Diabetes in Africa: the new pandemic

Report on the 19th World Diabetes Congress, Cape Town, December 2006

The prevalence of diabetes in Africa is predicted to increase by 80% in 2025 and impact younger working age patients. We increasingly live in an obesogenic society that drives the global pandemic of Type 2 diabetes. The powerful commercial, socio-economic and political factors shaping this society encourage individual choices that lead to a sedentary and unhealthy lifestyle. These factors are increasingly seen in lower income countries. The metabolic syndrome is now an established entity which can be identified and treated prior to the development of diabetes. In sub-Saharan Africa there is an emerging relationship between the HIV and diabetic epidemics. For example HAART leads to a higher risk of diabetes and diabetes increases the risk of infections such as TB. The quality of care in sub-Saharan Africa can be improved with relatively simple measures if they are implemented consistently and guidelines have been developed for this context. A vision for the way forward in Africa has been expressed in the 2006 African Diabetes Declaration.

Introduction

The diabetes conference at the Cape Town International Conference Centre was reportedly the largest conference they have held to date – 12,000 people came for 5-days to discuss nothing but diabetes. Although diabetes is a major problem in Europe and North America the conference was held in South Africa, not only because of our attractive "mother city", but also because diabetes is an important emerging problem on the continent. A number of local family physicians have combined their experience of the conference to produce this report.

Diabetes in Africa

Globally there is an increasing incidence of Type 1 diabetes and in many African countries access to and affordability of insulin remains a matter of life or death.[1] Although the prevalence of Type 2 diabetes is predicted to increase globally 55% by 2025, in Africa the rate is expected to rise by 80% (Table 1).[1]

Source: IDF Atlas www.eatlas.idf.org

In South Africa the prevalence rates are higher than the African average, already ranging between 4-6% especially in urban areas.[2]. Many diabetics remain undetected with figures ranging from 80% in Cameroon to 55% in Cape Town. [2] The rising prevalence of impaired glucose tolerance is a warning sign and reflects increasing obesity and decreased physical activity.[2] As diabetes is occurring in younger people the disability due to blindness, amputations and kidney disease is likely to impact on working age adults and erode efforts to overcome poverty.

An obesogenic society

The rising prevalence of diabetes is a reflection of our "obesogenic society" where powerful forces shape our bodies and our tendency to diabetes, hypertension, and hyperlipidaemia. These forces include the [3]:

- Food industry – our food is increasingly processed and provided by global corporations with few restrictions on the quality of what we eat.
- Media – the food industry uses the media to market cheap and freely available obesogenic products at the same time as new technology that encourages a sedentary lifestyle – for example computer games and play station.
- Urban environmental planning – with increasing urbanization our cities are not designed with healthy lifestyles in mind. There are few opportunities for safe cycling, walking or exercise alongside the traffic jams.
- Socio-economic factors – poverty and ill-health are closely related.
- Genetics – there is no doubt that genetics play an important role in explaining racial differences and markers have been identified.

Stress and ageing have also been linked to the development of the metabolic syndrome.[4] Cultural beliefs may also play a role, for example, obesity may be associated with authority, affluence and well-being – particularly in contrast to HIV. The need to walk and take exercise may be seen as a sign of poverty and aetiology may be mistakenly attributed to excessive sugar intake.[3] A Durban study found that 65% of urban Zulu women are obese [2]. While the health system is an important counterbalance to these factors it will not be able to adequately promote health and prevent the development of diabetes without advocating for a comprehensive inter-sectoral approach, as has been seen with the anti-smoking lobby. The IDF are campaigning for a United Nations resolution on diabetes under the banner "Unite for Diabetes" (www.unitefordiabetes.org)

Action suggested for poor countries includes an integrated approach to chronic diseases as well as diabetes specific action (Table 2).

