

# Diabetes in the English-speaking Caribbean

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## ABSTRACT

*Rates of diabetes mellitus in the English-speaking Caribbean have been rising in recent years, and they are projected to continue climbing in the new millennium. Prevalence rates across countries of the African diaspora mirror levels of Western acculturation, and available data emphasize the importance of obesity as a modifiable risk factor. The population-based Barbados Eye Studies have provided new information about the burden of ocular complications of diabetes such as retinopathy and lens opacities. Diabetes was shown to increase the risk of lens opacities, and 14% of prevalent cataract was attributed to diabetes. Persons with type 1 diabetes were particularly at increased risk of retinopathy, as a result of longer durations of illness and poor glycemic control. Other Caribbean studies have suggested that glycemic control in patients evaluated in various clinical settings is suboptimal, which raises important concerns about quality of care. Diabetics are at increased risk of mortality compared with nondiabetics, and that mortality risk increases with higher baseline levels of glycosylated hemoglobin, even among nondiabetics. These data highlight the need for urgent attention to public health and clinical strategies to prevent diabetes in unaffected persons as well as to prevent or reduce the burden of complications among those who are affected. Among the measures that should be adopted to stem the flood of diabetes in the Caribbean region are lifestyle interventions to promote better nutrition and to increase exercise; patient education, particularly about the central role of diabetes self-management; and the multidisciplinary team approach in the provision of care.*

## Key words

Diabetes mellitus, chronic disease, Caribbean region.

The increasing global prevalence of diabetes constitutes a major public health concern, particularly in middle-income countries undergoing rapid economic development, where the majority of new cases will arise (1). This is true, for example, in the English-speaking Caribbean, where high and

steadily growing rates of diabetes are documented (2, 3). (For brevity, in this article we will use the term “the Caribbean” to refer to the English-speaking Caribbean; we do not review data about diabetes in the other countries and territories of the Caribbean).

## EPIDEMIOLOGY OF DIABETES

The English-speaking Caribbean comprises 18 different countries and territories, with a combined population of 6.7 million. Historical events

that underpinned the movement of populations into the Caribbean include the significant British influence, the African slave trade, and migration of workers from India to supply the manpower needs following the cessation of slavery. These events have all contributed to the ethnic diversity of the Caribbean. In addition, rapid post-colonial socioeconomic changes have occurred, especially in the tourism-dependent countries such as Barbados. The creation of this ethnically and culturally diverse society has in turn influenced the clinical pattern of dia-

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betes. In contrast to Europe, type 1 diabetes is rare in the Caribbean (4). Incidence rates among African-origin populations in Antigua, Barbados, Dominica, Saint Croix, Saint Kitts, Saint Thomas, and Tortola over a 5-year period ranged from 0 cases per 100 000 (Saint Kitts) to 10 cases per 100 000 (Saint Croix) (5). Of note are the higher rates of incident type 1 diabetes that were recorded in the United States Caribbean territories of Saint Croix and Saint Thomas (5); the authors speculated that this might have been due to "particular elements of a U.S.-influenced environment" or genetic factors phenotypically characterized by a degree of white racial admixture.

Studies of diabetes prevalence were conducted in the Caribbean more than 30 years ago (6–9), but changes in diagnostic criteria over time limit those data's comparability with current data. There are, however, observations that have stood the test of time. Poon-King et al. conducted a prevalence study in nearly 24 000 persons during a one-year period starting July 1961 and found rates of diabetes of 2.4% in East Indian Trinidadians and of 1.4% in African-descent Trinidadians (8). Over a decade later, higher prevalence rates of diabetes and related cardiovascular disease were still being recorded among Indo-Trinidadians (2). These observations are now recognized as manifestations of the metabolic syndrome in populations of South Asian descent (10).

High rates of type 2 diabetes have been documented in African-origin populations of the Caribbean, with an estimated overall prevalence of 10% (2, 11–14). A gender dimorphism consistently reported in these studies and characterized by a higher female prevalence of diabetes appears to be chiefly influenced by higher rates of female obesity. The impact of lifestyle factors on prevalent diabetes in African-origin populations has been elegantly demonstrated by the International Collaborative Study on Hypertension in Blacks, where a clear gradient in prevalent diabetes rates was apparent, ranging from 2.0% in West Africa to 9.0% in the Caribbean and 11% in black populations in the

United States of America (the city of Chicago) (12). Given the common ancestral origins of these populations, it is plausible to relate such trends in diabetes rates to differing frequencies of lifestyle-related factors, in turn mirrored by increased frequency of obesity (15). While recognized diabetes risk factors have been reported in Caribbean populations, data quantifying measures of association between diabetes and such factors have only recently become available. Among black Barbadians, diabetes was found to be positively associated with increased age (odds ratio (OR) = 1.03 per year), a family history of diabetes (OR = 2.85), hypertension (OR = 1.71), central obesity (OR = 1.29), and a body mass index  $\geq 25$  kg/m<sup>2</sup> (OR = 1.74) (14).

