



Pattern of diabetic retinopathy in Kano, Nigeria

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Abstract

Background: The aim of the study is to determine the pattern of retinopathy seen in diabetic patients attending the outpatient clinic in Aminu Kano Teaching Hospital, Kano, Nigeria.

Materials and Methods: Consecutive patients who were attending the diabetic clinic and who consented were examined over a three-month period. Information obtained includes patient's bio data, type and duration of disease, and findings on eye examination. The fundus was examined with direct and indirect ophthalmoscopes, +90 D with slit lamp and fundal photography. Retinopathy was graded using the International Clinical Diabetic Retinopathy Disease Severity Scale (ICDRDSS).

Results: A total of 214 patients were examined during the study period. There were 88 males and 126 females (M: F = 1: 1.43). The mean age of the study population was 52.14 ± 13.23 years. The mean age of patients without diabetic retinopathy (DR) was 49.14 ± 13.17 years and the mean age of patients with DR was 58.51 ± 10.94 years. Forty nine patients (23%) had insulin-dependent diabetes mellitus (IDDM) while 165 patients (77%) had non insulin dependent diabetes mellitus (NIDDM). There was statistically significant difference in presence of retinopathy in patients with IDDM compared to those with NIDDM [$\chi^2=29.77$ {95% CI}, $P=0.000$]. DR was significantly more common in patients with disease duration of 15 years or more compared with those with disease duration of 14 years or less [$\chi^2= 65.85$, {95% CI} $P= 0.000$]. Based on ICDRDSS scale, 136 patients (64%) had no retinopathy and 78 patients (36%) had retinopathy. Some patients were visually impaired and the cause of blindness was DR in 6 patients (2.8%). Cataract and glaucoma were the cause in 6 patients (2.8%).

Conclusion: Diabetic retinopathy is common in our environment and is more frequent in IDDM and those with long disease duration. DR is a cause of visual disability although diabetic patients are not exempted from blindness from other eye diseases such as cataract and glaucoma. A screening program needs to be developed to facilitate early detection and prompt treatment.

Keywords: Diabetic retinopathy, eye examination, vision loss

Résumé

Fond: L'étude vise à déterminer le patron de la rétinopathie vu chez les patients diabétiques, participant à la clinique externe à l'hôpital enseignement Aminu Kano, Kano, au Nigeria.

Des matériaux et des procédés: Les patients consécutifs qui assistaient à la clinique pour diabétiques et qui ont consenti ont été examinés sur une période de trois mois. Les renseignements obtenus comprennent des données bio du patient, le type et la durée de la maladie et conclusions sur l'examen de la vue. Le fond de l'utérus a été examinée avec ophtalmoscopes directs et indirects, +90 D avec lampe à fente et photographie du fond utérin. Rétinopathie a été classé à l'aide de l'International clinique diabétique rétinopathie maladie gravité échelle (ICDRDSS).

Résultats: Un total de 214 patients ont été examinés au cours de la période d'étude. Il y a 88 mâles et 126 femelles (M: F = 1: 1,43). L'âge moyen de la population de l'étude était $52.14 \pm$ ans 13.23 . L'âge moyen des patients sans la rétinopathie diabétique (DR) était 49.14 ± 13.17 ans et l'âge moyen des patients avec DR était 58.51 ± 10.94 ans. Quarante neuf patients (23%) avaient diabète sucré (DID) tandis que 165 patients (77%) avaient l'insuline non dépendante du diabète sucré (DNID). Il n'y avait aucune différence statistiquement significative en présence de la rétinopathie chez des patients avec did comparés à ceux avec DNID [$\chi^2= 29,77$ {IC95}, $P =0,000$]. DR était

significativement plus fréquente chez les patients dont la durée de la maladie de 15 ans ou plus par rapport à ceux dont la durée de la maladie de 14 ans ou moins [$\chi^2 = 65.85$, {IC95} $P = 0,000$]. Basé sur l'échelle de l'ICDRDSS, 136 patients (64%) n'avaient aucune rétinopathie et 78 patients (36%) avaient la rétinopathie. Certains patients ont une déficience visuelle et la cause de cécité était DR dans 6 patients (2,8%). La cataracte et le glaucome étaient la cause dans 6 patients (2,8%).

Conclusion: Rétinopathie diabétique est commun dans notre environnement et est plus fréquente chez did et ceux dont la durée de longue maladie. DR est une cause de la déficience visuelle, bien que les patients diabétiques ne sont pas exemptés de cécité d'autres maladies de le œil telles que la cataracte et le glaucome. Un programme de dépistage doit être mis au point afin de faciliter la détection précoce et le traitement rapide.

