

Prevalence of Diabetes mellitus in Abeokuta, Ogun state, Nigeria

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Abstract: A total of one hundred and eighty two participants were screened for diabetes from three communities after counseled in Abeokuta. Informed consent was obtained from the participants before commencement of the study. Two blood samples were collected, the first sample was collected before eating in the morning (fasting blood sugar) and the second after two hours of food (post-prandial). The blood samples (0.01ml) were pipette into tubes and 1.00ml of the reagent were added. These were mixed and incubated for 10 minutes at 37°C. The absorbance of the standard and the blood sample (test serum) were measured against the reagents blank and read using spectrophotometer at wavelength of 540 nm. Of the one hundred and eighty two subjects that were screened, twenty seven were positive. Male subjects had higher prevalence of diabetes (1.85%) than females with 1.19% prevalence while age group 48 - 57years had the highest prevalent rate (21.1%). This study further confirms the high prevalence of diabetes mellitus among communities in Abeokuta, Ogun State, Nigeria. There is an urgent need for a comprehensive and integrated approach to diabetes prevention and control, that takes into account all of the relevant risk factors, at the individual, the country and the international levels.

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1. Introduction

Diabetes mellitus is a group of metabolic diseases in which a person has high blood sugar, either because the pancreas does not produce enough insulin, or because cells do not respond to the insulin that is produced (Shoback, 2011). This high blood sugar produces the classical symptoms of polyuria, polydipsia and polyphagia. Diabetes mellitus is classified into four broad categories: type 1, type 2, gestational diabetes and "other specific types". The "other specific types" are a collection of a few dozen individual causes (Shoback, 2011).

Globally, as of 2010, an estimated 285 million people had diabetes, with type 2 making up about 90% of the cases. Its incidence is increasing rapidly, and by 2030, this number is estimated to almost double (Wild et al, 2004). Diabetes mellitus occurs throughout the world, but is more common (especially type 2) in the more developed countries. The greatest increase in prevalence is, however, expected to occur in Asia and Africa, where most patients will probably be found by 2030 (Wild et al, 2004).

Diabetes mellitus is also the leading cause of blindness, non-traumatic amputations, and end-stage renal disease (Aiello et al, 1998; Mayfield, et al,

1998; Lok et al, 2004). The increase in incidence in developing countries follows the trend of urbanization and lifestyle changes, perhaps most importantly a "Western-style" diet. This has suggested an environmental (i.e., dietary) effect, but there is little understanding of the mechanism(s) at present, though there is much speculation, some of it most compellingly presented (Wild et al, 2004). In some of the poorest regions in the world such as Africa, where infectious diseases have traditionally been the focus of healthcare systems, diabetes cases are expected to increase by 90% by 2030 (International diabetes foundation , 2012). At least 78% of people in Africa are undiagnosed and do not know they are living with diabetes (International diabetes foundation, 2012).

Some of Africa's most populous countries also have the highest number of people with diabetes, with Nigeria having the largest number of people (3.0 million), followed by South Africa (1.9 million), Ethiopia (1.4 million), and Kenya (769,000) (International diabetes foundation , 2012). The crude prevalence of DM in a national survey conducted in 1992 in males and females below the age of 45 years was 1.6% and 1.9%, respectively; with a 3-fold

increase after the age of 45 years to 5.4% and 5.6% in males and females, respectively (Akinkugbe, 1997).

Urban communities had a higher overall prevalence of diabetes (3.3%) when compared with rural communities (2.6%) (Akinkugbe, 1997). The recent IDF data (2011) estimated the prevalence of diabetes in Nigeria to be 4.04%, compared to Reunion (highest in Africa [16.78%]), Benin (1.71%), Ghana (4.09%), Niger (4.36%), Cameroun (5.18%), and South Africa (6.46%) (International diabetes foundation, 2012). Over time, diabetes mellitus (DM) has emerged as a global healthcare problem that has reached epidemic proportions (Alebiosu *et al*, 2009).

This study aimed at determined the prevalence of diabetes among volunteering participants from three communities in Abeokuta, Nigeria.

