Pattern of Diabetic Eye Diseases in a Tertiary Health Facility, South East Nigeria

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ABSTRACT

Diabetes mellitus (DM) is characterized by chronic hyperglycaemia; the latter predisposes persons living with diabetes to certain diseases of the eyes such as diabetic retinopathy, diabetic macular oedema, cataract, glaucoma etc, each of which may progress to visual loss and blindness. The burden and pattern of diabetic eye diseases among persons living with diabetes in the commercial city of Aba, Nigeria is not known. This study, therefore, set out to determine this. This was a 6-year retrospective study in which all diabetic patients referred to or presenting at the Ophthalmology clinic of Abia State University Teaching Hospital (ABSUTH) Aba, Nigeria between January 2013 and December 2018 were included. The patients were examined by ophthalmologists and optometrists. Visual acuity, refraction, tonometry, slit-lamp examination of the anterior segment and fundus examination were carried out on each patient. Data was analyzed using SPSS version 20.0 and $p < 0.05$ was considered statistically significant. Participants in the study were 56 (44.4%) males and 70 (55.6%) females. Diabetic ocular complications occurred in 2.4% of the total Ophthalmology clinic visits in ABSUTH, Aba. The commonest diabetic eye disease was cataract which was present in 50% of the participants, No diabetic patient presented with blindness and the commonest co morbid disease in the participants was systemic hypertension. Ocular complications of DM constitute a significant burden to the Ophthalmology clinic visits in the commercial city of Aba and the commonest of these complications is cataract.

Keywords: Burden, Diabetes, Eye diseases, Patterns, Nigeria, Southeast

INTRODUCTION

Diabetes mellitus (DM) is a non communicable disease with increasing prevalence in the world.¹ DM was estimated to affect 371 million people worldwide in 2013 with about 5 million Nigerians affected² and the projection by WHO is that 552million people will be affected by 2030, with 298 million of those affected domiciled in developing countries³. The WHO estimates

that Nigeria has the largest number of people living with diabetes in Africa.^{1, 3} Uncorrected refractive errors and ocular diseases such as glaucoma, diabetic retinopathy, age-related macular degeneration and cataract are the major causes of visual impairment worldwide.⁴ Diabetes mellitus is a leading cause of cardiovascular diseases, end stage renal disease (ESRD), lower extremity amputation

and adult blindness.⁵ It causes microvascular and macrovascular complications involving multiple systems in the body. In the eye, DM complications can involve any part of the eye from the lid to the anterior and posterior segments of the eyes.⁵ Diagnosis of DM is made in some persons in the Ophthalmology clinic when they present with eye complaints. Diabetic eye diseases are estimated to be present in more than a quarter of persons with type 2 diabetes and half of persons with type 1 diabetes underlining the importance of regular monitoring⁶

Magulike *et al* in their study in Enugu⁷ reported that out of the diabetic patients seen in the outpatient Ophthalmology clinic, 2.0% were blind, 12.8% had DM retinopathy, 22.1% had cataract and 4.7% had glaucoma while in Uyo⁸, it was reported that cataract (56.4%) was the commonest DM ocular complication followed by non-proliferative diabetic retinopathy (31%) and glaucomatous disc cupping (11.4%). In a study in South Africa, it was reported that in the general population, cataract was the leading cause of blindness followed by uncorrected refractive error, glaucoma, DM retinopathy and ARMD.^{9,10} In the same study, DM retinopathy was the third most common cause of blindness in persons living with diabetes after cataract and glaucoma.¹¹ In another study, diabetic retinopathy was the leading cause of preventable blindness in working age adults and the potential risks of blindness in an individual with DM was 2.4 times higher than that of a person without diabetes.^{12,13}

In 2010, the WHO estimated that 285 million people globally are visually impaired – 90% are said to be living in low income settings.^{14,15} A year before then, in 1999, the WHO had launched Vision 2020, a global plan for the elimination of avoidable blindness by 2020.⁹ With increasing prevalence of DM globally, diabetic eye diseases are increasingly becoming problems to persons living with diabetes. According to the latest report of the Vision loss Expert Group of the Global Burden of Disease study, prevalence of vision impairment and blindness caused by diabetic retinopathy increased between 1990 – 2015 in developed countries.¹⁵

Because DM eye complications can lead to visual loss and blindness, it is worthwhile to define the magnitude and pattern of diabetes eye diseases. This done, one can then design an effective program for management and prevention of blindness from DM. There is a dearth of published studies on the burden and patterns of diabetes eye diseases in the commercial city of Aba, Nigeria, hence the need for this study.

