

## Blindness And Low Vision In Adults In Ozoro, A Rural Community In Delta State, Nigeria

\* G. Patrick-Ferife FMCoph, FWACS, \*\*A. O. Ashaye FMCoph, FWACS, \*\*\* B. M. Qureshi MBBS, DO

\*Eye Department, Marierie Memorial Central Hospital, Ughelli, Delta State, Nigeria. \*\*Department of Ophthalmology, College of Medicine, University of Ibadan, University College Hospital, Ibadan, Nigeria.

\*\*\*Pakistan Institute of Community Ophthalmology, Khyber Medical Complex, Peshawar, NWFP, Pakistan.

### ABSTRACT

**Background:** The objective of this article is to determine the prevalence and causes of blindness and low vision in Ozoro, a rural town of Delta State in Nigeria, in order to provide baseline information for planning a prevention of blindness programme.

**Methods:** A cross sectional study using a stratified random sampling method was used to select the compounds. The five communities in the town formed the different sub-groups or strata. Visual acuity were recorded for all adults 40 years and older. Persons who had visual acuity less than  $\frac{6}{18}$  were further examined to determine the cause of low vision or blindness. The WHO definition of visual impairment according to visual acuity was used as criteria for classification.

**Results:** A total of 815 persons (coverage of 51.7%) were examined using a modified WHO PBL record of blindness form. The prevalence of blindness (VA  $< \frac{3}{60}$  in the better eye) for people of 40 years and above was 6.3% (95% CI, 4.6% to 8%) and low vision VA  $\frac{6}{24}$  to  $\frac{3}{60}$  in the better eye was 25.2%. The estimated prevalence of bilateral blindness for all ages was 1.3% and low vision was 5%. The rate of blindness and low vision increased with age being highest in subjects who were 60 years and above. The main causes of blindness and low vision were cataract, accounting for 60% of all bilateral blindness and 51.7% of all low vision. Other causes of blindness include, posterior segment diseases (11.7%). Glaucoma was presumed to be cause of blindness in 9.8% of cases; others were uncorrected aphakia 5.9%, and globe abnormalities 5.9%. Refractive error was the second major cause of low vision accounting for 22% of bilateral low vision.

**Conclusion:** The magnitude of blindness and low vision in this oil rich Ozoro community in Delta State is high and majority are avoidable causes of blindness.

**KEY WORDS:** Blindness; Low vision; Rural town; Nigeria.

Paper accepted for publication 12th August 2005.

### INTRODUCTION

Nigeria has an estimated population of 130

million with an annual growth rate of 3%<sup>1</sup>. National blindness survey had not been undertaken at the time of this study.

Several local studies report blindness prevalence rates ranging from 0.62% to 5.4%<sup>2-9</sup>. The large variation in blindness rate may be related to large variations in socioeconomic conditions, age, sex, and availability of eye health resources and local endemic diseases like onchocerciasis.

Ozoro is a small under served headquarter town in Isoko North local government area of Delta State. It has a population of approximately 100,000. Eye care services are lacking in the state and especially in Ozoro. No blindness survey had been conducted in the state. Conducting a survey for the whole state was not feasible because of the limited resources. Results of this survey will therefore form baseline data for establishing a prevention of blindness programme that may be applicable to small but underserved towns.

### Study State

Delta State is one of the 36 states of the country. It is in the Niger Delta area of the country. It is divided into 25 local government areas and a state capital. It lies roughly between longitudes 5 and 6 degrees East and latitude 5 and 6 degrees North. On its Southern flank is a 160km coastline of the Bight of Benin.

The vegetation varies from the mangrove swamp along the coast to evergreen forest in the middle and the Savannah in the North East.

Delta State is rich in mineral deposits. With the exception of the North-East, other parts of the state abound in crude oil resources and natural gas.

Delta State has a population of 3,372,080 (projections from 1991 national census) with a growth rate of 3% per annum<sup>1</sup>. There are various ethnic groups in the state, the majority are Urhobo, Izon, Isoko, and Itsekiri. They claim a common ancestry thus their cultures are similar.

