

Diabetes Mellitus: the increasing burden of disease in Kenya

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Introduction

Non-communicable diseases (NCDs) are the leading cause of death globally and diabetes mellitus is the 4th main contributor [1]. It is characterized by chronic hyperglycaemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, action or both [2]. There are three main types: type 1 (T1DM) (10%), 2 (T2DM) (85%) or gestational (5%)[3] affecting 347 million people [4]. There were about 1.3 million deaths in 2008 [4] predicted to increase to over 2 million by 2030 [1]. The burden of diabetes is disproportionately high in low-middle income countries [5,6].

Burden of disease and diabetes

Kenya has a heavy disease burden with an average life expectancy of 56 years [7]. The main challenge arises from communicable diseases (CDs) (e.g.malaria and HIV [7,8]) accounting for about 62% of deaths [9]. Despite successes to control CDs [8], health status has stagnated due partly to the increase of NCDs [8,10] causing 28% of all deaths in 2010; diabetes accounted for 2% of this [7,9]. The World Health Organization (WHO) estimates that the prevalence of diabetes in Kenya at 3.3% [3,8,11] and predicts a rise to 4.5% by 2025 [12]. However, two-thirds of diabetics may be undiagnosed [10,11]. The double demand from CDs and NCDs has hindered Kenya's progress towards achieving the Millennium Development Goals (MDGs) [8]. It is therefore necessary to assess the increasing burden of diabetes and provide cost-effective strategies for its prevention and control.

Funding of healthcare in Kenya

The funding, structure and administration of a health service is key to achieving success. Kenya's healthcare system is financed predominantly through private sources [13]. Private businesses operate 43% of health facilities, government 41% and non-governmental organizations 15% [14]. However the government owns most hospitals, health centres and dispensaries [14]. In 2006 Kenya's total health expenditure (THE) was 4.6% of gross domestic product with 29US\$ per capita being spent on health [15], below the WHO recommended 34US\$ for provision of a



Figure 1. Health Centre treating local community of Muboroni, Nyanza Province, Western Kenya

minimum health package [15,16]. Kenya's focus has been to control CDs which account for the majority of THE [7,12,13]. A disproportionate expenditure is allocated to urban areas for curative care [7]. In East Africa the average total annual cost for care of a type 1 diabetic is 229US\$ with 60-70% of this being used to purchase insulin [12]. Kenya does not have adequate funds for diabetes prevention or care. Kenyans who can, independently fund their care [13,14], leaving many diabetics and their families at risk of poverty and poorer health [1]. Some save money through non-compliance; increasing the risk of complications [10]. Nearly 50% of Kenyans live on less than 1US\$ daily [14,17]. Kenya has developed a more positive attitude to prevention and public health, increasing THE from 9% (2001/2002) to 23% (2009/2010) [7]. But this needs to be accompanied by a more effective healthcare system.

Structure and management of Kenya's healthcare system

Kenya's health facilities are distributed regionally. Community dispensaries and health centres [14] provide the most basic level of service [17]. Sub-district hospitals, provincial hospitals and the Kenyatta National Hospital (KNH), provide more specialist services [14,17]. After the 2007 elections the hierarchical healthcare structure was divided [17]. The maintenance of two bodies controlling the same function created overlap in the planning and implementation of processes [12,17]. Widespread disparities in provision [17], may be attributed to socio-economic, gender and geographical differences [8], with

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only 77% of Kenyans who are ill utilizing the healthcare available [17]. Health worker distribution is also uneven, with greater numbers in hospitals and urban areas [7,12]. Hospitals often have public and private levels co-existing, managed by the same staff [17]. Conditions within public wards are poor compared to the unaffordable private wards [14,17]. As in many sub-Saharan African countries, the health system is organised to treat acute rather than chronic conditions [10,18,19], with a lack of primary healthcare to tackle chronic diseases such as diabetes [11,12] (see figure 1).

Management of diabetes in Kenya

Diabetes requires long-term follow up, with uninterrupted access to medication and specialist care [10]. Many health workers lack adequate knowledge and training [12, 20] thus exposing diabetics to suboptimal management. Many health facilities do not routinely screen for hyperglycaemia [11].

