, where modest increases in self monitoring, eye and foot examination, and vaccinations (5.4% to 15.4% improvements) were reported between 1995 and 2001.⁷

Next steps

We provided staff with feedback of key points from the 2002 audit and developed action plans. The achieved improvements in control blood pressure should help to reduce macrovascular and renal complications. Though other preventable diabetes related complications that result in admission to hospital, especially for infection, have declined, weight gain and continuing high rates of poor glycaemic control will require renewed effort to engage people in better self care (including improved nutrition and weight reduction). We will actively explore opportunities to improve treatment of glycaemia, including insulin treatment.

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Contributors: RM was responsible for the study design, overall improvement strategy, and composed the first draft of the paper. FT designed the data collection processes, managed the data, and performed the first analyses. BS managed the system improvement process, including feedback to staff and oversaw the clarification of staff roles and responsibilities. AS managed

Key learning points

Much routine diabetes care can be done by non-physicians based in the community

Structured care in remote settings can improve control of blood pressure and reduce complications, especially infections, in high risk populations

Control of weight and glycaemia are more complex and require greater community engagement by the health service, with an insulin resistant state at baseline

the diabetes outreach program, including training for clinical staff. RM is guarantor.

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Endpiece

The physician's countenance

For I would always have my physician of a cheerful countenance, pleasantly conceited, and well proportioned, that he might have his sharp potions mixed with sweet counsel, and his sour drugs mitigated with merry discourses . . . For this I know by experience, though I be but young to learne, and have not often been sick, that the sight of a pleasant and quick witted physician, hath removed that from my heart with talk, that he could not with all his treacle.

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