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Foeto-maternal outcome of diabetes in a tertiary health facility in Nigeria

From the Journals

Community support for diabetes

Assah FK, Atanga EN, Enoru S, et al. Community-based peer support significantly improves metabolic control in people with type 2 diabetes in Yaounde, Cameroon. Diabetic Medicine 2015; 32: 886-889

An interesting recent report from Cameroon has examined the effect of community support on poorly-controlled type 2 diabetes. All subjects had an HbA1c >7.0%, and there were 96 in the intervention group and 96 age and sex-matched controls. All patients received routine diabetes care, but the intervention group were helped by trained 'peer supporters'. During 6 months of follow-up contact between patient and peer supporters was maintained by group meetings, one-to-one interviews, and telephone calls. This resulted in significant improvement in glycaemic control – HbA1c at baseline was 9.6 ± 1.7% (1 SD), and after 6 months intervention it was 6.6 ± 0.9%. The control group also lowered their HbA1c but not to as great an extent (9.8 ± 1.6% to 8.5 ± 2.0%). The intervention group also had significant falls in BMI, lipids and blood pressure. These are very impressive results, though follow-up of 6 months is relatively short. It will be interesting to know whether these improvements can be maintained longer-term.

Treating diabetic foot osteomyelitis

Tone A, Nguyen S, Devemy F, et al. Six-week versus 12 week antibiotic therapy for non-surgically treated diabetic foot osteomyelitis: a multicentre open-label controlled randomised study. Diabetes Care 2015; 238: 302-307

Foot ulceration is a major problem in diabetes, and usually occurs with peripheral sensory neuropathy. Deep ulcers may be associated with osteomyelitis of the bones below – often the metatarsal heads. It used to be thought that in such cases, surgical removal of the infected bone was always needed. However, it is now recognised that prolonged antibiotic therapy can cure significant numbers of cases. The ideal type of antibiotic, and duration of treatment is uncertain; which has led to French diabetologists trialling 6 weeks versus 12 weeks of out-patient oral antibiotics. There were 20 patients in each group, and the cure rate was 65% in both. The type of antibiotic varied, but was usually rifampicin in combination with one other (eg. doxycycline, ciprofloxacin or trimethoprim-sulphamethoxazole). Most of these antibiotics will be available in Africa, and this means that a six-week course should be the initial treatment for patients with diabetic foot ulceration and underlying osteomyelitis. Surgery only needs to be considered if this fails.

Sleep duration and diabetes

Shan Z, Ma H, Xie M, et al. Sleep duration and risk of type 2 diabetes: meta-analysis of prospective studies. Diabetes Care 2015; 238: 529-537

There has been a suggested association between sleep duration and the risk of type 2 diabetes for some time, but the association has been unclear. A group of Chinese and American researchers have therefore undertaken a meta-analysis of 10 studies involving 482502 participants, of whom 18433 developed type 2 diabetes. The minimum risk of diabetes occurred with a sleep duration of 7 to 8 hours and the risk increased at both shorter and longer durations – a 'U-shaped' curve effect. The relative risk (RR) of T2DM was approximately 1.15 for both 5 hours and 10 hours sleep duration. Length of sleep can be associated with a number of potentially confounding factors – for example socio-economic status, depression, other co-morbidities and exercise patterns. These could affect diabetes risk, but the authors statistically adjusted for these variables, and the association remained. The reasons for this strange effect is unknown, nor do we know whether 'normalisation' of sleep duration will reduce diabetes risk.

Diabetes and depression in Zambia

Hapunda G, Abubakar A, Pouwer F, et al. Diabetes mellitus and comorbid depression in Zambia. Diabetic Medicine 2014; 32: 814-818

Studies in the USA and Europe have found a clear link between depression and diabetes, but there is very little information on the subject in Africa. This paper from Zambia examined 157 patients with diabetes (93 type 1 and 64 type 2), and a non-diabetic control group of 773 subjects. Using the 'Major Depression Inventory', depressive symptoms were significantly more common in the diabetic versus non-diabetic cohort (19.1 v 15.1 $p < 0.001$). Depression was also significantly linked to female sex and low socio-economic status. This information supports some similar work from Nigeria, and suggests that African patients with diabetes have similarly increased risks of depression as those in western countries. These results are of particular concern, as there is a great scarcity of psychiatric and psychological support in Africa for these patients.

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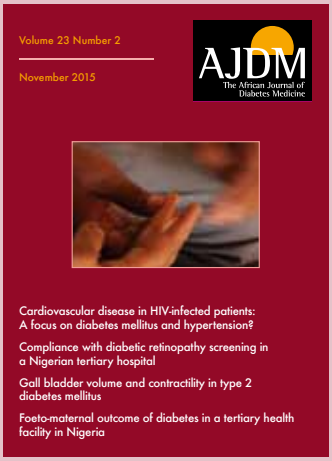

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Editorial

Type 1 diabetes in Africa

A recent study from Rwanda[1] has investigated the epidemiology of type 1 diabetes (TIDM) in that country. Based on a national registry, the incidence rate for patients under 26 years was 2.7/100 000/year. The peak age of onset was about 18 years. This data shows a very similar incidence to that reported from Tanzania in 1993[2], and is significantly less than rates in the USA and Europe. The age of onset is also later than in western countries, again confirming previous studies on TIDM from South Africa.[3]

Why should these puzzling differences exist between African TIDM, and the disease as seen in Europe and the USA? An important point is made by the authors of the Rwanda paper, that the numbers enumerated may be an underestimate due to deaths in the community before presentation. There are other potential factors, as it is recognised that TIDM incidence tends to increase northwards from the equator. Possible factors include the 'hygiene hypothesis' (frequent viral infections in infancy) and the 'sunshine hypothesis' (higher vitamin D levels in hot climates), both of which may favour lower TIDM rates in the tropics. Prolonged breast feeding (or more accurately, delayed introduction of cow's milk protein) may also reduce later TIDM risk, and also favour a later age of onset.

There is thus an epidemiological puzzle surrounding TIDM in Africa. Whatever the reasons, TIDM is certainly encountered less frequently in sub-Saharan Africa compared to western countries. We need more work on this problem, which may possibly shed light on the aetiology of TIDM in general.

Professor Geoff Gill.
Editor, African Journal of Diabetes Medicine, Liverpool School of Tropical Medicine, Liverpool, UK

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Front cover: A healthcare worker takes a blood sample from an urban slum dweller to test for diabetes in New Delhi, India. © 2012 Suneedh Manthri, Courtesy of Photoshare

In the news

MSD's cardiovascular safety trial of JANUVIA (sitagliptin), met primary endpoint in patients with type 2 diabetes

MSD, known as Merck in the United States and Canada, recently announced the primary results of the Trial Evaluating Cardiovascular Outcomes with Sitagliptin (TECOS), a placebo-controlled study of the cardiovascular (CV) safety of MSD's DPP-4 inhibitor, JANUVIA® (sitagliptin).

The TECOS cardiovascular safety trial was an event-driven study designed to assess the long-term CV safety of the addition of sitagliptin to usual care, compared to usual care without sitagliptin, in patients with type 2 diabetes and established CV disease.

More than 14 735 patients enrolled on the study from 38 countries and was led by independent academic research collaboration between the University of Oxford Diabetes Trials Unit and the Duke University Clinical Research Institute, and was sponsored by MSD. Among the key findings, it was evident that there was no increase in CV-related deaths or hospitalisation for heart failure in the Sitagliptin group versus placebo.

'Patients with type 2 diabetes may need antihyperglycaemic medicines to help control their blood glucose levels. Because these patients are at increased risk for cardiovascular complications, understanding the cardiovascular safety of these medicines is important,' said study co-chair Rury Holman, Professor of Diabetic Medicine and Diabetes Trials Unit Director, University of Oxford. 'The results from TECOS showed that sitagliptin did not increase the risk of cardiovascular events in a diverse group of patients with type 2 diabetes at high cardiovascular risk.'

Overall, the primary endpoint occurred in 11.4% (n=839) of sitagliptin-treated patients compared with 11.6% (n=851) of placebo-treated patients in the Intention-to-Treat (ITT) analysis, and in 9.6% (n=695) of patients in both the sitagliptin and placebo groups in the Per Protocol (PP) analysis.

In addition, there was no increase in hospitalisation for heart failure, and rates of all-cause mortality were similar in both treatment groups, which were two key secondary endpoints.

'We believe the results of TECOS provide important clinical information about the cardiovascular safety profile of sitagliptin,' said Dr. Roger M. Perlmutter, president, Merck Research Laboratories. 'The TECOS CV safety trial reflects the best efforts of clinical scientists at the University of Oxford, the Duke Clinical Research Institute and MSD on behalf of patients around the world who suffer from type 2 diabetes.'

Focusing on healthy eating for Diabetes Day 2015

The focus on this year's World Diabetes Day (WDD) is healthy eating which is a key factor in the fight against the condition, it has been announced.

This year's campaign entitled, 'Act Today to Change Tomorrow' is also hoping to raise awareness of the importance of early detection, and the blue circle symbol will be used across social media to mark and promote WWD.

It is led by the International Diabetes Federation (IDF) and runs all year round, but is celebrated on 14th November.

This year's message is to promote the importance of healthy eating which can help manage all types of diabetes.

According to the IDF, a healthy diet containing leafy vegetables, fresh fruit, whole grains, lean meat, unsweetened yogurt, and nuts can help reduce a person's risk of type 2 diabetes and reduce complications in people with type 1.

On 12th November 2015, two days before WWD, the IDF will release the Diabetes Atlas, which is the authoritative resource on the global burden of diabetes.

There are many ways people can participate in this year's campaign, including taking a blue circle selfie and sharing it on social media, or organising a diabetes fair. IDF are asking anyone who is participating in a WDD campaign to get in touch.

