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RESEARCH ARTICLE

Dysglycaemia among Adult Outpatients in Banjul, The Gambia

Dysglycémie chez les Adultes Externes à Banjul, Gambie

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ABSTRACT

BACKGROUND: **Glucose intolerance is a major risk factor for cardiovascular disease. Besides a few epidemiological studies on diabetes mellitus, there is limited information on glucose intolerance in the Gambia. The few studies that have been were several years ago.**

OBJECTIVE: **To determine the prevalence of, and associated risk factors for, dysglycaemia among outpatients in Banjul, The Gambia.**

METHODS: **In a cross-sectional study, 308 adult patients were enrolled at the Outpatient clinics of Edward Francis Small Teaching Hospital and Medical Research Council Laboratories in Fajara, Banjul. Data gathered included socio-demographic, anthropometric ,and clinical features as well as glucose tolerance status. Glucose tolerance status was assessed using a WHO standard oral glucose tolerance test. Summary data are presented as mean±(SD) and proportions as percentages. Association between and among variables are presented as odds ratios. Data analysis was performed using SPSS version 20. Statistical significance is set at p<.0.05**

RESULTS: **A total of 296 participants had complete data for analysis, of which 101(34.1%) were males. The mean age of the participants was 53.2 ± 12 years. . The mean fasting plasma glucose was 5.3 ± 0.8 mmol/l while the mean ± (SD) plasma glucose at 120 min after glucose load was 7.7 ± 2.3 mmol/l. About 56% of the participants had a normal glucose tolerance, 8% had impaired fasting glycaemia, 26% had impaired glucose tolerance, and 10% had previously undiagnosed type2 diabetes mellitus . The main risk factors for dysglycaemia were age, hypertension, body mass index, waist circumference, waist-hip ratio, systolic and diastolic blood pressure.**

CONCLUSION: **The prevalence of previously undiagnosed diabetes mellitus and prediabetes in patients attending clinics in Banjul , the Gambia appears to be high. Rates for impaired glucose tolerance appear higher than in many other reportrd studies from Africa. The risk factors for dysglycaemia in the Gambian attending clinics include age, hypertension, and obesity. The reason for the particularly high rates of impaired glucose tolerance among the Gambians are unclear and deserve further studies. BJM 2017; 1(1): 8–14.**

Keywords: Essential Hypertension, Impaired Fasting Glycaemia, Impaired Glucose Tolerance, Diabetes Mellitus, Oral Glucose Tolerance Test, The Gambia, Risk factors.

RÉSUMÉ

CONTEXTE: L'intolérance au glucose, est un facteur de risque majeur de maladie cardiovasculaire. Outre quelques études épidémiologiques sur le diabète sucré, il existe peu d'informations sur l'intolérance au glucose en Gambie. Les quelques études qui ont eu lieu il y a plusieurs années.

OBJECTIF: Déterminer la prévalence et les facteurs de risque associés à la dysglycémie parmi les patients ambulatoires à Banjul, en Gambie.

Méthodes: Dans une étude transversale, 308 patients adultes ont été inscrits dans les cliniques externes de l'hôpital Edward Francis Petit hôpital d'enseignement et les laboratoires du Conseil de recherches médicales à Fajara, Banjul. Les données recueillies comprenaient des caractéristiques sociodémographiques, antheropométriques et cliniques, ainsi que la tolérance au glucose. L'état de tolérance au glucose a été évalué au moyen d'un test de tolérance au glucose orale standard de l'OMS. Les données récapitulatives sont présentées sous forme de moyenne ± écart-type et de proportions en pourcentage. L'association entre les variables est présentée comme étant des odds ratios. L'analyse des données a été effectuée à l'aide de SPSS version 20. La signification statistique est fixée à p <0,05

Résultats: Un total de 296 participants avaient des données complètes pour l'analyse, dont 101 (34,1%) étaient des hommes. L'âge moyen des participants était de 53,2 ± 12 ans. . Le glucose plasmatique moyen à jeun était de 5,3 ± 0,8 mmol / l alors que le glucose moyen ± SD à 120 minutes après la charge de glucose était de 7,7 ± 2,3 mmol / l. Environ 56% des participants avaient une tolérance normale au glucose, 8% avaient une glycémie à jeun altérée, 26% avaient une tolérance au glucose altérée et 10% avaient un diabète de type 2 précédemment non diagnostiqué. Les principaux facteurs de risque de dysglycémie étaient l'âge, l'hypertension, la masse corporelle idex, le tour de taille, le rapport taille-hanche, la pression artérielle systolique et diastolique.

