

Diabetes in Visible Minority Populations in Ontario

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Abstract

Most published data on ethnic variations in diabetes care and outcomes come from the United States, and their generalizability to inform clinical care and policy making in Canada is limited. As a result, the Institute for Clinical Evaluative Sciences (ICES) has conducted several studies examining the burden of diabetes for and the quality of care received by visible minority populations in Ontario compared with the general population.

The Issue

Diabetes mellitus is a common chronic disease that is increasing in prevalence worldwide. It leads to numerous complications, making diabetes a leading cause of blindness and renal failure, as well as a major risk factor for coronary artery disease, stroke and peripheral vascular disease. People with diabetes have significant morbidity, reduced quality of life and premature mortality.

In Ontario, the prevalence rate of diabetes among adults is estimated to approach 10% (Lipscombe and Hux 2007). However, data from the International Diabetes Federation (2011) show significant variation in diabetes prevalence around the world, ranging from less than 3% in sub-Saharan Africa to more than 20% in many South Pacific and Middle Eastern nations. Similar variations are seen among ethnic groups within countries. In the United States, the prevalence of diabetes among Whites is 7.1%, whereas it is 11.8% among Hispanics and 12.6% among Blacks (Centers for Disease Control and Prevention 2012). In the United Kingdom, people of Black Caribbean, Indian, Bangladeshi and Pakistani origins have diabetes rates up to 2.5 times that of the general British population (Diabetes UK 2012). Ethnic variations are also seen in other multi-ethnic countries such as South Africa, Singapore and Mauritius (Molleutze and Levitt 2006; Söderberg et al. 2005; Tan et al. 1999).

Most published data on ethnic variations in diabetes care and outcomes come from the United States, and their generalizability to inform clinical care and policy making in Canada is limited. American studies generally focus on Black and Hispanic populations, whereas the two largest visible minority groups in

Canada are South Asian (from the Indian subcontinent) and Chinese (Statistics Canada 2013). The few American studies that do include these populations tend to aggregate them into a heterogeneous “Asian” category (Kanaya et al. 2011). In addition, the American healthcare system has significant income and insurance barriers to care, which may particularly affect minority populations but that may be mitigated in Canada.

Therefore, previous studies leave many unanswered questions about the impact of diabetes in visible minority communities in Canada. What is the rate of diabetes in Canada’s visible minority populations? Are there disparities in the quality of diabetes care for visible minority populations? How do complications of diabetes and mortality vary among these groups?

The Studies

Most research on ethnic variations in diabetes care originates in the United States, in part because American data sources frequently include data on race/ethnicity. In contrast, ethnic identifiers are rarely collected in Canada and are therefore not usually available in health data sources. Thus, other methods must be used to identify visible minority populations for health research in Canada. The Institute for Clinical Evaluative Sciences (ICES) has used several such methods:

- Although ethnic identifiers are not routinely included in administrative data, they are available from other sources. For example, the Canadian Community Health Survey (CCHS) is a regular telephone survey administered by Health Canada that probes a representative sample of Canadians on health status, health behaviours and clinical history. It also collects detailed demographic information, including self-reported ethnicity. Because the CCHS obtains respondents’ health insurance numbers, these data can be linked to provincial health administrative data.
- Canada’s two largest visible minority populations, the South Asians and Chinese, together account for nearly half of all visible minorities and nearly 9% of the entire Canadian population (Statistics Canada 2013). Both groups have distinctive surnames, many of which are

unique to their ethnic group. ICES has developed and validated lists of South Asian and Chinese surnames (Shah et al. 2010); since many healthcare data sources include patients' names, these lists can be used to identify South Asian and Chinese patients. The lists have a very high positive predictive value – patients with these surnames have a very high likelihood of being from the visible minority group.

- ICES has collected data directly from patients' charts in the offices of physicians practising in neighbourhoods with large concentrations of visible minority patients. Patient ethnicity was identified directly by the physician as part of the data collection process.

Using these methods, ICES has conducted several studies examining diabetes care and outcomes for visible minority patients in Ontario.

Key Findings

Diabetes Prevalence and Incidence

Diabetes prevalence is the proportion of the population living with diabetes. In Ontario, the prevalence of self-reported diabetes was higher for South Asians (8.1%) and Blacks (8.5%) than it was for Whites (4.2%). Diabetes prevalence was 4.3% for the province's Chinese population, but this was not statistically significantly higher (Chiu et al. 2010). When self-reported prevalence was enriched using the Ontario Diabetes Database, an administrative data-derived registry of diagnosed diabetes (Hux et al. 2002), prevalence in all groups was even higher but the relative differences between ethnicities persisted, as shown in Figure 1 (Shah 2008).

