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Prevalence and Causes of Low Vision and Blindness among Adult Patients Attending Eye Clinic in a Tertiary Hospital in South East, Nigeria

O. A. I. Otuka[1*], N. C. Ekeleme[2], E. N. Akaraiwe[3], E. C. Iwuoha[2], L. I. Eweputanna[4] and A. Kalu[1]

[1]Ophthalmology Unit, Department of Surgery, Abia State University Teaching Hospital, Aba, Nigeria.
[2]Department of Community Medicine, Abia State University Teaching Hospital, Aba, Nigeria.
[3]Department of Ophthalmology, Enugu State University Teaching Hospital, Park Lane, Enugu, Nigeria.
[4]Department of Radiology, Abia State University Teaching Hospital, Aba, Nigeria.

Authors' contributions

This work was carried out in collaboration among all authors. Author OAIO conceptualized and design of the research with drafting of the manuscript. Authors NCE, ENA, ECI Collected analyzed and interpreted the data. Author LIE collected the data and design of the research with drafting and approval of the manuscript. Author AK Critical/ final review of the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Background: Low vision and blindness are significant public health issues worldwide. They result in educational, occupational, and social challenges in the affected persons. Their care givers/ families are also severely affected. There is however limited data on the magnitude of visual impairment in Aba, South East Nigeria.
Objective: To determine the prevalence and causes of low vision and blindness among adult patients attending eye clinic in a tertiary hospital in South East Nigeria.
Materials and Methods: This was an institutional-based retrospective, descriptive study involving 457 patients who attended Abia State University Teaching Hospital eye clinic between April and

**Corresponding author: E-mail: elshaddai_2005@yahoo.com;*

September 2018. Data was obtained from patient's hospital records within the period under study and analyzed using IBM SPSS version 25.0. Statistical significance was set at a P-value of < 0.05.
Results: Data of 457 ophthalmic patients who met the inclusion criteria for this study were analyzed. Mean age of respondents was 48.5 ± 17.7 years. A total 5.4% of the patients had bilateral low vision, while 30.2% and 7% had monocular and bilateral blindness respectively. Cataract-related diagnosis, refractive errors and glaucoma (28.4%, 28.2% and 14.7%) respectively were the major causes of low vision and blindness among the patients. Statistically significant association was found between respondent's diagnosis and age as well as occupation (*P*<0.001).
Conclusion: Results from this study will aid in planning low vision & blindness preventive programs and improving eye care services.

Keywords: Blindness; low vision; prevalence; causes.

1. INTRODUCTION

'Low vision' is defined as visual acuity (VA) of less than 6/18 but equal to or better than 3/60 or a corresponding visual field loss to less than 20^0, in the better eye with the best possible correction. 'Blindness' is defined as a presenting VA of worse than 3/60, or a corresponding visual field loss to less than 10^0, in the better eye with the best possible correction. 'Visual impairment' includes both low vision and blindness. [1]

Nigeria is the most populous nation in Africa. It is home to about 207million people. [2] About 4.25 million of these people aged 40 years and above are currently visually impaired. [3]

Visual impairment affects the psycho-socio-economic life of not only a person but the family, community and nation as a whole. Causes of low vision and blindness could be congenital or acquired, congenital causes include congenital cataract, toxoplasmosis and some transplacental maternal infections. Acquired causes are degenerative, infective, inflammatory, traumatic, autoimmune, idiopathic etc. In Nigeria, the commonest cause of low vision and blindness is cataract, constituting 45.3% and 43.0% respectively [4] this is similar to studies done in other regions of the world. [5,6,7] This is however in variance with studies by Congdon *et al* in America in which age-related macular degeneration was the leading cause of blindness in the Caucasians while cataract and glaucoma topped the list in the blacks. [8]

Prevalence of low vision and blindness varies from place to place. In Nigeria, there is a prevalence of 9.8% and 4.2% of adults with low vision and blindness respectively. [9] There is a prevalence of 10% of visual impairment in adults aged 50 years or older in China. [5] In America, 1.98% and 0.78% of people older than 40 years of age have low vision and are blind respectively. [8] In the United Kingdom (UK) it is estimated that 1.93 million people are have sight loss and blindness. [10]

Despite studies done in different parts of Nigeria on low vision and blindness, there is a dearth of data on this subject matter in this environment and therefore a need to evaluate the causes and prevalence of low vision and blindness in this area to aid in designing and evaluating eye care services in terms of purchasing of equipment, consumables, drugs and manpower development in Abia State.

