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GLUCOSE INTOLERANCE AMONG APPARENTLY HEALTHY HAUSA-FULANI NORTHERN NIGERIANS

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Abstract
Background: Glucose intolerance has been recently reclassified by the World Health Organization (WHO) incorporating a new class known as impaired fasting glycaemia. Previous studies in this environment looked as diabetes mellitus only but not the other forms of glucose intolerance.
Objectives: To study the prevalence of glucose intolerance in apparently Nigerian subjects of *Hausa-Fulani* ethnicity, who had no known family history of diabetes mellitus or hypertension.
Method: Standard oral glucose tolerance tests (OGTT) in 39 healthy individuals.
Results: Three (7.7%) of the subjects demonstrated impaired glucose tolerance (IGT). There was no case of impaired fasting glycaemia (IFG) noted. All subjects who had IGT were females
Conclusions: glucose intolerance appears commoner among females in this study. Factors such as sedentary lifestyles, which are commoner among females in this community, could be the reason for this finding.

Key words: Glucose intolerance, Nigerians

Introduction

The Hausa and Fulani (Fable) are two distinct tribes with similar cultural practices. These tribes inhabit most of northern Nigeria. Intermarriages occur quite commonly among these tribes especially in urban and suburban northern Nigeria, making it difficult to come across pure breeds of either tribe. The term Hausa-Fulani has therefore been unofficially adopted and commonly used in Nigeria to refer to the hybrid of these tribes.

We had previously reported a prevalence rate of 1.6 % for diabetes mellitus in this environment. [1] However there are no studies that specifically looked at the prevalence of other forms of glucose intolerance in this community. Glucose intolerance has been recently reclassified; fasting and post oral glucose tolerance values are required for proper classification. [2] This study was designed to determine the prevalence of glucose intolerance in individuals of Hausa-Fulani ethnicity who had no family history of diabetes mellitus or hypertension and could therefore be considered at a relatively low risk of developing glucose intolerance. We report our preliminary findings.

Subjects and Methods

Fifty Hausa-Fulani volunteers were recruited after community visits to explain the nature and aims of the study which were preceded by health talks on diabetes mellitus. The exclusion criteria were: clinical evidence of any illness, personal or family history of diabetes or hypertension as this is expected to increase risk of glucose intolerance. [2] Similarly individuals on current use of any form of medication were also excluded.

Informed consent was obtained from all subjects. Weights were taken to the nearest 0.5 kg with only undergarments on, heights to the nearest 0.5cm. Body Mass Index (BMI) was calculated by dividing the weight in kg by the square of the height in meters. Normal BMI was defined as an index of 18.5 to 24.99 kg/m^2 while a value of 25 kg/m^2 was considered overweight. [3] Metabolic studies were carried out after an overnight ten to twelve hours fast commencing between 21.00 to 22.00 hours the preceding night.

On the day of the studies, fasting venous blood samples were drawn from each subject promptly centrifuged and analyzed for glucose using a glucose oxidase method.[4] This was followed by a standard OGTT based on which individual subjects were categorized using WHO criteria. [2]

Unpaired student's t-test was used to determine the differences between continuous variables while chi-square test was used for categorical variables. The level of statistical significance in each case was taken as $P < 0.05$.

Results

A total of 39 volunteers participated in the study. This was made up of 15 females (38.15%) and 24 males (61.5%). Mean age was 48.6 ± 9.8 years (range 36-69 years). Table 1 shows the age sex distribution of individuals studied. Ten (25.6%) of the control subjects made up of four (16.6%) males and six (40.0%) females were overweight ($p<0.05$).

None of the individuals studied had impaired fasting glycaemia (IFG), while three (7.7%), had impaired glucose tolerance (IGT). All those with IGT were females; the prevalence by sex is therefore 20 % for females and zero percent for males.

Table 1: Age and sex distribution of subjects studied

Age range (years)	Sex		Total (%)
	M (%)	F (%)	
30 – 39	4 (16.7)	3 (20.0)	7 (17.9)
40 – 49	10 (41.7)	7 (46.7)	17 (43.6)
50 – 59	5 (20.8)	3 (20.0)	8 (20.5)
≥ 60	5 (20.8)	2 (13.3)	7 (17.9)
Total	24 (61.5)	15 (38.5)	39 (100)

Discussion

Although the pathogenesis of type 2 diabetes is not fully understood, there appears to be a transitory intermediate state between normoglycemia and type 2 diabetes. This transitory condition is known as impaired glucose tolerance (IGT). [2] Although not all individuals with IGT develop diabetes, one in three individuals with IGT will develop type 2 diabetes within 10 years if left untreated. [5]

In this study, female subjects demonstrated higher body mass indices than their male counterparts and all subjects with IGT were females. This could be due to the fact the females in this community are essentially housewives who traditionally are required to remain within the confines of their matrimonial homes, and are expected to go out only with the express permission of their husbands or male guardians. Consequently, the females live more or less sedentary life-styles. Since sedentary life styles are associated with obesity and insulin resistance, [6] this may partially explain the high prevalence of IGT among females in this study. However only one of the subjects with IGT was overweight suggesting that other biologic factors may be involved.

Obasohan and colleagues, [7] studied glucose tolerance in newly diagnosed hypertensive patients in Benin, southern Nigeria, and found abnormal glucose tolerance in 36.4% of newly diagnosed hypertensives compared to 1.9 percent of normotensive controls. Our study shows a higher IGT rate (about four fold) when compared to their control group. Although the sample sizes in both studies are small, perhaps a different finding is likely with a larger sample size. It is also possible that ethnic factors may also play a role in these differences as our subjects are from different ethnic tribes with the ones in southern Nigeria.

A strong rationale exists for the implementation of strategies designed to reverse or stabilize the deterioration in glucose homeostasis in individuals with IGT. Fortunately, physical exercise is known to reverse insulin resistance and promote normal glucose homeostasis. Physical activity guidelines from the Centers for Disease Control and Prevention and the American College of Sports Medicine have suggested that intermittent moderate-intensity exercise is beneficial and can improve the health status of individuals with IGT. Specifically, the guidelines recommend the accumulation of 30 minutes of moderate-intensity physical activity per day. [8] There is the need to educate the populace in this community on the need to engage in some form of physical exercise by both males and females within the framework of what is culturally acceptable.

Although the sample size in this study is small and hence difficult to make categorical statements from, it however provides preliminary information for future studies. Obviously larger studies are needed to identify and follow up individuals with all forms of glucose intolerance in this environment, this would enable us understand the natural history of glucose intolerance in the population.

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