Mots clés: La rétinopathie diabétique, l'examen de le œil, une perte de vision

Introduction

Diabetes mellitus (DM) is characterized by sustained hyperglycemia secondary to lack, or decreased efficiency of endogenous insulin.^[1] DM affects many organs including the eye and there are two clinical types; insulin-dependent diabetes mellitus (IDDM) or type 1 that occurs between the ages of 10 to 20 years and non insulin dependent diabetes mellitus (NIDDM) or type 2 which occur in older patients. The prevalence of diabetic retinopathy (DR) is higher in IDDM (40%) than in NIDDM (20%).^[2] Diabetic eye disease is important to ophthalmologist because it is a major cause of blindness and vision loss among working age people in developed countries.^[3] Studies have shown that in Ireland, England and Wales, DR is the leading cause of blind certification in 7% and affects people of working age (16-64 years), respectively.^[4,5] Similarly in Leeds, the incidence of blind registration due to DR is 10 per million similar to other parts of the United Kingdom.^[6] In developing countries like Pakistan and the United Arab Emirate, the prevalence of DR was 15.7% and 19%, respectively.^[7,8] In North America, age-related macular degeneration (ARMD) and DR represent the major cause of low vision.^[9] Advances made in treatment of DR particularly in developed countries have not matched the large number of patients affected and DR has remained a major health problem.^[10] The prevalence of diabetic retinopathy in our environment is not known. With the establishment of a medical retinal unit in Kano, Nigeria, we plan to establish a protocol for early screening of patients with the aim of providing prompt intervention to prevent vision loss from DR. The aim of the study is to determine the pattern of diabetic retinopathy seen in diabetic patients attending the outpatient clinic of Aminu Kano Teaching Hospital, Kano, Nigeria.

Materials and Methods

The study is a prospective cross-sectional study. The study adhered to the Tenets of the Helsinki

Declaration. Ethical approval was obtained from the Hospital's Research Ethics Committee and individual patients gave an informed consent before they were included in the study. All patients with diabetes mellitus attending the outpatient's clinic from October to December 2009 who consented to participate were recruited into the study. Information collected includes patient's bio-data, clinical type of diabetes mellitus, type of anti diabetic medication, duration of the disease and presence of other systemic disease such as hypertension. Ocular examination done included visual acuity; intra ocular pressure measured with applanation tonometer or Pulsair (non contact) tonometer for less cooperative patients. All patients had fundoscopy (mostly with pupillary dilatation) using direct ophthalmoscope, indirect ophthalmoscope or +90D lens with slit lamp as the case may be. Comparison was made of mean age of study population, and mean age of patients with and with out DR. Similarly, an analysis was made to determine the existence of significant difference in retinopathy between patients with disease duration of 14 years or less and those with disease duration of 15 years or more. Fundal fluorescein angiography was not done. Retinopathy was graded using the International Clinical Diabetic Retinopathy Disease Severity Scale (ICDRDSS).^[2] The information obtained was analyzed.

Results

A total of 214 patients were examined during the

Table 1: Age and sex distribution of patients examined

Age group (years)	Sex		Number (%)
	Male	Female	
10-19	1	0	1(0.5)
20-29	0	4	4(2)
30-39	9	23	32(15)
40-49	20	30	50(23)
50-59	35	29	64(30)
60-69	14	26	40(18.5)
70+	9	14	23(11)
Total	88	126	214(100)

study period. There were 88 males and 126 females (M: F = 1: 1.43). The distribution of the patients by age and sex is shown in Table 1. The age ranged between 19 and 80 years. The mean age of the study population was 52.14 ± 13.23 years. The mean age of patients without retinopathy was 49.14 ± 13.17 years and the mean age of patients with DR was 58.51 ± 10.94 years. Diabetes mellitus was most common in the 50 to 59 years age group, only one patient (0.5%) was below the age of 20 years. Forty nine patients (23%) had IDDM while 165 patients (77%) had NIDDM. The distribution of patients based on the presence or absence of retinopathy is shown in Figure 1. There was statistically significant difference in presence of retinopathy in patients with IDDM compared to those with NIDDM [$\chi^2=29.77$ {95% CI}, $P=0.000$]. DR was significantly more common in patients with disease duration of 15 years or more compared with those with disease duration of 14 years or less [$\chi^2= 65.85$, {95% CI} $P= 0.000$]. Based on ICDRDSS scale, 136 patients (64%) had no retinopathy and 78 patients (36%) had retinopathy. Of those with DR, 15 patients (7%) and 18 patients (8%) had mild and moderate retinopathy, respectively. Nineteen patients (9%) had severe