Diabetes incidence is the number of new cases of diabetes that are diagnosed each year. When following subjects free of diabetes through time for new diabetes diagnoses, the incidence of diabetes was found to be 9.5 per 1,000 person-years for White patients, compared with 20.8 for South Asians,

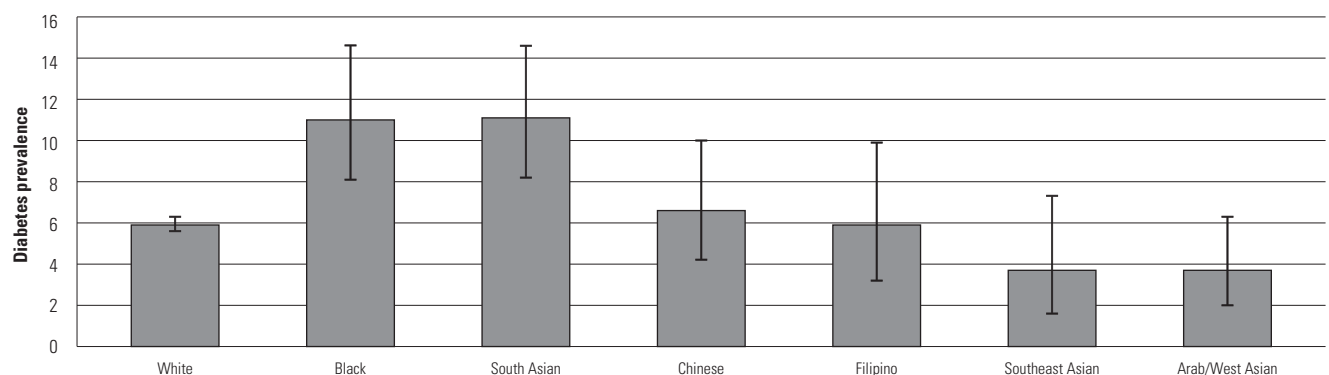
16.3 for Blacks and 9.3 for Chinese (Chiu et al. 2011). As with prevalence, incidence was significantly increased compared with Whites for South Asians and Blacks but not for Chinese. However, among Chinese Canadians in Ontario, the incidence rate of diabetes is accelerating (Alangh et al. 2013). White and Chinese cohorts who were free of diabetes in 1996 were followed up for five years. The incidence of diabetes was 7.8 cases per 1,000 person-years for White subjects and 1.3 per 1,000 person-years for Chinese subjects. When this was repeated using cohorts free of diabetes in 2005, the incidence of diabetes for White subjects was 9.7 per 1,000 person-years, one quarter higher than it had been in 1996; while for Chinese subjects, incidence was 19.6 per 1,000 person-years, more than 15 times higher than it had been in 1996.

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Quality of Diabetes Care

Other ICES studies have examined disparities in the quality of diabetes care received by visible minorities in Ontario. In a study by Shah (2008), about 85% of the province's diabetes patients had a regular primary care physician, with no disparities in utilization between ethnic groups. Likewise, about 20% of these patients had seen a diabetes specialist, with no indication of ethnic disparity. However, disparities were observed for ophthalmologist or optometrist visits, which all diabetic patients regularly need in order to screen for eye complications: about half of White and Chinese patients had had an eye examination, as opposed to only a third of South Asians.

FIGURE 1.
Prevalence of diabetes in visible minority groups, in Ontario



Other process measures of quality of care, such as appropriate laboratory testing, blood pressure measurement and foot examination, were similar for Chinese patients, South Asian patients and patients from the general population with diabetes (Shah et al. 2012). However, when compared with the general population, Chinese patients were more likely to achieve the target level for blood sugar and cholesterol control, and South Asian patients were more likely to achieve the target level for blood pressure. Thus, Canadian visible minority populations have a quality of diabetes care that is at least as good as that of the general population and may even be slightly better.

When compared with the general population, Chinese patients were more likely to achieve the target level for blood sugar and cholesterol control, and South Asian patients were more likely to achieve the target level for blood pressure.