2. MATERIALS AND METHODS

This is was a retrospective, descriptive study spanning from April to September 2018. Case files of patients managed in the Ophthalmology unit of Abia State University Teaching Hospital for visual impairment were retrieved.

2.1 Study Setting

Abia State University Teaching Hospital, Aba is a state-owned tertiary health facility that provides secondary and tertiary medical care, and it is also involved in training of high and middle level manpower for the health industry. It is a 300-bed hospital and serves as a referral centre for Aba and its environs. Abia State University Teaching Hospital is located in Osisioma Local Government Area of Abia state. Osisioma is a semi urban area with a land mass of 198 Km^2 a projected population of 252,560 (according to National Population Commission (NPC) 2010 population projection) and a 2016 projected population of 296,758. [11,12] The hospital serves as a referral centre for Abia State which is located at Latitude: 5.4167 and Longitude: 7.5000 and has a population of 4.2 million. [11,12]

2.2 Inclusion Criteria

All adult patients with visual impairment were included in the study.

The biodata such as age, and sex were obtained. The uncorrected and best corrected visual acuities were recorded. Recorded visual acuity (VA) for a 6 meter distance, unaided and aided with pin hole or correction were noted. Any VA improvement by at least one line with pinhole was considered to be a case of refractive error. Clinical presentation, eye and laboratory examination findings and management of these cases were retrieved. In each case, clinical examination was done after obtaining a detailed history. Ophthalmological assessment included routine ocular examinations with special reference to visual acuity, fundoscopy, findings on anterior and posterior segments examination assessed with binocular indirect ophthalmoscope and or using digital slit-lamp biomicroscope which was done on dilatation of the eye. Other causes of low vision and blindness were also noted.

The patients' blood pressure (BP) and urine sugar were assessed with Accosons mercury sphygmomanometer and dip stick respectively.

2.2 Exclusion Criteria

Patients whose medical records had incomplete information were excluded from the study.

2.3 Data Analysis

Continuous variables were presented using mean and standard deviation. Categorical data were analyzed using proportions. Charts and tables were used to present the frequency distributions of the variables. Chi square test was used to test associations between variables. Statistical significance was set at a P-value of < 0.05. IBM SPSS version 25.0 was used to analyze all data.

3. RESULTS

Table 1 above is on the socio-demographic characteristics of the respondents. The mean age was 48.5±17.7 years. A greater proportion of the respondents were above 40 years of age (61.1%) with comparable male-to-female ratio (1:1.2). Nearly 40% of them were traders while 29% were professionals. Majority of the participants (88%) had no past medical history; however 5.5% and 4.4% had hypertension and diabetes mellitus respectively with the most reported past ocular history being the use of glasses (20%).

Table 2 above shows the blood pressure measurement and urinalysis result of the respondents. The greater majority, 145 (31.7%) had stage 2 hypertension and 93.4% had no glucose in their urine.

Table 3 is on the prevalence of low vision and blindness among the respondents. Prevalence of low vision in the right eye was 12.5% while for the left eye was 12.9% giving 25.4% (116) of respondents with monocular low vision. Prevalence of blindness in the right eye was 14.0% and 16.2% for the left eye giving 30.2% the study participants with monocular blindness.

In Table 4 above on patients' diagnoses, cataract-related diagnosis and refractive errors were the major diagnoses among the respondents (28.4% and 28.2% respectively). These were followed by glaucoma-related causes (14.7%), allergic conjunctivitis (10.3%) and pterygium (6.3%).

The types of refractive error in Table 5 above reveals that over 78% (378) of the study participants did not have any refractive error; however, presbyopia (9.7%) appeared to be the more common age-related refractive error seen followed by myopia (4.6%) and hypermetropia (4.1%).

The Table 6 shows the association between visual acuity on the right eye and some variables (age, sex, blood pressure and occupation of respondents). Visual impairment and blindness was seen more in respondents between 41-80 years of age (68.4%), males, those with stage 2 hypertension and traders. These were found to be statistically significant (p=0.000).

