

Chibuikwe.S. Ejimadu, Chinyere. N. Pedro-Egbe

Department of Ophthalmology, University of Port Harcourt Teaching Hospital, Port Harcourt, Nigeria

## ABSTRACT

**Background:** The target of the world Health organization (WHO) to reduce blindness to less than 0.5% in all countries and <1% in individual countries is only possible if all major blinding eye diseases are detected early and treated or even prevented from occurring. Unfortunately, this target is frequently hampered by the problem of access to effective eye care in developing countries. The aim of this study is to determine the prevalence and causes of blindness in Ikwerre Local Government Area of River State, Nigeria

**Methods:** A population based, multistage random sampling survey on the causes of blindness was carried out between the 8<sup>th</sup> of September and 20<sup>th</sup> of October 2007. Various household in Seven villages picked from seven communities in the LGA were involved in the survey. Basic eye examination involving visual acuity measurement, pen torch assessment, funduscopy and intra-ocular pressure measurement were done. Data was recorded with WHO / PBL form.

**Results:** A total of 1513 persons were examined consisting of 754 males and 759 females. The prevalence of bilateral blindness was 1.26%; the commonest causes of bilateral blindness were cataract (37), glaucoma (31.5%) and optic atrophy (15.7%). There were more bilaterally blind females (68%) compared to males (32%). They were all above 50 years old.

The main causes of unilateral blindness were cataract (42.3%), glaucoma (15.4%) optic atrophy (11.5%) and corneal opacity (11.5%).

**Conclusion:** The burden of blindness can be reduced through effective planning and implementation of programmes for making cataract surgeries affordable, training of health personnel on basic eye care and establishment of a functional state programme for prevention of blindness.

**Key words:** Blindness; Prevalence; Causes; Ikwerre Nigeria

The contributing factors to blindness are ignorance, infections, malnutrition and lack of adequate eye care services which are worsened by the fact that rehabilitative and supportive measures are poor due to a dearth of technology in developing countries<sup>2</sup>. The major blinding diseases in Nigeria and other developing countries are cataract, trachoma, onchocerciasis, corneal diseases, glaucoma and trauma<sup>3</sup>.

The prevalence of blindness for Nigeria is 1.0% and 0.7% world wide<sup>4</sup> and according to 2002 estimate, 37 million people world wide were blind and out of this 1.2 million are found in Nigeria<sup>4</sup>. It is estimated that some one in the world becomes blind every five seconds while every minute a child becomes blind<sup>5</sup>. The planning and implementation of an effective blindness prevention programme is usually hindered by inadequate epidemiological data. This situation is worse in developing countries where 90% of the world's blind live, thus making it difficult to assess the global magnitude of the problem.

Simple population based assessment methodology is internationally accepted and used to develop the WHO Global Data Bank on Blindness, a necessary tool for planning international action against blindness<sup>6</sup>.

The Nigerian National Programme for Prevention of Blindness (NPPB) was launched in September 1990 in response to the twenty-eight World Health Assembly's resolution in Geneva (May, 1975) with the objectives of determining the causes and prevalence of blindness, reduction of the extent and nature of major blinding conditions including restoring sight to the curably blind and development of eye health man power at all levels on the short term and long term. This Study is aimed at determining the prevalence and causes of blindness in Ikwerre Local Government Area of River State and adding to the national data bank of information.

## MATERIALS AND METHODS

Approval to carry out this study was given by the Rivers State ministry of Health, Ikwerre Local Government Council and traditional rulers of each of the host communities where the study was carried out. The WHO estimate for the prevalence of blindness in Nigeria is 1% and the population of the local Government Area was 441,610 projected from 2006 census. The sample size was estimated using the formula:  $n = \frac{Z^2 Pq}{d^2}$  with 95% confidence Interval and sampling error Set at 5%.<sup>7</sup>

The minimum sample size was 1521.3. This was a population based multistage random sampling study conducted between the 8<sup>th</sup> of September, 2007 and 20<sup>th</sup> of October, 2007.

## INTRODUCTION

Blindness is a major public health and social problem with serious economic implications in the world today. However it has not received the desired attention in spite of the fact that it leads to social dependence, loss of productivity and income especially in the developing countries.

In the first stage sampling, seven (>50%) communities were randomly selected by balloting from the thirteen communities in the LGA which formed the sampling frame. In the second Stage Sampling, one village was selected also by balloting from a list of villages in each community selected. The third- stage sampling involved the selection of households. The size of each village selected determined the number of households selected. It was assumed that at least 6 persons made up a household. The required sample size for each village was then divided by 6 to get the number of households.