For more details visit http://diabetestimes.co.uk/diabetes-day-2015-to-focus-on-healthy-eating/#sthash.IAc8vjpw.dpuf

Digital tools provide limited support for diabetes

Community health workers in Malawi receive training on Medic Mobile from St. Gabriele's Hospital. © 2010 Marc Abbyad/Medic Mobile, Courtesy of Photoshare

A new study reports that digital tools to monitor diabetes have short-lived effects on users. While a plethora of apps and online resources are available for self-care, the knowledge provided often doesn't translate to behavioural changes.

Chronically ill patients can manage the disease using personalised programmes on computers and smartphones that can help reduce healthcare costs.

However, *the Cochrane Library* report explains such tools bring little improvement to long-term issues like depression, blood pressure, weight or quality of life.

Researchers reviewed data from more than 3500 people with type 2 diabetes who used computers or mobile phones to self-manage their disease. Though there were significant benefits for controlling blood glucose levels, they tapered off after six months.

The digital tools evaluated in the study include stat-taking, online peer support, goal setting and glucose indicators. Overall, while evidence suggests they do help provide a better understanding of the disease, they don't promote changes in diet and exercise.

'Effective self-management is a complex task that may require changes to many aspects of people's lives,' said lead researcher Kingshuk Pal. 'Any intervention to help that process needs to support sustained behavior change in different areas like eating habits, physical activity or taking medication regularly, and provide emotional support.'

Cardiovascular disease in HIV-infected patients: a focus on diabetes mellitus and hypertension?

S E Isa

Introduction

Diabetes and hypertension are among the most important risk factors for cardiovascular disease (CVD) and mortality in the general population.[1] CVD alone accounted for nearly half of the 38 million global deaths due to non-communicable diseases (NCDs) in 2012.[2] The number of individuals with diabetes is on the increase and will rise to 366 million by 2030 globally.[3] Similarly, the global prevalence of hypertension is projected to rise to affect 1.56 billion adults by 2025.[4] However, the greatest rise in diabetes and hypertension will occur in the developing regions of the world like sub-Saharan Africa (SSA).[4–6] Unfortunately, SSA is also the region that bears a disproportionately high burden of the HIV/AIDS pandemic and struggling health systems. Of the estimated 35 million 'People Living with HIV' (PLWH) globally in 2013, SSA is home to 71% of them,[7] with about 7.5 million accessing combination antiretroviral therapy (cART) in 2012.[8] The global prevalence of HIV infection in Figure 1 shows Africa to be the most affected region with a prevalence of 4.5%.[7]

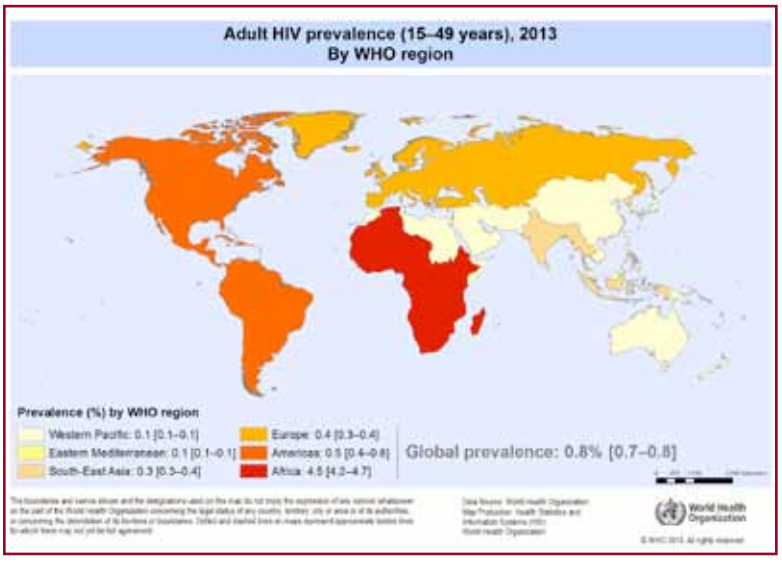

Figure 1. The adult HIV prevalence by World Health Organization (WHO) regions in 2013 (available from: http://gamapserver.who.int/mapLibrary/Files/Maps/HIV_adult_prevalence_2013.png).

PLWH are now living longer, largely due to improving access to cART, such that HIV/AIDS is increasingly viewed as a chronic disease rather than the invariably fatal infection it once was. However, diabetes and hypertension are associated with the advanced age, as well as changing lifestyle, that come with increasing prosperity and urbanisation, as is being currently witnessed in many low- and middle-income countries.[9,10] In addition to the usual risk factors for CVD seen in the general population, PLWH may have additional risks. Endothelial dysfunction and metabolic disorders associated with chronic inflammation in HIV infection itself and the use of the very life-saving cART may be responsible for the observed excess risk for CVD.[11–13] Therefore, the stage appears set for a twin epidemic of HIV/AIDS and NCDs such as diabetes and hypertension in sub-Saharan Africa.

An epidemic of HIV/AIDS and diabetes or hypertension could stall or even reverse the improvements in morbidity and life expectancy being recorded among PLWH, and further strain the already fragile health systems. Even though diabetes and hypertension are only a part of complex and overlapping variables that confer risk for CVD and other NCDs, a focus on them is important because they share common risk factors that are preventable, easily diagnosed and treated, with an associated substantial reduction in morbidity and mortality.[14] Moreover, emerging lessons from Cambodia and Uganda show that integrating HIV/AIDS services with services for NCDs like diabetes and hypertension is feasible and beneficial.[15,16]

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Emerging importance of diabetes and hypertension among PLWH

Countries with a high prevalence of HIV infection have been concerned with scaling up HIV/AIDS interventions; but will now, or in the near future, also have to contend with the spiralling burden of NCDs.[17] This assumption is supported by data that show PLWH carry substantial risk of CVD whether they live in low- or high-HIV prevalence settings. For instance, the Data Collection on Adverse Events of Anti-HIV Drugs (DAD) Study (a large observational study of about 18 000 that has been

recruiting mostly cART-treated patients since 1999 from hospitals across Europe, USA, and Australia) revealed that about 25% of the male and female patients in the cohort were ≥45 years and ≥55 years respectively.[18] This age cut-off has been previously described as conferring high cardiovascular risk in the general population in the National Cholesterol Education Programme guidelines[19] whereas being older than 40 years confers three times the risk of hypertension in PLWH.[20] This should be an important point to note considering that PLWH in Africa are now living longer. Furthermore, at baseline in the DAD study, more than 50% of the cohort were current cigarette smokers while about 22% had elevated total cholesterol, with triglycerides elevated in 34%. Smoking may also be prevalent among PLWH in SSA. Depending on the population studied, 3–30% were current cigarette smokers in West Africa.[21] The overall prevalences of diabetes and hypertension in the DAD study were about 2.5% and 8.0% respectively. The study also showed that regimens containing non-nucleoside reverse transcriptase inhibitors (NNRTI) and/or protease inhibitors (PIs), which are increasingly available in Africa, were associated with hypertension in univariate analysis. Importantly, this association disappeared in the final model containing age, sex and body mass index (BMI) as co-variates.

Contrary to association with hypertension, all cART regimens were independently associated with diabetes in the study. Another 10-year cohort study[22] involving 1046 PLWH on cART which covered 7846 person-years of follow-up (PYFU) in France, reported an overall diabetes incidence of 14.1/1000 PYFU. Although the sensitive oral glucose tolerance test (OGTT) was used for diagnosis, the more diabetogenic first-generation cART that were partly responsible for this rather high incidence of diabetes are still commonly used in SSA, or are only being slowly phased out.

Data on CVD and their risk factors among PLWH in Africa are mostly from relatively small studies.[23–25] However, a Ugandan hospital-based cohort of about 5600 PLWH aged ≥13 years receiving cART reported an overall 28% hypertension prevalence and at least 10% 10-year Framingham Risk Score in a subset of men.[26] Also, a systematic review with meta-analysis involving nearly 30 000 black adults who resided in sub-Sahara Africa27 reported differences in CVD risks between HIV-infected and HIV-negative populations that may be modified by cART.

In addition to reduced quality of life and increased treatment complexity and cost, the NCDs are now also a leading cause of mortality and are reported to be responsible for 53% of all deaths in PLWH who are older than 40 years.[28,29] Although the survival model by Braithwaite et al28 was based on data in the USA where cART has been widely available for a long time, the current scale-up in cART in Africa is also likely to cause a shift in causes of mortality from opportunistic infections to NCDs. Nonetheless, mortality due to NCDs in PLWH may not be entirely explained by the longevity advantage conferred by cART or the metabolic effects of cART. Lodwick et al[30] in a review of data from 23 cohorts in industrialised countries showed death rates were higher than in the general population among cART-naïve patients even when they had high CD4+ counts. This has led to suggestions that HIV itself, including differences in biological activities of viral types and strains, may play a role in the clustering of cardiovascular risk and mortality.[27] Cause-specific mortality data on NCDs among PLWH are hard to find in Africa but inferences can be drawn. Data from the Kenyan Ministry of Health reported that NCDs were responsible for 32% mortality in the general population with over 70% of the deaths due to CVD and diabetes,[31] and screening of 5800 PLWH found higher rates of hypertension than in the general population with a trend towards higher blood glucose levels.[32]

Pathogenesis of diabetes in HIV/AIDS

The development of diabetes in PLWH may be associated with traditional factors as seen in the general population, in addition to HIV-related factors and the use of cART.