The Table 7 shows the association between visual acuity on the left eye and some variables (age, sex, blood pressure and occupation of respondents). Visual impairment and blindness was seen more in respondents between 41-80 years of age (82.6%), males, those with stage 2 hypertension and traders. These were found to be statistically significant (p=0.000).

4. DISCUSSION

Low vision and blindness due to any cause is a major cause of significant morbidity and it affects

many globally. [1] In as much as there is greater prevalence of blindness in the elderly, the low frequency recorded in this study is probably due to age distribution in the study population and low life expectancy in our environment. [13] Also there is lack of knowledge of availability of help. It may also be due to the fact that there may not be appropriate escorts to eye care centers and lack of funds for eye care services.

There was female preponderance in the study population similar to other studies. [4,5,6] This has been attributed to the fact that females have higher life expectancy and thus are more in number in the general population, it is also suggested that females have more health seeking tendency. [14]

Table 1. Socio-demographic variables of respondents

Variable	Frequency (N=457)	Percentage (%)
Age group (in years)		
<20-40	174	38.1
41-60	164	35.9
61-80	102	22.3
>80	17	3.7
Sex		
Male	206	45.1
Female	251	54.9
Occupation		
Professionals	132	28.9
Traders	168	36.8
Student	63	13.8
Artisan	55	12.0
Unemployed	39	8.5
Past medical history		
Hypertension (HTN)	25	5.5
Diabetes Mellitus(DM)	20	4.4
HTN/DM	6	1.3
Peptic Ulcer Disease (PUD)	3	0.7
Asthma	1	0.2
None	402	88.0
Past ocular history		
Trauma	6	1.3
Glasses	92	20.1
Glasses/surgery	2	0.4
Surgery	15	3.3
None	342	74.8

Mean age= 48.5±17.7 years

Table 2. Blood pressure measurement and urinalysis

Variable	Frequency (N=457)	Percentage (%)
BP measurement(mmHg)		
Normal(<120/80)	110	24.1
Elevated(120-129/<80)	116	25.4
Stage 1(130-139/80-89)	71	15.5
Stage2(140/90 or higher)	145	31.7
Stage 3 (>180/>120)	15	3.3
Urinalysis for glucose		
Negative	427	93.4
Positive	30	6.6

**B.P measurement adapted from ACC/AHA*

Table 3. Prevalence of low vision and blindness

Variable	Frequency (N=457)	Percentage (%)
Prevalence of low vision		
Right eye	57	12.5
Left eye	59	12.9
Monocular low vision	116	25.4
Bilateral low vision	25	5.4
Prevalence of blindness		
Right eye	64	14.0
Left eye	74	16.2
Monocular blindness	138	30.2
Bilateral blindness	32	7.0

Table 4. Patients' diagnoses

Diagnoses	Frequency (N=457)	Percentage (%)
Cataract-related	130	28.4
Glaucoma-related	67	14.7
Refractive errors	129	28.2
Pterygium	29	6.3
Corneal opacity	9	2.0
Trauma	8	1.8
Allergic conjunctivitis	47	10.3
Others	38	8.3

Table 5. Types of Refractive Error

Variable	Frequency (N=457)	Percentage (%)
Refractive Error		
Myopia	22	4.6
Hypermetropia	20	4.1
Myopic astigmatism	4	0.8
Anisometropia	10	2.1
Amblyopia	2	0.4
Presbyopia	47	9.7
None	378	78.3

The respondents in this study were more of traders than professionals (40% vs 20%). Professionals are people engaged or qualified in a profession requiring special training like civil servants, doctors, lawyers, teachers and architects. For the purpose of this study, people engaged in buying and selling were referred to as traders. The greater percentage of traders in this study is a reflection of the occupation distribution in Aba which is mainly a commercial city and lately has been described as a hub for small and medium scale enterprises.[15]

History taking revealed a positive history of hypertension in 5.5% of the subjects. This is however in variance to findings during clinical examination that showed that about 50% of subjects were hypertensive. This goes to show that most hypertensives are unaware of their medical conditions. Grade 2 hypertension was the commonest in keeping with study done by the Nigeria National Blindness and Visual Impairment Survey. [3] There is therefore a need for public enlightenment on hypertension in general and on the ocular complications of hypertension. From urinalysis done 6.6% had glucosuria which is not very different from 4.4% obtained from history taking indicating a better awareness of health status of study population in terms of diabetes mellitus.

