

The Burden of Diabetes and HIV Among Older Adults in Agincourt, South Africa

Abstract

Global deaths due to Diabetes Mellitus have doubled since 1990, placing this condition in the top ten causes of death (Lozano 2012). Diabetes prevalence is projected to double in Sub-Saharan Africa, where rates of Type 2 diabetes are already approaching similar levels as found in the US. The HIV epidemic may be a potential driver of the increase in part because antiretroviral therapy (ART) medications including many first-line drugs used in South Africa are known to increase risk of metabolic syndrome. ART has also been shown to lead to increases in life expectancy in South Africa, and as people live longer, they may be more likely to develop the disease. Furthermore, increased contact with health services in part due to the HIV epidemic may lead to additional screening and diagnoses of diabetes cases. We analyze new data from a cohort of South African adults aged 40+, the Health and Aging: Longitudinal Studies of INDEPTH communities (HAALSI) survey currently being fielded in Agincourt, South Africa. Our results will offer new insight into the clinical status, knowledge and health behavior of African adults with respect to Type 2 Diabetes Mellitus, a non-communicable disease with a substantial impact on population health but about which relatively little is known among aging populations in Africa.

Background

Global deaths due to Diabetes Mellitus have doubled since 1990, placing this condition in the top ten causes of death (Lozano 2012). In 2010, diabetes was responsible for 6% of total mortality in Sub-Saharan Africa (Lozano 2012). The International Diabetes Federation has projected a 98% increase in the number of adults who will be diagnosed with diabetes in this region in the coming decades, from 12.1 million in 2010 to 23.9 million in 2030. The most common form, Type 2 diabetes, is an increasingly prevalent disease in Sub-Saharan Africa. In South Africa, the prevalence of Type 2 diabetes is estimated at 9.0% among those aged 30 and above, approximating the prevalence of this condition in the United States (Bertram 2013). Though the factors driving this increase have not been fully characterized, other research suggests westernization of diet, decreases in physical activity levels and urbanization may play a role.

In addition, the HIV epidemic may be a potential driver of this increase in part because antiretroviral therapy (ART) medications including many first-line drugs used in South Africa are known to increase risk of metabolic syndrome, though more evidence about this relationship is needed (Mbanya 2010). Moreover, the advent of ART has substantially increased life expectancy in Sub-Saharan Africa, thus increasing the incidence of Type 2 diabetes as the population ages and need for both screening and treatment. HIV prevalence in this population is quite high, peaking at 34 to 41% among women and men respectively in those aged 40-44, and steadily declining in the following age groups (Gómez-Olivé et al. 2013). We anticipate a high percentage of this population may be on ART.

The health impact of Type 2 diabetes is far-reaching, as it can damage multiple organ systems, and is in itself a risk factor for cardiovascular disease, including ischemic heart disease and stroke. Three common complications of Type 2 diabetes include blindness due to diabetic retinopathy, poorly healing ulcers and lower extremity amputations caused by debilitating peripheral neuropathy and renal failure secondary to diabetic nephropathy. The economic toll of this disease is also staggering. Though data are

sparse, the direct costs of care for the disease have been estimated at 67 billion USD annually for Sub-Saharan Africa (Hall 2011). In addition, with a peak age of onset between 40 and 59 years of age, the indirect costs of Type 2 diabetes and its complications fall primarily on adults in their most productive years.

The significant health and economic costs of Type 2 diabetes in Sub-Saharan Africa have been further exacerbated by poor access to diagnosis and treatment. In particular, late diagnosis of diabetes delays initiation of initial treatment, and management of disease complications. Inequalities in access to major classes of medications including insulin, and a lack of health systems capacity prevent better control of the disease and likely contribute to earlier and more severe presentation of diabetic complications or premature death (Mbanya 2010).

Research Questions

- 1) Those co-infected with HIV and on ART will have a higher mean HbA1c but also greater awareness and knowledge of Type 2 diabetes due to increased contact with the health system.**
- 2) We postulate that peripheral neuropathy will be the most prevalent diabetic comorbidity and will also have the greatest impact on productivity and function in both HIV and non-HIV infected populations.**

Methods

Recruitment

The Health and Aging in Africa: Longitudinal Studies of INDEPTH communities (HAALSI) survey will enroll about 5,000 participants aged 40 and above at its site in Agincourt, South Africa. Fieldwork training began in September 2014, and enrollment will begin in October 2014. Data collection is projected to be completed by June 2015. The data will be collected in a CAPI system, and will be available to the research team throughout the data collection period.

Innovation

This pilot will draw on the first wave of results from HAALSI, which is the first study of its kind to combine a comprehensive survey on self-reported cardiometabolic risk behaviors, HIV risk behaviors, as well as a full set of biomarkers taken in the home and in a subsequent clinic visit, including HIV status, CD4 count and whether or not participants have traces of ART drugs in their blood. Our pilot will make immediate use of the Hemoglobin A1C results to identify those who meet clinical criteria for the diagnosis of Type 2 diabetes (ADA 2009). We will also analyze follow-up data among all respondents under age 70; these participants will be invited to participate in a clinical study following participation in the main household survey.

In order to address our first hypothesis, we will analyze current self-reported health behavior relevant to this disease. To address our second hypothesis, we will analyze measures of Blood Urea Nitrogen (BUN) and Creatinine as well as a Urinalysis for measurement of markers of diabetic nephropathy. In addition, monofilament exams will be performed on each participant to document the presence of peripheral neuropathy in the lower extremities. Finally, we will assess current function and economic productivity using a short focused survey instrument.

Expected Results

The results of this study will offer detailed insight into the knowledge and health behavior of an aging South African population with respect to Type 2 diabetes in the context of high HIV prevalence, as well as novel data on the prevalence of three common complications of this condition in this population and their impact on productivity and function. This study will also offer unique insight into how this differs in those with and without HIV and the feasibility of using these two instruments to assess diabetes in this population. Our results will offer new insight into the clinical status, knowledge and health behavior of African adults with respect to Type 2 Diabetes Mellitus, a non-communicable disease with a substantial impact on population health but about which relatively little is known among aging populations in Africa. In particular, the opportunity to gain a better understanding of Type 2 diabetes in patients who are being treated for HIV infection would be unique. More importantly, this study could provide a foundation for the design of future intervention studies for health education, behavior change or medicine access initiatives (specifically oral hypoglycemic agents) to control Type 2 diabetes in this population.

References

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