The decrease in peripheral fat and increase in central fat (lipodystrophy) with perturbations in serum lipid concentrations may lead to variable levels of insulin resistance. In the mouse model, HIV accessory Vpr protein has been shown to contribute to disorders of insulin–glucose homeostasis by markedly enhancing glucocorticoid action on a wide array of response promoters.[33] The Vpr accessory protein may also induce insulin resistance or lipodystrophy by affecting the function of peroxisome-proliferator activated receptor-γ (PPAR-γ), an important regulator of adipocyte differentiation and tissue insulin sensitivity.[34]

Antiretroviral drugs affect glucose or lipid homeostasis either directly, as in the case of protease inhibitors (PIs), or indirectly as with reverse transcriptase inhibitors (RTIs). The PIs directly prevent glucose uptake in 3T3-L1 adipocytes by selectively inhibiting the function of glucose transporter 4 (GLUT-4).[35] This class of antiretroviral drugs also impairs the activation and subsequent build-up of sterol regulatory element-binding protein 1 (SREBP-1) in adipocytes and hepatic cells, leading to dysregulation of adipocyte differentiation and the way glucose and lipids are metabolised.[36] Among the PIs, indinavir (which induces insulin resistance and blocks GLUT-4) is believed to have one of the most potent effects on glucose metabolism – thus, 4 weeks administration to HIV-negative volunteers resulted in insulin resistance.[37,38] However, relatively newer PIs such as lopinavir or atazanavir, often used boosted with ritonavir which also blocks GLUT-4, are believed to have much less effect on glucose and lipid metabolism.[39] Un-boosted lopinavir and ritonavir disturb triglycerides and free fatty acids while un-boosted atazanavir is not implicated.[37] The nucleoside RTIs, including stavudine, zidovudine, and non-nucleoside RTIs like efavirenz (widely used in developing countries) are believed to exert their effects through mitochondrial dysfunction and apoptosis of adipocytes

by inhibition of mitochondrial DNA polymerase-γ and depletion of mitochondrial DNA.[40,41]

Low testosterone and growth hormone deficiency,[42,43] or increased tumour necrosis factor-alpha (TNFα),[44] as seen in PLWH have all been implicated in insulin resistance as well. Lastly, medications such as steroids used in the management of some complications of HIV infection, pentamidine[45] in treating Pneumocystis jiroveci pneumonia, and co-infection with hepatitis C virus (HCV)[46] have also been implicated in dysglycaemia in PLWH. Although, no association was observed in a Swiss cohort,[47] association of diabetes with HCV infection is attributed to insulin resistance, intra-hepatic elevation of TNF levels, and various degrees of liver disease, including hepatic steatosis.[48]

Pathogenesis of hypertension in PLWH

Functional and structural vascular tree changes plus metabolic syndrome/insulin resistance seem to be important in the pathogenesis of hypertension in PLWH. In the general population, narrower retinal arteriolar diameters are associated with the development of hypertension.[49,50] Although atherosclerosis and vasculitis may be assumed from a more general context of HIV-induced inflammation, literature directly linking vascular tree changes in PLWH to hypertension are sparse.[51]

Atherosclerosis, an inflammatory disorder characterised by accumulation of activated macrophages and deposition of oxidised lipids, has been shown to progress faster among PLWH and it occurs even when HIV replication is under control in peripheral blood, and also in those who have never used cART or smoked cigarettes.[52] Also, the massive depletion of gut CD4+ cells early in HIV infection and associated with structural changes in the gut mucosa, allows translocation of bacterial lipopolysaccharide into the blood stream which then activates macrophages.[53]

In addition, excessive sodium and water retention caused by preserved kidney sensitivity to insulin, with high insulin levels produced to overcome insulin resistance, could lead to volume-dependent hypertension.[54]

There is also a possible role for other chronic co-infections like HCV infection in driving the atherosclerotic process, but the independent or relative role HIV or its treatment may play in the pathogenesis of hypertension in such co-infections is less clear.[55] Furthermore, HIV-associated renal impairment either due to immune-complex glomerulonephritis (in populations with an already high prevalence of streptococcal glomerulonephritis) or the use of cART, could lead to development of hypertension.

Conclusions

Frontline healthcare providers should conduct baseline and periodic evaluation for diabetes and hypertension aimed at early detection and prevention. Emphasis must also be placed on promotion of a healthy lifestyle as a preventive measure. Policy planners should advocate and mobilise necessary resources for properly designed surveys to reveal reliable estimates of the burden of diabetes and hypertension, their risk factors and complications; as PLWH are living longer and experience with cART is increasing. There is now evidence of successful models for the integrated delivery of NCDs and HIV/AIDS services,[15,16] which can make use of the substantial investment in health systems originally meant to tackle only the HIV/AIDS epidemic. These should be piloted and adapted to suit local circumstances with monitoring and evaluation systems built in for continuous improvement.

Author Declaration

Competing interests: none.

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Gall bladder volume and contractility in type 2 diabetes mellitus

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Abstract

The aim of this study was to sonographically evaluate gall bladder changes in type 2 diabetes. One hundred type 2 diabetic subjects (50 with neuropathy and 50 without neuropathy) and 50 healthy controls underwent sonographic evaluation of the gall bladder. Fasting and postprandial gall bladder volumes (FGBV and PPGBV) were measured, and the gall bladder contractility index (GBCI) calculated. The presence of gallstones was also noted. It was found that patients with diabetic neuropathy had a significantly higher FGBV and PPGBV, and lower GBCI, compared with diabetic patients without neuropathy; PPGBV and GBCI also differed significantly from non-diabetic controls. Gallstones were present in 22% of diabetic patients with neuropathy, in 10% of those without neuropathy, and in 8% of controls. We conclude that diabetic patients with neuropathy have significant abnormalities of gall bladder function, presumably due to autonomic nerve dysfunction. These patients also have a higher prevalence of gallstones, suggesting that ultrasound screening may be worthwhile.

Introduction

Diabetes mellitus is a syndrome of chronic hyperglycaemia due to relative insulin deficiency, resistance or both.[1] At least 220 million people worldwide are affected by this disease, with a projected rise to 440 million by the year 2030.[1] The chronic hyperglycaemia causes long-term damage to various body organs including the eyes, kidneys, nerves, heart, and blood vessels.[2,3] The gall bladder is one of the organs that may be affected by autonomic neuropathy because vagal parasympathetic fibres maintain its tone and influence its emptying.[4–6] An increased incidence of cholesterol gallstones, inadequate emptying, and increased volume have been reported as gall bladder changes associated with type 2 diabetes.[6,7]

The purpose of this study was to establish sonographic abnormalities in the gall bladder of type 2 diabetes patients in Nigeria, and to determine any correlation between these changes and duration of disease.

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Patients and methods

This prospective, non-randomised, case-control study was carried out in the Radiology Department of a tropical university teaching hospital from March 2010 to January 2011. Informed consent was obtained from all the participants. The study group comprised 100 type 2 diabetic patients with and without clinical evidence of neuropathy (50 of each), as well as 50 healthy, age- and sex-matched, non-diabetic controls asymptomatic of gall bladder disease or other systemic illness that may affect the gall bladder. The subjects were recruited consecutively from the Endocrinology Clinic and ward of the hospital. Patients with type 1 diabetes, liver disease, or biliary disease were excluded. Diabetes was diagnosed according to American Diabetic Association criteria.[8] The age, sex, and duration of diabetes of each subject were documented.

The presence of neuropathy was ascertained on physical examination by an endocrinologist. Autonomic neuropathy was tested for by taking the pulse rate at rest and repeating it while the patient performed a Vasalva manoeuvre. The subjects were then required to breathe normally and after a period of 5–10 minutes the pulse rate was taken again. The pulse rate is expected to normalise after this period to its resting state. Autonomic neuropathy was considered present when a subject had at least two abnormal cardiovascular reflexes, i.e. impaired heart rate response to Vasalva manoeuvre, standing, or deep inspiration. A postural fall in the systolic blood pressure of ≥30 mmHg when the patient changed from supine to an upright position also indicated autonomic neuropathy.[9] Peripheral neuropathy was considered present when there was impairment of fine touch, pinprick sensation, vibration and position sense; or deep tendon reflexes. Based on these, the study subjects were divided into two groups: those without evidence of neuropathy and those with evidence of neuropathy. Fifty study subjects, consecutively recruited, were selected for these groups.

Abdominal ultrasonography was performed with a Mindray® DC-6 ultrasound machine (Shenzhen Mindray Bio-medical Electronics, Nanshan, Shenzhen, China) with a 3.5–5.0 MHz curvilinear transducer. Sonographic examination was performed after an overnight fast and repeated 45 minutes after ingestion of a fatty meal (bread and butter of about 40–50 g).

Each subject was scanned in the supine position. The transducer was placed longitudinally and beveled cephalad in the right hypochondrion to obtain the maximal

length (cm) and antero-posterior diameter (cm) of the gall bladder. The subject then turned to the left lateral decubitus position (oblique) to obtain the maximal transverse diameter (cm) of the organ by turning the probe transversely at 90° to the longitudinal plane. Each measurement was taken three times and the average obtained. The sonographic examinations were performed by one investigator to reduce inter-observer error.

The gall bladder volume (cm^3) was then calculated using the prolate ellipsoid formula (length × height × width × 0.523).[10] Gall bladder contractility index (GBCI) was the difference between the fasting and postprandial gall bladder volume (FGBV and PPGBV), divided by the fasting volume, multiplied by 100 (%).[10]

The study data were analysed using the Statistical Package for Social Sciences (SPSS) version 17 (SPSS Inc., Chicago, IL, USA). The continuous variables were expressed as mean ± standard deviation (SD) and compared using analysis of variance (ANOVA) or Student's t-test for unpaired values. Statistical significance was set at $p<0.05$.

Results

The mean ages of the diabetic patients with neuropathy, without neuropathy, and the controls were 63+6 years, 55+17 years, and 56+9 years respectively. Twenty-two (44%) of the neuropathic group were males, while 28 (56%) were females. The diabetic patients without neuropathy and the control groups had equal numbers of males and females (50% each).

