Type 2 Diabetes Mellitus and Impaired Fasting Blood Glucose in Urban South Western Nigeria

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Type 2 Diabetes Mellitus and Impaired Fasting Blood Glucose in Urban South Western Nigeria

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Abstract

Diabetes Mellitus (DM) is a non communicable disease which has a rising prevalence worldwide. A high percentage of the prevalence is projected to occur in developing countries. There has been a rising prevalence of DM in Nigeria. Measures must be taken to identify asymptomatic DM patients. 301 civil servants aged 35 years and above from randomly selected ministries and subdivisions of the Oyo State Secretariat, Nigeria took part in the study. Ethical approval for the study was obtained from the Oyo State Research Ethical Review Committee. A questionnaire was used in extracting information on demographic variables and measurements of fasting blood glucose were made using a fine-test glucometer. Results were analyzed using frequencies and descriptive statistics. Of the 301 participants who took part in this study, 112 (37.2%) were men, while 189 (62.8%) were women. Majority (74.4%) of the participants were aged over 45 years. Most (91.7%) of the participants were married. 2.7% of women had diabetes as compared to 2% of men. The overall incidences of Impaired fasting glucose (IFG) and (DM) in this study were 3.3% and 4.7% respectively. The study showed that there is a high prevalence of IFG among apparently healthy civil servants in Ibadan with a male: female ratio of 1:1.33.

Keywords: Prevalence, diabetes, fasting blood glucose, civil servants, Ibadan.

Introduction

Diabetes Mellitus (DM) is a chronic disease associated with a high morbidity and mortality rate. Close to four million deaths in the 20-79 age groups may be attributable to diabetes in 2010, accounting for 6.8% of global all-cause mortality in this age group.[1] Its prevalence is on the increase worldwide,[2] It was 30 million in 1985, and by 2006, it had risen to 230 million which represents 6% of the world population, with Africa harbouring 10%.[3] There are a minimum of six million sufferers in Nigeria[4]. The disease affects many people under the age of 64 years in Africa as compared to the developed world where it affects many people over the age of 64 years.[2] Individuals in urban population are more prone to developing DM compared to their counterparts in rural communities.

Type 2 DM is preceded by impaired (elevated) fasting blood glucose (IFG) - a pre-diabetes state which can exist undetected for many years,[5] causing irreversible damage to the kidneys, eyes and nerves. Impaired Glucose tolerance (IGT), similar to IFG, has a prevalence rate of 7.1% in Nigeria.[6] The fasting glucose level of a normal individual should not exceed 109 mg/dl of blood. Values between 110mg/dl and 125mg/dl of blood are categorized as IFG, i.e.

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prediabetes, while values over 126mg/dl are classified as DM.[7]

Edelman and Mandle[8] stated that 'prevention in the narrow sense means avoiding the development of disease in the future, and in a broader sense, consists of all the interventions to limit the progression of a disease. The levels of prevention occur at various points of a course of disease prevention. Leavell and Clark[9] defined three levels of prevention: primary prevention, secondary, and tertiary. Five steps describe these three levels: Primary prevention focuses on (a) health promotion and (b) protection against specific health problems (e.g. immunization against Hepatitis B). The purpose of primary prevention is to decrease the risk or exposure of the individual or community to disease.

Secondary prevention focuses on (a) early identification of health problems and (b) prompt intervention to alleviate health problems. Its goal is to identify individuals at an early age of a disease process and to limit future disability. Tertiary prevention focuses on restoration and rehabilitation with the goal of returning the individual to an optimal level of functioning. In practice, the three levels may overlap. Epidemiological studies that focus on detecting the presence of risk factors for chronic, non-communicable diseases like DM operate at the level of secondary prevention and are therefore encouraged by WHO.[10]

Again, as a result of the increase in the prevalence of Type

2 DM globally and the predicted future epidemic of the disease[2] many developed countries have adopted various strategies to curb the increasing prevalence. Some of these measures are especially targeted at identifying people with impaired fasting glucose, glucose intolerance and DM, so as to carry out measures that will prevent progression to DM.[11]

In the Sub-Saharan Africa, both DM and IFG, which are chronic communicable diseases exist alongside communicable diseases such as malaria, HIV/AIDS etc, which have long been eradicated in other countries, thereby creating a double burden of diseases in these resource-poor countries.[12] There is need to determine the prevalence of these conditions among apparently healthy individuals in the society so as to better draw the attention of policy makers and government officials to the ubiquitousness of these conditions.

Diagnostic criteria
The diagnosis of DM was based on the WHO 2006 criteria with fasting blood glucose of over 125mg/dl being diagnostic of DM, 110-125mg/dl being diagnostic of Impaired fasting glucose.[7]

Materials and Methods
This descriptive study was carried out in Oyo State Secretariat Complex, Ibadan. Ibadan is located in South-Western Nigeria and is comprised predominantly of the Yoruba ethnic group, one of the major tribes occupying the area between Senegal River and the Cameroon. The Oyo State Secretariat is located in the North of Ibadan, the capital of the State, thus geographically forming part of the Ibadan North Local Government Area. At the time of data collection, there were 15 Ministries and 16 subdivisions[13]

In the Nigerian Civil service, civil servants are generally classified into junior and senior civil servants with junior ones being those placed on Grade levels 1-6. These consist mainly of manual workers/labourers. The group also includes messengers, clerical officers, typists, drivers, gardeners etc. However, with promotion after years of service, this group can also become senior civil servants but cannot pass level 14. The total population of workers at the secretariat was 7,889 of which 5,049 were on level 7 and above.[14]