The metabolic syndrome (MS)

The conceptualization of a metabolic syndrome as a precursor of diabe-

Table I: Predicted prevalence rates of Type 2 Diabetes in Africa 2007-2025

African parameters	2007	2025
Total population	747 million	1088 million
Adult population (20-79yrs)	336 million	537 million
Prevalence of diabetes	3.1%	3.5%
Number of diabetics	10.4 million	18.7 million (+80%)
Prevalence impaired glucose tolerance	7.2%	7.5%
Number with impaired glucose tolerance	24.2 million	40.3 million (+66%)

Table 2: Actions suggested for poor countries. [3]

Integrated actions	Specific actions
Macroeconomic policy and health. Health and economic development are inter-related. Focus on extreme poverty.	Increase awareness of diabetes i.e. IDF campaigns such as "diabetes action now" and "unite for diabetes"
Strengthen chronic care health systems	Collect data on the economic impact of diabetes
Increase funding for chronic disease. Of $2.9 billion donor funds only 0.1% currently goes to non-communicable diseases.	Define a minimum acceptable global package of care (rather than an impossible ideal)
Focus on primary prevention and changing the obesogenic environment – transport, urban design, marketing of food to children, food and exercise requirements at school, sale of junk food on public premises, labeling of food etc.	Target primary prevention on high risk groups with impaired glucose tolerance Support implementation of specific projects and evaluation

Table 3: Definition of the metabolic syndrome by the IDF.[5]

For a person to be defined as having the metabolic syndrome they must have: **Central obesity** (defined as waist circumference* of >=94cm for males and >=80cm for females) **plus any two of the following four factors:**	
Raised triglycerides	>= 1.7 mmol/L or specific treatment for this lipid abnormality
Reduced HDL cholesterol	< 1.03 mmol/L in males < 1.29 mmol/L in females or specific treatment for this lipid abnormality
Raised blood pressure	Systolic BP >= 130 or diastolic BP >= 85 mm Hg Or treatment of previously diagnosed hypertension
Raised fasting plasma glucose	>= 5.6 mmol/L or previously diagnosed type 2 diabetes If above 5.6 mmol/L, OGTT is strongly recommended but is not necessary to define the presence of the syndrome.

tes and cardiovascular disease has now been well established and accepted.[4] This has highlighted that not only is the total level of obesity important (as measured by the body-mass index) but also the distribution with the degree of abdominal obesity (as measured by the waist circumference) being important. Individuals at risk for MS could be identified by opportunistic screening of their waist circumference. Three international definitions of MS have been published including that of the IDF (Table 3).[5] In the USA the MS is now being seen in adolescents and type 2 diabetes is predicted to be commoner than type 1 diabetes in this age group in the near future.[6] Healthcare professionals have an important role to play in preventing and screening for MS. The most important intervention is to lose weight and improve lifestyle, however anti-obesity drugs and even surgery can contribute and the individual components of the MS be treated.[7]

- If BMI is >30kg/m2, central obesity can be assumed and waist circumference does not need to be measured. No specific data on waist circumference for sub-Saharan Africa is available and therefore European figures are given.

Nutrition

There is an ongoing debate as to the best diet for weight reduction. Is it the "low carbohydrate" or "low fat" or "high protein" or "low glycaemic index (GI) diet" that is best? Healthcare professionals often give conflicting advice to patients and this can cause confusion.

Low GI diets have been shown to decrease HbA1c, improve insulin sensitivity and decrease the risk of developing diabetes.[8] Others argue that the GI is not the best indication of a healthy diet because the individual response to the same food is highly variable; there is variation in the GI for the same food in different countries and some "unhealthy" foods (e.g. ice-cream, coke, chocolates) have a low to moderate GI.[9]

These diets can all be successful in weight reduction in the short-term (6 to 12 months), but a "mixed healthy diet" in adherent patients leads to greater long term success.[10] There is also a lack of evidence for nutrition recommendations and most of the evidence is short-term and under powered. [11]

HIV, TB and Diabetes

While fear of HIV may increase positive perceptions of overweight and obesity the adverse effects of some anti-retroviral medication will also increase the number of people with impaired glucose tolerance.[3] In addition diabetes increases susceptibility to TB and in India 26% of new smear positive TB cases are attributed to diabetes.[3]

The lipodystrophy syndrome is seen in 40 – 50% of HIV patients on HAART and up to 64% if they are on a protease inhibitor.[12] It is characterized by fat wasting in the limbs, but abdominal obesity. There is insulin resistance, dyslipidaemia and impaired glucose tolerance, which increases the risk of developing diabetes and cardiovascular disease.[13] HIV infection per se increases the relative risk of diabetes to 2.2 while the addition of HAART increases the relative risk to 4.6. Studies have shown that after 4 years on HAART 30% of patients had developed metabolic syndrome [13] and 10% diabetes - compared to 3% in HIV negative subjects.[12]

