Contents available at ScienceDirect

Diabetes Research and Clinical Practice

journal homepage: www.elsevier.com/locate/diabres

International Diabetes Federation

Review

Type 2 diabetes mellitus in African women

Julia H. Goedecke[a,*], *Asanda Mtintsilana*[b], *Siphiwe N. Dlamini*[b], *Andre Pascal Kengne*[a]

[a] *Non-Communicable Disease Research Unit, South African Medical Research Council, Cape Town, South Africa*
[b] *Medical Research Council/University of Witwatersrand, Developmental Pathways for Health Research Unit, Department of Paediatrics, School of Clinical Medicine, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa*

ARTICLE INFO

Article history:
Received 16 November 2016
Accepted 28 November 2016
Available online 5 December 2016

Keywords:
Risk factors for diabetes
Pathophysiology
Dual-burden of disease
Body fat distribution
Adipose tissue biology
Detection and management of diabetes

ABSTRACT

Compared to global estimates, Sub-Saharan Africa (SSA) has the highest projected rates of increase in type 2 diabetes (T2D) over the next 25 years. This is attributed to the ageing population, increasing urbanisation and the associated lifestyle changes. Although the prevalence does not differ by gender, deaths attributable to T2D in SSA are greater in women, likely due to differences in beliefs and access to care. Women in SSA also have greater risk factor burden for T2D than men, in particular obesity, which is explained in part by socio-cultural factors. The pathogenesis of diabetes differs between African and Caucasian women, with implications for risk assessment. African women are more insulin resistant than their Caucasian counterparts, despite a more 'favourable' body fat distribution. Notably, women in SSA face the dual burden of T2D and HIV/AIDS. HIV positive women in SSA are typically young and obese, with the latter being exacerbated by anti-retroviral therapy (ART). Cultural perceptions regarding weight loss and limited financial resources are the major limitations to the management of T2D. Hence prevention is vital. However, there is a paucity of studies examining the effectiveness and sustainability of interventions to reduce T2D in SSA.

Contents

* Corresponding author at: Non-Communicable Disease Research Unit, South African Medical Research Council, PO Box 19070, Tygerberg, 7505 Cape Town, South Africa.
E-mail address: Julia.goedecke@mrc.ac.za (J.H. Goedecke).

http://dx.doi.org/10.1016/j.diabres.2016.11.017
0168-8227/

1. Introduction

Sub-Saharan Africa (SSA) currently contributes the smallest proportion to the global population of people with type 2 diabetes (T2D) [1]. However, SSA has the highest projected rate of increase in T2D population over the next 25 years, by 2.5-fold from 14.2 million in 2015 to 34.2 million by 2040. Notably, SSA has the highest proportion of undiagnosed T2D, with 66.7% of people with T2D unaware of their condition [1]. The rising figures of T2D in SSA may be attributed to the ageing population, increasing urbanisation and the associated lifestyle changes. Despite the fact that 61.3% of Africans live in rural areas, the majority (58.8%) of people with T2D live in cities [1]. These factors may also partly account for the large variability in T2D across the region, ranging from 0.6 [0.5–2.5]% in Benin to 17.4 [11.7–23.7]% in Seychelles [1].

The distribution of diabetes by gender varies widely in SSA, but overall, the prevalence of T2D does not differ between men and women. However, diabetes-attributable mortality is 1.7 times higher in women compared to men [1]. This may be attributed to men dying of other causes (e.g. armed conflict), but may also be due to differences in beliefs, and access to care. Further, women in SSA have greater risk factor burden for T2D than men, in particular obesity, which may be attributed to sociocultural factors such as gender-specific work activities, sedentary lifestyles and cultural beliefs that obese women are attractive and devoid of HIV [2]. By virtue of the pivotal role in the family's structure in Africa, women are also highly involved in the management of T2D of family members, in their capacity as mother or partner.

This review is on the impact of T2D on women in SSA. We aim to provide insight into the burden, risk factors and pathophysiology of T2D, and the interaction with infectious diseases. In addition, we will discuss the direct and indirect impact of T2D on the lives of women in SSA.

2. T2D in SSA women: the scope of the burden

According to the International Diabetes Federation (IDF) estimates, 50.5% of women vs. 49.5% for men in SSA have T2D [1]. Similarly, a systematic review including 36 prevalence studies of T2D in SSA found similar prevalence rates in men and women [3], however, men had a 56% higher odds of impaired fasting glycaemia and a 16% lower odds of impaired glucose tolerance than women, suggesting a gender difference in T2D pathophysiology. Furthermore, gender differences varied substantially by region, within the Southern African region women were more likely to have prevalent T2D than men, while in Eastern and middle Africa, the prevalence of T2D was lower in women than in men. The Non-Communicable Disease Risk Collaboration (NCD-RisC) has estimated that the age-standardised prevalence of T2D in SSA has increased from 3.3% in 1980 to 6.8% in 2014 in women, and from 2.7% to 6.7% in men during the same time interval [4]. Estimates however were based only on fasting glucose and reported history of T2D. NCD-RisC further estimated that the lowest prevalence of T2D among SSA women in 2014 was recorded in Burundi (4.2%) and the highest in Mauritius (12.9%).

Although the complications of T2D do not differ by gender [2,5], diabetes-attributable mortality is higher in African women compared to men. In 2015, 321,100 deaths in Africa were attributable to diabetes, with 62.7% of these deaths recorded in women [1]. Furthermore, nearly half of diabetes related deaths in women occurred before the age of 40 years.

3. Risk factors for T2D

3.1. *Non-modifiable risk factors*

The risk of developing T2D increases with age worldwide in both men and women. In SSA, the life expectancy is increasing due to reduced rate of infectious diseases and improved quality of health care [6]. The majority of people with T2D in SSA are less than 60 years of age, with the highest proportion being between the ages of 40 and 60 years [2]. Notably, women have a greater life expectancy compared to men, and this may explain the higher proportion of SSA women with T2D in some SSA sub-regions.

Although glucose tolerance progressively declines with age, European and African American findings suggest that age-associated decline in insulin sensitivity might be due to increased total and visceral adiposity, rather than the consequences of aging [7]. This may partly explain the higher prevalence of impaired glucose tolerance in SSA women who are more obese than SSA men. However, our recent findings [8] suggest that insulin sensitivity may not change with increasing age in both SSA men and women, regardless of age-associated increases in BMI. Conversely, insulin secretion and estimated β-cell function decreased with increasing age in both SSA men and women, independent of BMI, with a tendency to be stronger in women compared to men.