

DIABETIC EYE DISEASE IN ENUGU SOUTH-EASTERN NIGERIA – A Preliminary Report

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SUMMARY

Objectives:

- To determine the pattern of ocular complications seen among patients being managed in a diabetic clinic.

Methods: Patients were randomly selected from the diabetic clinic of UNTH Enugu and examined over a 3 year-period between 1997 and 2000. The procedures carried out on each patient comprised: blood pressure check with patient standing; assessment of visual acuity; slit-lamp and torchlight examination of the anterior segment; tonometry using the Perkin's handheld applanation tonometer; and funduscopy using the directive ophthalmoscope.

Results: Out of the 149 patients examined, 3 (2.0%) were blind and 23 (15.4%) had visual impairment. Nineteen patients (12.75%) had diabetic retinopathy; 33 (22.1%) had cataracts; and 7 (4.7%) glaucoma. Nine (47.3%) of those with diabetic retinopathy were found to be hypertensive, four of which had maculopathy.

Conclusion: From this preliminary report, it is obvious that diabetic eye disease is also an important public health problem in southeastern Nigeria. Health education, screening for early detection, and prompt treatment of ocular complications will reduce visual loss in the patients.

Key words: diabetes, eye, Enugu

INTRODUCTION

For many years, diabetes was wrongly believed to be a disease that afflicted only the affluent and resulted from an overindulgent lifestyle. However, from recent reports, the prevalence of diabetes seems to be highest among populations in developing countries, and the migrant and minority communities in industrialized countries.¹

Diabetes mellitus causes significant morbidity and mortality as a result of microvascular and macrovascular complications that involve multiple systems in the body eg, the cardiovascular system. In the eye, diabetic complications range from lid and orbital signs to anterior and posterior segment complications. While some of these do not affect the patient's vision, diabetic retinopathy does seem to be the fourth major cause of blindness worldwide, after cataracts, the glaucomas and trachoma.²

In the developed world, diabetic retinopathy remains the major cause of blindness in patients under 55 years of age.³ Comparatively, diabetic eye disease is increasingly becoming a problem in the developing countries because of longer life expectancy and a higher incidence of diabetes.⁴ In Nigeria, it is one of the causes of legal blindness in the working age group.⁵ However, it is thought that many of the complications from diabetes, including blindness, may be delayed or even prevented by prompt and effective treatment and education.

The first stage in developing a programme for the prevention of blindness from diabetes, is to appreciate the magnitude of the problem. This study was carried out to determine the pattern of ocular complications seen in diabetic patients who are being managed in the specialist clinic of the University of Nigeria Teaching Hospital (UNTH), Enugu.

BACKGROUND INFORMATION ON ENUGU

Enugu is the capital of Enugu State which is located in the southeastern part of Nigeria. The state has a population of about 3 million.

The University of Nigeria Teaching Hospital is the only teaching hospital in Enugu State and is the oldest and most well-established in southeastern Nigeria. It therefore, serves Enugu State and the six neighbouring states, each with a population of more than 1 million.

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PATIENTS AND METHODS

Site: The outpatients' diabetic unit of the University of Nigeria Teaching Hospital (UNTH), Enugu.

Sample size: One hundred and forty-nine randomly selected diabetic patients were examined over a three-year period, between 1997 and 2000.

Method of patient selection: First, the study was clearly explained to the nurse in-charge in the diabetic clinic. During each diabetic clinic day she first made a list of all the patients, who came to see the diabetologist. They were numbered serially and then an average of 5 numbers was randomly selected using the lucky dip method. The patients with their folders are then sent to the examining ophthalmologist. Each ophthalmologist examined 4-5 diabetic patients each clinic day. There were never more than two examining ophthalmologists per clinic day.

Proforma: A proforma was prepared with three sections.

Section A contained a record of the patient's personal data and was completed by the ophthalmologist interviewing the patient.

Section B contained mainly diagnostic symptoms and signs. The duration of diabetes was obtained from the patients' hospital records.

Section C had information on ocular signs. It was completed by the ophthalmologist after examining the patient.

Procedure: Each patient had a blood pressure check while standing; a visual acuity assessment using the Snellen's E-chart with multiple optotypes, unaided and then with glasses if any; an anterior segment examination using a torchlight and a slit-lamp biomicroscope; applanation tonometry using Perkin's handheld applanation tonometer; funduscopy through dilated pupils (with guttae tropicamide 1%) using a direct ophthalmoscope.

Additionally, for patients who were found to have vertical cup/disc ratio of ≥ 0.5 in one or both eyes, the central visual fields were analysed using the MK 1 Friedman's field analyser.

