Title: Pattern of Ocular Morbidity in Patients Attending Urban Specialist Eye Clinic in South East Nigeria.

Abstract

Background: The pattern of eye diseases varies across the world. Racial, ethnic, socio-cultural and socio-demographic characteristics are known to exert some influence on the pattern of these eye diseases. Knowledge of these patterns is important in planning for adequate eye care services.

Aim: To determine the pattern of ocular morbidity in an urban Specialist Eye Clinic in Awka, South-East Nigeria.

Setting and Design: A two-year descriptive retrospective study of patients seen in an urban Specialist Eye Clinic in South-East Nigeria

Materials and Methods: The needed information, which included socio-demographics and diagnosis, were extracted from patients' case files and entered into a proforma. The data were analyzed using SPSS version 20. Ninety five percent Confidence Interval was given for percentages and $p \leq .05$ was accepted as statistically significant.

Results: Five hundred and twenty seven patients comprising 277 (52.6%) females and 250 (47.4%) males with a mean age of 43.2 ± 21.7 years seen within the two year period were reviewed. Refractive error, glaucoma, allergic eye diseases, and cataract in that order were the commonest ocular morbidities in these patients. Spherical errors were commoner than cylindrical errors. Hypermetropia was the commonest refractive error while hypermetropic astigmatism was the commonest astigmatic error. All the refractive errors were commoner in females than in males. Although 185 (35.1%) patients were presbyopic on clinical examination, only 41(7.7%) patients had presbyopia as their main diagnosis.

Conclusion: Most of the common reasons for ophthalmic consultations were refractive error, glaucoma, allergic eye diseases, and cataract. Adequate provision for the management of these conditions will help in reducing the burden of visual impairment and blindness.

Key Words: Ocular, Morbidity, Urban, Awka

Introduction

There are different patterns of eye diseases in terms of eye clinic diagnosis across the world. Racial, geographic, social, and cultural factors all have some influence on the pattern of these ocular diseases.[1], [2] Ukponmwan in Benin- city, Nigeria reported the common causes of ocular morbidity in a tertiary hospital to include refractive errors, cataract, allergic conjunctivitis and glaucoma in that order. [3] Oladigbolu et al in Northern Nigeria, on the contrary reported that infective conjunctivitis, followed by allergic conjunctivitis, was the commonest reason for eye clinic consultation, though this was in an University Sick Bay[4]. Ademe et al in Ethiopia, found that the commonest reason for eye clinic consultation was allergic conjunctivitis, followed by refractive error, cataract and glaucoma. [5] Lipa et al also reported allergic conjunctivitis as the commonest reason for out- patient eye clinic consultations in a tertiary hospital in India. [6] A study in a community centre in Nepal reported that refractive error, cataract and conjunctivitis were the most prevalent eye diseases seen in the centre similar to the Benin-City study.[2] Refractive error and conjunctivitis were commoner in the younger age group while cataract and other posterior segment lesions were commoner in the older age group.[2] A study among the elderly in Southern Germany recorded that cataract, Dry Eye Syndrome, glaucoma and age related macular degeneration were the commonest eye diseases found on examination.[7] On the other hand, Lusambo et al in Kinshasa, Democratic Republic of Congo reported allergic conjunctivitis and refractive error as the commonest eye diseases in a population-based study in children aged 16 years and below. [8] Knowledge of the different patterns of eye diseases/reasons for eye clinic consultations are important in planning for eye care and allocation of scarce resources to the necessary and most needed eye care

facilities/equipment especially in Resource-limited regions of the world. This study is aimed to determine the pattern of eye diseases at an urban Specialist General Clinic in Awka, South-East, Nigeria, with a view to generating information that may help in planning for adequate eye care services in the region and other regions that share similar demographic characteristics.

Materials and Methods

This was a two-year descriptive retrospective study, carried out on patients who presented at a specialist eye clinic in Awka, Nigeria, between January 2020 and December 2021.