Every body in the selected households was examined beginning with visual acuity. This was tested under daylight with Snellen's illiterate chart. Each eye was tested separately at 6 meters and where the subject could not see 6/60, the test was repeated at 3 meters. Pictorial chart was used to test the vision of children between the ages of 4 and 6 years old while those less than 4 years had their central fixation tested. Visual acuity was repeated with pinhole if it was less than 6/18 and aphakics were tested with a +10 diopter sphere lens. The lids, conjunctiva, cornea, anterior chamber and pupils were examined with a pen torch this was followed by ophthalmoscopy with a direct ophthalmoscope. Intraocular pressure measurement was done for subject with cupped optic discs (C/D ratio of > 0.5) using Perkins applanation tonometer after applying 1% tetracaine and fluorescein eye drops. The WHO/PBL form was used to record the data of subjects, which was analysed using the statistical package for Social science (SPSS) version 15. Ethical approval was given by the ethics committee of University of Port Harcourt Teaching Hospital and informed consent obtained from all the subjects in the study.

## RESULTS

One thousand five hundred and thirteen persons were examined giving a good coverage of 99.4%. The age group 0-9 years had the highest population of those examined (16.6%) while those 80 years and above (1.8%) constituted the least. Those below 40 years constituted more than half of the Survey population. Males in the survey constituted 49.8% while women constituted 50.2%. A total of 19 (1.26%) persons all above 50 years, 95% CI, were blind in both eyes

26 (1.7%)

Table 1: Age and Sex Distribution

S/N	Age Group (Yrs)	Male (%)	Female (%)	Total Examined (%)
1	-910-19	130(8.6%)	121 (8%)	251 (16.6%)
2	20-29	116(7.7%)	109 (7.2%)	225 (14.9%)
3	30-39	105 (6.9%)	97 (6.4%)	202 (13.4%)
4	40-49	112 (7.5%)	106 (7.0%)	218 (14.4%)
5	50-59	115 (7.6%)	102 (6.7%)	217 (14.3%)
6	60-69	90 (5.9%)	93 (6.2%)	183 (12.1%)
7	70-79	51 (3.4%)	71 (4.7%)	122 (8.1%)
8	0	26 (1.7%)	41(2.7%)	67 (4.4%)
9	80 and above	9 (0.6%)	19 (1.2%)	28 (1.8%)
<b>Total</b>		<b>754 (49.8%)</b>	<b>759 (50.2%)</b>	<b>1,513 (100%)</b>

Table 2: Sex Distribution of Blindness

S/N	Sex	Bilateral Blindness		Unilateral Blindness	
		No.	(%)	No.	(%)
1.	Male	6	(31.5%)	14	(53.8%)
2.	Female	13	(68.5%)	12	(46.2%)
<b>Total</b>		<b>19</b>	<b>(100%)</b>	<b>26</b>	<b>(100%)</b>
<b>X<sup>2</sup> (P)</b>		<b>5.16 (0.023)</b>		<b>0.31 (0.056)</b>	
		<b>df=1</b>		<b>df = 1</b>	

More females (68.5%) were bilaterally blind then males, while more males (53.8%) had uniocular blindness (table 2). The top three causes of both bilateral and unilateral blindness were cataract, Glaucoma and optic atrophy. Other causes of blindness were corneal opacity, phthisis bulbi, absent globe, chorioretinitis, maculopathy (table 3)

Table 3: Causes of Blindness

Causes	Bilateral Blindness	Unilateral Blindness
	No (%)	No (%)
Cataract + Uncorrected aphakia	7 (37%)	11 (42.3%)
Glaucoma	6 (31.5%)	4 (15.4%)
Optic Atrophy	3 (15.7%)	3 (11.5%)
Corneal opacity	2 (10.5%)	3 (11.5%)
Phthisis Bulbi	1 (5.3%)	0 (0%)
Absent globe	0 (0%)	1 (3.9%)
Chorioretinitis	0 (0%)	2 (7.7%)
Maculopathy	0 (0%)	2 (7.7%)
<b>Total</b>	<b>19 (100%)</b>	<b>26 (100%)</b>

persons were blind in one eye only.

## DISCUSSION

Using the WHO criteria of best corrected visual acuity of less than 3/60 in the better eye, the prevalence of blindness in this study is 1.26% with a 95% confidence interval. This is higher than the national average of 1.0%<sup>8</sup>. The prevalence of blindness of 1.26% is the lowest among the three studies done so far in Rivers State; this may be attributed to the closeness of Ikwerre Local Government Area to University of Port Harcourt Teaching Hospital, which provides tertiary eye care services and also to the presence of two general hospitals and a private teaching hospital, which provide some eye care

services in the LGA.