Table 1 shows the FGBV and PPGBV, as well as GBCI for the three groups. The mean FGBV of Group A (diabetes with neuropathy) was significantly higher than Group B (diabetes without neuropathy), p=0.007. Similarly, PPGBV was higher in Group A compared with Group B (p=0.001), and also Group C (controls), p = 0.02. The GBCI was lower in Group A compared with Group B (p=0.03). It was also lower in the diabetics with neuropathy than in the controls (p<0.001).

Variables	A n=50	B n=50	C n+50
FGBV (cm^3)	37.74±16.90	29.14±14.16	35.22±16.74
PPGBV (cm^3)	24.92±12.10	17.43±9.32	18.86±12.45
GBCI (%)	33.44±13.62	39.62±15.15	47.68±18.01

Note: Group A, diabetes with neuropathy; Group B, diabetes without neuropathy; Group C, controls

Table 1. Mean fasting gall bladder volume (FGBV), postprandial gall bladder volume (PPGBV) and gall bladder contractility index (GBCI) in the study groups

The mean diabetes durations for patients with neuropathy and those without were 15+3 years and 6+3 years, respectively ($p<0.05$). There was a positive correlation between FGBV and duration of diabetes, with an r value of 0.23 ($p>0.05$); GBCI and duration of diabetes showed a negative linear correlation with an r value of −0.28 ($p<0.05$). These relationships are illustrated by scatterplots in Figures 1 and 2.

	Prevalence		
	Male	Female	Total
All with diabetes	6 (6%)	9 (9%)	15 (15%)
Group A	4 (8%)	7 (14%)	11 (22%)
Group B	2 (4%)	3 (6%)	5 (10%)
Group C	0 (0%)	4 (8%)	4 (8%)

Note: Group A, diabetes with neuropathy; Group B, diabetes without neuropathy; Group C, controls

Table 2. Prevalence of gallstones in the study groups

The prevalence of gall stones in all the diabetic patients was 15%. The prevalence of gall stones was 22% in those with neuropathy, 10% in those without neuropathy and 8% in the controls. Gallstones were more prevalent among females in all the study groups (Table 2).

Discussion

Gall bladder abnormalities may be seen in long-standing diabetes, especially those with diabetic neuropathy.[4–7] Diabetes is also a known predisposing factor to emphysematous cholecystitis.[11,12]

In this study, the FGBV was significantly higher in diabetic patients with neuropathy than in those without neuropathy (Table 1). The FGBV with neuropathy was also higher than in the control group, though this was not statistically significant. Singh et al[12] found that FGBV in patients with neuropathy was higher than in those without neuropathy, although the difference was statistically insignificant, unlike in our study. Furthermore, in Singh et al's study, the FGBV of patients with neuropathy was significantly higher than that of controls; in our study, the difference was statistically insignificant.

The increased FGBV seen in this study is similar to the findings of Sharma et al[13] who also found that subjects with neuropathy had a significantly larger FGBV. However, our findings are at variance with the findings of Keshavrzzian et al[14] who reported that gall bladder dysfunction is rare in diabetes.

The PPGBV in those with neuropathy was significantly higher than in those without and in controls. This finding is similar to what was observed in the study by Ertugrul et al.[15] Other studies also established a similar pattern among the three study groups.[16,17]

The GBCI, which is a measure of the ejection fraction, was significantly impaired in patients with neuropathy compared with the controls and those without neuropathy. Similar findings were documented by Singh et al[12] who reported that GBCI was reduced in diabetic patients compared with a control group; and was further reduced in diabetic patients with neuropathy, although this was not statistically significant. Guliter et al[16] and Agarwal et al[17] also demonstrated gall bladder ejection impairment in diabetic patients with neuropathy.

The mean age of those with neuropathy was

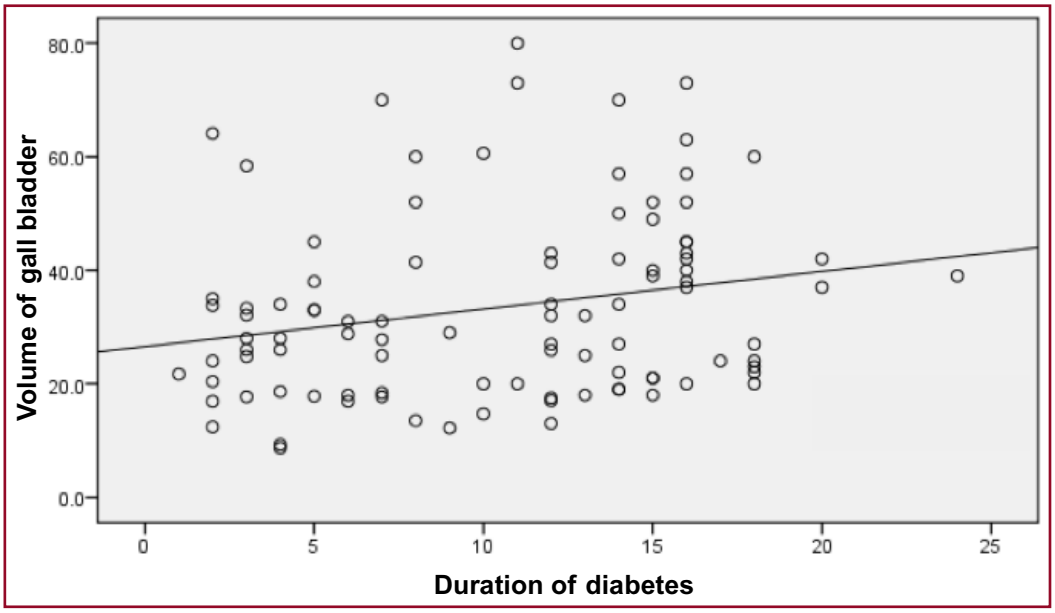

Figure 1. Scatterplot showing linear positive relationship between gall bladder volume and duration of diabetes (r=0.23)

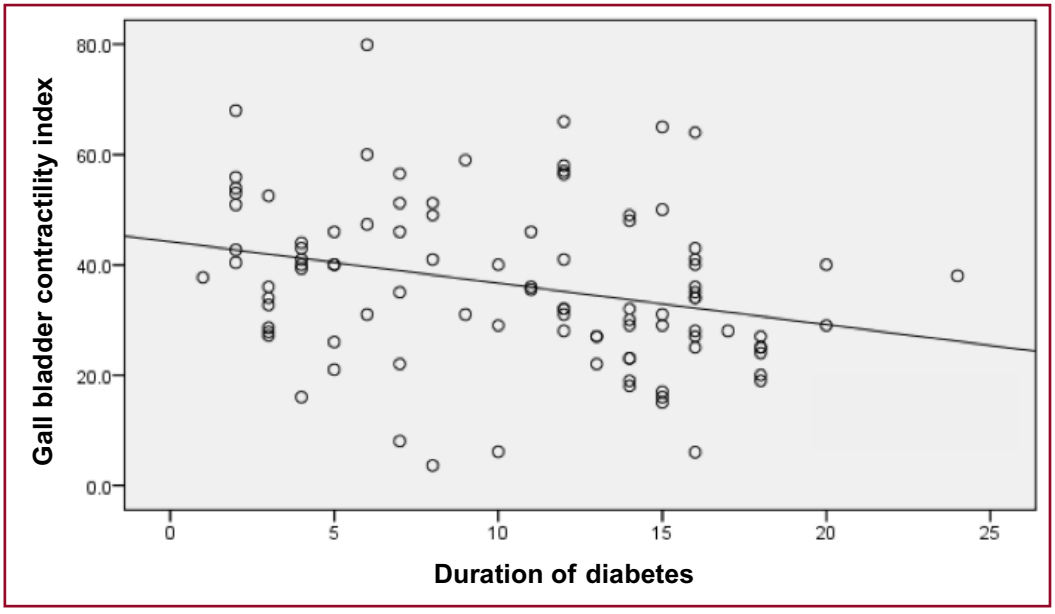

Figure 2. Scatterplot showing negative linear relationship between gall bladder contractility and duration of diabetes (r=0.28)

significantly higher than those without neuropathy in this study. Furthermore, the duration of the disease was significantly longer in diabetes with neuropathy. This is consistent with the findings of Singh et al[12] who reported that autonomic neuropathy became more prevalent with increasing duration of illness. Therefore, relationships thus exist between the duration of diabetes, FGBV, and GBCI. The mean FGBV was highest in the group that had the highest mean duration of diabetes, i.e. the diabetic group with neuropathy. The prevalence of gallstone in diabetes was 15% in this study. Females had a higher prevalence in all the three groups (Table 2). Similar findings were reported by Hahn et al.[11]

The exact mechanisms for gall bladder dysfunction in diabetes patients are not known. Pazzi et al[18] reviewed gall bladder motor function in diabetes and proposed that the mechanism of gall bladder emptying abnormalities may represent a manifestation of denervation caused by visceral neuropathy, a decreased sensitivity of smooth muscle of the gall bladder to plasma cholecystokinin, and/or decreased cholecystokinin receptors in the gall bladder wall. Hahn, et al[11] suggested that impairment of gall bladder motility complicated by autonomic neuropathy causes stasis and results in cholesterol gall stone

crystal formation and gall stone growth.

Since gall bladder abnormalities may be asymptomatic in diabetic patients, gall bladder ultrasonography should be considered in the management of diabetic patients, to facilitate proactive management of gall bladder complications and its attendant morbidity/mortality. Ultrasonography is cheap and usually readily available, and does not utilise ionising radiation.

Author Declaration

Competing interests: none.