CONCLUSION: La prévalence de diabète sucré et de prediabète non diagnostiqués auparavant chez les patients fréquentant des cliniques à Banjul, en Gambie, semble être élevée. Les taux d'inhibition de la tolérance au glucose semblent plus élevés que dans de nombreuses autres études menées en Afrique. Les facteurs de risque de dysglycémie dans les cliniques gambiennes sont l'âge, l'hypertension et l'obésité. La raison des taux particulièrement élevés de tolérance au glucose altérée chez les Gambiens est peu claire et méritent d'être étudiées plus avant. **BJM 2017; 1 (1): 8–14.**

Mots-clés: Hypertension artérielle essentielle, glycémie à jeun altérée, Tolérance au glucose altérée, diabète sucré, test oral de tolérance au glucose, Gambie, facteurs de risque.

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Abbreviations: 2HPG, Two Hour Plasma Glucose; **BMI,** Body Mass Index; **BP,** Blood Pressure; **DM,** Diabetes Mellitus; **FHx,** Family History; **FPG,** Fasting Plasma Glucose; **GI,** Glucose Intolerance; **HTN,** Hypertension; **IFG,** Impaired Fasting Glycaemia; **IGT,** Impaired Glucose tolerance; **MRC,** Medical Research Council; **NGT,** Normal Glucose Tolerance; **RF,** Risk Factor; **SBP,** Systolic Blood Pressure **WC,** Waist Circumference; **WHR,** Waist-Hip Ratio.

INTRODUCTION

Glucose intolerance (GI) also referred to as dysglycaemia, consists of any one of diabetes mellitus (DM), impaired fasting glycaemia (IFG), and impaired glucose tolerance (IGT). It is associated with significant morbidity and mortality especially with increased cardiovascular disease.[1, 2] Reported studies of glucose intolerance or dysglycaemia in The Gambia are few. A nationwide survey for diabetes mellitus (DM) in 1996 found a prevalence rate of 0.3% for DM while later community studies reported a rural DM prevalence rates of 0.8–2.2% and an urban prevalence of about 8%.[3–8]

Thus there is limited information on GI in the Gambia as several risk factors were not reported. As part of our studies on the risk factors for cardiovascular diseases in the Gambian, we determined the prevalence and types of glucose intolerance and its risk factors among hypertensive and non hypertensive Gambians.

SUBJECTS, MATERIALS, AND METHODS

In a cross-sectional study conducted at the Medical Research Council (MRC) Laboratories, Fajara and the Royal Edward Francis Small Teaching Hospital (REFTH), Banjul, The Gambia, participants without a known history of DM were recruited from the Hypertension Clinic of REFTH and the Gate Clinics of the MRC. Three hundred and sixteen (209 female and 107 male) consecutive patients seen during the period of study accepted to participate in the study.

Inclusion criteria included being an adult of age > 25 years and freely consenting to participate in the study. Patients with major diseases (other than hypertension), severe inter-current illness, systemic or metabolic diseases and/or morbid obesity (BMI > 35 kg/m^2) were excluded from the study.

The study was approved by The Gambia Government / MRC Ethical Committee. All the participants gave written informed consent

Research Procedures

Using the appropriate local language, an assistant gathered information on socio-demographic data, family, social and past medical history. Anthropometric measurements that included weight, height, waist and hip circumferences, using standard techniques were taken. [9] Measurements of height as well as body circumferences were made to the nearest 0.5 cm while body weight was recorded to the nearest 0.5 kg. A digital blood pressure (BP) machine (Omron ^{r} HOM – 705 CP, Japan) was used to measure blood pressure on the left arm. Three BP readings were taken; the mean of the last two readings was used for the analysis.