The diagnosis of glaucoma was made using the presence of the following criteria in one or both eyes: disc characteristics (vertical cup/disc ratio of ≥ 0.5 or notching of the neuroretinal rim or asymmetry of the vertical cup/disc ratio of ≥ 0.2) \pm IOP ≥ 21 mmHg and characteristic glaucomatous visual field defect.

DATA MANAGEMENT

The data collected on the protocol was analyzed on using the EPINFO 6.04.

Figure 1 shows the age and sex distribution of the patients examined. Patient age ranged from 28 to 81 years with a mean age of 55.34. There were 79 females and 70 males.

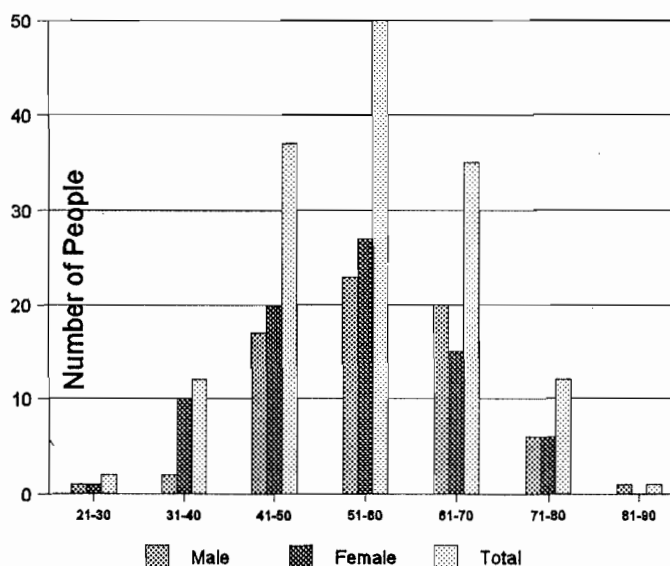


Figure 1. Age distribution by sex

METHOD OF DIAGNOSIS OF DIABETES

Ninety-five patients were diagnosed to be diabetic based on presentation with classic symptoms of weight loss, fatigue, polyuria and polydipsia and confirmation by fasting hyperglycemia on blood test. All but one of the patients had non-insulin-dependent diabetes mellitus (type 2 diabetes).

VISUAL ACUITY

The visual acuity of the patients is shown in table 1. Only 23 (15.4%) patients had visual impairment (corrected visual acuity $< 6/18 - 6/60$ in the better eye); 3 (2%) were blind (corrected visual acuity $< 3/60$ in the better eye) of which one had visual acuity of $< 1/60$.

Table 1. Corrected visual acuity of patients in the better eye

| Category of Vision | V/A | Number | Percent |
|--------------------|-----------------|--------|---------|
| 0 | 6/5 - 6/18 | 123 | 82.6 |
| 1 | $< 6/18 - 6/60$ | 21 | 14.0 |
| 2 | $< 6/60 - 3/60$ | 2 | 1.3 |
| 3 | $< 3/60 - NPL$ | 3 | 2.0 |

OCULAR COMPLICATIONS

Out of the 149 patients examined 98 did not have ocular complications. The ocular complications in the 51 patients are summarised in table 2.

Of the 33 cataracts seen, 31 were classified as immature cataracts, one of which was posterior subcapsular cataract, and two as mature cataracts. The mean age of these patients were 62.8 years (range: 50 - 81).

Seven patients, four males and three females were found to have glaucoma, six of whom were diagnosed for the first time in this study. Nine male and ten female patients were diagnosed with diabetic retinopathy.

Table 2. Ocular complications (one or both eyes)

| | Complication | No (percentage of total points) |
|-------------------|----------------------|---------------------------------|
| Anterior segment | Cataract | 33 (22.1) |
| | Glaucoma | 7 (4.7) |
| Posterior segment | Diabetic retinopathy | 19 (12.8) |
| | • non-proliferative | 14 (9.4) |
| | • proliferative | 5 (3.4) |
| | • maculopathy | 6 (4.0) |

The patients with diabetic retinopathy had suffered from diabetes for a period between 7 to 23 years. In 14 patients the duration was ≥ 10 years. The ages of the patients ranged from 36 to 67 with a mean of 54 years.

The differences in the mean duration of diabetes between the patients without diabetic retinopathy and those with retinopathy were significant at the $p < 0.05$ levels (see table 3).

Table 3. Diabetes mellitus: retinopathy, age, duration

| Retinopathy | No. | Mean age (range) | Mean duration of diabetes (range) |
|-------------------|-----|------------------|-----------------------------------|
| None | 130 | 5.55 (18-28 yr) | 4 (<1yr- 23yr) |
| Non proliferative | 14 | 52.3 (36-67 yr) | 13.9 (7-23 yr) |
| Proliferative | 5 | 47.0 (41-52 yr) | 10 (8-12 yr) |

HYPERTENSION AND DIABETES

Hypertension (taken as a blood pressure $> 140/90$ mmHg according to WHO definition) was found in 41(27.5%) patients. Nine (48.3%) of those with diabetic retinopathy were hypertensive; out of which four had maculopathy.