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Foeto-maternal outcome of diabetes in a tertiary health facility in Nigeria

C O John, J O Alegbeleye, and A O Otoide

Abstract

Diabetes complicating pregnancy is associated with adverse maternal, foetal and neonatal outcomes. We have determined the prevalence of both pre-gestational (PGDM) and gestational diabetes mellitus (GDM), and their associated maternal and perinatal morbidities and mortalities at the University of Port-Harcourt Teaching Hospital, Nigeria. A retrospective study was carried out of all cases of diabetes in pregnancy between 2008 and 2012. The case notes of the next two non-diabetic patients, whose gestational ages and parities matched, were examined as case controls. There were 122 cases of diabetes from a total of 14, 521 deliveries (8.4 per 1000 deliveries), 21 cases of PGDM, and 101 cases of GDM (1.45 per 1000 deliveries and 6.96 per 1000 deliveries respectively). There were 60 cases of foetal macrosomia (49%). The mean birth weight was 3.75±0.76 kg. There were 11 perinatal deaths (perinatal mortality rate 90 per 1000 deliveries). The caesarean delivery rate was 89%. Sixty (60) babies (49%) required neonatal intensive care admission. There were no maternal deaths or congenitally malformed babies. We conclude that diabetes in pregnancy is associated with adverse maternal and neonatal outcomes. Patients at risk should be encouraged to attend preconception clinics and register early in well-equipped hospitals for antenatal care. Universal screening of all pregnant women at booking and patients with clinical risks characteristics at 24 and 28 weeks of gestation may be effective for the early identification and management of GDM.

Introduction

Diabetes mellitus is the commonest endocrine disorder in pregnancy and complicates up to 10% of pregnancies overall, and up to 40% of pregnancies in communities with racial predilection for the disease.[1] The incidence has increased in recent years, probably due to increasing obesity and advanced maternal age.[1,2] Pre-gestational diabetes (PGDM) is the term used to refer to type 1 and type 2 diabetes occurring before pregnancy. Gestational diabetes (GDM) is diabetes that presents for the first time in pregnancy.[1–3] Diabetes in pregnancy may be associated with an increased risk of recurrent miscarriage, early onset of hypertensive disease in pregnancy, congenital anomalies, intra-uterine death, macrosomia, foetal growth restriction, difficult delivery, and increased operative delivery and birth injury.[1–4]

In the neonatal period, infants of mothers with diabetes are prone to birth asphyxia, hypoglycaemia, and respiratory distress syndrome. More than half of these mothers with GDM develop type 2 diabetes later in life.[1–5] The maternal and perinatal risk of adverse outcomes for both pre-gestational and gestational diabetes are similar from the second trimester of pregnancy. However, as a result of hyperglycaemia in the pre-conception and early conception periods, infants of mothers with PGDM experience double the risk of birth injury, triple the likelihood of caesarean delivery, and quadruple the incidence of newborn intensive care admissions.[3–5] In addition, relatively few women with PGDM receive preconception care, especially in developing countries, and foetal malformations as a result of poor glucose control before and during the early weeks of conception may be a major cause of perinatal mortality.[5–8]

Studies have shown that early identification and appropriate management of diabetes complicating pregnancy are associated with a decrease in morbidity and mortality in infants.[6–8] In view of this, the management of PGDM should begin in the preconception period as proper glycaemic control is essential for better outcomes. Opinions are divided over the use of appropriate screening for GDM, or screening of only patients with high clinical risk characteristics.[8–11]

The objective of this study was to determine the incidence of both PGDM and GDM, and their possible associated maternal and perinatal morbidity and mortality, at the University of Port-Harcourt Teaching Hospital, a tertiary institution in South Nigeria.

Patients and methods

A retrospective study was carried out on all cases of diabetes complicating pregnancies managed at the University of Port-Harcourt Teaching Hospital from 1 January 2008 to 31 December 2012. Patients were identified from delivery registers. The case notes of the next two non-diabetic patients, whose gestational ages and

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parities matched those of the patients with diabetes, were also retrieved to serve as case controls. A total of 122 patients with diabetes in pregnancy and 244 non-diabetic patients were studied. Data retrieved included maternal age, parity, gestational age at booking, high clinical risk characteristics, diagnosis or confirmation of PGDM or GDM, treatment received for diabetes in pregnancy, gestational age at delivery, mode of delivery, indications for delivery, and delivery outcome.

The criteria for screening in our department were a booking weight over 90 kg (or evident obesity), a family history of diabetes, previous GDM, glycosuria, previous macrosomia, congenital abnormalities or intrauterine foetal deaths, recurrent miscarriages, or unexplained stillbirths. Patients with such risk factors are screened at booking and a repeat test is done at 28 weeks. The screening test employed was the 2-hour 75 g oral glucose tolerance test.[11] A plasma glucose value ≥7.0 mmol/l for fasting or a plasma glucose value ≥7.8 mmol/l at 2 hours is diagnostic. Patients with PGDM are assessed with fasting plasma glucose, 2-hour post-prandial glucose, and glycated haemoglobin (HbA1c) tests. The management of such patients involves a multi-disciplinary approach by physicians, dieticians, obstetricians, and neonatologists. The choice of planned delivery versus spontaneous labour depends on the degree of glycaemic control achieved, with other obstetric indications associated on an individual basis.

This data were entered and analysed using SPSS version 17.0. The results obtained were expressed as percentages for frequencies, means and standard deviations (SD) for continuous variables, and presented in bar charts, pie charts, line pictograms or frequency tables as appropriate.

Results

There were a total of 122 cases of diabetes identified amongst booked patients from a total of 14521 booked deliveries within the study period, giving a prevalence of 0.8%. There were 21 cases of pre-gestational diabetes and 101 of gestational diabetes, giving an incidence of 1.45 per 1000 deliveries and 6.96 per 1000 respectively.

The numbers of cases of diabetes progressively increased over the 5-year study period as shown in Figure 1. This increase was accounted for mainly by GDM. The mean age of the patients was 32±4 (SD) years and ranged between 23 and 42 years. Their parity ranged from 0 to 7. Twenty (20) were nulliparous (16%), 92 were multiparous (75%) and 10 grandmultiparous (9%). None of the patients had any form of preconception care. Patients with PGDM presented earlier, and accounted for 34% of first trimester registrations. Twenty per cent (20%) of GDM cases were diagnosed before 24 weeks, and the rest afterwards.

Glycosuria was seen in 66% of cases, family history of diabetes in 40%, previous foetal macrosomia in 33%, booking weight greater than 90 kg in 28%, and bad poor obstetric history (defined as previous intrauterine foetal death, unexplained stillbirths, early neonatal deaths, recurrent miscarriages, or infertility) in 20% of cases. A previous history of GDM was identified in only 6% of cases. Dietary management alone was instituted for 41% of patients while dietary management with insulin therapy was instituted for 59%.

There were sixty (60) cases of foetal macrosomia (49%). The mean birth weight was 3.75kg±0.76 kg, and there were 11 perinatal deaths, giving a perinatal mortality rate of 90 per 1000 deliveries. This is shown in Figure 2, which compares rates with infants of non-diabetic mothers between 2008 and 2012. The overall caesarean delivery rate was 89%, shown in Figure 3, which gives rates from 2008 to 2012, and compares rates with non-diabetic mothers. Problems in the puerperium were identified in 21% of patients. Sixty (60) babies (49%) required neonatal intensive care admissions. There were no maternal deaths or congenitally malformed babies amongst among the patients studied.

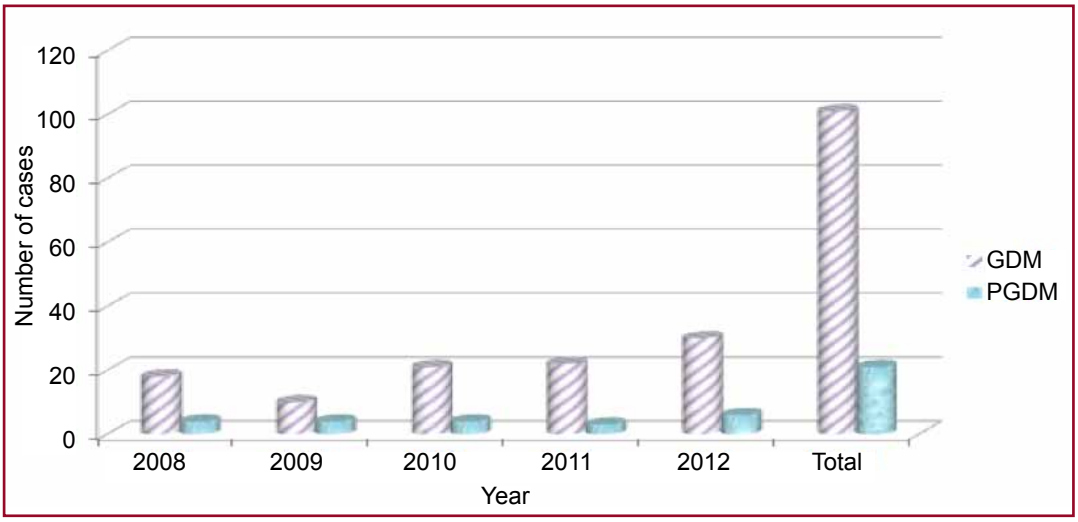

Figure 1. Pregestational (PGDM) and gestational (GDM) diabetes numbers from 2008 to 2012

Discussion

The prevalence of diabetes in pregnancy in this study is relatively high compared with other reports from Nigeria.[2,7,8] A previous study from Port Harcourt, Nigeria in 2001 reported a GDM rate of 3 per 1000 pregnancies.[2] This is significantly lower than the incidence of 7 per 1000 deliveries reported in this study. The difference may be accounted for by increasing levels of obesity due to changes in dietary practices and physical activity. A study in Enugu, Nigeria reported a prevalence of diabetes in

