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Review

Type 2 diabetes in Indigenous populations: Quality of intervention research over 20 years

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ABSTRACT

Background. A robust evidence base is needed to reduce the disproportionately high rates of diabetes-related mortality and complications among Indigenous peoples.

Objective. This study aimed to evaluate the quantity and methodological quality of published intervention research on Type 2 and gestational diabetes in the Indigenous populations of Australia, Canada, New Zealand, and the United States from 1989 to 2008. A robust evidence base is needed to reduce the disproportionately high rates of diabetes-related mortality and complications among Indigenous peoples.

Methods. Systematic searches of Medline, Embase, and EBM Reviews identified publications focused on Type 2 or gestational diabetes in Indigenous peoples published between 1 January 1989 and 31 December 2008. Total publication number and proportion of research involving interventions over time were examined. The quality of intervention studies was evaluated using Cochrane's Effective Practice and Organisation of Care (EPOC) criteria.

Results. Total publication number increased significantly over the 20 years ($p<0.004$). Research was predominantly descriptive (87%), with the proportion of research involving interventions increasing from 3% in 1989–1993 to 12% in 2003–2008 ($\chi^2=12.42$, $df=3$, $p=0.006$). However, only 25% (95%CI: 9–41%) of intervention studies met the EPOC methodological quality criteria; other studies lacked sufficient controls or measurements over time.

Conclusions. Increases in the amount of high-quality intervention research for prevention and treatment of Type 2 and gestational diabetes among Indigenous populations of these countries are needed.

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Introduction

Type 2 diabetes contributes to the health inequalities experienced by Indigenous peoples in developed countries. In Australia, Type 2 diabetes and ischemic heart disease contribute to 26% of the excess disease burden of Indigenous Australians and to a 13-year lower life expectancy than other Australians (Vos et al., 2007). In New Zealand, the lower life expectancy in Maori men and women (8–9 years less than the general population) is partly attributed to different rates of diabetes and smoking (Ministry of Health, 2009; Statistics New Zealand, 2009). In the United States, the age-adjusted death rate for diabetes mellitus in American Indians/Alaskan Natives in 2006 was 1.9 times higher than in US non-Hispanic whites (39.6 and 20.4 per 100,000, respectively) (US Department of Health and Human Services, 2006). The severity of certain diabetic complications including end-stage renal disease and lower-extremity amputation tends to be significantly higher among Indigenous groups (Chaturvedi et al., 2001; Naqshbandi et al., 2008; Spencer et al., 1998). Addressing Type 2 diabetes and the background risk factors (including obesity, sedentary behavior, and gestational diabetes) is critical to reducing Indigenous health inequalities in these countries.

Governments of Australia, Canada, New Zealand, and the United States have identified Type 2 diabetes and Indigenous Health as priority areas for research and health services. These directives have principally occurred within the last 10 years and have resulted in a number of research funding collaboration initiatives and Indigenous-specific health service organizations, including the National Center on Minority Health and Health Disparities (NCMHD) in the United States (established in 2000), the Institute of Aboriginal Peoples' Health in Canada (established in 2000), and the National Health and Medical Research Council (NHMRC) of Australia Strategic Plan 2003–2006 allocating at least 5% of research funding to Indigenous Health (Cunningham et al., 2003).

Research that develops and evaluates interventions aimed at preventing and managing the condition is fundamental to evidence-based practice in this field. Policy makers, health service providers, and Indigenous communities themselves seek a solid evidence base of "up-to-date information from relevant, valid research" (Cochrane, 1972) to guide their efforts in the prevention and treatment of Type 2 diabetes. Given the unique needs and designated health services for Indigenous populations, there is a need for an evidence base for this group.

The level of evidence provided by an intervention study is based on the ability of the study to demonstrate causality or the effectiveness of the intervention. This can be assessed by criteria that evaluate the methodological quality of the study design and the risk of bias in its conduction, and therefore, the level of evidence it is able to provide. The Cochrane Collaboration's Effective Practice and Organisation of Care (EPOC) group provides guidelines for the evaluation of intervention research in community and education settings (McAuley, 2002).

In light of the increased funding for diabetes research and Indigenous health research, it is reasonable to expect that the amount of research in this field will increase over time and be reflected in the number of research publications produced. The aims of this study were to determine whether (1) the amount of research (total and original data-based) and (2) the proportion of research that tests the effectiveness of intervention strategies has changed over time and (3) whether the intervention research is of sufficient methodological quality to contribute to an evidence base for prevention and management of Type 2 diabetes in Indigenous populations. Sufficient methodological quality was defined by the minimum standards set by Cochrane EPOC inclusion and quality criteria (McAuley, 2002).

Methods

Data sources

Searches of Medline, EMBASE, and EBM Reviews databases identified articles published between 1 January 1989 and 31 December 2008 on the subject of Type 2 diabetes and/or gestational diabetes in Indigenous populations of Australia, Canada, New Zealand, and the United States. A 20-year period, beginning in 1989, was examined to give sufficient time for trends in numbers of research publications over time to be observed.

Search strategy

Search terms included a combination of MeSH and keywords to identify publications related to the Indigenous populations: Aborigines or Aboriginal, Torres Strait Islander or Torres Strait, Maori, American Indian, North American Indian, Alaska(n) Native, native Hawaii(an), native American, American Samoa(n), Eskimo, Inuit, Aleut, Metis, Indigenous, Indigenous health services; and a combination of MeSH *Diabetes Mellitus, Type 2/ or *Diabetes Mellitus/ or *Diabetes, Gestational/ (Medline, EBM Reviews) and keywords "Type 2 diabetes", "gestational diabetes" (EMBASE) to identify those related to Type 2 and gestational diabetes. Duplicate citations from the multiple databases were removed. The search identified 821 citations.

Selection criteria

Inclusion and exclusion criteria were applied to the titles and abstracts of identified citations. All types of published studies were included if they:

1. had Type 2 diabetes or gestational diabetes as their main focus/outcome, or they deliberately examined the effect of diabetes on another outcome (e.g., diabetic/non-diabetic cohorts) and
2. had included all or predominantly Indigenous participants and/or compared Indigenous and non-Indigenous groups, and/or used ethnicity as a predictor.

Publications were excluded if their main focus and outcome measures related to co-morbidities such as cardiovascular disease, hypertension, or obesity and they did not deliberately address the effect of diabetes (i.e., with diabetic/non-diabetic comparisons). Reports that focused on Type 1 diabetes or that did not differentiate between Type 1 and Type 2 were also excluded. Publications without abstracts were excluded if the appropriate information could not be gained from the title and relevant keywords in the full citation.

Data extraction

Publications meeting the inclusion criteria were classified by publication type into original research, reviews, discussion papers, and case studies. Original research publications were categorized by research type into *measurement research*—developing or testing a measure or measurement tool, *descriptive research*—characterizing the nature of the condition and potential risk factors and causation, or *intervention research*—testing the effectiveness of clinical or public health intervention. Descriptions of the research types have been previously described (Sanson-Fisher et al., 2006).

If a publication focused on descriptive or measurement research in addition to intervention research, it was classified as intervention research, and publications that focused on both measurement and descriptive issues were coded as measurement research.

Selection and classification were performed by a principal reviewer, with a random sample of 100 publications (12%) reanalyzed by a second independent reviewer and compared using the Kappa statistic (K).