non proliferative diabetic retinopathy (NPDR), 8 patients (3.7%) had proliferative diabetic retinopathy (PDR), and the fundus was not visible in 10 patients (5%) as shown in Table 2. One hundred and forty nine patients (69.6%) had associated systemic hypertension. Two third of the patients above the age of 70 years have DR. Most of the patients with diabetes mellitus of less than 5 years disease duration do not have DR. All those patients with DM for 20 years or more have retinopathy as shown in Figure 2. There were 165 patients (77%) with normal vision, 37 patients (17%) had low vision and 12 patients (6%) were blind. The visual acuity in the patient's eye and the patient's vision status is shown in Table 3. The cause of blindness was is DR in 6 patients (2.8%). Cataract and glaucoma was the cause in 6 patients (2.8%).

Discussion

Diabetic retinopathy is a costly and progressive condition associated with chronic hyperglycemia and is potentially vision threatening.^[11] Microangiopathy and capillary occlusion underline the pathogenesis of the disease.^[3] Diabetes mellitus was once believed

Table 2: International clinical diabetic retinopathy disease severity scale

Disease severity level	Findings on fundoscopy	Number (%)
No apparent retinopathy	No abnormality	136
Mild NPDR	Micro aneurysms only	15
Moderate NPDR	More than just micro aneurysms but less than severe NPDR	18
Severe NPDR	Any of the following	19
	More than 20 intra retinal hemorrhage in a quadrant	[9]
	Definite venous beading in 2 or more quadrants	[11]
	Prominent IRMA in one or more quadrants	[2]
	And no signs of proliferative retinopathy	
Maculopathy		[8]
Proliferative diabetic retinopathy	One or both of the followings	8
	Neovascularization	
	Vitreous/ pre retinal hemorrhage	
Unable to assess fundus due to media opacity	Undetermined	10
Total		

Figures in bracket are not absolute and indicate overlap of clinical features, NPDR: Non proliferative diabetic retinopathy

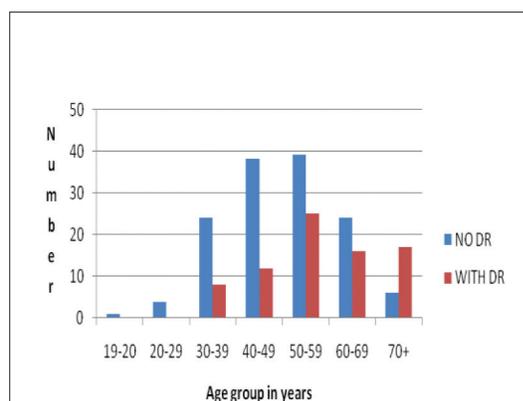


Figure 1: Age distribution of patients based on the presence or absence of diabetic retinopathy

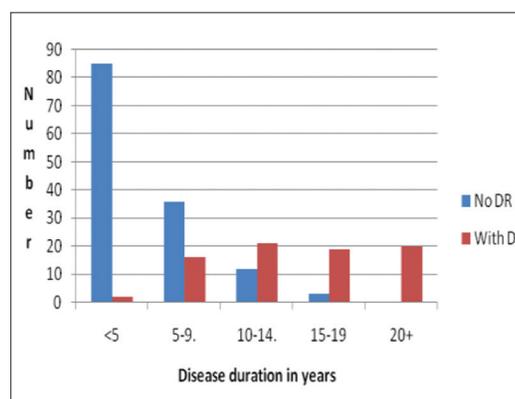


Figure 2: Disease duration

to be a disease of the developed countries of the West, but it is now becoming obvious that DM is endemic even in some developing urbanizing countries.^[12] Our study showed a slight predominance of female patients with DM at variance with the pattern of more males than female patients attending the hospital and this may be related to the disease that manifest in some female patients during pregnancy. NIDDM was twice more common than IDDM, this is not surprising as NIDDM is globally more prevalent. The 36% prevalence of DR found in our diabetics is higher than the findings from Pakistan, UAE, India and Oman where rates of 17.5, 19, 26 and 6.3% were reported, respectively.^[5,13-15] However, our prevalence is lower than that of Vanuatu and Yemen where the prevalence rate was 52.9 and 55%, respectively.^[16,17] DR is a public health challenge in Nepal similar to other developing countries.^[18] Most of the patients examined had no retinopathy. The mean age of the study population was in the early fifties. Patients without retinopathy have a younger mean age and not surprisingly, those with retinopathy have a higher mean age. Older patients particularly those with prolonged disease duration are more likely to develop retinopathy. There was a statistically significant difference in the presence of retinopathy between those with less years of disease duration and those with longer disease period. There was a strong relationship between duration of diabetes mellitus and retinopathy. DR appeared in patients in the third decade and above. Elderly diabetic persons are 1.5 times more likely to develop low vision and blindness than their eye-matched non-diabetic persons.^[19] Our study showed a clear and parallel relationship between disease duration and development of retinopathy. A quarter of the patients studied had severe NPDR, PDR or macula edema. Risk factors for progression to PDR are duration and poor glycaemic control.^[20] The estimated average time of developing DR from none existence to retinopathy is 26.5 years in Taiwan.^[21] This enables the clinician to monitor the patient over time and to institute intervention measures promptly. The majority of the patients studied had NIDDM and were treated with oral hypoglycemic agents and dietary modification. This study did not compare long-term glycaemic control with presence of DR. This was due to inability to do glycosylated hemoglobin level which was a more