MATERIALS AND METHODS

Study Design and Setting

This was a 6-year retrospective study conducted at the Ophthalmology clinic of Abia State University Teaching Hospital (ABSUTH) Aba, Nigeria between January 2013 and December 2018. The Ophthalmology clinic in ABSUTH operates two days every week in which all patients with eye complaints or referred from peripheral hospitals are attended to. The hospital (ABSUTH) is the only teaching hospital in Aba which is a commercial city in the South East region of Nigeria known for her industrial, trading, and craftwork activities.

Recruitment and data collection

The data of diabetic patients referred to or presented at the Ophthalmology clinic of ABSUTH were extracted from the Nurse's Outpatient Register and used for the study. All the patients with a diagnosis of DM (from fasting or random blood glucose of more than 7.0 or 11.1mmol/l respectively) were noted and their Case notes obtained from the Medical Records office. Each of them had been examined by ophthalmologists and optometrists when they visited the clinic using Snellens chart for visual acuity, auto-refractor for refraction, tonometer for tonometry, slit-lamp for examination of the anterior segment and fundus examination using indirect ophthalmoscope and +78 dioptre lens. Data collected included their age, gender and eye findings/diagnosis which were entered into the SPSS software, version 20.0 (SPSS, Inc, Chicago IL) and analyzed. Level of statistical significance was set at $p < 0.05$.

RESULTS

A total of 5280 outpatient visits to the Ophthalmology clinic of ABSUTH, Aba, South East, Nigeria was recorded within the study period of which 126 patients (2.4%) were living with diabetes mellitus. Participants in the study were 56 (44.4%) males and 70 (55.6%) females, aged between 38 – 75 years with a mean age of 54.64 ± 10.26 years. Majority of the subjects (60.3%) were middle aged, followed by the elderly people (table 1). Pattern of diabetic eye diseases over the 6-year period is summarized in table 2. Cataract alone was the diagnosis in 41.3% of the participants and when cataract is considered in combination with other eye conditions such as diabetic retinopathy, ocular hypertension, retinal detachment,

iris neovascularization and diabetic macular oedema, it accounted for 50% of the diabetes eye complications. Presbyopia (10.3%), refractive error and presbyopia together (10.3%), refractive error alone (7.9%), DM retinopathy (9.5%), ocular hypertension (7.2%), diabetic macula oedema (5.2%) and retinal detachment (4%), were the other common

eye diseases prevalent in the study population within the study period. None of the participants was blind and glaucoma (0.8%) was the least common eye disease which was present. Systemic hypertension and ARMD were the commonest co morbid condition in the participants (table 3)

Table 1 : Gender distribution of the participants stratified by age groups in ABSUTH Ophthalmology clinic, Aba

Age group	Male	Female	Total
20-39 years	4	4	8 (6.4%)
40-59 years	32	44	76 (60.3%)
60 years and above	20	22	42 (33.3%)
Total	56	70	126

Table 2 Pattern of eye diseases in DM patients accessing outpatient ophthalmology care in ABSUTH, Aba

Eye diseases	Frequency (n=126) (%)
Presbyopia	13 (10.3)
Cataract	52 (41.3)
DM retinopathy	10 (7.9)
Glaucoma	1 (0.8)
Refractive error	10 (7.9)
Diabetic macular oedema	4 (3.2)
Iris Neovascularization	2 (1.6)
Cataract and DM retinopathy	2 (1.6)
Refractive error and presbyopia	13 (10.3)
Cataract and ocular HTN	5 (4.0)
Retinal detachment	3 (2.4)
Retinal detachment and cataract	2 (1.6)
NVG and cataract	1 (0.8)
Ocular HTN and refractory error	2 (1.6)
DME and cataract	1 (0.8)
ARMD	3 (2.4)
DME and ocular HTN	1 (0.8)
Dm retinopathy and ocular HTN	1 (0.8)
Total	126 (100)

Key : NVG = Iris neovascularization, ocular HTN = ocular hypertension, DME = diabetic macular oedema, ARMD = age related macular degeneration

Table 3: Pattern of comorbid conditions in the participants

Co-morbid conditions	Frequency	Percent
Systemic hypertension	5	4.0
ARMD	3	2.4
Infective conjunctivitis	4	3.2
Nil co morbid eye or systemic disease	114	90.4
Total	126	100

Key: ARMD = age related macular degeneration

DISCUSSION

The main findings of this study included a 2.4% diabetes burden on the Outpatient Ophthalmology clinic visits of ABSUTH, Aba, South East, Nigeria. Cataract was the commonest diabetic eye complication with glaucoma being rare while systemic hypertension was the commonest co morbid condition.

