

# Diabetic retinopathy in a Nigerian community

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## ABSTRACT

**Introduction:** This study was designed to determine the prevalence of diabetic retinopathy among diabetic patients attending the medical outpatient department of the Federal Medical Centre, Owo, Ondo State, Nigeria.

**Methods:** This study was conducted between November 2007 and February 2008. Ethical clearance was obtained from the ethical committee of the hospital prior to carrying out the study. 100 diabetic patients selected by simple random sampling were interviewed with the aid of a semi-structured questionnaire. All the respondents had fundoscopy conducted at the eye clinic with the aid of a direct ophthalmoscope. The data was collated and analysed.

**Results:** The majority of the respondents (85 percent) had type 2 diabetes mellitus, while the rest (15 percent) had type 1 diabetes mellitus. 15 percent of the respondents had varying degrees of diabetic retinopathy. The duration of diabetes mellitus was significantly associated with the development of diabetic retinopathy at a p-value of 0.002.

**Conclusion:** A few of the respondents had diabetic retinopathy. There is a need to create awareness among diabetic patients on the need for routine ocular examinations.

**Keywords:** diabetes mellitus, diabetic retinopathy, retinopathy

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## INTRODUCTION

Diabetes mellitus has become a common disease that leads to chronic complications such as neuropathy, nephropathy, vascular diseases (cardiac, cerebral and peripheral) and retinopathy. World Diabetes Day is celebrated on November 14 every year. This is also the birthday of Fredrick Banting, who along with Charles Best, discovered insulin in 1921.<sup>(1)</sup> The development

**Table 1. Occupation of the respondents (n = 100).**

Occupation	No. of respondents
Trading	30
Farming	21
Pensioner	14
Civil service	13
Teaching	8
Artisan	6
Unemployed	5
Schooling	3

of chronic complications is related to the duration of diabetes mellitus.<sup>(1)</sup> The total burden of diabetes mellitus is due to the increasing number of new cases that are a result of inherited risk and changes in lifestyle (sedentary lifestyle, abnormal eating habits), as well as an increase in life span. Patients with diabetes mellitus now live longer because of better treatment modalities, thus preventing acute complications and premature death. As a result of this, there is now a larger population of diabetes mellitus patients who are at a higher risk of developing chronic diabetic complications. Diabetes mellitus is a disease that is commonly encountered by health care professionals.<sup>(2)</sup> In the 2000 year, there were 171 million diabetic patients in the world.<sup>(3)</sup> By 2030, this figure is projected to increase to 366 million.

Apart from significant mortality, diabetes-related morbidities, such as diabetic retinopathy, neuropathy and cardiovascular disease, have also placed a heavy financial burden on society.<sup>(4,6)</sup> In the United States, the total annual economic cost of diabetes mellitus in 1997 was estimated to be US\$98 billion, and this included US\$44 billion in direct medical and surgical treatment costs and US\$54 billion for indirect costs resulting from disability and mortality. Diabetes mellitus is a silent disease, and many sufferers only become aware of it when it threatens their life.<sup>(7)</sup> Diabetic retinopathy is a common complication of both type 1 and type 2 diabetes mellitus.<sup>(8)</sup> Diabetic retinopathy can be broadly categorised into non-proliferative and proliferative diabetic retinopathy. Non-proliferative diabetic retinopathy may impair vision if the macula is involved, and this could result in a loss of vision.<sup>(9)</sup> Proliferative diabetic retinopathy is a serious eye complication of

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**Table II. Fundus findings of the respondents (n = 100).**

Fundus finding	No. of respondents
Normal fundus	77
Mild non-proliferative diabetic retinopathy	5
Moderate non-proliferative diabetic retinopathy	8
Proliferative diabetic retinopathy	2
Glaucoma	2
Age-related macular degeneration	6

diabetes mellitus that can result in blindness.<sup>(10)</sup> Diabetic retinopathy is a leading cause of blindness in developing countries.<sup>(11)</sup> Metabolic control affects the development of complications of diabetes mellitus.<sup>(12,13)</sup> This study was designed to determine the prevalence of diabetic retinopathy among diabetic patients presenting to the medical outpatient department of the Federal Medical Centre, Owo, Ondo State, Nigeria.

## METHODS

Ethical clearance was obtained from the ethical committee of the Federal Medical Centre, Owo, Ondo State, Nigeria, prior to carrying out this study. The study was conducted between November 2007 and February 2008. 100 consenting diabetics presenting to the medical outpatient clinic of the hospital were selected by simple random sampling and were interviewed by the authors with the aid of a semi-structured questionnaire. Informed consent was obtained from each of the respondents. Information obtained included their biodata, the type of diabetes mellitus and the duration of the disease. All the respondents had fundoscopy done with the aid of direct ophthalmoscope at the eye clinic of the hospital. Those with opacities in the lens that impaired a detailed view of their fundus had their pupils dilated with tropicamide eye drops prior to fundoscopy. The data obtained was collated and analysed using the Statistical Package for Social Sciences version 12.0.1 (SPSS Inc, Chicago, IL, USA).