Monocular low vision was commoner than binocular low vision in this study (25.4% vs 5.4%) similar to findings by Ansah [16] in which 28.2% and 3.7% had low vision and blindness respectively. This however differs from findings by Thapa *et al* in Nepal [17] in which 52% of study population had low vision. The difference in result is probably due to the fact the study group in Nepal were of higher age bracket 60-95years. There was no significant statistical difference in frequency of monocular low vision in the right or left eye in this study.

Table 6. showing association between Visual impairment/Blindness (Right eye) and socio-demographic variables with B.P

	Visual acuity (Right eye)			
Variables	**Normal(N%)**	**Visual impairment/Blind(N%)**	**χ^2**	**P-value**
Age group(in yrs)				
<20-40	150(44.6)	24(19.8)	61.110*	0.000**
41-60	129(38.4)	35(28.9)		
61-80	54(16.7)	48(39.6)		
>80	3(0.89)	14(11.7)		
Sex				
Male	134(39.9)	72(59.4)	13.837	0.000**
Female	202(0.1)	49(39.6)		
Blood pressure				
Normal	96(28.6)	14(11.6)	21.560	0.000**
Elevated	87(25.9)	29(24.0)		
Stage 1	53(15.8)	18(14.9)		
Stage 2	92(27.5)	53(43.8)		
Stage 3	8(2.4)	7(5.8)		
Occupation				
Professionals	110(32.9)	22(18.2)	30.318	0.000**
Traders	119(35.4)	49(40.5)		
Student	53(15.8)	10(8.3)		
Artisan	26(7.7)	29(24.0)		
Unemployed	28(27.4)	11(9.1)		

**Fisher's test* ***Statistical significance*

Table 7. Showing association between Visual impairment/Blindness (Left eye) and socio-demographic variables with B.P

	Visual acuity (Left eye)			
Variables	**Normal N=324(%)**	**Visual impairment/Blind N= 133(%)**	**χ^2**	**P-value**
Age group(in yrs)				
<20-40	155(47.8)	19(15.7)	93.956*	0.000**
41-60	124(38.2)	40(33.0)		
61-80	42(12.9)	60(49.6)		
;>80	3(0.9)	14(11.6)		
Sex				
Male	134(39.9)	72(59.5)	17.217	0.000**
Female	198(60.1)	49(40.5)		
Blood pressure				
Normal	94(29.0)	16(12.0)	32.576	0.000**
Elevated	90(27.7)	26(19.6)		
Stage 1	50(15.4)	21(15.8)		
Stage 2	84(25.9)	61(45.9)		
Stage 3	6(1.8)	9(6.8)		
Occupation				
Professionals	110(33.8)	22(16.5)	50.331	0.000**
Traders	109(33.7)	59(44.1)		
Student	57(17.6)	6(4.5)		
Artisan	22(6.9)	33(24.8)		
Unemployed	26(8.0)	13(9.8)		

**Fisher's test* ***Statistical significance*

The causes of visual impairment in this study were cataract, glaucoma, refractive errors, pterygium, corneal opacity, eye trauma and allergic conjunctivitis. Other causes identified in this study were phthisis bulbi, scleritis, retinitis pigmentosa and hypertensive retinopathy.

Cataract, refractive errors and glaucoma were the leading causes of visual impairment accounting for 28.4%, 28.2% and 14.7% of cases respectively in this study. As in this study, cataract is the leading cause of blindness worldwide. [3,5,6]

Presbyopia is an accommodation defect that causes near visual impairment with advancing age. [18] It is a gradual age related loss of the eye's ability to focus actively on nearby objects as a result of physiological change in the crystalline lens of an adult eye with consequence loss of the amplitude of accommodation, resulting in inability to focus at the near distance the eye had hitherto been accustomed to. [18] It usually becomes noticeable in the early to mid-40's and worsens around the age of 65. It is thought that presbyopia affects younger Africans (from 30 years). [19] Studies however show that there is no statistical difference in the age of onset of presbyopia in different races. [20]