2. MATERIALS AND METHODS

A total of one hundred and eighty two participants were recruited. The participants for this diabetic screening were recruited from three communities in Abeokuta in September, 2013. Informed consent was obtained from the participants before commencement of the study. Two blood samples were collected, the first sample before eating in the morning (fasting blood sugar) and the second after two hours of food (post prandial). Consented participants aged 18 years and above were involved in the study. Abeokuta is located on longitude 7° 10' N and latitude 3° 26' E and is the capital of Ogun State in south-western Nigeria. Abeokuta is predominantly a Yoruba city but urbanization and industrialization have brought in many other ethnic groups.

2.1. PRINCIPLE

Glucose is determined after enzymatic oxidation in the presence of glucose oxidase. The hydrogen peroxide formed reacts, under catalysis of peroxidase, with phenol and 4-aminophenazone to form a red – violet quinoneimine dye as indicator.

2.2. REACTION PRINCIPLE

Glucose + O₂ + H₂O₂ -----> gluconic acid + H₂O₂
 2H₂O₂ + 4-aminophenazone + phenol ----->
 quinoneimine + 4H₂O₂

2.3. NORMAL VALUES

Serum, plasma (fasting): 4.2 – 6.4 mmol / l or 75 – 1115 mg/dl

2.4. PROCEDURE

The blood sample was collected into a fluoride oxalate bottle. The blood sample (0.01ml) was pipette into a tube and 1.00ml of the reagent was

added. This was mixed and incubated for 10 minutes at 37°C. The absorbance of the standard and the blood sample (test serum) was measured against the reagent blank and read using spectrophotometer at wavelength of 540 nm.

Tubes	1	2	3	4
Standard	-	0.01ml	-	-
Control serum	-	-	0.01ml	-
Test serum	-	-	-	0.01ml
Glucose oxidase reagent	1ml	1ml	1ml	1ml

3. RESULTS

Table 1 showed prevalence of diabetes among the gender in Abeokuta. Of the one hundred and eighty two subjects that were screened for diabetes, twenty seven were positive. The sex - specific prevalence showed that male subjects had higher prevalence of diabetes (1.85%) than females with 1.19% prevalence for diabetes.

Table 1. The prevalence of diabetes among the gender

Gender	No. Tested	No. positive (%)
Male	81	15(1.85)
Female	101	12(1.19)
Total	182	27(1.48)

Age group 48 - 57years had the highest prevalence (21.1%) of diabetes followed by age group 58- 67years with (19.6%) while age group 18 - 27years had the least (2.9%) as shown in Table 2.

Table 2. The prevalence of diabetes among the age group

Age group	No. Tested	No. positive (%)
18 – 27	34	1(2.9)
28 – 37	14	2(14.3)
38 – 47	29	5(17.2)
48 – 57	38	8(21.1)
58- 67	46	9(19.6)
67 – Above	21	4(19.1)
Total	182	27(14.8)

4. Discussion

Diabetes and its associated complications are a major concern in nations in terms of health and the economy. Diabetes is the leading cause of blindness, cardiovascular diseases and renal disease (Coyne *et al*, 2000). In this study out of 182 blood samples analyzed, 27(14.8%) were positive for

diabetes leaving a greater negative result of 155(85.2%).

The crude prevalence of DM in a national survey conducted in 1992 in males and females below the age of 45 years was 1.6% and 1.9%, respectively; with a 3-fold increase after the age of 45 years to 5.4% and 5.6% in males and females, respectively (Akinkugbe, 1997). A similar trend was observed in this study with participants within age group 48 - 57years having the highest prevalence (21.1%) of diabetes.

The diabetes prevalent rate in this study locality seems higher than what was observed in many other studies in Nigeria and some of the West Africa countries. Premature deaths and disability from diabetes have significant implications for productivity as well as social costs to communities and individual families. The epidemic of diabetes requires that we reconsider the options for prevention and control of this condition. The patterns of diabetes occurrence are often attributed to genetic factors and individual behaviours (Foliaki and Pearce, 2003).

The WHO has stated that the prevention and control of noncommunicable diseases cannot be achieved by the medical profession alone, but rather requires active participation from the public and social planners, the private sector, economists and politicians (WHO, 1999).

5. Conclusion

This study further confirms the high prevalence of diabetes mellitus among communities in Abeokuta, Ogun State, Nigeria. Knowledge of diabetes care by healthcare workers in many Nigerian health establishments is still generally poor and this can result in inadequate care for many persons with diabetes. There is an urgent need for a comprehensive and integrated approach to diabetes prevention and control, that takes into account all of the relevant risk factors, at the individual, the country and the international levels.

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