objective means of assessing long-term control rather than current fasting blood sugar level which only give an impression of the current patient's blood sugar profile. A study showed that most patients with IDDM with average disease duration of 40 years had no retinopathy and those who had DR showed no visual disability or blindness.^[22] Our study showed that some of the patients were either blind or visually impaired although we observed that blindness and visual disability were attributed to DR in half of the cases and the remaining were blind from cataract and glaucoma. Patients with DM are not exempted from developing other causes of blindness and low vision as may be observed in the non diabetic population. Ocular co morbidity resulting in media opacity was the cause of inability to assess the fundus in some of the patients. Diabetic retinopathy and maculopathy accounted for 10.1% of blindness in Israel.^[23] Macula edema results in low vision though rarely is the visual acuity less than 20/200, nonetheless patients may require low vision rehabilitation and laser treatment.^[24] Clinically significant macula edema (CSME) is defined as vascular leakage that results in fluid accumulation in the center of the macula.^[25] Macula edema was observed in some of the patients though greater details could have been obtained if fundal angiography had been performed. Baseline poor glycaemic controls, DR severity, proteinuria and old age are predictors of visual loss in African Americans with diabetes mellitus.^[26] More than half of the patients studied had systemic hypertension which compounds the vascular leakage further compromising vision. Tight glycaemic and blood pressure control has been shown to significantly decrease the risk of development as well as progression of retinopathy.^[27] A study in Yemen showed that presence of DR and visual disability among patients with diabetes is associated with irregular attendance of diabetes clinic.^[28] PDR was associated with tangential traction band in few patients [Figure 3]. Other features of DR such as neovascular glaucoma (NVG) and retinal detachment were not observed in the patients studied. A study in Ibadan Nigeria reported that 8.3% of those with NVG had diabetic eye disease.^[29] There is a huge time limit between onset of diabetes mellitus and development of retinopathy.

Table 3: Visual acuity in the patient's eye and patient's vision status

Vision grade	Vision in the patient's eyes Number (%)	Patient's vision status Number (%)
6/6 – 6/18	308(72)	165(77)
< 6/18 – 6/60	51(12)	26(12)
< 6/60–3/60	26(6)	11(5)
< 3/60–NPL	43(10)	12(6)
Total	428(100)	214(100)

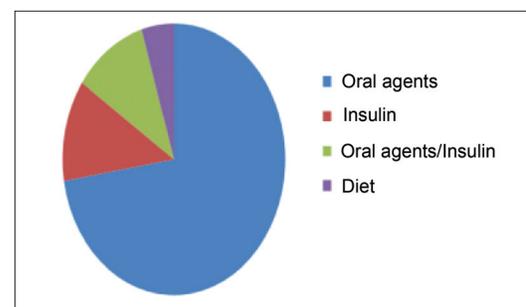


Figure 3: Types of diabetic medication

Therefore, there is avenue for screening patients, making an early diagnosis and instituting prompt intervention whenever there is the need to do so. Screening for retinopathy should be performed within three years of diagnosis of IDDM and shortly after the diagnosis of NIDDM with annual follow up eye examinations in both types of diabetes.^[30] Annual fundus examination with photography is considered as a sensitive method of screening for retinopathy.^[31] There is need for screening protocol to be established in our hospital and create awareness of DR as lack of awareness was observed to be a great barrier to service delivery for both patients and providers in the United Kingdom. Providing more complete information about DR, and making eye clinic attendance more convenient for patients may increase the number of diabetic patients having regular eye examinations.^[32] Timely detection and treatment of DR is essential in preventing severe and moderate vision loss in diabetes mellitus.^[33] Eye examination in diabetic is not to be restricted to search for retinopathy alone as they can also develop vision loss from other causes such as cataract and glaucoma.

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