

## **Global challenges in health: effect of westernization on the prevalence of diabetes mellitus in Nigeria.**

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### **Editorial Review**

#### **Abstract**

Diabetes mellitus is a common non communicable disease which appears to be assuming epidemic proportions worldwide with 382 million people affected worldwide. Current estimates describe Nigeria as having about 4 million affected people a large proportion of which are undiagnosed. The factors driving the diabetes epidemic worldwide include obesity, physical inactivity, smoking, alcohol intake all of which are associated with globalization/ westernization. The role of these factors in Nigeria and the possible measures to reduce the trend in the country are highlighted in this review. Simple inexpensive lifestyle measures have been outlined to curb the looming diabetes epidemic in the country.

**Key words:** Diabetes mellitus, prevalence, challenges, westernization, Nigeria

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## **Défis mondiaux dans le domaine de la santé: effet de l'occidentalisation sur la prévalence du diabète au Nigéria.**

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### **Révision éditoriale**

#### **RÉSUMÉ**

Le diabète sucré est une commune non maladies transmissibles qui semble être prendre les proportions d'une épidémie dans le monde avec 382 millions de personnes touchées de par le monde. Les estimations actuelles décrivent le Nigéria comme ayant environ 4 millions de personnes dont une grande partie ne sont pas diagnostiqués. Les facteurs à l'origine du diabète épidémique dans le monde comprennent l'obésité, l'inactivité physique, le tabagisme, l'alcool d'admission qui sont tous associés à la mondialisation/ occidentalisation. Le rôle de ces facteurs dans le Nigéria et les mesures possibles pour diminuer la tendance dans le pays sont mis en évidence dans cet examen. Simple vie peu coûteuses mesures sont étés soulignés à endiguer la menace du diabète épidémique dans le pays.

**MOTS CLÉS:** Diabète sucré, la prévalence, défis, occidentalisation, le Nigéria

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## INTRODUCTION

The world is facing global challenges. The scourge of communicable diseases is now plateauing off while non-communicable diseases (NCDs) are taking centre stage.

Diabetes mellitus(DM) now affects 382 million people and will reach 592 million in 2035 (1). The highest increase in the prevalence will be in the developing countries with some recording about 100% increase in prevalence by 2035 by current projections (1). This paper looks at the main factors driving the change in the prevalence and efforts to curb the increasing trend.

## EPIDEMIOLOGY OF DIABETES MELLITUS

The prevalence of DM has risen steadily over the past 3 decades. The global prevalence of DM has risen from 100 million in 1994 to 171 million in 2000, to 250 million in 2007, 366 million in 2012 and finally 382 million in 2013 (2-3).

Table 1 shows the changes over time:

	1994	2000	2007	2011	2013
Global DM Prevalence (millions)	100	171	250	366	382

Mirroring the global increase in DM prevalence, Nigeria has been recording rising DM prevalence (1,2). In the 1960s Johnson estimated a DM prevalence of <1% in Lagos in a community based study, while Ohwovoriole two decades later recorded a prevalence of 1.8% in a community screening involving 1627 respondents in urban Lagos (4,5). Akinkugbe O et al in a Ministry of Health funded nationwide adult survey recorded national DM prevalence of 2.2% in the 1990s (6).

Nyenwe et al recorded 6.8% prevalence in Port Harcourt, an urban community in the South-south zone of the country in 2003 (7). Ekpenyong et al in another survey in an urban community of Calabar also in the south south zone recorded a DM prevalence of 10.5%. Current

estimates of DM prevalence are 0-2% in rural adults and 6-10% in urban dwelling adults in Nigeria (9,10). This translates to about 4 million people living with the condition, a large proportion of which are undiagnosed. What does this rising prevalence portend?

## CHALLENGES OF HEALTH

The global challenges as they relate to DM are enormous with DM patients consuming over 10% of health budgets in developed countries (11). In developing countries like Nigeria where the health insurance system is poorly developed or has low coverage many patients have to bear the cost of care out of their pockets (or from their family).