A standard oral glucose tolerance test (OGTT) was performed using 75 g anhydrous glucose.[10] Venous plasma was drawn for glucose levels at 0, 30 and 120 minutes and other analytes at 0 minute. Venous blood glucose was determined immediately upon taking the samples using a Haemocue analyser (Haemocue AB, of Sweden). For the purposes of analysis and interpretation, venous whole blood glucose concentrations were converted to venous plasma glucose concentrations (PGC) following the instruction accompanying the Haemocue® Manual.

Definition of Terms and Criteria.

The operational definition of terms and criteria adopted for this study are shown in Table 1.

Data Management and Statistical Analysis

The data obtained were managed using Microsoft Excel 2007 and analysed using Stata version 8.0 statistical package (Stata Corporation, College Station, Texas, USA). Percentages which were calculated for discrete variables were compared using Pearson chi-square test. Average values are presented as means and standard deviation for continuous variables and compared using student t-test. Summary results of nonparametric data were compared using Pearson Chi-square test. P-values of less than 0.05 were taken as statistically significant while clinical significance was determined using odds ratio or effect size.

RESULTS

Quality of Data and Clinical Characteristics of Participants

Three hundred and sixteen outpatients were recruited into the study. Twenty of the participants (twelve females and eight males) had incomplete data and were excluded from further analysis. Thus the completion rate of the study was about 94%. The performance of the plasma glucose assay was satisfactory. Tthe intra-assay coefficients were 1.3% at 5.4 mmol/L and 1.6% at 16.1 mmol/L and the inter-assay coefficients of variation were 1.2% at 5.2 mmol/L and 2.5% at 14.8 mmol/L.

Characteristics of Study Participants

The study had more women than men (65.9% v 34.1%). Male and female participants were similar with regards to age, weight, and fasting plasma glucose. About three quarters of the participants were in the middle age group of 45-64 years. The females had higher values of

Table 1: Operational Definition of Terms and Diagnostic Criteria

Entity	Definition / Criteria
Systemic Hypertension	Systolic blood pressure $\geq$ 140 and / or diastolic blood pressure $\geq$ 90.mmHg or use of antihypertensive medications[11]
Global Adiposity	Normal, overweight and obesity respectively: BMI < 25, 25–29.9 and $\geq$ 30 kg / m ^{2}. [12]
Central Obesity	Waist Hip Ratio $\geq$ 0.9 (males) and $\geq$ 0.8 (females). OR WC $\geq$ 88 cm (Female), $\geq$ 102 cm (male). [12]
Diabetes Mellitus	Fasting venous plasma glucose $\geq$ 7.0 mmol/L and or 2h post glucose PGL $\geq$ 11.1 mmol/L [1, 2]
Impaired Fasting Glycaemia	Fasting venous plasma glucose $\geq$ 6.1 mmol/L and < 7.0 mmol/L. [1, 2]
Impaired Glucose Tolerance	Fasting venous plasma blood glucose < 7.0 mmol/L and 2h post glucose load $\geq$ 7.8 mmol/L and < 11.1 mmol/L.[1, 2]

Table 2: Characteristics of Study Participants

Characteristic	Mean (SD) or N (%)		
	All	Male	Female
		Mean SD	
N (%)	296 (100)	101 (34.1)	195 (65.9)
Age (years)	53.2 (12.0)	54.4 (10.6)	52.5 (12.6)
SBP mmHg	136.2 (27.8)	139.5 (28.3)	134.5 (27.45)
DBP mmHg	83.2 (15.6)	83.3 (13.8)	83.3 (14.5)
FPG mmol/L	5.27 (0.84)	5.26 (0.82)	5.26 (0.85)
2hPGL mmo//L	7.73 (2.25)	7.54 (1.85)	7.82 (2.43)
		Number (%)	
Age (years)			
< 45	69 (23.3)	18 (17.8)	51 (26.2)
45–64	173 (58.4)	63 (62.4)	109 (56.4)
≥ 65	55 (18.6)	20 (19.8)	35 (17.9)
Overweight/Obesity	158 (53.3)	39 (38.6)	119 (59.5)
Normal BMI (<25)	138 (46.6)	62 (61.4)	76 (38.5)
Overweight (25–29.9)	81 (27.4)	26 (25.7)	55 (28.2)
Obese, BMI (≥30)	77 (26.0)	13 (12.9)	64 (32.8)
Cigarette Smoking	65 (22.0)	51 (50.5)	14 (7.2)