These findings support internationally recommended^{16, 17} annual routine screening of all persons living with diabetes for ocular complications which may go a long way to preventing visual loss and blindness arising from diabetes. This diabetes burden reported in the index study is in keeping with the report by Cheung *et al* that the potential risks of blindness in an individual with DM was 2.4 times higher than that of a person without diabetes¹¹. The implication of this significant diabetes burden on the outpatient Ophthalmology clinic visits in ABSUTH, Aba is that the diabetes care team and the Ophthalmology unit need to cooperate more with each other aimed at preventing visual loss and blindness in persons living with diabetes.

In the index study, that cataract alone and with other eye complications constituted the commonest diabetes ocular complication is similar to the reports in Enugu⁷, Uyo⁸ and South Africa.¹⁰ Frequency of cataract as a DM ocular complication in the index study (50%) was similar to the 56.4% reported in Uyo and greater than the 22.1% reported in Enugu. Reasons for the disparity in frequency of cataract as a diabetic ocular disease in Enugu, Uyo and the index study is not known but could be because of the increasing prevalence of DM over the years and changing treatment modalities bearing in mind that the Enugu report was in 2003 while the Uyo and index study were reported more than 10 years after the study in Enugu.

The high frequency of presbyopia alone or in combination with refractive error (20.6%) was not reported in the Enugu and Uyo studies. It is not clear whether these conditions occurred as a diabetic eye complication or same as would have been found in the general population.

Diabetic retinopathy (9.5%) in the index study is comparable to the reports in Enugu and South Africa where DM retinopathy was found to be an important sight threatening complication of DM. It is, also, comparable to the 7.4% frequency in a cross sectional study in Rivers¹⁸ State, South-south, Niigeria However, diabetic retinopathy in the present study is lower than the 36% and 32.6% frequency of DM

retinopathy noted in other Nigerian tertiary hospital based studies in Kano¹⁹ and Ado Ekiti²⁰ respectively. The implication of these findings is that with routine screening of persons living with DM for these eye complications, many would be saved the agony of treatable and preventable visual loss and blindness.

Diabetic macular oedema and retinal detachment are serious sight threatening conditions noted in the index study but were not reported in the Enugu and Uyo studies. Reasons why they were not reported in those studies even though their frequencies in the index study were high cannot easily be given but could be from the expertise of the manpower and or sophistication of instruments used. It is important to note that unlike in the Enugu study where two of the participants were blind, none of the participants in the index study was blind. This could, probably, be a consequence of improved diabetes education and awareness of the need for regular ophthalmic check for DM patients.

Finally, glaucoma was found in the index study to be a rare occurrence (0.8%) in persons living with diabetes unlike the situations as reported in Enugu (4.7%), Uyo (11.4%) and in South Africa where glaucoma even came second after cataract. In South Africa, glaucoma was commoner than DM retinopathy. Explanation for this disparity is not clear. It is worthy of note that in the index study, systemic hypertension and age-related macular degeneration are significant co-morbid conditions that were not documented in the Enugu, Uyo and South African studies. Both conditions and even DM increase with increasing age; therefore, one is not surprised that they are significant co-morbidity in this study. This finding is in agreement with Voleti and Hubschman²¹ who noted that the prevalence of vision problems is strongly associated with ageing and this compromised visual function affects individuals' ability to perform activities of daily living. Systemic hypertension is amenable to medical treatment and should be treated adequately when present.

CONCLUSION

Cataract, DM retinopathy and macular oedema with or without refractive error are common diabetic ocular complications in the commercial city of Aba, South East. Nigeria where the burden of diabetes to the outpatient Ophthalmology visits is significant. Systematic screening of DM patients has the potential to reduce the incidence of sight threatening visual impairment and blindness. Such

programmes / measures need to be implemented in all health facilities where diabetes care is undertaken.

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