The contribution of Type 2 Diabetes to disease burden in South Africa
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Prior to joining Thomson Reuters, Shyama was a scientist in the pathology unit of the University of Antwerp, Belgium. With more than 10 years of post-doctoral experience, Shyama is interested in data content curation, the role of biomarkers in disease prognosis and the molecular mechanisms governing disease severity. She relates to disease modeling, translational research and computational biology. Science is her passion.
Sub-Saharan Africa (SSA) has witnessed a rise in diabetes burden, with prevalence varying across the region. The major public health challenge was reported in urban Tanzania at rates of 0.3% in the 1980s, increasing to 4.6% in 1996 (1998 WHO criteria), while urban Cameroon saw diabetes prevalence rising from 1.5% in the 1990s to 6.6% in 2003.
Disease burden

In South Africa (SA), about 1,826,100 cases of diabetes were reported in 2017, corresponding to a prevalence of 5.4%. Overall, numbers are reported to be increasing over time.

In SA 2015, diabetes ranked second among the top ten leading natural causes of death, accounting for 5.4% of deaths. Approximately 14% of ischemic heart disease (IHD), 10% of stroke, 12% of hypertensive disease and 12% of renal disease mortality in those 30 years or older were attributable to diabetes.

Figure 1 lists the top 10 causes of death in 2016 (from specific disease conditions, road injuries and interpersonal violence). Temporal trends for the period 2005-2016, were reported.

The top 10 causes of death were HIV/AIDS, ischemic heart disease, lower respiratory infection, diabetes, cerebrovascular disease, tuberculosis, road injuries, interpersonal violence, COPD and diarrheal diseases. Despite a significant 51.6% decrease in HIV fatality rates during the period, 2005-2016, the condition remains the number one killer in SA.

While most conditions causing death reported falling numbers during 2005-2016, an increasing trend was noted for diabetes with a 10% increased mortality rate posing a serious concern for the country. Within this study period, diabetes also caused high disability rates, with a 34.1% increase in years lived with disability (YLDs) for 2005-2016.

Figure 1: Top 10 causes of death in SA; % change 2005-2016, all ages, number
Source: http://www.healthdata.org/south-africa
Trends in risk factors causing most death and disability

Behavioral, metabolic and environmental/occupational risk factors play significant roles in the manifestation of diseases causing both death and disability. Unsafe sex is the central risk factor for HIV infection, despite SA reporting a -50.8% change for this feature during the years 2005-2016 (Figure 2).

HIV prevalence rates were reportedly high among children and young women. In 2016, an estimated 320,000 children (aged 0 to 14) were living with HIV in SA, only 55% of whom received treatment.

While most risk factors (unsafe sex, malnutrition, alcohol and drug use, dietary risks, high blood pressure, tobacco use, air pollution and WaSH) displayed decreasing trends during the study period, risk factors for diabetes (high body mass index and high fasting plasma glucose) were on the rise, with 8.1% and 6.6% increases during 2005-2016.

Figure 2: Top 10 risk factors driving the most death and disability combined in SA (% change 2005-2016)
(WaSH: Inadequate drinking water, sanitation and hygiene)
Source: http://www.healthdata.org/south-africa
**How much is spent on health?**

For the year 2040, expected growth trajectory based on past healthcare costs is displayed in Figure 3.

While costs are forecast to increase in government health spending and out-of-pocket expenditures, prepaid private spending will decrease in comparison. Slight increase in development assistance for health is estimated in the next decades.

In 2015, the total healthcare expenditure was $1,109 (U.S); the expected total (future growth trajectory based on past growth) for the year 2040 is $1,220.

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**Figure 3:** Forecasting year 2040 healthcare costs in SA

**Source:** Financing Global Health Database 2017 [http://www.healthdata.org/south-africa](http://www.healthdata.org/south-africa)
Type 2 diabetes in Sub-Saharan Africa

Existing cases (Prevalence)

Type 2 diabetes, a disorder of a person's metabolism, is primarily characterized by high blood glucose which is caused by insulin resistance or lack of insulin.

For the year 2013, overall prevalence rate for type 2 diabetes in Africa was reported at 4.9%. The corresponding rates for individual countries are shown in Figure 4.

The highest type 2 diabetes prevalence rates were reported in SA (9.30%) and Tanzania (9.00%), with Nigeria, DRC, Uganda, Ethiopia and Kenya showing values that range from 3.10%-4.30%.

Figure 4: Type 2 diabetes prevalence rates reported for year 2013 in separate Sub-Saharan African countries (age range 20-79 years)
Source: The Incidence and Prevalence Database, Clarivate Analytics
Projections

Projecting prevalence values can assess disease burden over the next years. The projection set shows an increasing number of people living with type 2 diabetes over the next 20 years, with significantly higher numbers in Nigeria, Tanzania and South Africa.

Figure 5: Projected type 2 diabetes prevalence for SSA (2013-2038). Five years of historical data and 20 years of projected data are shown. Population data was obtained from the U.S. Census Bureau. 
Source: The Incidence and Prevalence Database, Clarivate Analytics
The clinical trials scenario

An overview of clinical trials conducted on diabetes in SSA is presented in Figure 6. Given the high prevalence of diabetes mellitus in SA, this country reported the highest number of clinical trials in that region.

The most common drug interventions tested in these clinical trials were metformin hydrochloride, inhaled insulin (Pfizer), insulin glargine, evacetrapib and insulin glargine biosimilar (Eli Lilly/Boehringer). Figure 7 shows the top 15 sponsors for diabetes mellitus clinical trials in SSA.

Figure 6: Top 20 countries with the most HIV clinical trials in SSA
Source: Cortellis Clinical Trials Intelligence, Clarivate Analytics, May 31, 2018
Compared to 20 years ago, the current high diabetes prevalence in the urban black African population of Cape Town is of considerable concern. Furthermore, investigators predict that these numbers will continue to rise due to the high rates of impaired glucose tolerance (IGT) and high levels of overweight/obesity.

In SSA, efforts to raise public awareness for diabetes risk factors are needed, together with healthier lifestyles. Policies that implement behavior changes and targeted screening programs that address the suboptimal detection of diabetes need to be considered.

Finally, factors such as a strong sense of coherence (SOC; characteristic related to a positive life orientation leading to effective coping) influence diabetes incidence. Diabetes prevention should also incorporate measures to modify this risk, calling on social support when developing effective prevention strategies.

References

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