### Study Location

This study was carried out between July and August 2000 in Ozoro, the rural capital town of Isoko North Local Government Area (LGA) of Delta State, Nigeria. It is an Isoko speaking community with a

population of 105,000 (estimated from 1991 national census), of which the male population is 49% and female population 51%. It is largely a farming community. With the major crop being cassava the staple food in this community is 'gari' and other products of processed cassava.

It consists of five communities which are Uroto, Erovie, Etevie Urude and Oruamudo communities. All communities are basically homogenous with similar socio-economic conditions<sup>9</sup>.

### Health Care Facilities

There is one government hospital maintained by the state government, a health centre run by the local government council and one private owned clinic in the town. Surprisingly all these facilities are located in the same community/area, which is, some distance from a large proportion of the population. There were no eye care services. Eye care was sought from the state capital and other neighbouring states.

### SUBJECTS AND METHODS

A random sampling method with stratification was used in which the five communities formed the strata or subgroups. All people of 40 years and above resident in the village for more than 6 months were selected. Eight hundred and fifteen persons out of the calculated sample size of 1,575 were examined. Sixty three persons refused to be included.

### Sampling Design

The proportion of people to be seen per community was calculated using the estimated number of houses as given by the chairman of the council.

Community/Area	Estimated No. Of Houses	Sample Size
Uruto	1,360	600
Erovie	420	200
Etevie	500	200
Urude	1,050	400
Oruamudo	400	200

In the town, the basic living unit was a compound which was made up of 4 to 5 numbered houses with a common courtyard. The primary sampling unit therefore was the compound. With an estimated 2 persons above 40 years per household or house, 8 to 10 individuals per compound were expected to be examined. Alternate compounds were visited

starting from the largest street in each community.

For the purpose of determining the sample size, estimate of the prevalence of blindness for adults 40 years and above was 10%, a design effect of 1.0, a confidence interval of 95%, and a response rate of 90% were used. In view of all the latter, the calculated sample size was 1,575 persons.

A survey team comprising of a guide/interpreter, 3 auxiliaries nurses who were trained for visual acuity measurements and recording and the researcher carried out the fieldwork. Data was collected and recorded on a modified WHO/PBL record of blindness form, which was pre-tested prior to commencement of the study. After obtaining consent, demographic data was recorded and a history of any eye surgery was also recorded. Visual acuity using the Snellens chart was checked with subjects best correction and all individuals with visual acuity less than  $\frac{6}{18}$  in the better eye were further examined. Further examination included the use of the pinhole, pen-torch dilated funduscopy and intraocular pressure measurement using the Schiottz tonometer.

The principal cause of blindness and low vision was recorded as the best treatable. This was done by the ophthalmologist. The recommended treatment was categorized into medical, surgical, refraction or no action. Diagnosed cases were referred to two designated centres while minor conditions were treated in the field.

### Data Analysis

Data was entered into epi info version 6.0 software. Univariate analysis was undertaken to assess prevalence and causes of blindness, and Chi-square values were calculated.

### RESULTS

A total of 815 subjects aged 40 years and above were examined representing 51.7% coverage. Subjects above 60 years made up 48.3% of the sample (Table I). Of the subjects examined, 499(61.2%) were females and 316(38.8%) were males.

The prevalence of blindness in subjects 40 years and above was 6.3% (95% confidence interval, 4.6%-8%), with an overall prevalence of blindness for the population of 1.3%. Table II shows the age specific prevalence of blindness. A high prevalence of 11.2% was found in subjects 60 years and above, and blindness rate increased markedly with age. The prevalence of blindness was slightly more in females (6.4%) than in males (6.0%) (Table III) although this was not statistically significant ( $p=0.3$ ).

Five subjects who consented to be included in the study refused eye examination and were believed not to be blind.

The major cause of bilateral blindness in this survey was cataract accounting for 60.8% of all the bilateral blindness with a prevalence of 3.8% in subjects 40 years and above. Cataract was responsible for 66% of blindness in persons of 60 years and above. Twenty five out of the 39 blind subjects were farmers, all of who were blinded by cataract.

