Diabetes in Indigenous Australians: possible ways forward

Kerin O'Dea, Kevin G Rowley and Alex Brown

Reducing the burden of diabetes will require action well beyond the health service sphere

Type 2 diabetes represents a serious public health problem for Indigenous Australians, occurring at a much higher prevalence than in the non-Indigenous population, and with a much earlier age of onset of the disease and its micro- and macrovascular complications.[1,2] It is likely that diabetes is an important contributor to the considerably higher circulatory disease mortality rate among Indigenous Australians at young ages (9–10 times higher in Indigenous men aged 25–44 years, and 12–13 times higher in Indigenous women aged 35–54 years).[1] Thus, diabetes imposes significant financial and human costs on Australian society, which are disproportionately borne by Indigenous individuals, families and communities.

Of three articles about diabetes in Indigenous Australians in this issue of the Journal, two provide evidence that the problem is escalating. Craig et al[3] (*page 497*) analysed data from the Australasian Paediatric Endocrine Group NSW Diabetes Register and found that type 2 diabetes accounts for 11% of new diabetes cases among 10–18-year-olds, and that the incidence in Indigenous children was about six times higher than that in non-Indigenous children. McDermott et al[4] (*page 505*) found that, for Torres Strait Islanders, there were significant increases in body mass index (BMI) — the major risk factor — between 1999 and 2005, and a very high 5-year incidence of diabetes.

Is it possible to prevent type 2 diabetes? International studies indicate that, in people with impaired glucose tolerance, an intensive focus on diet and physical activity can substantially reduce progression to diabetes, and to an equal or greater extent than pharmacological interventions.[5] Although BMI and age are the two strongest predictors of diabetes for Indigenous Australians, leanness is protective.[6,7] As in all Australians, preventing diabetes goes hand in hand with preventing excessive weight gain, but trends in overweight and obesity are unambiguously upwards.

Preventing excessive weight gain in Indigenous communities, which are profoundly disadvantaged relative to mainstream Australia, is complicated by the strong link between poverty and obesity. People living in poverty tend to maximise calories per dollar spent on food,[8] and energy-dense foods rich in fats, refined starches and sugars represent the lowest cost options. Healthy diets based on lean meats, whole grains, and fresh vegetables and fruits are much more costly. Poverty in Indigenous communities is related to high unemployment and welfare dependency; living conditions are overcrowded, and community infrastructure is poor, with limited access to good quality foods.[1] Many of these factors are compounded by remote living, although successful prevention of obesity in some outstation communities has been associated with greater physical activity, consumption of bush foods, and ownership of and access to traditional homelands.[9]

Are there any opportunities for practical intervention? Low birthweight, which is linked to an increased risk of central obesity and type 2 diabetes in adult life, is more common in Indigenous and other socially disadvantaged communities, and is linked to maternal smoking, overcrowded living conditions and mothers' perceived stress.[10] Furthermore, diabetes in pregnancy increases the risk of early onset obesity and diabetes in the offspring. This can be attenuated by improved control of gestational diabetes, and by the mother breastfeeding for at least 2–3 months.

A systematic approach to improving nutritional status of infants should be a priority — including the option (controversial in some circles) of providing subsidised food. We have observed that a community decision to provide a healthy breakfast and lunch 5 days a week for primary school children was a major step towards the children achieving their recommended daily intakes for a number of key nutrients (unpublished data). Improved maternal and child health could be an important and cost-effective contributor to diabetes prevention programs at the population level.

Preventing and managing the complications of diabetes, such as cardiovascular risk factors, also involve lifestyle modification. Through changes in food supply, increased opportunities for physical activity, and health promotion, Indigenous communities were able to achieve amelioration of dyslipidaemia, improved insulin action (even in the absence of weight loss), and increased in red cell folate and reduced homocysteine levels.[11] A large international trial has shown that fish and fish-oil supplements reduce coronary heart disease mortality.[12]

There seems little argument that improving the quality use of medicines (including through greater access) is one of the most cost-effective approaches to reducing the additional and preventable burden of chronic illness among Indigenous people.[13,14] Angiotensin-converting enzyme (ACE) inhibitors have been shown to reduce mortality in an Aboriginal community with a high prevalence of end-stage kidney failure.[15] Internationally, numerous trials have reported the effectiveness of statin therapy in reducing vascular mortality. Metformin improves glycaemic control in diabetes, without weight gain. Yet, the gaps between the evidence and actual practice, in both Indigenous communities and the broader community, remain unacceptably large, and are limiting gains for those at risk of diabetes and for those who already have the disease and related conditions.

The article by McDermott et al[4] (*page 505*) illustrates the value of systematic primary health care approaches to diabetes control, including electronic health information systems, screening, management protocols, recall systems, improved specialist access, quality improvement activities, and staff support and training. Such systems are integral to improving the quality and outcomes of clinical care. All three articles on diabetes in Indigenous people in this issue[3,4,16] also address aspects of screening. Taken together, they support a critical role of coordinated health system approaches to diabetes identification and control. Simple point-of-care procedures, as developed by Marley et al[16] (*page 500*), could form the basis of cost-effective screening for diabetes (and other vascular risk factors) in high-risk populations, and may be able to accurately identify those who could benefit from more immediate pharmacological and non-pharmacological therapies.