HIV infection itself causes arterial wall inflammation leading to arteriosclerosis, as well as decreased HDL and LDL and raised triglycerides. While it is well known that protease inhibitors can cause lipodystrophy, Stavudine has also been shown to be a significant risk factor for the development of diabetes and insulin resistance. The WHO has recommended that countries move away from Stavudine containing regimens when they can afford it [13] or at least avoid it in women with a high BMI.[14]

HIV and diabetes has been described as two epidemics on a collision course.[15] In the context of the high mortality rates of 5% Stage 4 HIV patients dying each month if they do not access HAART,

the metabolic complications of HAART should never be used as an argument to withhold life saving treatment.[14]

Quality of care

Several audits of diabetic care in South Africa show significant room for improvement. For example Figure 1 shows an audit of the Cape Town Metropolitan District Health Services (MDHS) in 2005.[16] Following this audit the MDHS have piloted a project to screen for diabetic retinopathy with a non-mydriatic fundal camera and introduced a simpler screening tool for the diabetic foot.[17] Family physicians have been made responsible for quality improvement systems and clinical governance. Good quality of care can be achieved even with limited resources and requires a threefold focus on [18]:

- Health care workers knowledge and skills – effected by university training
- Patient empowerment – effected by communities and health services
- Access to resources needed – effected by policy makers, managers and industry

Improvement in quality is typically slow and progressive and requires sustained effort over several years. Quality criteria can be reported at the level of individual patients, health facilities or districts.

Individual data also allows specific feedback on risks to the patient and there are now risk calculators based on the UKPDS study that calculate this for you www.dtu.ox.ac.uk/riskengine.[19] Models recognise that risk factors are linearly related to outcomes and are not dichotomous (i.e. at risk / not at risk), as treatment thresholds and guidelines commonly imply. The overall risk by considering multiple risk factors together will therefore be more important than decisions based on individual risks alone.

The good news however is that even a small but sustained reduction in HbA1c over 10-years can lead to a significant reduction in risk:[19]

- 25% for microvascular risks
- 16% for myocardial infarction
- 21% for retinopathy
- 33% for albuminuria
- 12% for all risks

Similarly a 10/5 reduction in blood pressure over 10-years leads to a risk reduction of:

- 34% for retinopthay
- 44% cerebrovascular accidents (stroke)
- 22% all risks

To support quality improvement initiatives the IDF have produced Global Guidelines for Type 2 Diabetes (www.idf.org) and the African Region a contextualized clinical practice guideline for diabetic programmes.[20]

The total medical costs of diabetic patients in developed countries have decreased over the last 15 years despite an increase in cost for non-diabetic patients over this time period.[21] This is mainly due to a reduction in hospitalized patient costs, possibly due to better preventive care programs, screening programs and by treating potential complications earlier.[21]

Late breaking trials

A handful of late breaking trial results were presented at the conference. These included the AFORRD, ADOPT, and SERENADE trials.

AFORRD [22]

The Atorvastatin Factorial with Omega-3 fatty acids Risk Reduction in Diabetes (AFFORD) trial, was a community based, multi-centre, randomised controlled trial conducted in primary care, designed to identify possible benefits of statin therapy amongst those patients with type II diabetes, previously thought by their physicians not to be at high enough risk to warrant a statin. In these patients lipid lowering with atorvastatin 20mg, was found to reduce LDL cholesterol to 2.6mmol/l in 91% of patients (mean 1.8mmol/l) and significantly reduce the estimated 10-year CVD risk by 21% (absolute risk reduction 6.7%). The study highlighted the extent to which type II diabetics were under-treated with statins in primary care in the UK. AFORRD also studied the effect of an Omega-3 product on blood triglyceride levels. They were found to marginally reduce triglyceride levels (5.6%) but not to reduce overall estimated CVD risk.