Other causes of bilateral blindness were posterior segment disorders (11.7%), glaucoma (9.8%), uncorrected aphakia (5.9%), phthisis bulbi (5.9%), central corneal scars (3.9%), and undetermined causes in 1.9%.

The posterior segment disorders were Toxoplasmic macular scars (2), age-related macular degeneration (2), retinal detachment (1) and retinitis pigmentosa (1).

Glaucoma was the presumed cause of blindness in 5 out of the 51 cases of bilateral blindness. Uncorrected aphakia was the cause of blindness in 5.9% of the bilateral blinds. Most of the subjects had their cataract removed by couching and did not have aphakic correction. One subject with unilateral aphakia and cataract in the fellow eye had a pair of aphakic glasses, which she does not wear because of image distortion. No person was blind from refractive error. Five hundred and forty five (66.9%) of the sample population complained of poor near vision.

Globe abnormalities/Phthisis bulbi was a cause of blindness in 3 cases. Two of the subjects had used traditional eye medications following sudden loss of vision in both eyes. The other subject was on medication but could not afford the drugs and resorted to traditional eye medications when his vision deteriorated.

Central corneal opacity (CCO) was a cause of blindness in 2 subjects.

The prevalence of bilateral low vision in subjects 40 years and above was 25.2% with an overall population prevalence of 5%. The prevalence increased with age with more low vision occurring in subjects who were 60 years and above (Table V).

The major causes of low vision were cataract (51.7%), refractive error (21.9%) and posterior segment diseases (12.7%). Of the latter, age related macular degeneration was the commonest (65.4%) followed by diabetic retinopathy. Two subjects had bilateral optic atrophy probably from nutritional optic neuropathy. Pterygium was a cause of low vision in 10 (4.9%) cases (Table VI).

Sixty-three (7.7%) persons in the sample population were blind in one eye (visual acuity of less than  $\frac{3}{60}$  in one eye and better than  $\frac{3}{60}$  in the fellow eye). The major causes of unilateral blindness are shown in Table VII. They were cataract (41.3%), globe abnormalities/phthisis bulbi (20.6%), glaucoma (presumed) (20.6%), posterior segment disorders (11.1%). Central corneal opacity was seen in 4 subjects and all resulted from trauma.

Other causes of unilateral blindness were pterygium, ptosis, unilateral aphakia and one subject which was undetermined.

#### Cataract surgical coverage (CSC)

Fourteen subjects had cataract surgery, out of which 5 had intracapsular cataract extraction and the other 9 subjects had their cataract removed by couching. The cataract surgical coverage (eyes) both for couching and surgery, regardless of visual acuity was 16%.

#### Recommended Treatment

In all blind subjects, surgery was the recommended treatment in 58.8% of subjects. Refraction for uncorrected aphakia and use of low visual aids was needed in 35.1% of subjects. Medical treatment was needed in 5.9% of subjects. No definite action was taken in 2.0% of the subjects (Table VIII) with age related macular degeneration. Subjects were referred to the nearest eye clinic but most declined because they could not afford the cost of treatment and transportation to the referral centre. Refraction was the recommended treatment for 35% of all low vision.

For all subjects who were either blind or had low vision, surgery and refraction were the most recommended treatment, whereas in all the blind subjects, surgery was the most recommended treatment (58.8%) followed by refraction (35%) for uncorrected aphakia. Specialized surgery in the form of keratoplasty may be beneficial to some of the subjects with corneal scarring. The cases for which no action was taken immediately included those with posterior segment disorders and those who refused examination.

**Table I. Age/Sex Distribution of Subjects, Ozoro**

Age	Females	Males	Total (%)
	No. (%)	No. (%)	
40-59 years	14(62.2)	90(37.8)	238(42.1)
50- 59 years	111(60.7)	72(39.3)	183 (22.8)
60 years & above	240(60.9)	154 (39.1)	394 (35.1)
Total	499(61.2)	316 (38.8)	815

**Table II. Age Specific of Prevalence of Blindness in Adults, Ozoro.**

Age	Sample No.	No. Blind	Prevalence (%)
40 - 49 years	238	2	(0.8)
50 - 59 years	183	5	(2.7)
60 ≥ years	394	44	(11.2)
Total	815	51	(6.3)