Complications of Diabetes and Mortality

Cardiovascular disease (including coronary artery disease, stroke and peripheral vascular disease leading to amputation) is a major contributor to the premature mortality associated with diabetes, but there are ethnic differences in these risks, as presented in Figure 2 (Shah et al. 2013). South Asian patients with diabetes have an overall risk for cardiovascular disease that is similar to that of the general population (adjusted hazard ratio [HR] = 0.95; 95% confidence interval [CI] = 0.90–1.00), but they have a reduced risk for stroke (adjusted HR = 0.82; 95% CI = 0.72–0.94). Chinese patients with diabetes have a markedly reduced overall risk for cardiovascular disease (adjusted HR = 0.50; 95% CI = 0.46–0.53) and, in particular, a reduced risk

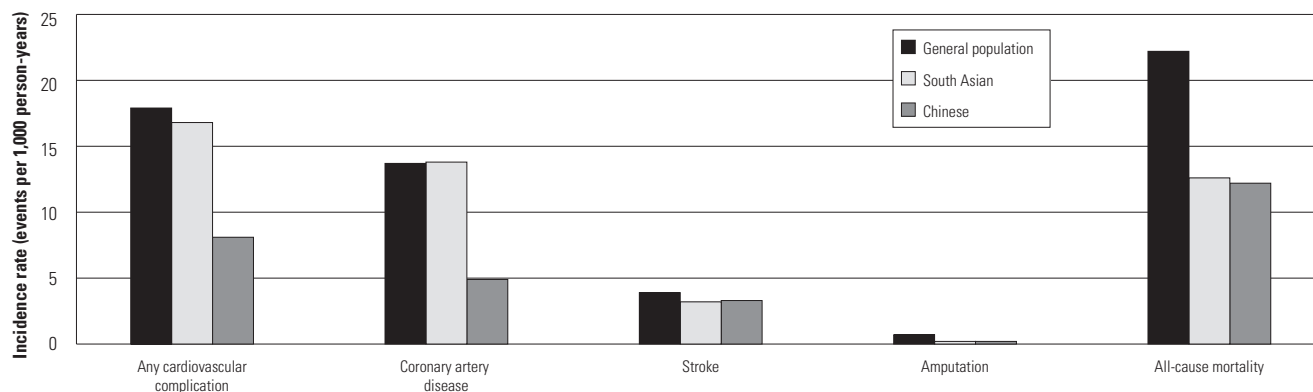
of coronary artery disease (adjusted HR = 0.39; 95% CI = 0.36–0.43). Both visible minority groups have a 70% reduced risk for amputations and an approximately 45% reduced risk for mortality compared with the general population.

Summary of Results and Implications

These studies demonstrate that the burden of diabetes in many visible minority populations in Ontario is increased compared with the general population. Even Chinese Canadians, who historically have not had an increased prevalence of diabetes, have seen a rapid acceleration in diabetes incidence, so their diabetes prevalence is likely to grow. This corroborates data from around the world that shows that most non-White ethnic groups have an increased risk of diabetes compared with White populations, particularly when adopting Westernized lifestyles or moving to Western countries. However, at least among the South Asian and Chinese populations in Ontario (the province's two largest minority groups), the quality of care is similar to that of the general population. In fact, these two groups were slightly more likely to achieve recommended treatment targets. These observations may reflect the success of the Canadian healthcare system in mitigating some barriers to care for visible minority patients. The burden of cardiovascular disease is lower for Chinese populations and no higher for South Asian populations, and mortality after diabetes diagnosis is substantially lower for both groups. These large differences cannot be explained simply by small differences in diabetes screening or quality of care, so the reasons why South Asian and Chinese patients are seemingly protected from the complications and mortality of diabetes need to be better understood. In addition, many other visible minority groups in Canada have a significant burden of diabetes, but their quality and outcomes of care have not been studied in as much detail.

FIGURE 2.

Risk of cardiovascular complications and mortality after diabetes diagnosis in visible minority groups and the general population, in Ontario



The conclusions about quality and outcomes of diabetes care for visible minorities found in these ICES studies are different from those seen in studies from the United States and United Kingdom. Therefore, these studies demonstrate both the feasibility of studying visible minority populations despite the absence of ethnic identifiers in Canadian data sources, and the importance of examining care received by Canadian minority populations, as findings from other jurisdictions are not generalizable. **HQ**

References

Alangh, A., M. Chiu and B.R. Shah. 2013. "Rapid Increase in Diabetes Incidence among Chinese Canadians between 1996 and 2005." *Diabetes Care* 36(10): 3015–17. May 30 [Epub Ahead of Print].