Case files of all patients who presented to the clinic within the two year period were retrieved from the medical records and the needed information extracted from the case files and recorded in a proforma designed for the study. Information obtained included socio-demographic data (age, sex, occupation), and ocular diagnosis on the first consultations. Where multiple diagnoses existed, the one that has the worst effect on vision and/or causing greater discomfort to the patient was taken as the major diagnosis. Primary open angle glaucoma diagnosis was made when the following criteria were met on slit lamp binocular indirect ophthalmoscopy with 90D lens, and automated visual field testing : open anterior chamber angle (Shaffer's grade 2, 3 or 4); glaucomatous optic neuropathy [vertical cup/disc ratio (VCDR) $\geq$ 0.7 and/or VCDR asymmetry > 0. 2], associated with glaucomatous visual field defect. Anderson's criteria were used to determine the presence of glaucomatous visual field defect.[9] Ocular hypertension was diagnosed based on intraocular pressure > 21mmHg in the absence of glaucomatous optic neuropathy and glaucomatous visual field defect[10]. Shaffer's grade 0 and 1 were diagnosed as angle closure glaucoma. Cataract was defined as any visually significant lens opacity. The data were analyzed using statistical package for social science version 20 (SPSS-20). Ninety five percent Confidence Interval was given for percentages. Associations were tested with Chi-square and $p \leq .05$ was described as statistically significant. The tenets of Helsinki declaration was adhered to throughout the study.

Results

Five hundred and twenty seven (527) patients comprising 277 (52.6%) females and 250 (47.4%) males (Female:Male = 1:1.1) presented within the period under review. The age range of the patients was 1- 93 years (mean=43.2 ± 21.7). Majority (60%) of the patients were aged between 20 and 60 years (Table 1).

Table 1: Age Category of Patients

Age Category (Years)	**Frequency**	**Percentage (%)**
1-10	40	7.6
11-20	41	7.8
21-30	90	17.1
31-40	64	12.1
41-50	94	17.8
51-60	77	14.6
61-70	64	12.2
71-80	36	6.8
81-90	18	3.4
Above 90	3	0.6
Total	**527**	**100**

The commonest ocular morbidity in the study was refractive error which accounted for 27.3% (144/527) of all new consultations (Table 2).

Different types of glaucoma, of which Primary Open Angle glaucoma was the commonest, constituted the second commonest ocular morbidity. Glaucoma constituted 17.4% (92/527) of the ophthalmic diagnosis (Table 2). Allergic eye disease, cataract, and presbyopia respectively were the third, fourth and

fifth commonest diagnosis (Table 2). Although only 41 (7.7%) patients had presbyopia as their main diagnosis (Table 2), 185 (35.1%) patients were found to have presbyopia on clinical assessment.

Table 2: Main Diagnosis on First Eye Clinic Consultations

Diagnosis	**Frequency**	**Percentage (%)**
Refractive Error	144	27.3
Primary Open Angle Glaucoma	71	13.4
Angle Closure Glaucoma	10	1.9
Secondary Glaucoma	7	1.3
Neovascular Glaucoma	4	0.8
Allergic Eye Disease	65	12.3
Cataract	45	8.5
Presbyopia	41	7.8
Infective Conjunctivitis	14	2.6
Dry Eye Syndrome	13	2.5
Age Related Macular Degeneration	12	2.3
Uveitis	10	1.9
Pterygium	10	1.9
Diabetic Retinopathy	8	1.5
Posterior Vitreous Detachment	7	1.3