The high cost and low availability of insulin in Kenya [12] with inadequate patient follow up [10] contribute to poor management [6]. Although the Kenyan government subsidizes insulin to reduce price for patients, supplies frequently run out and there is miscommunication between local depositories and central medical stores to restock [12].

The “Leadership for Education and Access to Diabetes Care” Initiative (Novo Nordisk), aimed to provide insulin at lower prices to least developed countries (LDCs). However the price is often marked up for profit [12], forcing many patients to buy from private sources at prices over 60% higher [12]. Unsurprisingly, many patients have poor glycaemic control [6] and a quarter of all hospital admissions in Kenya are diabetes-related [21].

Risk factors for diabetes

A Kenyan study reported that a family history of diabetes in a 1st degree relative conferred a relative risk of 2.2. Higher rates of diabetes are found in urban areas [3]. Urbanisation and adoption of ‘Western lifestyles’ have led many Kenyan’s towards risk factors for T1DM [20]. Kenya has seen increases in abdominal obesity, poor dietary habits, excess alcohol consumption and physical inactivity [2,3,5]. Childhood starvation is also associated with T1DM (relative risk of 2.08) [3]. Such modifiable risk factors need to be targeted.

Knowledge and attitudes toward diabetes

There is a low level (perhaps under 30%) of public awareness and knowledge about diabetes in Kenya [11,12,22]. Knowledge differs according to education and region [22]. Most respondents have poor behaviours

towards diabetes [22]: 41% show an unwillingness to adopt healthier lifestyles. Although an increased level of knowledge is associated with good practice for diabetes prevention, 49% with adequate knowledge failed to put this into practice [22].

The National Diabetes Educators Manual (2010) [23] was produced acknowledging the need for further education of healthcare staff and the public. The effectiveness of the scheme is yet to be confirmed.

Diabetic complications

Many diabetics in Kenya are diagnosed with irreversible complications [6, 11], likewise half of T1DM patients in

**ANSWER TO
PHOTO QUIZ FOR OUR
READERS**



Photograph sent by Kivumbi J. Bonabantu, Mariallou Hospital.

Question: Why do you think this child is wearing such a heavy bracelet?

Answer: This boy with a broken humerus came to Mariallou hospital for analgesics following reduction of the broken bone using this traditional method of traction – a mould made of mud.

Congratulations to Dr. Ruot Garjiek Teny, Akobo County Hospital, South Sudan, for submitting the correct answer.

the UK have complications at diagnosis [24,25]. In Africa infection and acute metabolic complications are the most common causes of death [6], compared to cardiovascular/renal complications in Western countries [1,6].

Diabetic ketoacidosis (DKA) accounted for 8% of diabetic admissions in a study at KNH, 30% of patients died within 48 hours of presentation [26]. Foot ulcers are seen frequently at many tertiary clinics in Kenya and are associated with poor glycaemic control, infection, hypertension and dyslipidaemia [11]. This has encouraged provision of community mobile podiatry services [11].

The WHO report that diabetics require up to triple the healthcare resources compared to non-diabetics [1]. Diabetes threatens Kenya's healthcare system and the wider economy with loss of productive workforce [22].

Prevention of diabetes

The burden of diabetes is recognised. Kenya is addressing the need for improvements through the launch of a National Diabetes Strategy in 2010 [11,20]. This aims to prevent or delay the development of diabetes, improve the quality of life by reducing complications and premature mortality [11]. Key interventions prioritise prevention, early detection and control. Hospital diabetic clinics have been established in the nine provinces [20] but access remains a challenge due to travel distances [12]. A Diabetes Education Programme has also been implemented for healthcare staff [12]. Success of such strategies is dependent on their sustainability and local ownership [20]. To date there has been little evaluation of the strategy [12] so policy makers cannot make informed suggestions for improvements.

Discussion

Funding and structure

The Kenyan government recognises the threat from NCDs and is committed to improving health by widening access to quality care [27]. The National Diabetes Strategy (2010-2015) is fundamental to this aspiration. Ultimately a positive political environment is required for success [10].