## BURDEN OF COMPLICATIONS

It has been documented that African-origin populations in the United States and the United Kingdom experience significantly higher rates of diabetes-related complications, including visual loss, lower extremity amputations, and end-stage renal failure, than do comparable white populations (16–18). In spite of the clinical impression that such complications are frequent, there still remain limited data from the Caribbean. Acute diabetes-related illnesses account for over 10% of hospital admissions and approximately 25% of bed occupancy; many such admissions are precipitated by acutely disordered blood glucose control and diabetic foot problems (19, 20).

Up to 15% of diabetics will have an amputation during their lifetime (21), with resulting permanent disability and adverse impact on quality of life. Such outcomes are particularly likely in settings with limited access to prosthetic devices and rehabilitation services, a situation all too common in the Caribbean. In addition to the high economic costs to health care systems,<sup>2</sup>

amputations result in economic hardship to patients and their families. Furthermore, amputations often coexist with other complications, leading to reduced life expectancy. Diabetic foot problems are a significant clinical and public health issue in Barbados, as they are in the rest of the Caribbean, accounting for the majority of admissions to the general surgical service (22). Deficiencies in care provision and in education uptake by patients have been documented (23, 24), and appropriate interventions are urgently needed. It has been established that education and simple self-care strategies, such as regular foot examination, can reduce the likelihood of lower extremity amputation. Therefore, education must underpin public health policies.

In contrast to limited data about diabetes-related clinical sequelae in the Caribbean, data about ocular complications are available from the Barbados Eye Studies, a nationally representative cohort of adult Barbadians who were aged 40 to 84 at baseline and who have been studied for over a decade. The aim of this research was to document the prevalence, risk factors, and incidence of the major causes of visual loss in a predominantly black population (25). Just over 4 700 persons (or 84% of a simple random sample) were examined in the prevalence study, conducted between 1988 and 1992. Based on fundus photographs, 5.9% of the overall black population had diabetic retinopathy, which also affected 28.5% of participants with diabetes. Minimum retinopathic changes (microaneurysms, hard/soft exudates, or retinal hemorrhages only) were evident in 19.8%, moderate changes (intraretinal microvascular abnormalities or venous beading) were apparent in 7.7%, and severe vascular changes were seen in 0.9% (26). Although there were only 12 cases of type 1 diabetes, those persons were at particularly high risk of complications: 83.3% of them had retinopathy, compared to 30.5% (167 of 547) of those with previously diagnosed type 2 diabetes. Clinically significant macular edema was also more prevalent among persons with type 1 diabetes. These findings are underpinned by a longer

<sup>2</sup> Belle TR, Fraser HS, Adomakoh SA, Walrond ER. The economic cost of managing diabetes mellitus in Barbados [conference presentation]. Caribbean Health Research Council, 47th Annual Council and Scientific Meetings, Georgetown, Guyana, April 2002.

duration of illness in type 1 diabetics, coupled with poor glycemic control.

Lens opacities were also frequent in the Barbados Eye Study population, 41% of whom had some form of lens opacity or history of previous cataract surgery (27). In contrast to findings in white populations, where nuclear cataract predominates (including the subgroup of white Barbadians in this study), cortical cataract was the most frequent type of lens opacity in the black population. Diabetes was associated with a doubling of the risk of cortical opacities, while elevated diastolic blood pressure and abdominal obesity also increased the risk of these lens changes. Overall, about 14% of prevalent cataract could be attributed to diabetes, an association that partly explained the increased mortality risk related to cataract (28).

There is, however, a noteworthy lack of data assessing the impact of diabetes on cardiovascular and renal disease in the English-speaking Caribbean. Such data are urgently needed to inform services and public health policy, given that these complications are potentially preventable.

A doubling in the crude death rate attributable to diabetes was recorded in the English-speaking Caribbean during the decade ending in 1990 (29). Recent information directly evaluating the impact of diabetes on survival is now available from prospective evaluation of the Barbados Eye Study cohort (14). Compared to nondiabetics, diabetics were at a higher risk of 4-year mortality (death rate ratio = 1.42). Furthermore, glycosylated hemoglobin levels were predictive of increased mortality risk. Irrespective of diabetes status, there was a 9% increase in 4-year mortality for the entire study population for each 1% increase in glycosylated hemoglobin at baseline (death rate ratio = 1.09; 95% confidence interval: 1.04–1.15). This signals

the need for public health interventions aimed at improving glycemic control at the population level, and not only as determined by diabetes status. Intensifying care has cost implications for cash-strapped economies, but the United Kingdom Prospective Diabetes Study has shown both a reduction in complications and the cost-effectiveness of such interventions (30).