2hPGL = Two Hour Plasma Glucose, BMI = Body Mass Index, DBP = Diastolic Blood Pressure, FPG = Fasting Plasma Glucose, SBP = Systolic Blood Pressure

Table 3: Distribution of Participants by Risk Factors for Type 2 Diabetes Mellitus

RF for T2DM	Number (%)			P value
	All Participants	Male	Female	
Global obesity	77 (26.0)	13 (12.9)	64 (32.8)	<0.001
Overweight	81(27.4)	26(25.7)	55 (28.2)	>0.05
↑ WC	216 (74.3)	34 (33.72)	182 (93.3)	<0.001
↑ WHR	220 (74.3)	41 (40.6)	179 (91.8)	<0.001
FHx of DM	44 (14.9)	10 (9.9)	34 (17.4)	0.08
HTN	208 (70.3)	70 (69.3)	138 (70.7)	0.66
Smoking	73 (24.7)	58 (53.2)	15 (7.7)	<0.001
IFG	14 (4.7)	5 (4.9)	9 (4.6)	0.92
IGT	90 (28.5)	34 (30.4)	56 (28.7)	0.44
Age ≥45 years	227(76.7)	83 (82.1)	144 (73.8)	0.345

DM, diabetes mellitus; FHx, family history; IFG, imaoired fasting glycaemia; IGT, impaired glucose tolerance; HTN, hypertension; RF, risk factor; ↑WC, increased waist circumference; ↑WHR. increased waist-hip ratio.T2DM, type 2 diabetes mellitus

body mass index,_BMI), waist circumference (WC), waist to hip ratio (WHR) and frequency of overweight and/or obesity. Smoking was much significantly commoner among the men than among the female participants (50% v 7%). Table 2 shows a summary of the characteristics of the study participants.

Prevalence of risk factors for Type 2 Diabetes Mellitus

The prevalence of risk factors for type 2 diabetes mellitus (T2DM) among the study participants is shown in Table 3. Overall the commonest risk factors for T2DM were central obesity, age > 45 years, and global obesity. The three commonest risk factors for diabetes mellitus in the males aside hypertension were increasing age, smoking, and central obesity. Among the female participants the three leading risk factors (excluding hypertension) were central obesity, overweight / obesity, and age ≥45 years. All anthropometric indices of propensity to develop DM were more common in the female than in the male participants. The least common risk factor for DM was IFG followed by a low rate of positive family history of diabetes mellitus.

Frequency and Types of Dysglycaemia

Figure 1 shows the distribution of participants by the type and frequency of glucose tolerance status they had at assessment. Overall, 131(44.3%) of the patients had dysglycaemia, about 23% of which were undiscovered type 2 DM. Prediabetes was the commonest class of GI, affecting 37.6% of the males and 36.9% of the females. About a third of the participants and three quarters of all those with GI had prediabetes. . Impaired glucose tolerance (IGT) was significantly more common than either IFG or DM in both males and females. Prediabetes either as IFG or IGT was more prevalent in the males than in females($p > 0.05$) but undiscovered DM was more common among the females than males.

Relationship Between Glucose Tolerance Status and Risk Factors

Table 4 shows a comparison of the participant characteristics by the various degrees of glucose metabolism, from normal glucose tolerance to diabetes mellitus. Generally the patients with GI were older and fatter by BMI or waist circumference. All other indices of proneness to developing DM were higher in the participants with GI than those who were glucose tolerant. The participants with DM had the highest mean or frequency of all the risk factors except age which was highest among those with prediabetes. The mean of values and / or prevalence rates of anthropometric risk factors progressively increased from NGT subjects through prediabetes to type 2 diabetes.