Corneal Ulcers	6	1.0
Non glaucomatous Optic Atrophy	6	1.0
Ocular Hypertension	5	0.9
Chorioretinal Scar	4	0.8
Corneoscleral Laceration	4	0.8
Preseptal/Orbital Cellulitis	4	0.8
Phthisis Bulbi	4	0.8
Migraine	4	0.8
Thyroid Eye Disease	4	0.8
Corneal dystrophy	3	0.6
Chalazion	3	0.6
Herpes Zoster Ophthalmicus	3	0.6
Conjunctival Cysts	2	0.4
Conjunctival Naevus	2	0.4
Conjunctival Squamous Cell Carcinoma	2	0.4
Corneal Foreign Body	2	0.4
Corneal Scar/Opacity	2	0.4
Lid Laceration	2	0.4
Accommodative Esotropia	2	0.4
Traumatic Hyphaema	2	0.4
Total	**527**	**100**

Spherical error was commoner than astigmatic error among these patients with hypermetropia being the commoner spherical error as well as the commonest refractive error (Table 3). Hypermetropic astigmatism was the commonest astigmatic error while mixed astigmatism was the least form of astigmatic error as well as the least common of all error (Table 3). All the refractive errors were commoner in females, being present in 32.5% (90/277) of females and constituting 62.5% (90/144) of all errors (Table 3); Female: Male for refractive errors = 1.7:1. Chi-square test showed that this difference between males and females was statistically significant; X^2 (1, N=527) =7.85, *P= .005*(Table 4)

Table 3: Pattern of Refractive Error

Refractive Error	**Frequency**		**Total (Percentage)**
	Male	**Female**	
Hypermetropia	14	29	43 (29.9)
Myopia	16	24	40 (27.8)
Hypermetropic astigmatism	11	18	29 (20.0)
Myopic astigmatism	10	14	24 (16.7)
Mixed astigmatism	3	5	8 (5.6)
Total	**54**	**90**	**144 (100)**

Table 4: Contingency Table showing the Refractive States in Males and Females with the Chi-Square Statistics of each Cell.

	Refractive Error	No Refractive Error	**Row Total**
Females	90 (75.69) [2.71]	187 (201.13) [1.02]	277
Males	54 (68.31) [3.00]	196 (181.69) [1.13]	250

Column Total	144	383	**527 (Grand Total)**

Key

Numbers in bracket = Expected values

Numbers in square bracket = Chi-square statistic for each cell

X^2 (1, N=527) =7.85, *P= .005*

Discussion

Refractive error, glaucoma, allergic eye disease and cataract in that order were the commonest ocular morbidities in this study. These commonest ocular morbidities, excluding allergic eye diseases, are among the commonest causes of visual impairment and blindness worldwide as well as in Nigeria.[11],[12] This is similar to the findings of Ukponmwan in a hospital- based study in Benin-City, Nigeria where she reported refractive error as the most prevalent ocular morbidity in a tertiary eye centre.[3] However, contrary to Ukponmwan's report of cataract being the second commonest eye disease, the present study found glaucoma to be the second commonest eye disease. Allergic eye disease was the third commonest in both Ukponmwan's study and the present study. The larger sample size of Ukponmwan's study (7220) compared to that of present study (527), and the period of her study (2004 to 2008) may have accounted for some of the observed differences. Eze et al similarly found that refractive error was the commonest cause of ocular morbidity among public secondary school students in Enugu, Nigeria. [13] They reported that more than half (57%) of ocular morbidities among these children were due to refractive error. The mean age of Eze et al's subjects were however much lower (14.2 years ± 1.9) than that of the present study (43.2± 21.7), and all were children and young adults aged 10 – 21 years while the present study included children as young as one year and adults as old as 93 years. Similarly, Razyal et al in Nepal and Mukwanseke et al in Kinshasa, Democratic Republic of Congo, reported refractive error as the commonest ocular morbidity. [2],[14] The