## RESULTS

There were 100 participants in this study. The respondents were aged between 21 and 90 years old, with a mean age of 57.6 years. There were 55 males and 45 females, and the male-female ratio was 1.1:0.9. The ethnicity data of the respondents revealed that the majority (88%) were Yorubas, 9% were Ibos and other ethnic groups accounted for the remaining 3%. The respondents comprised 88 Christians and 12 Muslims. Most respondents (41%) had tertiary education, 26% had no formal education, 13% had primary education and 20% had secondary education. The majority of the

**Table III. Fundus findings vs. duration of diabetes mellitus.**

Fundus finding	Duration (years)/no.				Total
	5	5–10	10–15	>15	
Normal fundus	54	17	5	1	77
Mild non-proliferative DR	1	1	2	1	5
Moderate non-proliferative DR	1	2	4	1	8
Proliferative DR	1	-	1	-	2
Glaucoma	1	1	-	-	2
Age-related macular degeneration	5	-	-	1	6
Total	63	21	12	4	100

DR: diabetic retinopathy

respondents (83%) were married, 14% were widowed and 3% were single. As shown in Table I, most of the respondents (30%) were traders, while those in the farming industry made up 21% of the respondents. Most respondents (85%) had type 2 diabetes mellitus, while the rest (15%) had type 1 diabetes mellitus. 63% had diabetes mellitus for less than five years, 21% for 5–10 years, 12% for 10–15 years and 4% for more than 15 years. The fundus picture of the respondents is shown in Table II, revealing that 15% of the respondents had diabetic retinopathy of varying severity. 8% had moderate non-proliferative diabetic retinopathy, 5% had mild non-proliferative diabetic retinopathy, and only 2% had features of proliferative diabetic retinopathy. As shown in Table III, the cross-tabulation of the fundus picture with the duration of diabetes mellitus revealed that the prevalence of diabetic retinopathy was significantly associated with the duration of diabetes mellitus ( $p = 0.002$ ).

## DISCUSSION

The ages of our respondents accounted for the young, middle aged and the elderly, thus minimising age-related bias. Our respondents were predominantly Yorubas because the study community was a Yoruba community. Christianity was the predominant religion among the study population as it was the predominant religion in the community. As most of the respondents were educated, this could have contributed to their enthusiasm to access qualitative healthcare at the tertiary level. Trading was the leading occupation among the respondents in view of the large proportion of traders in the community. In the developed world, diabetic retinopathy is a leading cause of blindness in patients aged  $\leq 55$  years.<sup>(14)</sup> In developing countries, changes in the lifestyle of the populace have increased the risk of being diagnosed with diabetes mellitus and its complications.<sup>(15)</sup> It is

projected that 20% of diabetic patients worldwide will develop diabetic retinopathy.<sup>(16)</sup>

It has also been reported that 2%–5% of all diabetic patients will develop proliferative diabetic retinopathy.<sup>(17)</sup> 15% of our study population had diabetic retinopathy of varying degrees of severity, which is similar to the findings of Magulike et al, in which a 12.75% prevalence of diabetic retinopathy was reported in Enugu.<sup>(18)</sup> However, our numbers were lower than the 33% reported by Nwosu in Nnewi.<sup>(19)</sup> Nwosu also established that diabetic retinopathy accounted for 14% of retinal diseases in Onitsha.<sup>(20)</sup> The findings of this study and that of other Nigerian studies<sup>(18-20)</sup> have revealed that diabetic retinopathy is no longer as rare in Nigeria as previously reported by Osuntokun.<sup>(21)</sup> The lower prevalence of diabetic retinopathy in this study compared with Nwosu's study<sup>(19)</sup> could be due to the use of a direct ophthalmoscope for fundoscopy in this study, which may have made it possible to miss some subtle retinal changes. The use of direct ophthalmoscope due to the unavailability of binocular indirect ophthalmoscope is thus a limitation of the study. A study carried out in the United Arab Emirates found a diabetic retinopathy rate of 19%.<sup>(22)</sup> The findings of Khandekar et al in Oman are consistent with our findings as they established a diabetic retinopathy prevalence rate of 14.39%.<sup>(23)</sup> Gordon et al reported a diabetic retinopathy prevalence rate of 47.8% in Lesotho.<sup>(24)</sup> The 2% prevalence rate of proliferative diabetic retinopathy was in keeping with the 2%–5% reported in the literature.<sup>(17)</sup>

This study has shown that the duration of diabetes mellitus significantly affects the development of diabetic retinopathy. Our findings are consistent with those of other studies,<sup>(18,21,23,24)</sup> and show that individuals who have suffered from diabetes mellitus for a long period of time are at risk of developing diabetic retinopathy. This highlights the need for physicians to refer diabetic patients to ophthalmologists for evaluation. It also highlights the necessity of creating awareness among diabetics of the importance of routine eye evaluations, so as to detect early ocular complications that may arise from diabetes mellitus. More vitreo-retinal surgeons should be trained and more laser facilities made available to address the challenges posed by diabetic eye diseases. Physicians should also ensure the optimal control of blood glucose among diabetic patients so as to prevent complications and enhance the quality of life of these patients.

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