Studies with large sample population had relatively lower prevalence of blindness compared to those with small sample population. In Oturkpo LGA of Benne State with prevalence of 0.78%, 3,080 persons were examined<sup>9</sup>, Esan central LGA of Edo state (0.9%), 1,604 persons were examined<sup>10</sup>. In Ahoada East LGA Rivers State (2.8%), only 860 persons were examined<sup>11</sup>. It seems the more the sample population, the closer the prevalence to the WHO estimates. The prevalence of blindness in this study (1.26%) is closer to the W.H.O estimate of 1% for Nigeria than those of the other two studies done in Rivers State<sup>11,12</sup>. The Sample population in this study is also the largest compared to the other two studies in the state.

A prevalence of blindness of 1.26% is high when compared to the National average and this could be attributed to ignorance, poverty, harmful traditional practices and inhibitions. Cassava being a staple food in the LGA may also be contributory since its cyanide and coumarin contents are suspected to be associated with optic atrophy<sup>13,14</sup> which is the 3<sup>rd</sup> commonest cause of blindness in the survey. This needs to be further explored.

Most of the causes of blindness in this study are due to avoidable causes. This is similar to the findings in other studies<sup>15,16,17</sup> and comparable to the global findings by WHO which attributed 80% of blindness to avoidable causes<sup>18</sup>. Poor political will by governments, limited health care delivery system and inadequate referral health care system are all implicated in the high prevalence of avoidable blindness.

#### Causes of blindness

Cataract was the commonest cause of both bilateral and unilateral blindness in this study accounting for 37% and 42.3% of respectively.

More females had bilateral blindness due to cataract (85%). However, more males had unilateral blindness from cataract (66%). Other studies done in Nigeria<sup>11,19</sup> and Africa<sup>17</sup> also found cataract to be the commonest cause of blindness though with male preponderance<sup>11</sup>.

Those bilaterally blinded by cataract were over 70 years. Poor uptake of cataract surgery is responsible for the high rate of cataract related blindness in Nigeria and other developing countries of the world<sup>20</sup>. Gambia with high uptake of cataract surgery has low prevalence of blindness<sup>16</sup>.

Glaucoma was the second commonest cause of bilateral blindness, accounting for 31.5% with a male to female ratio of 2.1 and all cases were above 50years. It was also the 2<sup>nd</sup> commonest cause of unilateral blindness accounting for 15.4% with males and females equally affected and subjects all above 40 years old. This is consistent with studies by Pedro-Egbe<sup>11</sup> and Ezepue<sup>21</sup>. However, glaucoma is considered the 3<sup>rd</sup> commonest cause of blindness world wide affecting 5.2 million people. Ikwere is not endemic for either onchocerciasis or trachoma, which explains why glaucoma was ranked as the 2<sup>nd</sup> commonest cause of blindness<sup>22</sup>. Age is confirmed as a risk factor for developing glaucoma in this study since all those blinded by glaucoma were over 50 year

old<sup>23,24</sup>. Since glaucoma is the leading cause of irreversible blindness worldwide (and unfortunately sufferers may not present with symptoms until the condition has reached advanced stages), persons above 40 years of age should therefore, have regular eye examinations as this can avoid vision loss if the disease is detected early and treatment commenced promptly<sup>25</sup>. Optic atrophy was the 3<sup>rd</sup> commonest cause of both bilateral (15.7%) and unilateral (11.5%) blindness in this study. Corneal opacity accounted for 10.5% of the causes of blindness in this study. This could have been due to corneal complications resulting from the application of harmful traditional eye medications in females who were over the age of 60years. Three males over 40years had unilateral blindness from corneal opacity as a result of trauma<sup>27</sup>.

Phthisis bulbi was the cause of blindness in a 74 year old woman who had poorly treated infections in both eyes. Other causes of unilateral blindness in this study were due to chorioretinitis in two females aged 18 and 24 years, empty socket from evisceration in a 52 years old man, macular holes in a 78year old woman and macular degeneration in a 69 year old man<sup>28</sup>.

#### CONCLUSION

Most causes of blindness in this study are avoidable; therefore the emphasis on eye care should be focused on prevention through public enlightenment and regular eye screening with the participation of government<sup>26</sup>. The prohibition of harmful traditional practices, discouragement of self medication, the provision of basic eye care delivery and increasing cataract surgery uptake will also help to reduce the prevalence of blindness in our society.

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