Centers for Disease Control and Prevention. 2012. *Diabetes Report Card 2012*. Atlanta, GA: Centers for Disease Control and Prevention, US Department of Health and Human Services. Retrieved August 9, 2013. <<http://www.cdc.gov/diabetes/pubs/pdf/DiabetesReportCard.pdf>>.

Chiu, M., P.C. Austin, D.G. Manuel, B.R. Shah and J.V. Tu. 2011. "Deriving Ethnic-Specific BMI Cutoff Points for Assessing Diabetes Risk." *Diabetes Care* 34(8): 1741–48.

Chiu, M., P.C. Austin, D.G. Manuel and J.V. Tu. 2010. "Comparison of Cardiovascular Risk Profiles among Ethnic Groups Using Population Health Surveys between 1996 and 2007." *Canadian Medical Association Journal* 182(8): E301–10.

Diabetes UK. 2012. *Diabetes in the UK 2012: Key Statistics on Diabetes*. London, England: Author. Retrieved August 9, 2013. <<http://www.diabetes.org.uk/Documents/Reports/Diabetes-in-the-UK-2012.pdf>>.

Hux, J.E., F. Ivis, V. Flintoft and A. Bica. 2002. "Diabetes in Ontario: Determination of Prevalence and Incidence Using a Validated Administrative Data Algorithm." *Diabetes Care* 25(3): 512–16.

International Diabetes Federation. 2011. *IDF Diabetes Atlas*. Brussels, Belgium: Author.

Kanaya, A.M., N. Adler, H.H. Moffet, J. Liu, D. Schillinger, A. Adams et al. 2011. "Heterogeneity of Diabetes Outcomes among Asians and Pacific Islanders in the US: The Diabetes Study of Northern California (DISTANCE)." *Diabetes Care* 34(4): 930–37.

Lipscombe, L.L. and J.E. Hux. 2007. "Trends in Diabetes Prevalence, Incidence, and Mortality in Ontario, Canada 1995–2005: A Population-Based Study." *Lancet* 369(9563): 750–56.

Molleutze, W.F. and N.S. Levitt. 2006. "Diabetes Mellitus and Impaired Glucose Tolerance in South Africa." In K. Steyn, J. Fourie and N. Temple, eds., *Chronic Diseases of Lifestyle in South Africa: 1995–2005. Technical Report*. Cape Town, South Africa: South African Medical Research Council.

Shah, B.R. 2008. "Utilization of Physician Services for Diabetic Patients from Ethnic Minorities." *Journal of Public Health* (Oxford, England) 30(3): 327–31.

Shah, B.R., J.C. Victor, M. Chiu, J.V. Tu, S.S. Anand, P.C. Austin et al. 2013. "Cardiovascular Complications and Mortality after Diabetes Diagnosis for South Asian and Chinese Patients: A Population-Based Cohort Study." *Diabetes Care* 36(9): 2670–76. May 1 [Epub Ahead of Print].

Shah, B.R., K. Cauch-Dudek, S.S. Anand, P.C. Austin, D.G. Manuel and J.E. Hux. 2012. "Absence of Disparities in the Quality of Primary Diabetes Care for South Asians and Chinese in an Urban Canadian Setting." *Diabetes Care* 35(4): 794–96.

Shah, B.R., M. Chiu, S. Amin, M. Ramani, S. Sadry and J.V. Tu. 2010. "Surname Lists to Identify South Asian and Chinese Ethnicity from Secondary Data in Ontario, Canada: A Validation Study." *BMC Medical Research Methodology* 10: 42.

Söderberg, S., P. Zimmet, J. Tuomilehto, M. de Courten, G.K. Dowse, P. Chitson et al. 2005. "Increasing Prevalence of Type 2 Diabetes Mellitus in All Ethnic Groups in Mauritius." *Diabetic Medicine* 22(1): 61–68.

Statistics Canada. 2013. *2011 National Household Survey: Immigration and Ethnocultural Diversity in Canada* (Catalogue No. 99-010-X2011029). Ottawa, ON: Author.

Tan, C.E., S.C. Emmanuel, B.Y. Tan and E. Jacob. 1999. "Prevalence of Diabetes and Ethnic Differences in Cardiovascular Risk Factors: The 1992 Singapore National Health Survey." *Diabetes Care* 22(2): 241–47.

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