**Table III. Prevalence of Blindness by Age and Sex**

Age	Females		Males	
	No. Blind/ Sample No.	(%)	No. Blind/ Sample No.	(%)
40 - 49 years	1/148	(0.67)	1/90	(1.1)
50 - 59 years	4/111	(3.6)	1/72	(1.4)
60 ≥ years	27/240	(11.3)	17/154	(11.0)
Total	32/499	(6.4)	19/316	(6.0)

**Table IV. Prevalence of Causes of Bilateral Blindness in Adults, Ozoro**

Causes	No. Blind	Prevalence (%)
Cataract	31	3.8
Post Segment Disorders	6	0.7
Glaucoma (Presumed)	5	0.6
Uncorrected Aphakia	3	0.4
Globe	3	0.4
Central Corneal Opacity	2	0.2
Undetermined	1	0.1

**Table V. Age Specific of Prevalence of Low Vision, Ozoro**

Age	Sample No.	No. Low Vision	Prevalence (%)
40-49 years	238	14	(5.9)
50-59 years	183	29	(15.8)
60 > years	394	162	(41.1)
Total	815	205	(25.2)

**Table VI. Causes of Low Vision**

Causes	No. Low Vision	(%)
Cataract	106	(51.7)
Refractive Error	45	(21.9)
Post Segment Disorders	26	(12.7)
Pterygium	10	(4.9)
Glaucoma (Presumed)	7	(3.4)
Uncorrected Aphakia	6	(2.9)
Ptosis	1	(0.5)
Undetermined	4	(2.0)
Total	205	

**Table VIII. Recommended Treatment**

Treatment	Blind No. (%)	Low Vision No. (%)
Surgery	30(58.8)	117(57.1)
Refraction	6(11.8)	72(35.1)
Medical	6(11.8)	12(5.9)
No action	9(17.6)	4(2.0)

**Table VII. Cause of Unilateral Blindness**

Causes	No. (%)
Cataract	26 (41.3)
Globe/Phthisis bulbi	13 (20.6)
Glaucoma (Presumed)	9 (14.3)
Post Segment Disorders	7 (11.1)
Central corneal opacity	4 (6.3)
Other causes	4 (6.3)
Total	63

## DISCUSSION

This was the first survey done in this community. The inhabitants were not too co-operative. Obtaining consent for examination was difficult. Those who did not consent to be included in the study claimed their eyes were in good condition. The low overall coverage of 51% indicates the poor response to the survey and does not give reliable estimates for the blindness and low vision for Ozoro town but can give a clue of the eye care problems in the area.

The prevalence of bilateral blindness in people of 40 years and above in Ozoro was 6.3% and of low vision was 25.2%. This is quite high compared to other studies in Africa<sup>10-13</sup> or in neighbouring district in Nigeria<sup>8</sup>. Persons 40 years and above made up approximately 20% of the population hence the estimated prevalence of bilateral blindness for all ages was 1.3%, which is within the estimated blindness rate for Nigeria (1-3%)<sup>5-8</sup>. Similar high values are found in onchoendemic areas of Nigeria<sup>3, 4</sup> but Ozoro is not in an onchoendemic zone. The high rate of blindness and low vision here may be attributed to the lack of eye care services and eye health. There may also be an over estimation of blindness prevalence, if only those who felt the need to have their eyes checked consented to be examined. The poor coverage makes this reason a possibility.

Other population-based studies in the country have reported overall blindness rates comparable to that in this study<sup>2,7</sup>. All of these studies including this study were conducted in under served rural areas of the country, but Ozoro, although a headquarter town

had similar high blindness prevalence rate. Lower blindness rates are reported for more semi-urban and literate areas where the level of awareness of eye care is high<sup>8,9</sup>.

The prevalence of blindness in Ozoro increased with age with a prevalence of 0.8% in age group 40-49 years, 2.7% in age group 50-59 years and 11.2% in people of 60 years and above. This trend is often attributed to the very high prevalence of age related cataract in this age group as has been found in most other studies<sup>3-9</sup>.