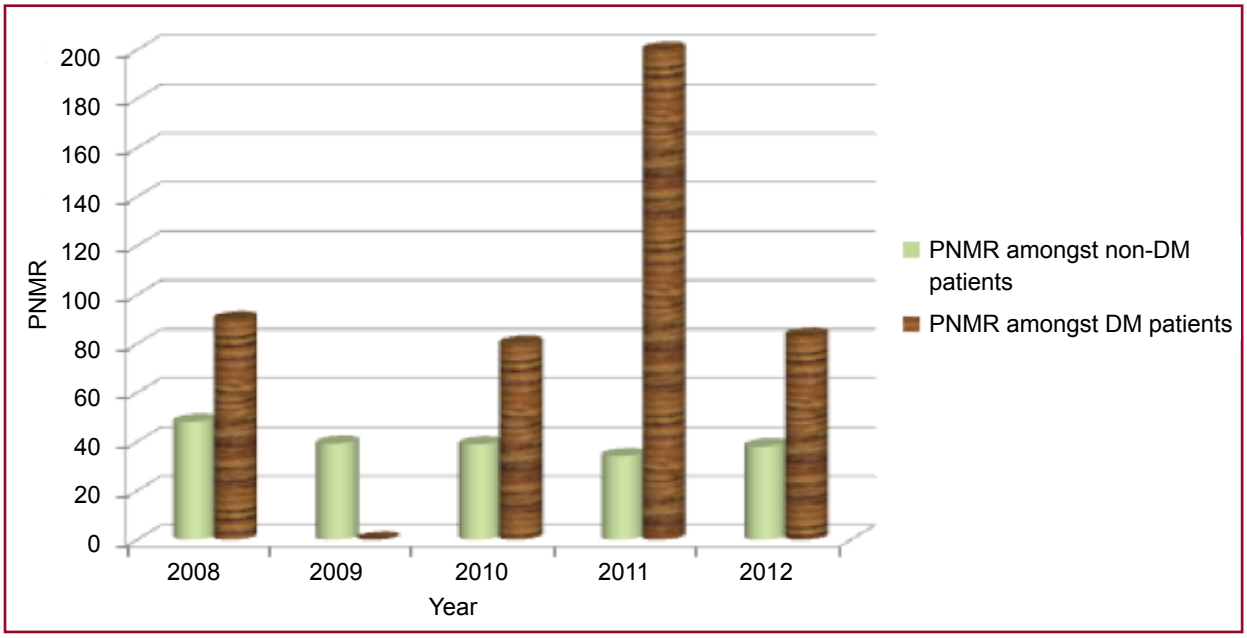

Figure 2. Perinatal mortality rate (PNMR) among infants of diabetic mothers, compared with non-diabetic mothers (2008–2012)

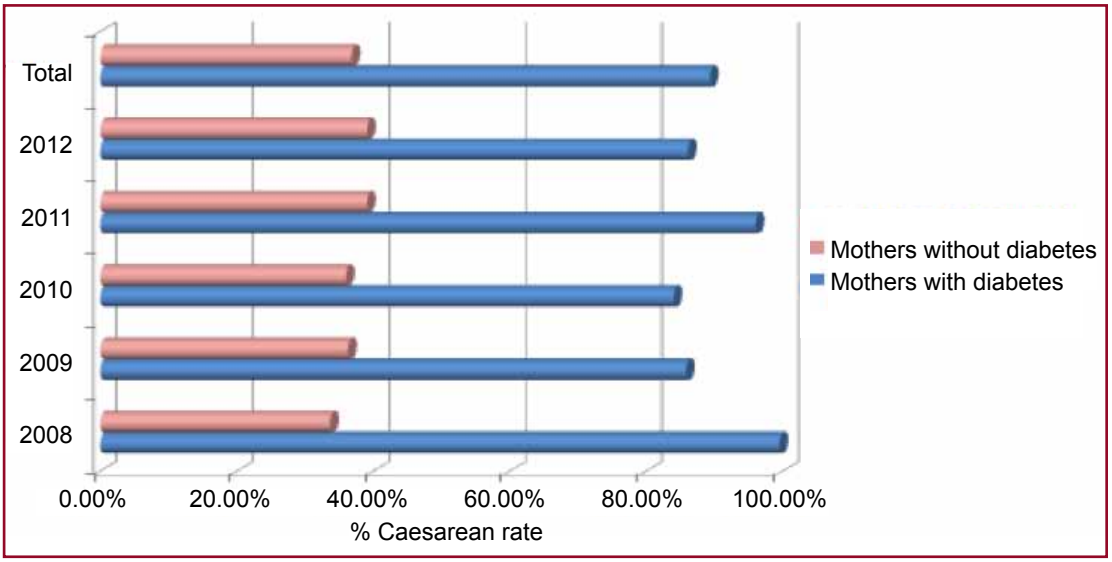

Figure 3. Caesarean section rates (2008–2012) among mothers with and without diabetes

pregnancy of 1.7%[8] which is similar to the prevalence reported in this study but significantly lower than the prevalence of 4.8% for gestational diabetes reported in Abakaliki, 6.8% reported from a multicenter study in Port Harcourt, and 8.3% reported from Jos, Nigeria.[12–14]

The majority of our patients were between the ages of 21 and 34 years and most were primiparous (31%). These findings are in keeping with previous studies from Port Harcourt and Lagos, Nigeria.[2,7,14] However, a study from Qatar found that the prevalence of GDM increased significantly with advancing maternal age and increased parity.[5] In our environment, most pregnant women present late in their pregnancies for antenatal care, especially those who have had a previous delivery.[1,2] This means that screening for GDM often occurs later than is ideal.

The uptake of preconception care in our study was low. Though patients with PGDM presented earlier than those with GDM, they should ideally have had planned pregnancies. Most studies from the developing world have identified foetal macrosomia as a risk factor for diabetes in pregnancy. Glycosuria was, however, the most indicative in our patients. Studies in African populations using universal screening policies suggest that a proportion of patients with diabetes in pregnancy may have no recognised risk factors.[9-12,15-17] This group of patients would be missed by present screening criteria, and universal screening is advocated.

The incidence of foetal macrosomia was 49%, the perinatal mortality rate was 90 per 1000 deliveries, the caesarean section rate was 89%, and neonatal intensive care admission rate was 49%. These are much higher rates than those reported by Ugboma et al in a similar study in the same region.[7] The adverse outcomes in spite of treatments received or type of diabetes in pregnancy, suggest that current treatment modalities may be inadequate and more sensitive methods of foetal surveillance and glycaemic assessment in patients diagnosed with

diabetes in pregnancy are required. Late booking, late diagnosis and the resultant poor diabetic control for most of the pregnancies may also be implicated. This may also account for the high incidence of operative deliveries and neonatal intensive care admissions.

This study has shown that diabetes complicating pregnancy in still associated with a high risk of adverse outcomes. Universal screening of all pregnant women at booking, and patients with clinical risks characteristics at 24 and 28 weeks of gestation, may be more effective for the early identification and management of the disease in pregnancy. Community education targeted at women of reproductive age may help to encourage uptake of reproductive services (such as pregnancy planning or family planning clinics) for high-risk patients and early registration for antenatal care, and will teach women to recognise the signs and symptoms of diabetes in pregnancy.

Author Declaration

Competing interests: none.

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The impact of religion and culture on diabetes care in Nigeria

H Adejumo, O Odusan, O Sogbein, N Laiteerapong, M Dauda, and O Ahmed

Abstract

This study aimed to relate the psychosocial effects of religion and culture with the awareness, knowledge and attitude of Nigerians regarding diabetes prevention and care. Data was collected from a sample of 1500 individuals in communities where secondary and tertiary health care centres are situated from 12/02/2012 to 25/03/2012. The study population included a higher proportion of females (65%), with the majority between 19 and 29 years old (56%). Most were unemployed (67%) or in the teaching profession (24%). Over half (58%) respondents were Christian; while 41% were Muslim, and 1% were traditional worshippers. Over 25% believed that diabetes was due to witchcraft or a punishment from God. Also, 28% believed that diabetes was caused by an infection; and 16% and 10% believed diabetes could be caused by witchcraft or by God, respectively. Nearly all (90%) believed that diabetes was potentially fatal. We conclude that many diabetic patients have inadequate knowledge about the causes of diabetes and its complications.

Introduction

Nigeria is the most populous African country and the tenth largest country by population in the world. Nigeria is rich in diversity with multiple ethnic groups, languages, states, traditional and modern cultures, affluence and poverty, education and ignorance. The population of Nigeria was more than 140 million people in 2006.

A belief about the causes and care of illness is identified as one of the five essential dimensions of commonsense understanding and representation of illness.[1-3] All cultures and religions have systems of health beliefs to explain what causes illness, the cure or treatment, and who should be involved in the process. The extent to which the populace perceive diabetes education as having cultural and religious relevance to them can have profound effects on their reception of information and willingness to use it. Ethnicity is one of the keys to understanding Nigeria's pluralistic society. It distinguishes groupings of people who, for historical reasons, have come to be seen as distinctive on the basis of locational origins and other cultural markers. Generally, studies have focused on the extent to which people believe that the cause of their illness is internal versus external, global versus specific, or stable versus changing.[4]

People's beliefs about the causes of illness probably entail more dimensions than the three (internal/external, global/specific, and stable/changing) investigated to date. Studies from medical anthropology and sociology have demonstrated that many people believe that illness may be caused by exposure to cold, wet weather; a form of punishment for violating moral and religious taboos, a mystical retribution for offending God, 'bad blood', 'witches' or the 'evil eye'. Also, illness can be considered a failure to maintain inter and intra-personal harmony.[5-8] Studies suggest that culture and religion have a strong influence on different health behaviours. In spite of advances in diabetes care, desired outcomes are not good;[9] and linked to this, patient satisfaction is not optimal.[10] According to the 'Rule of Halves,'[10] only half of people living with diabetes have been diagnosed, and only half of those diagnosed receive professional care.

The prevalence of diabetes has continued to increase in Nigeria. With the current trend of transition from communicable to non-communicable diseases, it is projected that the latter will soon equal or even exceed the former in developing nations, including Nigeria, thus culminating in a double burden of disease.