Two Caribbean studies have explored quality of care issues and glycemic control (31, 32). The data were not reassuring. In a comparison of public and private clinic settings in Barbados, British Virgin Islands (Tortola), and Trinidad and Tobago (31), overall blood glucose control was poor (> 8 mmol/L fasting) in 50% of the clinic patients, while in a comparable Jamaican study it was poor in 61% (32). Clinical examination of feet and eyes and the provision of advice about diet and exercise were both rare. In a modest intervention study using a combination of guidelines developed in the English-speaking Caribbean and workshops, modest improvement in quality of care was shown,<sup>3</sup> suggesting that changes in diabetes control and reductions in complications and mortality are achievable.

At the beginning of this new millennium, the challenges related to the prevention and care of diabetes in the Caribbean seem daunting. Basic quantitative epidemiological information about prevalent diabetes and related complications is still lacking. This situation needs to be urgently addressed: not only are the absolute burden of disease and its complications rising but new clinical patterns are also emerging, particularly type 2 diabetes in adolescence. Such informa-

tion is critical for formulating and evaluating appropriate intervention strategies and for optimizing the allocation of resources.

There are public health and clinical issues that are of particular relevance to the Caribbean. West Indian patients with diabetes still have a very poor understanding of their condition, frequently using indigenous remedies for diabetes instead of prescribed medicines (24). On the other hand, care providers are still overly focused on medication rather than diet and activity changes, and care is often driven by drug marketing and fashions in prescribing (3). Improved education of both care providers and patients is therefore a vital step on the path to progress.

Efforts must be aimed at primary prevention of diabetes through increased activity and dietary modification. Diabetes can no longer be seen as an illness in isolation. Instead, it should be viewed as a disease that frequently coexists with obesity, hypertension, and associated vascular complications. Furthermore, these manifestations of the metabolic syndrome must be considered in the context of the underlying and potentially modifiable lifestyle risk factors such as poor diet and inactivity. This should be complemented by ongoing efforts to screen for diabetes within populations, paying particular attention to those at highest risk (the overweight and the relatives of diabetics). Rather than remaining a theoretical concept, the multidisciplinary team approach in the care of diabetes must be aggressively promulgated. Management goals and standards of care must be taught to both patients and practitioners, and the paradigm that patients must be actively involved in self-care must also be energetically propagated (33). Only then can targets of ideal glycemic control become attainable in response to behavior modification and optimal drug use.

<sup>3</sup> Alert CV, Fraser HS. Diabetes mellitus in Barbados: an assessment of the CCMRC/Ministry of Health's effort to improve management in the public sector [conference presentation]. Commonwealth Caribbean Medical Research Council, 42nd Scientific Meeting, St. Maarten, Netherlands Antilles, April 1997.

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## RESUMEN

### La diabetes en el Caribe de habla inglesa

Las tasas de diabetes mellitus en los países del Caribe de habla inglesa se han venido incrementando en los últimos años y se espera que continúen aumentando en el nuevo milenio. Las tasas de prevalencia en los países receptores de la diáspora africana reflejan los niveles de aculturación occidental y los datos disponibles subrayan la importancia de la obesidad como factor de riesgo modificable. Los Estudios de Oftalmología de Barbados (*Barbados Eye Studies*), de base poblacional, han brindado nueva información acerca de la carga que constituyen las complicaciones oculares de la diabetes, tales como la retinopatía y la catarata. Mediante ellos se demostró que la diabetes aumentaba el riesgo de sufrir cataratas y que 14% de los casos diagnosticados eran atribuibles a la diabetes. Las personas con diabetes tipo 1 tenían, específicamente, un mayor riesgo de padecer retinopatía como resultado de una enfermedad más prolongada y un control deficiente de la glucemia. Según otros estudios realizados en el Caribe, el control de la glucemia en pacientes evaluados en diversas instancias clínicas no es el óptimo y pone en duda la calidad de la atención. Los diabéticos tienen un mayor riesgo de morir que las personas que no tienen esta enfermedad, y ese mayor riesgo se incrementa a medida que aumenta la concentración basal de glucohemoglobina, incluso entre personas sin diabetes. Estos datos resaltan la urgente necesidad de idear estrategias clínicas y de salud pública dirigidas tanto a prevenir la diabetes, como a prevenir o reducir la carga de complicaciones clínicas que sufren las personas ya afectadas por esta enfermedad. Entre las medidas que deben adoptarse para reducir la frecuencia de la diabetes en la Región del Caribe están las intervenciones basadas en estilos de vida que favorecen una mejor alimentación y la práctica de ejercicio físico; la educación de los pacientes, en particular sobre el papel central que debe desempeñar su propio control de la glucemia; y el enfoque multidisciplinario en la provisión de la atención.