The prevalence of low vision in people of 40 years and above was 25.2% with an estimated prevalence of 5% for the study population. This figure though high compares closely with the studies done in Ikene local government area of Ogun State showing a prevalence of 4.8%<sup>14</sup>. Prevalence of low vision was about five times the blindness prevalence rate, higher than the expected 3 fold increase. This suggests a larger than usual reservoir of low vision in the people of Ozoro. With increasing longevity, the backlog of cataract may turn out to be huge if the problems are not tackled.

In this study, cataract was the single most important cause of blindness and low vision accounting for 60% of all bilateral blindness and 51.7% of low vision. It was also a cause of blindness in 41.3% of unilateral blindness. Most of the cataract were age related. The prevalence of blinding cataract was 3.8% being highest in people of 60 years and above. These findings are similar to previous studies in rural areas, of underserved areas of developing economy<sup>3-6,11,14</sup>.

Refractive error was the second most important cause of low vision accounting for 22% of all bilateral low vision, much higher than that of 5% found in Kano State<sup>15</sup>. No case of blindness from refractive error was seen in this study.

Uncorrected aphakia was the cause of blindness in 3 out of 51 bilateral blindness and accounted for 29% of the causes of low vision in this study. Until recently in Nigeria, cataract surgery was by intracapsular extraction with spectacle correction. Uncorrected aphakia as a cause of low vision had been similarly reported in rural African community<sup>3-8</sup>.

Glaucoma accounted for 5(9.8%) out of 51 cases of bilateral blindness and 9(14.3%) out of 63 cases of unilateral blindness in Ozoro. Bearing in mind the bilaterality and asymmetry of the disease, it can be said that 14 subjects were diagnosed with blinding glaucoma. The prevalence of glaucoma in this study might be an under/over estimation since the criteria adopted here was intra ocular pressures (IOP) above 21mmHg and cup disc ratio of more

than 0.6. The absence of visual field tests make the diagnosis of glaucoma presumptive. Some of those diagnosed to have glaucoma may not have the disease. Others who have the disease, who might have normal tension glaucoma, might have been missed. This limitation of absence of field studies in these patients limit definite categorization of subjects assumed to be blinded by glaucoma. These cases however were referred for further tests to confirm presence or absence of glaucoma where such facilities were available.

Glaucoma has always been reported as an important cause of blindness accounting for between 15% and 22% of blindness in population blindness studies and clinic studies in Nigeria<sup>9,16-19</sup>.

Central corneal opacity was a cause of 3.9% of bilateral blindness and 6.3% of unilateral blindness; all of which resulted from trauma. This high figure was previously reported by Oluyadi<sup>1</sup> and frequently found in population whose major occupation is farming.

Pterygium was a cause of low vision in 10(4.9%) subjects. No subject was blind from pterygium in this community. Pterygium is not always listed as a common cause of low vision but, its importance in this population may be attributed to the continuous exposure to smoke from fire places emanating from household cooking and smoking of sea foods. Even higher figure was reported in Edo State where pterygium was reported as accounting for 10.9% of low vision. It was the third most important cause in that locality<sup>8</sup>.

Other causes of blindness and low vision found in this study are not different from those found in underserved population of Africa.

No subject with trachoma was seen in this study. In the Northern parts of Nigeria, trachoma is still a major cause of blindness<sup>4</sup>. The low prevalence of trachoma in the Southern part of Nigeria has been documented previously<sup>5-8</sup>. Eye care practitioners in the Southern region of Nigeria however report occasional cases of trachoma in clinic studies<sup>9</sup>.

The leading causes of blindness and low vision in Ozoro are cataract, refractive error 18%, posterior segment 13%, and glaucoma 5%. It is estimated that there are approximately 6600 persons of 40 years and above with visual loss in Ozoro community. Cataract surgery will be required in 3600 of these people, mostly in the elderly.

Refractive error as a cause of visual loss can easily be tackled by the provision of spectacles and access to refraction services. Refraction services will be required for approximately 1400 persons and this does not include those presbyopes needing

spectacles for near work.