DISCUSSION

Ocular complications of diabetes are increasingly becoming an problem in developing countries because of the longer life expectancy and a higher incidence of diabetes.¹ Among Nigerians of working age, it is one of the causes of legal blindness. It is estimated that 2 million Nigerians have diabetes but only one half of these are aware of it.⁵

This study was carried out on randomly selected, confirmed diabetic patients. Being a hospital-based study, however, information obtained is biased as only a selected group was seen. Much comparison cannot be made between it and population-based studies.

Study Group: A total of 149 patients were examined in the study; with the ratio of male to female at about 1 : 1. Generally the patients had satisfactory visual acuity, with 83% of the patients having corrected visual acuity in the better eye of 6/5 - 6/18. While only three patients were blind; 23 (15.4%) had visual acuity of $< 6/18 - 3/60$.

OCULAR COMPLICATIONS

Cataract: Diabetes is a risk factor for developing cataract and two types of cataract are associated with it:⁶

- *Age-related cataract* which appears earlier in a diabetic and may progress more rapidly than in a non-diabetic.
- *True diabetic cataract*, which is due to osmotic over-hydration of the lens and appears as a bilateral white punctuate or snowflake posterior or anterior opacities. In certain cases the cataract may mature in a few days.

In our study, 33 patients were found to have cataracts. The mean age of these patients was 62.5 years. This is not in accordance with the age for earlier development of cataract in diabetics. This may be explained by the fact that diabetics are not diagnosed early enough in our environment thus the ages at which the cataracts are diagnosed are not good indicators of age development.

GLAUCOMA

Diabetic patients have a higher prevalence of primary open-angle glaucoma (POAG) than non-diabetics. Conversely, about 10% of POAG patients have either frank diabetes or an abnormal glucose tolerance test result.⁶ In our study, 7 (4.7%) patients were found to have glaucoma, 6 of whom were diagnosed for the first time. Out of these 7 patients, 2 were blind (the cause of blindness being glaucoma was confirmed in one of the two).

DIABETIC RETINOPATHY

In the developed world, diabetic retinopathy remains the major cause of blindness in patients below 55 years of age.³ In this study 18 out of the 19 patients (9 males and 10 females) found to have diabetic retinopathy were aged between 36-65 years. No patient younger than 35 years had retinopathy. It is possible that the Nigerian diabetic patient does not present early enough.

Diabetic retinopathy is not as rare as formerly indicated by Osuntokun in 1969.⁷ The 12.75% prevalence recorded in this study is comparable to that recorded in Ibadan by Bella et al.¹⁸ In the study by Nwosu,⁹ diabetic retinopathy accounted for 14% of retinal diseases in Onitsha. Only direct ophthalmoscopy was employed to examine the fundus through dilated

pupils in our study. It is possible that many cases of diabetic retinopathy were missed through this method. This probably explains why the recorded prevalence in this study is lower than that recorded in Nwosu's study¹⁰ at Nnewi (33%). The prevalence of diabetic retinopathy increases with the length of time the person had been suffering from diabetes; this finding is similar to findings by other researchers.^{7, 11} The earliest development of diabetic retinopathy occurred seven years after the onset of diabetes in our study group. The increased prevalence of diabetic retinopathy may be explained by longer life expectancy of diabetics as a result of better medical care.

Diabetic retinopathy usually develops 15-20 years after the onset of the disease.^{12, 13} The duration of diabetes before onset of diabetic retinopathy in this study ranged from 7-23 years (mean: 13.9 years). These figures were derived from the time of diagnosis of diabetes, which, in our environment is usually made several years after the onset of the disease. By this time the disease would be interfering with the patient's daily activities. This is alarming, because by the time of presentation, the patients would likely have developed complications, which could lead to irreversible visual impairment or blindness. It is, therefore, emphasized that those at risk of developing diabetes should be screened regularly for early detection and prompt management of the condition.

CONCLUSION

Caution is normally exercised in extrapolating the findings from a hospital-based study (such as this one) to the general population. The findings, however, agree with those from other non hospital-based studies. Approximately 4 out of every 100 diabetic patients have undiagnosed glaucoma. The prevalence of diabetic retinopathy is high. It is not as rare as formerly indicated.

RECOMMENDATIONS

The study is still ongoing. It is recommended that:

- The sample size be increased to 250-500 from 149;
- All fundoscopy be done through dilated pupils using the Volks lens +90D or +78D, and direct ophthalmoscope.

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