There are also great burdens on the healthcare system as patients with complications of DM stretch the capacity of the hospitals and centers beyond their limits. DM is the 2nd or 3rd commonest cause of end stage renal disease and thus consumes a lot of time and personnel in dialysis units (12). Many in-patient beds on medical wards are taken up by patients who have long stay conditions like diabetic foot ulcers (or gangrene) and stroke. Some of these patients with DM complications and co-morbidities occupy the few available beds for up to 2-3 months at a time in developing countries like Nigeria (13,14).

## FACTORS DRIVING THE DIABETES EPIDEMIC: GLOBALIZATION

Overweight/Obesity: The single most important factor in the diabetes epidemic is excess body weight. Obesity and overweight has reached epidemic proportions worldwide. There are now 1.8 billion people who are affected. Though obesity is commoner in the industrialized western nations affecting a third of adults, the less industrialized low and middle income countries are also experiencing increased numbers (15,16). The factors responsible for the upward trend in body weight include rural to urban migration which is associated with changing diet from the rural high fiber diet to the calorie dense low fiber diets and soft drinks in the urban centers (17).

Studies in Nigeria, like that of Olusanya et al in undergraduates of a university show that over 70% of students consume snacks on a daily basis which could explain the high overweight/ obesity prevalence in these communities (18). Akarolo-Anthony et al also describes the transition in eating patterns in Nigeria with many urban dwellers now consuming rice than in the past (19).

Other factors which have been implicated in rising overweight and obesity prevalence in Nigeria include sedentary lifestyle (more television, video and computer games, less use of playgrounds, sporting facilities), longer school hours, etc (20,21). Studies have shown that physical activity levels are reduced in both urban and rural dwelling Nigerians compared to their American counterparts (22). The rising weight trends are noticeable from early in life and several studies in children and adolescents have demonstrated this.

Abah et al in a study in Ekpoma, near Benin, Nigeria, demonstrated that 9.6% of students 9 – 18years were overweight/obese, this was commoner in those attending private schools compared to those in the public schools suggesting that higher socioeconomic status in this community was associated with childhood/adolescent obesity (23). Chinedu et al described even higher prevalence of overweight and obesity in a similar study of children, adolescents and young adults attending school in Ota, South West Nigeria. In the preschool children undernutrition was common and in the 6-9 year age group obesity and overweight was the more common abnormality. Overall overweight obesity rates were about 13% (24).

**Changing Disease Pattern:** Gradual reduction in mortality from communicable diseases has led to a gradual increase in lifespan and an increase in the importance of the non-communicable diseases (NCDs) in developing countries like Nigeria (25). Lifestyle in urban communities is characterized by more alcohol and tobacco use. Over 50% of adults in urban Nigeria take alcohol (26). Fortunately smoking is not a

very common habit in Nigeria with less than 20% adults smoking (27,28). Unfortunately the trend for smoking appears to be rising and in some parts of the country about a third of adults are current smokers as found in Yola in North East Nigeria by Desalu et al (29). Hypertension is becoming commoner in Nigeria. Treatment with anti-hypertensive drugs (thiazides and other anti-hypertensive drugs) has the potential for unmasking or precipitating DM (30).

Some other drugs like corticosteroids, contraceptives which are more commonly used may have similar effects. The impact of all these drugs on DM prevalence however has not been quantified. With greater longevity it is believed that disease patterns in Nigeria may follow that of westernized nations. The current life expectancy at birth in Nigeria is about 51 years (31). As lifespan increases the DM prevalence may rise as has been seen in countries with older populations.

## **REDUCING DIABETES PREVALENCE IN NIGERIA**

To reduce the trend of increasing DM prevalence concerted efforts are required at two levels. These are primordial prevention (reducing the risk prior to birth, for instance in utero) and primary prevention (before the disease starts).