Why is patient satisfaction and desired outcome not adequate? The reasons are multiple and include inadequate attention to biological aspects of diabetes, inadequate or inappropriate pharmacology, and also psychosocio-cultural reasons. This study has sought to relate the psychosocial effects of religion and culture to the awareness, knowledge and attitude of Nigerians regarding diabetes prevention and care. Our enquiry also focused on the belief of respondents on supernatural (mystical retribution) causes of illness, and the belief that illness is God's will or punishment, and/or is caused by bad blood, witches, or the evil eye. We hypothesised that religious and cultural beliefs may influence the awareness, knowledge and attitude of people to diabetes

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prevention and care, and that health behaviour would be related to the dimension of belief.

Patients and methods

This study was multi-centred (Lagos and Ogun States). Data were collected from a sample of 1500 individuals in communities where secondary and tertiary healthcare centres were situated from 12 February to 25 March 2012. It was assumed that communities where secondary and tertiary healthcare facilities were situated may be more enlightened about diseases of public health importance than communities that did not have healthcare facilities.

Data collection was by written questionnaire and in-person interview for participants unable to read. Survey questions asked about individual's awareness, knowledge of, and attitude towards diabetes; as well as questions regarding cultural and religious beliefs. Other specific questions included individual's awareness of diabetes, previous knowledge, family history, socio-demographic data, and where their diabetes-related information originated from (e.g. media, health workers, friends, or family).

Further questioning concerned knowledge, fundamental definitions, complications, and whether diabetes was believed to be curable. Also explored were attitudes to prevention and care of diabetes, general attitudes to health prevention and care, who is consulted when ill, whose opinions matter to them when ill, and how religion and culture influence such decisions.

Results

Our study population included a higher percentage of female respondents (65%), with the majority aged between 19 and 29 years (56%); 6% of the respondents were traders by profession, 24% were in the teaching profession, 3% were professionals (bankers, doctors, engineers, and others working in offices apart from teachers), and 67% were unemployed. Religious beliefs were as follows: Christian (58%), Muslim (41%), and traditional (1%).

Doctors (42%) and nurses (37%) were the commonest sources of information about diabetes among our respondents. Parents were the most frequent source of information about diabetes among family members (48%), reflecting the important influence of parents in information dissemination. Indeed, the home (45%) was the majority's choice of place of information followed by open campaigns (24%).

The main findings are as follows:

1. Knowledge of diabetes: 35% believed that diabetes was due to the presence of excess sugar in the blood and/or drinking excessive fluids, while 15% believed it was the presence of too much sugar in the urine and/or passing large amounts of urine.
2. Financial burden: 55% considered diabetes to be a collective burden on patient, family, and society; while 18% thought the burden lay with the patient alone and 12% with society alone.
3. Curability: 66% thought that diabetes could be cured, with the rest understanding that it was incurable. Of this latter 34%, most (85%) believed that treatment and control was possible, while the rest felt it could not be controlled.
4. Neglecting diabetes: 42% thought that if diabetes was neglected it could lead to kidney failure, and 23% thought it could lead to heart failure. Only 0.3% thought that neglecting diabetes could result in limb amputation – this is a worryingly low figure, as according to the International Diabetes Federation (IDF), diabetes is responsible for over 1 million amputations yearly worldwide, and that a limb is lost to diabetes every 30 seconds.
5. Attitudes to illness: 49% of patients would consult a doctor if they were ill, 43% would talk to family members, and 5% to their religious leaders. There were 51% who said they would comply with a doctor's advice and opinions, 40% with family, and 7% with religious leaders. In terms of disease prevention, 57% would value their doctor's opinion, 33% the opinion of family members, and 7% their religious leaders.
6. Care and screening availability: 54% had access to regular diabetes follow-up in their community, while 46% did not. There were 82% who felt that screening for diabetes and hypertension was worthwhile, and 18% were not interested in such screening.

Discussion

According to traditional widely held beliefs, every illness has a cure. In the context of these beliefs, the scientific description of diabetes as a chronic non-communicable disease exposes the limitations of biomedical medicine and motivates people who subscribe to these widely held beliefs to consult traditional healers. In traditional belief systems, diabetes is classified into three categories: naturally occurring, man-made, and ancestral.[11] The first category fits the biomedical explanation, while the second and third point to causal agents such as witchcraft or supernatural beings (ancestral or a deity). A cure is believed to be available for each of these types of diabetes. The biomedical 'incurability' of diabetes is often interpreted within a traditional framework. It is believed that this 'incurability' is a temporary issue, and that ancestors or deity will eventually provide a cure.

Within the traditional model, diabetes is recognised as having its origin in the history of a person's family, but this is not the same as the 'family history' that is recorded in orthodox healthcare facilities. The traditional family history refers to the interpretation of issues, including conflicts and misdeeds, which might date back to several previous generations. Beliefs about the causes of illnesses may entail emotional, punitive, natural, or supernatural (mystical retribution) dimensions.[6]

Among our respondents, the home was for most the place where information regarding diabetes was ob-

tained, followed by open campaigns. The open campaign is a popular method of information dissemination in Nigeria; religious, cultural, and communal organisations utilise this method mostly for information dissemination. Awareness is the key to diabetes health, and the platform for creating awareness in our community include masquerades (*eyo* from Lagos, *lisabi* from Ogun State), festivals (*oro, ereke, ojude-oba*), and the traditional weekly markets (*awolowo, falawo, itoku*) where all and sundry attend, providing a mass forum for communication. According to 'The use and interpretation of Diabetes Conversation Maps' (a socio-educational tool), community awareness is highly recommended; splitting the *ohanaeze* (communal assembly) into small groups of 3–10 people.[12,13]

In their proper spheres, orthodox and traditional medicines are mutually independent and autonomous, each serving the personal and health needs of Nigerians. The more they co-operate reasonably, the more effectively they will perform this service to the advantage of Nigerians living with diabetes. Gradual co-operation between orthodox and traditional healers, as recommended by the World Health Organization (WHO), is perhaps the most promising policy. Mutual respect between care providers in both fields (traditional and modern) is a pre-requisite for this approach.[12] It would also engender evidence-based research, which would in turn trigger reforms to permit the regulated incorporation of traditional healers into healthcare systems. If, under this approach, traditional healers were provided with education on the symptoms and complications of diabetes, they might be able to act as frontline players, especially in primary diabetes care.

While a number of the practices in traditional medicine can have negative health consequences, and constitute a poor alternative to modern medical treatment, the traditional healers themselves, if their knowledge and skills can be properly recognised and harnessed, might prove to be effective partners in the fight against diabetes. Furthermore, with stakeholders' involvement – namely traditional, religious and medical authorities – psychosocial[13] or management guidelines may be drawn up; focusing on initiatives related to diet, physical activity, stress management, and positive attitudes towards modern healthcare and insulin usage. Such a co-operative system may improve diabetes education and knowledge, and reduce some of the factual inaccuracies in the knowledge of some patients that were found in this study.

Author Declaration

Competing interests: none.

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Compliance with diabetic retinopathy screening in a Nigerian tertiary hospital

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Abstract

There is little information on default rates and reasons for retinal screening in diabetes. We prospectively studied 179 type 2 diabetic patients referred for screening at a tertiary Nigerian medical centre. Defaulting occurred in 100 patients, i.e. over half (56%). Defaulting was associated with not having had a previous eye examination (p=0.027) and either a short (<1 year) or medium (6–10 year) duration of diabetes (p=0.001). Location of residence, level of education, diabetes treatment, age and gender did not correlate with screening compliance. We recommend that screening be carried out as soon as possible after diagnosis, which may improve future compliance.

Introduction

There is a global increase in the prevalence of diabetes, and the global burden of 171 million patients in the year 2000 is projected to reach 366 million in the next three decades, with developing countries being the most affected.[1] The prevalence of diabetes in Nigeria is reported to be 4.9%.[2] Diabetic retinopathy is a potentially blinding retinal vasculopathy and accounts for 0.02% of national blindness in Nigerian adults.[3] A retinopathy prevalence rate of 4.6% was reported in 1969 by Osuntokun, and it was then considered to be a rare problem in Nigerian diabetic patients.[4] However, retinopathy prevalence rates of between 15 and 42% have been reported in Nigeria in more recent times.[5–9] Laser photocoagulation and intravitreal pharmacotherapy, as well as vitrectomy, are useful modalities in the treatment of various stages of diabetic retinopathy, along with strict metabolic control.[10]

Since diabetic retinopathy is largely asymptomatic in the early stages, screening for the disease remains a very important part of management as it detects early treatable stages allowing for prompt treatment and prevention of visual loss.[11] Default rates from retinopathy screening of up to 50% were reported in the USA[12] and more than 60% in the Korean National Health and Nutrition Examination Survey.[13] Ashaye et al reported that 43% of the type 2 diabetes patients did not present for scheduled retinopathy screening in Ibadan.[9] Factors that prevent diabetes patients from attending retinopathy screening may differ from community to community. Age, sex, educational level, and self-reported health status are some factors reported to affect compliance.[13,14]

A national retinopathy screening protocol has yet to be developed in Nigeria and studies on the utilisation of diabetic retinopathy screening are scarce. Are there modifiable characteristics of persons who default from scheduled diabetic retinopathy screening? This study set out to review some characteristics of diabetic patients who defaulted from scheduled eye screening, in order to guide the development of a local diabetic retinopathy screening protocol.

Patients and methods

A cross-sectional analytical prospective study was carried out in the Endocrinology Outpatient Clinic and the Ophthalmology Outpatient Unit of the Wesley Guild Hospital, Ilesa, Nigeria; a tertiary referral centre and part of the Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife. The study population was made up of type 2 diabetes patients who attended the Endocrinology Outpatient Clinic between July 2010 and November 2010. All attendees during this period were informed of the study, and consent was subsequently obtained. Consecutive patients were enrolled. Ethical clearance was obtained from the Ethical Committee of the Obafemi Awolowo University Teaching Hospital, Ile-Ife.