Prevention and control of diabetes

The current disease burden indicates a need for more resources for prevention and health promotion, with primary healthcare taking greater responsibility for chronic diseases. Effective primary care should lower hospital admissions and reduce overall cost. The WHO recommendations are now a focus of the Kenyan government [28], however the financial demands for curative care reduce funding available for implementing such policies [7]. The WHO recommends changes in financing and delivery of services for chronic conditions

within Kenya and other sub-Saharan African countries [18]. Funding needs to be reassessed and allocated appropriately, with a greater proportion to NCDs especially diabetes. A lower financial burden on individuals by increasing public funding should

- Reduce poverty,
- Increase treatment compliance,
- Improve diabetic control and
- Reduce complications, thus
- Reducing further burden on healthcare services.

Education focusing on prevention and management is crucial to reducing the burden of diabetes [29,30]. Current strategies for patient and healthcare staff need evaluation. This should be targeted at high risk groups, e.g. those with a diabetic family history, obesity, physical inactivity, glycaemic impairment. Increased knowledge may change attitudes towards diabetes and aid prevention by motivating individuals to take responsibility for their health [22]. The UK 'change4life' strategy was implemented to increase healthier behaviour [31] and Kenya could use this as a model.

Health promotion strategies enables self-assessment for risk of diabetes and identify common symptoms, thus encouraging access to health services [22]. Educating families with a family history of diabetes could reduce modifiable risk factors [3] and be used for screening.

Diabetes is not a priority for many healthcare staff [12]. There is a need for continuing professional education of all healthcare workers. Screening of those at increased risk and monitoring of symptomatic patients should be encouraged. Such individuals need instruction to modify their risk factors. Investment should be sought to train more healthcare workers, particularly within rural and poorer areas [10].

Diabetes should be aggressively managed by regular clinic attendance [22] and patients assisted, where practical, to take responsibility for their own blood glucose monitoring [32]. This improves the chance of achieving optimal glycaemic control [22]. Healthcare workers should also monitor blood pressure and provide footcare [1].

The improvement of education needs to be met with improved availability of diagnostic equipment and appropriate affordable treatments (insulin is on the WHO essential drugs list). This means a greater allocation of funds, purchasing through tenders and pooled procurement [10]. A task easier said than done.

Managing complications

For individuals with existing complications, regular checks should be provided to prevent further deterioration.

This requires strict management of blood glucose, blood pressure and lipids with regular follow up [33].

Data collection and research

The lack of clear data on the epidemiology of diabetes makes informed policy decisions difficult [12]. The WHO's Global Strategy 'Prevention and Control of Noncommunicable Disease' recommends that countries track NCDs, their risk factors and determinants [1]. Robust evaluation of interventions to establish the most cost effectiveness is required.

Kenya's challenges

The utilisation of health services by Kenyans is increasing but access to quality healthcare remains limited [7]. Poor health service infrastructure and unavailability, shortage of health, administration and management personnel and financial constraints restrict delivery of an adequate service [7]. Kenya cannot fund even the WHO minimal level care package to each citizen [16].

Conclusion

Kenya has a challenging health landscape with the burden of diabetes and other NCDs adding to the existing challenge of CDs. Tackling the burden of diabetes presents many difficulties. There remains inadequate funding for the effective implementation of an effective strategy for the prevention, detection and management of diabetes. Lack of awareness and an increasing prevalence of diabetic risk factors are critical obstacles to overcoming diabetes in Kenya [12]. This is reflected by the many patients presenting with complications. The financial strain from diabetes hinders Kenya's achievement of their UN MDGs [1] and Vision 2030 [11].

Kenya has an opportunity to reduce the burden of diabetes but funding needs to be concentrated on public health and primary healthcare interventions. In turn this requires changing population behaviours to adopt healthy lifestyles. Intensive management and monitoring of diabetics is crucial with matched diagnostic and medical availability.

Evaluation of implemented strategies and epidemiological research are essential. This would inform decisions leading to optimal care quality and cost effectiveness.

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PHOTO QUIZ FOR OUR READERS

1. What name is given to this facial physical sign?
2. What is the underlying cause?
3. What parts of the body are most likely to be the infected foci?
4. Describe the cardiovascular complications.
5. What is the risk of sucking out (aspirating) secretions from the trachea?
6. With what apparently minor symptom might a neonatal case of this condition present?

See answers in the next issue.

We are grateful to Dr. David Webster for providing this photograph of his experience in Amudat Hospital, Uganda when he was there as Medical Superintendent in the 1960's.