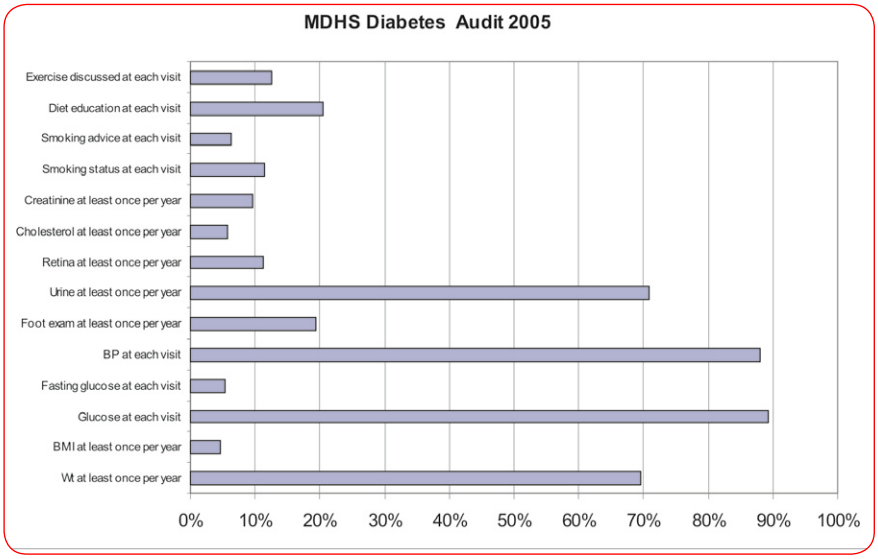
ADOPT [23]

A Diabetes Outcome Progression Trial (ADOPT) was designed to compare the efficacy of a thiazolidinedione (rosiglitazone) with other oral hypoglycaemic agents (metformin and glyburide) in maintaining glycaemic control in type II diabetics with the primary outcome defined as failure of monotherapy. Results revealed a cumulative monotherapy failure at 5 years of 15% with rosiglitazone, 21% with metformin and 34% with glyburide, representing a risk reduction of 32% for rosiglitazone, compared with metformin, and 63% compared with glyburide. Investigators concluded that though rosiglitazone was superior to the other agents, the consideration of adverse effects, cost effectiveness and individualized risk/benefit margins should inform the choice of pharmacotherapy in type II diabetic patients.

SERENADE [24]

This study was a 6 month randomized, double blinded, placebo controlled, international multicentre study, utilising a fixed dose of Rimonabant (the first selective Cannabanoid I receptor blocker) as sole treatment for previously untreated type II diabetics with multiple cardio-metabolic risk factors. Efficacy and safety were reported on, with the effect on HbA1c as the primary outcome mea-

Figure 1: Audit of diabetic care in Cape Town Metropolitan Health Services 2005. [16]



sure. Results showed a clinically meaningful fall of 0.8% in HbA1c compared with placebo. This was accompanied by significant improvements in a range of cardio-metabolic risk factors (weight, waist circumference, HDL-cholesterol and Triglycerides) though not in blood pressure. Nevertheless, on balance, and in taking cost and overall efficacy into account, investigators reiterated that metformin remains the first choice oral anti-diabetic agent.

The African Diabetes Declaration 2006

Despite the justifiable attention being given to HIV/AIDS and TB the diabetic pandemic is gaining ground, even in Africa. The African Diabetes Declaration and Strategy sets out a call to action and plan of action targeting the countries of Africa covered by the partner organizations: IDF-Africa, WHO-AFRO and the African Union.[25] The declaration is shown in the box and the full plan is available from the website www.idf.org.

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Africa is in the grip of a diabetes epidemic. This is not just a threat to physical and economic health but an evolving reality. The personal suffering and public cost of diabetes in Africa is insupportable and can be avoided.

Diabetes and its complications are largely preventable through relatively simple interventions. The evidence for preventing diabetes and its complications is so overwhelmingly positive that there is no longer any excuse for not intervening.

There are low cost interventions with proven effectiveness that can reduce the impact of diabetes while simultaneously addressing risks for other disease areas. The cost of intervening will be cheaper than the cost of not intervening and an investment in diabetes brings health gains in other disease areas.

The IDF-Africa and WHO-AFRO call on governments of African countries, non-government organizations, international financial institutions and donor agencies, industry, business, unions, citizens, health care providers and all partners and stakeholders in diabetes and related chronic diseases to ensure:

- Adequate, appropriate and affordable medication and supplies for people with diabetes.
- Earlier detection and optimal quality of care of diabetes
- Effective efforts to create healthier environments and prevent diabetes
- The identification and dissemination of information, education and communication to empower people with diabetes to access appropriate diabetes services and improve self care
- Equitable access to care and prevention services for people with or at risk of diabetes
- Awareness of diabetes in the community and among health care providers
- A truly integrated approach which utilizes the whole health workforce to address infectious and non-communicable diseases simultaneously
- Government commitment to reducing the personal and public health burden of diabetes
- Partnership and collaboration within and between government sectors, private sectors, non-government organizations and communities to create community and workplace environments that promote better health.

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