In this study presbyopia was noted in 9.7% of subjects. This high frequency noted is related to the fact that most of our study population were more than 30years of age. This figure is comparable to studies done in North central, North west, and South west Nigeria in which presbyopia was noted in 52.9%, 49.7% and 31.8% of subjects respectively but differs from study in Bayelsa, South-South Nigeria in which 12.8% of patients were presbyopes. [21,22,23,24]

Myopia was common in this study, occurring in 21% of study subset. In myopia the visual images come to focus in front of the retina resulting in defective vision of distant objects. The prevalence of myopia increases with age thus the high frequency noted in this study. In a study by Ezelum et al. [25], a prevalence of 16.2% and 2.1% was noted for myopia and high myopia respectively; while 26.4% was noted by Aham-Onyebuchi *et al* in Ogun state. [26]

Cataract and glaucoma were of higher frequency after the age of 50, while refractive errors and allergic conjunctivitis occurred with higher frequency before the age of 50. Cataract is a vision-impairing disease characterized by gradual progressive clouding and thickening of the lens of the eye. It is the leading cause of treatable blindness worldwide. [3] As noted in this study, cataract is commoner with increasing age. [3,4] Cataract can be congenital or acquired. Besides aging, other causes of acquired cataract are systemic diseases like diabetes mellitus, radiation and trauma. Cataract was noted in 28.3% of respondents. This is similar to 22.7% and 36.5%, obtained in studies done in Ghana and Osogbo, southwest Nigeria. [4,16] It is however in variance with 68% noted in study in Nepal. [17] The greater number recorded in Nepal is due to the fact that the study group constituted only of the elderly and as earlier stated incidence of cataract increases with age. [3,4,5]

Glaucoma is associated with a life time risk of about 42.2% and 16.4% of monocular and bilateral blindness respectively. [17,27] It is a group of ocular disorders with multifactorial etiology united by a clinically characteristic intraocular pressure associated with optic neuropathy and resulting in progressive visual field loss and irreversible blindness. A total of 14.7% of study population had glaucoma similar to 16.7% and 20.1 % obtained in previous Nigerian studies. [4,9]

Pterygium was noted in 6.3% of study population. Pterygium is a cause of treatable and avoidable blindness. It is a degenerative disease of the conjunctiva characterized by the encroachment of a fleshy mass of thickened conjunctiva over the cornea. It can be unipolar usually nasal or temporal and frequently results in visual disturbance. [28] Visual disturbance occurs when the pterygium indents the cornea or crosses the pupillary axis. In a study in south India, 9.5% of subjects had pterygium which was more common in females and in rural dwellers.[29] In Ogun State, Nigeria, [30] 42.6% and 11.3% of study population were visually impaired and blind as a result of pterygium while in Anambra, South East Nigeria,[31] 8.2% of study population had pterygium; the latter being similar to our finding.

Allergic conjunctivitis is common in hot, humid and tropical climates like Nigeria. It is inflammation of the conjunctiva (membrane covering the white part of the eye) due to allergy. Complicated cases may involve the cornea leading to severe visual loss. In this study, 10.3 % of subjects with low vision/blindness were due to allergic conjunctivitis. This is similar to 7% reported from studies in Nnewi South-East Nigeria. [32]

In this study, respondents between the ages of 41 and 80 years (83.2%), males, patients with stage 2 hypertension and traders had statistically significant association with visual impairment and blindness (p=0.000) in both the right and left

eyes (see tables 6 & 7). Increase in prevalence of blindness with age is universal and the Nigeria national blindness and visual impairment survey 2005-2007 supports this finding. [9] Blindness is commoner in males in this study. This differs from the aforementioned study's finding in which blindness was commoner in females. The gender difference in blindness may be related to the fact that females generally have more health seeking tendency and theirs may be more frequently reported. [14] The higher frequency of visual impairment and blindness in stage 2 hypertensive patient is similar to findings by Abdull *et al*. [9] The reason for this is however not understood and there is need other studies in this field.

5. CONCLUSION

A total 5.4% of the patients had bilateral low vision, while 30.2% and 7% had monocular and bilateral blindness respectively. Cataract, glaucoma, pterygium and allergic conjunctivitis are leading causes of low vision and blindness in Aba, Nigeria.

CONSENT

Only consenting patients were enrolled in the study.

ETHICAL APPROVAL

Ethical approval for this study was obtained from the Ethical and review committee of the hospital. Confidentiality of patients' information was ensur.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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