The civil servants who met the following inclusion criteria participated in the study:
1. Age: 35 years and above.
2. Willingness to participate and comply with the instructions of the study including overnight fasting where necessary.
3. Willingness to give informed consent to participate.
4. Civil servants on level 7 and above (senior civil servants)

Exclusion criteria
1. History of use of drugs that could affect glucose metabolism e.g. steroids, B-blockers, thiazide diuretics.
2. Pregnant women.
3. Persons previously diagnosed to have Type 2 DM

A simple random technique, was used in selecting 5 Ministries and 5 subdivisions each, from the 15 Ministries and 16 subdivisions. Civil servants who met the criteria were then purposively selected and they were 320 in number.

Instrument
A questionnaire was used in eliciting information on subject's sociodemographic variables. Blood glucose meter which was checked each day to ensure proper functioning, and correct setting was used to measure subjects' fasting blood glucose

Data collection procedure
A letter of permission to carry out the study at the secretariat was obtained from the State Head of Service, while ethical permission was obtained from the Oyo State Ethical Review Board. Participants were met in their offices prior to data collection and invited to participate. An information hand bill was made and given to individuals in the selected ministries and subdivisions, few days before data collection commenced. The information on the hand bill included the purpose of the study, the inclusion and exclusion criteria, what the study entailed i.e. an overnight fast of 8-12 hours before the procedure, the day the data was to be collected, the time and venue of the study.

Actual data collection commenced by 7: 30 am daily so that participants could resume their normal work schedule. Muslim participants were attended to during an afternoon session which lasted between 2 -4 pm, as the Ramadan fast was ongoing during the period and was being observed by Muslim participants. This timing was necessary in order to ensure that fasting blood glucose level was obtained at least 8 hours after the last meal, which was usually not later than 5 am in the morning.

On arrival at the venue, participants' informed consent was sought. After this, they were asked to complete the part of the questionnaire on socio-demographic variables. Subsequently, fasting blood glucose was obtained by using Fine-Test blood glucose Monitor (Infopia, Korea), calibrated to the nearest mg/dl. Before leaving to resume work, participants were offered refreshment. Participants found to have high fasting blood glucose were counselled privately and referred to seek health care in the nearby University College Hospital.

Results
The mean age of participants in this study was 49 years (SD±6.47). 77 (25.6%) were aged 35-44 years, while most (74.4%), were aged 45 years and above (Table 1)

The table further shows that study subjects comprised of 112 males (37.2%) and 189 females (62.8%); 91.7 % were married and 1.7% single; and that majority (76.4%) of them practised the Christian religion.

Data regarding participants' level of education shows that more than half (57.1%) of them had tertiary education. Also, most (89.7%) of the civil servants were below 'Grade level 14.

Table 1: Socio demographic characteristics of Participants (N=301)

Demographic variables	Frequency	Percent
Gender: Male	112	37.2
Female	189	62.8
Marital status : Single	5	1.7
Married	276	91.7
Widowed	14	4.7
Separated	6	2.0
Religion: Christianity	230	76.4
Islam	70	23.3
Others	1	0.3
Age : 35 – 44 years	77	25.6
45years and above	224	74.4
Highest level of education:		
Primary	53	17.6
Secondary	76	25.2
Tertiary	172	57.1
Salary grade level :		
GL 07 -13	270	89.7
GL 14 & above	31	10.3

Table 2: Fasting Blood Glucose Level of Participants

Category (mg/dl)	Frequency (N=301)	Percent
< 110 (Normal)		
Male	176	58.5
Female	101	33.6
Total	277	92.0
110-125(IFG)		
Male	5	1.65
Female	5	1.65
Total	10	3.3
126 & above		
Male	6	2.0
Female	8	2.7
Total	14	4.7

Most participants (92%) were normoglycaemic, 3.3 % had impaired fasting glucose while 4.7% had Diabetes Mellitus. Most of those with DM were women.

Discussion
The prevalence of DM and Impaired fasting glucose observed in this study is relatively high when compared with previous studies. Earlier, in 1998, Olatunbosun et al[15] had reported a prevalence of 0.8% of DM, and 2.2% of IGT among civil servants in Ibadan. Owoaje et al[16] however, reported a prevalence of 2.8% in an adult population in Ibadan a year before.

Nyewe et al[17] reported a prevalence of 2.2% in Port Harcourt in 2003. The prevalence of 4.7% found in this study is also higher than the national prevalence of 2.2% reported in the IDF Atlas in 2007[18]. This notable difference in the number of people with diabetes may be associated with the global increase in the trend of diabetes and the predicated epidemic in developing countries.[19]

In addition, many authors have alluded to urbanisation as a known factor in the increasing prevalence of diabetes worldwide[20,21]. Similarly, Unwin et al[21] predicted that the greatest increase in the prevalence of type 2 DM is expected from developing countries as a direct result of increasing urbanisation. A review of studies on the prevalence of DM in adults in Africa by Unwin et al[21] also demonstrated a rising prevalence across the continent.

Conclusion
Undiagnosed Diabetes has a rising prevalence in developed and developing countries. 4.7% cases were found among apparently healthy individuals in this study, with a higher prevalence in females and a male: female ratio of 1: 1.33

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