Association Between Type 2 Diabetes Mellitus Versus its Principal Risk Factors among Study Participants

Table 5 shows the univariate analysis of the relationship between T2DM and its principal RFs among the study participants presented as odds ratios (ORs). The Table shows that in the males the risk factors strongly associated with T2DM (OR >3) were a positive family history of DM, global and central forms of obesity, and a history of cigarette smoking. In the females age more than 45 years, central obesity (high WC and high WHR) and IFG were the leading risk factors. In the females obesity but not overweight (BMI of 25–29.9) was moderately associated with having diabetes mellitus.

DISCUSSION

The purpose of this work was to determine the prevalence of glucose intolerance and its associated risk factors among Gambians attending outpatient clinics. The quality of data was generally satisfactory. The response rate was of good quality at about 94% while the precision of the glucose assays were both satisfactory with intra- and inter-assay repeatabilities of less than 5%.

The distribution of the participants by sex was skewed towards the women but both sexes had sufficient participants to undertake a meaningful sub-analysis. The preponderance of females may reflect the differences between African men and women in their health-seeking behavoiur. The female participants were generally heavier and smoked less. Concerning other variables, including baseline serum analytes and clinical features, the men and women were generally comparable.

Prevalence of and Types Dysglycaemia

About 40% of the participants had one form or the other of dysglycaemia. The prevalence of previously undiagnosed Type 2 DM in adult Gambians of 10% found in this study was high but similar to the reports from a previous Gambian study. That study reported a prevalence of 0.3%.[3,4] In an urban Banjul community study however, the prevalence of DM (both diagnosed and undiagnosed) was 8% in men and 9% in women.[5] Relatedly, the prevalence

Table 4: Comparison of Participants by Glucose Tolerance Status and Risk Factors

Risk Factor	NGT	Prediabetes	DM	All Dysglycaemia
		Mean (SD)		
Age (Years)	51.5(10.8)	55.6(12.4)	53.3(9.9)	55.2(11.9)
BMI(Kg/m^2)	26.0(6.0)	26.16(6.2)	29.2(6.9)	26.8(6.5)
WC (cm)	91.0(13.2)	92.7(12.7)	98.94(12.7)	94.08(17.9)
WHR	0.867(0.068)	0.884(0.056)	0.897(0.07)	0.887(0.060)
SBP(mmHg)	132.84(26.7)	139.52(29.2)	144.7(5.8)	141.13(38.5)
FPG (mmol/l)	4.0(0.53)	5,4(0.77)	6.6(1.10)	5.7(0.96)
2HPG(mmol/l)	6.3(0.83)	8.64(1.16)	12.3(2.7)	9.5(2.2)
		Number (%) with Factor Present		
N	**165**	**101**	**30**	**131**
Males	56(33.9)	38(37.6)	7(23.3)	45(34.1)
Females	109(66.1)	63(62.4)	23(76.7)	85(65.9)
FHx	24(14.5)	10(9.9)	7(23.3)	17(13.0)
Cigarette Smoking	30(18.2)	28(27.7)	7(23.3)	35(26.7)
↑ WHR	116(70.3)	72(71.3)	27(90.0)	99(75.6)
BMI > 25	86(52.1)	52(51.5)	20(66.7)	72(55.0)
↑ WC	78(47.3)	49(48.5)	23(76.7)	72(55.0)
HTN	60(36.4)	65(64.3)	17(56.7)	97(82.8)

2HPP = Two Hour Plasma Glucose,; BMI, body mass index kg/m2; DM. diabetes mellitus; ; FPG = Fasting Plasma Glucose ; FHx, family history; IFG, imaoired fasting glycaemia; IGT, impaired glucose tolerance; HTN+, hypertension; ↑WC, increased waist circumference; ↑ WHR. increased waist-hip ratio.T"DM, type 2 diabetes mellitus