### **PRE- PRIMARY (PRIMORDIAL) PREVENTION**

**Maternal and Fetal Health:** Several studies have revealed that ensuring better maternal health will lead to healthy pregnancies which in turn reduce the rates of complicated pregnancies which are associated with small for gestational age (SGA) babies. SGA babies are at higher risk for DM in adult life especially when they experience rapid catch up growth (32). On the other hand mothers with gestational and pre-gestational diabetes, especially when poorly managed have large for gestational age (LGA) babies. These LGA babies have also been found to have a higher risk for developing DM than their normal birth weight peers (33). Thus improved maternal

health is one of the keys to early DM prevention.

**Neonatal and Infant Health:** Several studies have demonstrated that healthy early life is associated with less development of the risk factors of DM. Thus emphasis on raising healthy children is a very important overweight, obesity and DM prevention measure. This can be achieved by healthy nutrition (starting with breast feeding and followed by less processed foods and encouraging high fiber, low glycaemic index foods which are readily available), immunization, adequate and healthy environment, adequate play time and physical activity (34,35).

### PRIMARY PREVENTION

**Child Health:** Malnutrition in childhood is associated with higher DM prevalence in adult life. Thus the thrifty gene hypothesis postulates that periods of starvation promote insulin resistance and an ability to easily accumulate fat to ensure survival in periods of famine. This gene or phenotype however becomes harmful where there is continuous supply of food as seen in westernized nations. Both under-nutrition and Over-nutrition are implicated in increased DM prevalence in adulthood. Other factors that raise the risk of DM include less breastfeeding and more use of artificial or cow milk formulae for infant feeding (36,37). Barker hypothesis tried to explain the basis of high DM prevalence in adults who had intrauterine growth restriction in early life (38). It is believed that the early life malnutrition limits the beta cell growth in utero leading to the child being born with reduced beta cell mass.

**Lifestyle Measures:** Lifestyle measures are the most cost effective way in reducing DM prevalence. The Diabetes Prevention Program demonstrated that regular exercise (150 minutes/week) can reduce significantly the development of DM in pre-diabetic subjects (39). Other studies have replicated these benefits. Exercise or regular physical activity leads to weight reduction or prevention of weight gain. Obesity is one of the most important factors in the DM

epidemic. Thus diet and exercise help in improving insulin sensitivity and the metabolic profile thereby reducing cardiovascular risk (40).

Smoking cessation and alcohol reduction are also very important in primary and secondary DM prevention.

**Government and Non-Governmental Organization Policies:** Policies of health funding agencies have to be redirected to cover NCDs like DM and hypertension. Currently the Millennium Development Goals do not place much emphasis on NCDs. In many nations some of the facilities for controlling communicable diseases like malaria, tuberculosis and Human Immune Virus /Acquired Immune Deficiency Syndrome have been expanded to accommodate the NCDs including DM.

Screening programs for pre-diabetes and DM detection also need to be harnessed and harmonized to ensure early detection and proper DM management (41).

**DM Advocacy:** There is also need for DM advocacy. The right attitude to DM and its prevention needs to be promoted. Also influential or key opinion leaders need to spread the message. The media need to spread the message of DM prevention, government requires to ensure promotion of healthy lifestyle (promoting exclusive breast feeding, adequate playgrounds, walking and biking paths, restricted smoking, soft drinks and alcohol advertisement, etc) All these efforts require to be well laid out and coordinated (42,43,44,45). Children need to be encouraged by parents and other role models to reduce television viewing, increase exercise/sports and eating healthy, balanced diets.

### CONCLUSION

DM is now a common NCD in Nigeria. Over the years the prevalence has increased. The global and local trends of the disease suggest that except concerted efforts are made to curb the menace the impact of the looming diabetes epidemic on the health care system of the country will be devastating.

Simple inexpensive measures like healthy lifestyle changes, provision of recreational facilities, increasing awareness of pre diabetes/DM and reduction of known risk factors will go a long way in curbing the looming epidemic of DM in Nigeria.

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