The prevention and management of diabetes are critical to the future health of Indigenous as well as non-Indigenous Australians. But, there is no simple solution. The effectiveness of clinical and

public health interventions is limited in Indigenous people, by the added burden of systematic historical and contemporary discrimination. Getting it right will require better clinical treatment and action well beyond the health service sphere. This is one of contemporary Australia's greatest challenges.

Author details

Kerin O'Dea, AO, BSc, PhD, Professorial Fellow[1,2]
Kevin G Rowley, PhD, Senior Research Fellow[3]
Alex Brown, BMed, MPH, FCSANZ, Head[4]

1 University of Melbourne, Department of Medicine, St Vincent's Hospital, Melbourne, VIC.
2 Baker Heart Research Institute, Melbourne, VIC.
3 Onemda VicHealth Koori Health Unit, School of Population Health, University of Melbourne, Melbourne, VIC.
4 Baker Heart Research Institute, Centre for Indigenous Vascular Research, Alice Springs, NT.

Correspondence: kod@medstv.unimelb.edu.au

References

1 Australian Institute of Health and Welfare. The health and welfare of Australia's Aboriginal and Torres Strait Islander peoples 2005. Canberra: Australian Bureau of Statistics and AIHW, 2005. http://www.aihw.gov.au/publications/ihw/hwaatsip05/hwaatsip05.pdf (accessed Apr 2007).
2 Cass A, Cunningham J, Wang Z, Hoy W. Regional variation in the incidence of end-stage renal disease in Indigenous Australians. *Med J Aust* 2001; 175: 24-27.
3 Craig ME, Femia G, Broyda V, et al. Type 2 diabetes in Indigenous and non-Indigenous children and adolescents in New South Wales. *Med J Aust* 2007; 186: 497-499.
4 McDermott RA, McCulloch BG, Campbell SK, Young DM. Diabetes in the Torres Strait Islands of Australia: better clinical systems but significant increase in weight and other risk conditions among adults, 1999–2005. *Med J Aust* 2007; 186: 505-508.
5 Gillies CL, Abrams KR, Lambert PC, et al. Pharmacological and lifestyle interventions to prevent or delay type 2 diabetes in people with impaired glucose tolerance: systematic review and meta-analysis. *BMJ* 2007; 334: 299.
6 Daniel M, Rowley KG, McDermott R, et al. Diabetes incidence in an Australian Aboriginal population. An 8-year follow-up study. *Diabetes Care* 1999; 22: 1993-1998.
7 Daniel M, Rowley KG, McDermott R, O'Dea K. Diabetes and impaired glucose tolerance in Aboriginal Australians: prevalence and risk. *Diabetes Res Clin Pract* 2002; 57: 23-33.
8 Drewnowski A, Spector SE. Poverty and obesity: the role of energy density and energy costs. *Am J Clin Nutr* 2004; 79: 6-16.
9 Rowley KG, Gault A, McDermott R, et al. Reduced prevalence of impaired glucose tolerance and no change in prevalence of diabetes despite increasing BMI among Aboriginal people from a group of remote homeland communities. *Diabetes Care* 2000; 23: 898-904.
10 Borders AE, Grobman WA, Amsden LB, Holl JL. Chronic stress and low birth weight neonates in a low-income population of women. *Obstet Gynecol* 2007; 109: 331-338.
11 Rowley KG, Su Q, Cincotta M, et al. Improvements in circulating cholesterol, antioxidants, and homocysteine after dietary intervention in an Australian Aboriginal community. *Am J Clin Nutr* 2001; 74: 442-448.
12 Gruppo Italiano per lo Studio della Sopravvivenza nell'Infarto miocardico. Dietary supplementation with n-3 polyunsaturated fatty acids and vitamin E after myocardial infarction: results of the GISSI-Prevenzione trial. *Lancet* 1999; 354: 447-455.
13 Couzos S. PBS medications: improving access for Aboriginal and Torres Strait Islander peoples. *Aust Fam Physician* 2005; 34: 841-844.
14 Kelaher M, Dunt D, Taylor-Thomson D, et al. Improving access to medicines among clients of remote area Aboriginal and Torres Strait Islander health services. *Aust N Z J Public Health* 2006; 30: 177-183.
15 Hoy WE, Baker PR, Kelly AM, Wang Z. Reducing premature death and renal failure in Australian Aboriginals. A community-based cardiovascular and renal protective program. *Med J Aust* 2000; 172: 473-478.
16 Marley JV, Davis S, Coleman K, et al. Point-of-care testing of capillary glucose in the exclusion and diagnosis of diabetes in remote Australia. *Med J Aust* 2007; 186: 500-503. ❑