Study participants had a questionnaire administered, following which a jointly scheduled date for retinopathy screening in the Ophthalmology Outpatient Unit was fixed. The questionnaire was used to obtain information on patients' age, sex, educational level, residential address, duration of diabetes, current management modalities, and awareness of possible damage of diabetes to other parts of the body including the eye. Residency status was graded as living: in the same town; outside the town but within the same state; and outside the state in which the hospital was located. Participants were also asked if they had had a dilated eye examination since the diagnosis of diabetes was made, and if they had eye complaints. Each participant was educated on the need for diabetic retinopathy screening for the prevention of blindness and visual impairment from the disease. Screening at the Ophthalmology Clinic included visual

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acuity assessment for each eye using Snellen's chart or Tumbling E chart as well as dilated funduscopy with a +78DS lens and Haag Streit slit lamp biomicroscope.

The outcome measure was attendance at retinopathy screening. Those who attended were recorded as compliant, while those who did not attend were recorded as defaulters. Data obtained were analysed with SPSS version 16 for univariate and multivariate analysis. Variable comparison was achieved with Chi Square, Fisher's Exact and Student's t test as appropriate, and statistical significance was chosen as $p<0.05$.

Results

A total of 179 patients were recruited. Mean (+SD) age was 61+12 years, and 91 (51%) were male. Diabetes duration was <1 year in 23 patients (13%), 1–5 years in 87 (49%), 6–10 years in 44 (26%), and >10 years in 25 (14%). There were 2 patients (1%) on diet control alone, 158 (88%) on oral hypoglycaemic agents (OHA), 14 (8%) on OHA plus insulin, and 5 (3%) on insulin alone. Forty patients (23%) had no formal education, 54 (30%) had primary education, 40 (22%) secondary, and 45 (25%) tertiary; 100 patients (56%) had no eye complaints, and most (79%) knew that diabetes could damage the eye. No dilated eye examination had been done on 122 (68%) since diagnosis.

Defaulting from retinal screening referral occurred in 100 patients (56%) with the other 79 (44%) being complaint. The characteristics of these two groups are shown in Table 1. Mean ages of defaulters (61+12 years) and attendees (62+12 years) were similar. Those with a diabetes duration of <1 year and of 6–10 years were more likely to default ($p=0.012$), see Figure 1. The default rate was also higher in those who had not had an eye examination since diagnosis (62%), compared with those who had (44%), $p=0.027$. There was no statistically significant difference between the groups in terms of gender, education, treatment, place of residence, eye complaints, or retinopathy awareness (see Table 1).

Discussion

Only 57 patients (32%) had had their eyes examined at least once since diagnosis of the disease – a very low rate despite the fact that most patients (79%) reported knowledge that diabetes could damage their eyes. The rate of previous eye examination is however higher than the 16% and 29% reported in Kano and Ile-Ife respectively.[6,15]

More than half (56%) of patients defaulted from retinopathy screening in this study; higher than the 43% default rate reported by Ashaye et al in Ibadan 9 and the 22% by Gulliford et al in the United Kingdom.[16]

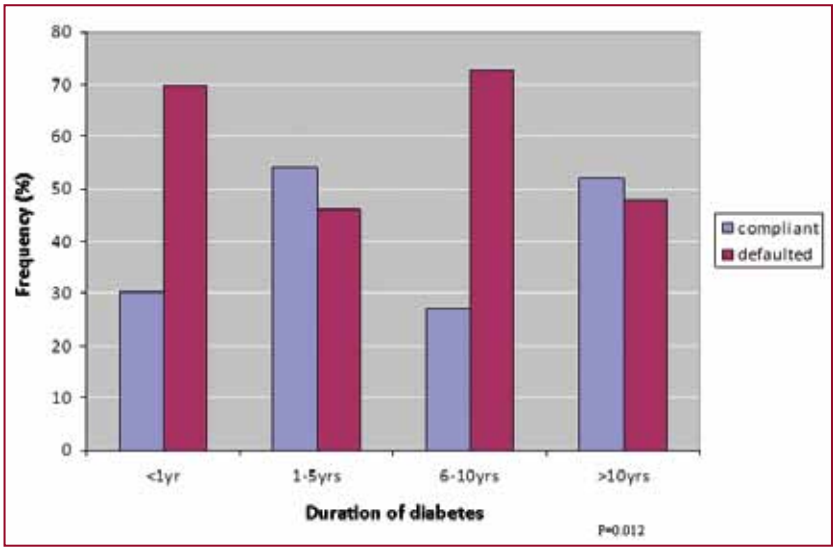

Figure 1. Duration of diabetes and compliance with retinopathy screening

		Attenders (n=79)	Defaulters (n=100)
Gender	Male	44 (56%)	47 (47%)
	Female	35 (44%)	53 (53%)
Education	None	18 (23%)	22 (22%)
	Primary	22 (28%)	32 (32%)
	Secondary	17 (21%)	23 (23%)
	Tertiary	22 (28%)	23 (23%)
Treatment	Diet	2 (3%)	0 (0%)
	OHA	69 (87%)	89 (89%)
	OHA + insulin	6 (7%)	8 (8%)
	Insulin	2 (3%)	3 (3%)
Eye complaints	Yes	49 (62%)	55 (55%)
	No	30 (38%)	45 (45%)
Retinopathy awareness	Yes	62 (78%)	80 (80%)
	No	1 (2%)	3 (3%)
	Unsure	14 (20%)	17 (17%)
Residence	Same town	63 (80%)	70 (70%)
	Same state, different town	9 (11%)	21 (21%)
	Different state	7 (9%)	9 (9%)

Note: OHA = Oral hypoglycemic agent.

Table 1. Characteristics of attenders (n=79) and defaulters (n=100) from diabetic retinopathy screening

Varying socio-demographic and clinical characteristics in individuals can affect utilisation of health services. Although the screening default rate was slightly higher among females compared with males in this study, this difference was not statistically significant.

Patients who do not attend diabetic eye screening are at risk of developing sight- threatening diabetic retinopathy.[17] A statistically significant difference was observed in relation to having had a previous eye examination since diagnosis; the default rate being higher among patients who had not had screening since diagnosis. This may be indicative of a greater level of awareness and perceived benefit from such previous examinations. Thus, initial eye screening as soon as a diagnosis of diabetes is made may be indispensible in enhancing the likelihood of subsequent compliance. Default rates were significantly different depending on the duration of diabetes, being highest among those with a diagnosis <1 year and between 6 and 10 years. The reason for this is not clear; however it is possible that persons who have had diabetes for less than a year may not be sufficiently aware of diabetes complications. This further reinforces the need to encourage and ensure retinopathy screening as soon as the diagnosis is made.

Type 2 diabetes patients who did not know that diabetes could affect the eyes, as well as those who did not reside in the same town as the study, had non-statistically significant higher screening default rates (p=0.45 and p=0.22). Patients with no eye complaints had higher default rates compared with persons with eye complaints, but the differences were not statistically significant (p=0.25 and p=0.34). It appears that the patient's perceived need for eye care probably informed their decision to attend screening. It may also be a reflection of a lack of knowledge and the largely asymptomatic nature of retinopathy in its early treatable stages.

In conclusion, higher rates of default from retinal screening were associated with duration of diabetes diagnosis as well as lack of previous eye examination. Appropriate and efficient screening should include education on diabetic eye complications as soon as a diagnosis of diabetes is made. Every effort must be made in partnership with the physicians caring for patients to ensure screening at diagnosis.

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Author Declaration

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Guidance to Authors

The Editors welcome articles on diabetes, and the management of diabetic diseases, from all health professionals, medical and non-medical. The philosophy of the journal is to reflect as much as possible the multi-disciplinary nature of diabetic care. The *African Journal of Diabetes Medicine* seeks to fulfil a role in continuing medical education and, therefore, welcomes in particular review articles which provide practical updates on the management of diabetic patients. Original research studies will constitute an important minority of the articles published. In assessing the suitability of research papers for publication, the Editors will favour those contributions which will provide readers with information of practical use in their day-to-day practice. Advice and assistance will, wherever possible, be provided to potential authors on the scope of their research or method of presenting papers.

Manuscripts

Review articles

These are particularly welcome as we receive relatively few. They can be on any aspect of diabetes, though preferably of general interest to our readers. Review articles do not need an abstract, and should be no more than 2500 words long (excluding references). A reasonable number of figures and/or tables can be used.

Original articles

These should be research-based articles, divided in a standard way into abstract (unstructured), introduction, methods, results and discussion. In length they should be no more than 2000 words (excluding references) with no more than three tables or figures, and 30 references.

Short reports/case reports

These should be up to 800 words long (excluding references), have one table or figure only, and up to 10 references. The sub-divisions of the report should be the same as for original articles, but the abstract should be very brief – usually two or three sentences.

Letters, news and notes, editorials etc.

We welcome news items, conference reports, letters to the editor, etc. We normally write editorials 'in house', but if you think you have a useful editorial to offer, we'd be glad to see it.

Illustrations

These must be supplied as jpeg, tiff or PDF files, in CMYK format with a resolution of at least 300 d.p.i.

General guidance

Articles should be sent by email – to our Cambridge office (editor@fsg.co.uk) – as a Word attachment (saved as a text-only document please). For all contributions referencing should be numerical and in the Vancouver style. Please note that all articles submitted to the *African Journal of Diabetes Medicine* are deemed to have been offered exclusively to the journal, unless otherwise stated. Copyright in papers published will be vested in the publishers.The Editors reserve the right to shorten or to make other alterations to articles at their discretion.