Kinshasa study had similar sample size (500) and mean age (41.9 years) to those of the present study. Majority of the subjects in the Nepal study were also aged between 20- 60 years similar to those of the present study. These similarities in the sample population could account for the similarities in the findings despite the racial differences. Oladigbolu et al, contrary to the present finding, reported infective conjunctivitis as the commonest ocular morbidity in a university sick bay in Nigeria. [4] Oladigbolu subjects, however, were younger (mean age=24.3) and majority were students. A study by Chinawa et al in Rivers state, Nigeria, contrary to the present finding, recorded glaucoma and then refractive error as the leading causes of ocular morbidity. [15] Their study was however a community based study while the present study was a hospital based study. Also in contrast to the present study, Ademe et al in Ethiopia and Lipa et al in India both reported allergic conjunctivitis as the commonest diagnosis in eye clinic consultations. [5], [6] Both the Ethiopian and Indian studies were hospital-based like the present study but however had lower mean ages compared to that of the present study, and this together with geographical differences could account for the observed differences. Although the Ethiopian study was a retrospective cross-sectional study like the present study it was done ten years before the present study and this could also contribute to the differences in the observed pattern of eye diseases. The Indian study was a prospective cross-sectional study done between 2013 and 2014 unlike the present study which was a retrospective study of patients seen between 2020 and 2021; this also may account for the observed differences.

Among patients with refractive error, hypermetropia was found to be the commonest error, followed by myopia, with mixed astigmatism being the least common error. This is similar to the finding of Bekibele et al among drivers in Ibadan, Nigeria. [16] They found that hypermetropia was the commonest refractive error in a community-based study involving only male subjects. Ezepue in Enugu and Bagaiya et al in Kaduna similarly reported hypermetropia as the commonest refractive error.[17], [18] Ezepue and Bagiya et al studies, like the present study, were hospital based studies and included both adults and children. A study among secondary school teachers in Onitsha, Nigeria similarly recorded hypermetropia as the commonest refractive error although it was a community based study involving only adults. [19] The present finding on the other

hand is different from the findings of Ezelum et al in Nigeria and Anajekwu et al in Nsukka, Nigeria. [20], [21] Both Ezelum et al and Anajekwu et al studies were community based and involved only adults unlike the present study. These differences could account for the observed variations in the pattern of refractive error.

There was a statistically significant difference between the sexes with all the refractive errors being commoner in females than the male. This is similar to what Lawan et al found in Kano, Nigeria.[22] Lawan's subjects, though eye clinic patients like the present study, were all adults aged 35 years and above. Besufikad et al in Ethiopia, similarly found that refractive error is more prevalent in women in a retrospective hospital based study. [23] On the contrary, Malu et al in Jos, Nigeria and Abah et al in Zaria, Nigeria, did not find any statistically significant difference in the prevalence of refractive errors between male and female.[24],[25] Although Malu et al and Abah et al studies were hospital-based studies and included adults and children just like the present study, both studies were in Northern Nigeria while the present study was in South Eastern Nigeria. Cultural differences between these geopolitical regions may account for the observed differences. Abah's subjects were also younger with a mean age of 24.6 ± 4.9 years. Anajekwu et al also did not find any statistical difference in the refractive errors between male and female. [21] Anajekwu et al subjects, however, were only adults and the study was a community based study unlike the present study. These could account for the observed differences.

Conclusion

Refractive error was the commonest reason for ophthalmic consultation in this study. Glaucoma, allergic eye disease and cataract were the second, third and fourth commonest reasons for ophthalmic consultations respectively. These common eye morbidities, with the exclusion of allergic eye disease, are known and common causes of visual impairment and blindness globally. There was also a high incidence of presbyopia that needed correction among these subjects. Adequate provisions in terms of facility, drugs and manpower, should be made available by relevant eye health planning bodies and hospitals to ensure proper management

of these common eye morbidities. This will go a long way to help in reducing the burden of visual impairment and blindness, as well as the discomfort associated with these eye conditions.

Consent

As per international standard or university standard, patient(s) written consent has been collected and preserved by the author(s).

Ethical Approval:

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

Conflict of Interest: There is no conflict of interest in this study. The study was not sponsored by any organization or individual. It was fully funded by the authors.

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