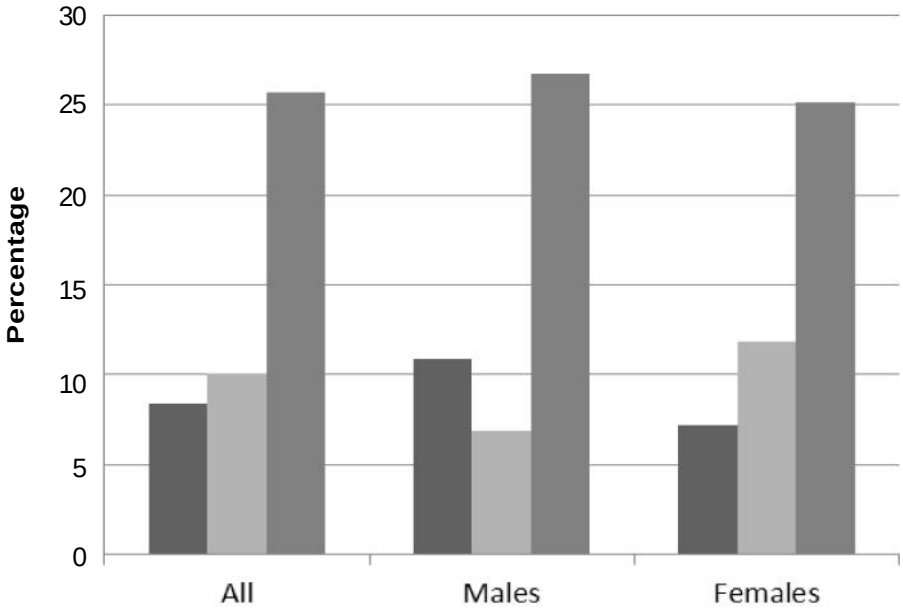

Fig. 1: Frequency of Dysglycaemia Subtypes Among Gambians at a Routine Outpatient Clinic. Overall, about 45% of the patients had dysglycaemia, about 23% of which were undiscovered type 2 diabetes DM. Prediabetes was the commonest class of dysglycaemia, affecting about 37% of both the males and of the females. *DM, diabetes mellitus IFG, impaired fasting glycaemia, IGT, impaired glucose tolerance.*

Table 5: Univariate Analysis of the Relationships Among Risk Factors and the Odds of Undiagnosed Type 2 Diabetes Mellitus

Risk Factor	OR(95%CI)			
	Males		Females	
Age	1.29	0.15 – 11.48	9.04	2.68 – 30.47*
FHx DM	4.97	0.81 – 30.43*	1.56	0.53 – 4.70
Cigarette Smoker	2.61	0.48 – 14.12	1.39	0.29 – 6.73
BMI ≥25	3.67	0.67 – 20.05*	0.79	0.28 – 2.25
BMI ≥30	3.05	0.53 – 12.69*	1.45	0.60 – 3.50
↑*WC*	4.67	0.94 – 23.31*	9.52	2.76 – 32.82*
↑*WHR*	3.68	0.68 – 19.98*	10.32	1.31 – 81.37*
HTN	1.81	0.38 – 8.56	1.99	0.83 – 4.79
IFG	3.02	0.57 – 17.49*	5.35	1.87 – 15.33*

**, Clinically significant association; BMI, body mass index (kg/m²). DM. diabetes mellitus; FHx, family history; IFG, impaired fasting glycaemia; IGT, impaired glucose tolerance; HTN, hypertension; RF, ↑WC, increased waist circumference; ↑WHR. increased waist-hip ratio.*

of hypertension was high at 17% and 19% in men and women respectively.[3–8] These discrepant higher prevalence rates found in the Banjul studies compared to the rural areas may be partly due to urbanization and adoption of western lifestyle as has been reported by others.[13]

Reports from other parts of Africa have shown a similar trend.[14-18] In urban Ghana, Amoah et al reported a DM prevalence of 6.3% (1.9% diagnosed and 4.4% undiagnosed),[14,15] a rate very much lower that reported (1.5%) in the Ashanti region.[16] A hospital based study in Kumasi found 18% previously undiagnosed Type 2 DM among these patients.[17] The National NCD survey in the 1990s in Nigeria recorded a national DM prevalence of 2.2% but middle aged participants from urban Lagos had a higher prevalence of 7%.[18] Other Nigerian studies have reported varying prevalence rates[19–22] Sabir *et al* found a prevalence of about 5% undiagnosed DM in urban Fulanis in Northern Nigeria.[23] These DM prevalence rates from West Africa are either similar to or lower than those reported from a Chinese population.[24]