Further treatment will be required for approximately 1200 persons with visual loss from posterior segment disease and glaucoma. This will have to be done in a more equipped centre. Early recognition and referral system must be put in place. If functional cataract service had been put in place at the time of the survey, blindness from cataract and uncorrected aphakia would have been eliminated, the number of all blind persons would have been only 17 and the prevalence of blindness would have been 0.04%. With the appropriate services, the blindness rate of Ozoro community can be greatly reduced.

The results of this survey though not representative of the state gives an insight into the status of eye disease and eye care services in Ozoro community of Delta State. The blindness rate in more remote areas of the state may be much higher.

This survey has identified amongst the people of age group 40 years and above in Ozoro community, two conditions which need immediate intervention. These interventions were cataract surgery, refractive error and low vision treatment.

#### ACKNOWLEDGEMENT

We acknowledge the sponsorship for this study by the Christoffoel Blinden mission and the Pakistan Institute of community Ophthalmology for advice and assistance with statistics.

#### REFERENCES

1. Oluyadi OF. Prevalence and causes of blindness in Egbeda local government areas of Oyo State, Nigeria. A report submitted to the Nigerian National Committee for the prevention of blindness. 1995.
2. Umeh RE, Chijioke CP, Okonkwo PO. Eye disease in an onchocerciasis-endemic area of the forest savanna mosaic region of Nigeria. Bull World Health Organization 1996; 74(1): 95-100.
3. Abiose A, Muedoch I, Babalola O, *et al*. Distribution and aetiology of blindness and visual impairment in mesoendemic onchocercal communities, Kaduna State, Nigeria. Kaduna Collaboration for Research on Onchocerciasis. Br J Ophthalmol 1994; 78(1): 8-13.
4. Fafowora OF. Prevalence of blindness in a rural ophthalmically underserved Nigerian community. West Afr J Med 1996; 15(4): 228-31.
5. Adeoye A. Survey of blindness in rural communities of South-Western Nigeria. Trop Med Int Health 1996; 1(5): 672-6.
6. Ezepue UF. Magnitude and causes and low vision in Anambra State of Nigeria (results of 1992 point prevalence survey). Public Health 1997; 111(5):305-9.
7. Nwosu SN. Blindness and visual impairment in Anambra State, Nigeria. Trop Geogr Med 1994; 46(6):346-9.
8. Ayanru JO. Blindness in the Midwestern State of Nigeria. Trop Geogr Med 1974; 26(3):325-32.
9. A booklet for the first meeting of Delta Council on Health. Published by the State Ministry of Health, Warri. July 2000; 5-6.
10. Thylefors B. Avoidable blindness. Bull World Health Organization 1999; 77(6): 453.
11. Adeoti CO. Prevalence and causes of blindness in a tropical African population. West Afr J Med 2004; 23(3): 249-252.
12. Whitfield R, Schwab L, Ross-Degnan D, Steinkuller P, Swartwood J. Blindness and eye diseases in Kenya: ocular status survey results from the Kenya Rural Blindness Prevention Project. Br J Ophthalmol 1990; 74(6): 333-340.
13. Moll AC, van der Linden AJ, Hogeweg M, *et al*. Prevalence of blindness and low vision of people over 30 years in the Wenchi district, Ghana in relation to eye care programmes. Br J Ophthalmol 1994; 78(4): 275- 229.
14. Wilson MR, Mansour M, Ross-Degnan D, *et al*. Prevalence and causes of low vision in the Extreme North Province of Cameroun, West Africa. Ophthalmic Epidemiol 1996; 3(1): 23- 33.
15. Thylefors B. Much blindness is avoidable. World Health Forum 1998; 12(1): 78- 86.
16. Ajibode HA. The prevalence of blindness and visual impairment in Ikenne local government area of Ogun State. Nig J Ophthalmol 1999; 7(1): 23-27.
17. Abdu L. Prevalence and causes of blindness and low vision in Dambatta local government area, Kano State, Nigeria. Niger J Med 2002; 11(3): 108- 112.
18. Thylefors B. Eliminating onchocerciasis as a public health problem. Trop Med Int Health 2004; 9(4): A1-3.
19. Ashaye AO. Clinical Features of primary glaucoma in Ibadan. Nig J Ophthalmol 2003; 11(2): 70-75.