Prevalence of Prediabetes Mellitus

Pre-diabetes may manifest as IFG and or IGT. Prediabetes is not a clinical entity *per se* but represents a risk factor for DM and some cardiovascular diseases.[28–30] In this study the prevalence of IFG was 8% when the WHO criterion was applied. This Gambian prediabetes rate is quite low compared to several other studies.[14,15,23–26,30–32]

Using the WHO criterion for IFG , Sabir *et al* reported a higher prediabetes prevalence of 16.9% from Northern Nigeria.[30] Similarly in the Accra community studies the prevalence of IFG was higher than ours at 10.7%.[14, 15] On the other hand studies from Australia and China have reported prevalence rates similar to ours.[24,31] In the US the prevalence of IFG was reported to be higher in men than women a phenomenon which is attributed to the higher fasting plasma glucose in US men.[25–27] This sex difference trend which appears to be at variance with our results was also reported in the Australian study.[31]

This study found an IGT prevalence of 26% which appears high but is similar to reports from other studies.[25] The prevalence of IGT was higher in the males than in he females, a finding that is similar to several others including the Gambian reports.[3–8, 26, 28] An IGT prevalence of 28% was reported in the community study in The Gambia, with about 25% in participants with normal BMI and 50% in the obese participants.[3–8] Reports from several African centres indicate much lower IGT prevalence rates than we found in this study, most being about 15%.[14,15,22,33] Sabir *et al* reported a prevalence of 15% from northern Nigeria,[22] Amoah reported a prevalence of 15.8% from Accra, Ghana[14, 15] while Elbagir *et al* reported a lower prevalence of 7.9% from northern Sudan.[33] The prevalence rates of IGT from other continents show similar differences to our findings. The NHANES survey in 1988 – 1994 recorded a crude prevalence of 15.6% with similar findings in men and women while in the 2005–2006 survey a prevalence of 5.4% isolated IGT and 9.8% combined IFG and IGT were reported.[26–27] Other studies have IGT prevalence rates varying from 10% to 24%.[31,34-36] The reason for the much higher IGT prevalence in our study compared to other reports is not obvious from our study and deserve further studies.

Risk factors for Diabetes Mellitus and Prediabetes Mellitus

In this study, the main risk factors for DM were age, hypertension, BMI, WC, WHR, and BP . Previous Gambian studies had showed that the prevalence of hypertension was higher in DM patients than in the general population and that among the urban Gambian participants there was frequent co-existence of obesity, hyperlipidaemia, physical inactivity, hypertension and DM.[3-8] The earlier study also had 3.3% of the participants reporting a family history of DM. Though our study found a moderate proportion of participants with a family history of DM, this was not associated with DM and pre-diabetes. Sabir *et al* identified age and obesity as the major risk factors for dysglycaemia in the northern Nigerian population[30] while in Ghana, Amoah reported dysglycaemia to be associated with increasing age, SBP, DBP and BMI.[14, 15]

Conclusion

The major strength of this study was the performance of a standard OGTT in a large number of participants with no history of DM in The Gambia . The main weakness of this study was the fact that it was a hospital based cross - sectional study which was likely to be fraught with some biases.

The prevalence of prediabetes and previously undiagnosed Type 2 DM in the urban adults attending outpatient clinics in Banjul in the Gambia appears to be high and much higher than previously

reported. The most common form of dysglycaemia among the Gambians studied was prediabetes with IFG being predominant. The risk factors associated with dysglycaemic states are increasing age, hypertension and obesity. This increasing trend of dysglycaemia is likely to be the result of the change in lifestyle of urban Gambians. There is therefore the need to increase screening, management and control of these factors. Further larger and prospective studies may yield more robust data to support or refute our results and our therefore called.

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