

CAUSES OF BLINDNESS AND VISUAL IMPAIRMENT AT THE SCHOOL FOR THE BLIND OWO, NIGERIA

C.O. Omolase FWACS, FMCOPhth, A.S. Aina M.B.B.S, B.O. Omolase M.B.B.S and E.O. Omolade M.B.B.S .

Department of Ophthalmology, Federal Medical Centre, P.M.B 1053, Owo, Ondo State.

Correspondence:

Dr. Omolase C. Oluwole

Department of Ophthalmology,

Federal Medical Centre,

P.M.B 1053,

Owo.

Ondo State.

E mail: omolash2000@yahoo.com.

ABSTRACT

Aim: This study was designed to determine the causes of blindness amongst the pupils of the School for the blind ,Owo and also identify treatable causes of blindness in the study population.

Methodology: This study was conducted between November and December,2007 at the School for the blind, Owo. Ethical clearance was obtained from the Ethical Committee of Federal Medical Centre, Owo prior to carrying out this study. Sixty two pupils of the School for the blind and blind students in Owo High school were enrolled in this study. The subjects were interviewed and examined by the authors with the aid of WHO'S recording form for blindness and visual impairment in children. The data obtained with the study instrument was collated and analyzed with SPSS 12.0.1.

Results: Majority of the subjects: 55 (88.7%) were blind while the remaining 7 (11.3%) had low vision. Lens ranked highest amongst the anatomical sites of visual loss accounting for 24.2%,followed by retina (14.5%),optic nerve (12.9%) and glaucoma (12.9%).The main aetiological factors were intrauterine (37.1%) and hereditary factors (21%). The commonest single diagnosis was cataract (21%) followed by glaucoma (12.9%). Twenty seven respondents (43.6%) had treatable causes of blindness.

Conclusion: The lens ranked highest amongst the anatomical sites of blindness and visual impairment. The main aetiological factors were intrauterine and hereditary factors. The commonest single diagnosis was cataract. Less than half of the respondents had treatable causes of blindness and visual impairment.

Key words: Childhood blindness, visual impairment, cataract, blind school and Nigeria.

INTRODUCTION

Childhood blindness is increasingly becoming a major challenge world wide. It is estimated that a child goes blind some where in the world every minute. This is indeed disturbing in view of the attendant problems and hopelessness associated with blindness especially in children. In view of the importance associated with childhood blindness the theme of year 2007's World Sight Day was Vision in Children.

Childhood blindness describes a number of diseases and conditions that occur in childhood. Most of the more serious disorders can be prevented or avoided. When they do occur and often in spite of attempts at treatment or if left untreated they can result in lifetime blindness.

World wide an estimated 1.5 million children are bilaterally blind, most live in the developing world.^{1,2} The prevalence of childhood blindness varies according to the socioeconomic development of the country and the mortality rate of the children younger than 5 years of age.

Ninety percent of the blind children in the world live in Asia or Africa and 75% of all causes of childhood

blindness in those areas are preventable or treatable.³ For a child who is born blind or who becomes blind the total number of years of disability are greater than for a person who becomes blind later in life. ⁴ The WHO's prevention of blindness programme with the International Centre for Eye Health has developed a standard methodology and reporting form to record the causes of visual loss in children with the emphasis on the identification of preventable or treatable causes of blindness.⁵

This methodology is now being used in developing and middle income countries. ^{5,6,7} The prevalence of blindness in children ranges from an estimated 0.3 per 1,000 children in high income countries with low under 5 mortality to 1.5 per 1,000 in low income countries with high under 5 mortality rates.^{8,9}

Although the actual number of blind children is much smaller than the number of adults who are blind, the number of blind years resulting from blindness in children is also equal to the number of blind years due to age related cataract.¹⁰ The burden of disability in terms of blind years in these children represents a major

social, emotional and economic burden for the children, their families, the communities and the nation.¹¹ An estimated 500,000 children become blind each year, but in developing countries up to 60% are thought to die within a year of becoming blind.⁸ Blind children have a higher death rate than their sighted counterparts.¹² In view of the above control of childhood blindness is considered a high priority within the WHO's Vision 2020 initiative: the right to sight.^{8,13} This study was designed to establish the causes of blindness amongst the pupils of the School for the blind, Owo and also identify treatable causes of blindness in the study population. We hope that relevant policy implication will be drawn from this study to contribute to the control of childhood blindness in this part of the world.

| Anatomical site | Frequency | Percentage |
|-----------------|-----------|------------|
| Whole globe | 12 | 19.4 |
| Cornea | 7 | 11.3 |
| Lens | 15 | 24.2 |
| Uvea | 3 | 4.8 |
| Retina | 9 | 14.5 |
| Optic nerve | 8 | 12.9 |
| Glaucoma | 8 | 12.9 |
| Total | 62 | 100 |

Table 1: Anatomical sites of visual loss

METHODOLOGY

Ethical clearance was obtained from the Ethical Committee of Federal Medical Centre, Owo prior to carrying out this study. The approval of the school authority was sought and obtained before commencement of this study. Informed consent was obtained from each of the respondents who were eighteen years and above. All the sixty two pupils in the school for the blind and those in Owo High school were enrolled. WHO's definition of blindness as best corrected visual acuity of 3/60 or less in the better eye was adopted in this study. A modified type of WHO's recording form for blindness and low vision in children was utilized. All the pupils were interviewed with the aid of the modified form. Information obtained included bio- data of the respondents, when the pupil was enrolled in the school, any previous surgery received for the eye condition. All the pupils were examined by the authors. Visual acuity was assessed with snellen E chart for those with severe visual impairment, that is, visual acuity: 3/60 to 6/60 while for those whose vision was <3/60 we checked for light perception. Anterior and posterior segment examination was carried out. Dilated funduscopy was done when the need arose. Respondents whose ocular condition was amenable to treatment were regarded as having treatable causes of blindness. The ones with causes of blindness that was amenable to primary, secondary and tertiary prevention were regarded as having preventable causes of blindness. Those with

treatable causes of blindness or visual impairment were referred to the eye centre in the community located at Federal Medical Centre, Owo. The chances of the respondents regaining vision following treatment was used to assess the prognosis for restoration of vision. Those with good prognosis were those who had good chance of restoration of vision following treatment while those with poor prognosis were not likely to regain vision following treatment. The data obtained was collated and analyzed with the aid of SPSS statistical software version 12.0.1. This study was carried out in November and December, 2007.

RESULTS

Sixty-two respondents were interviewed comprising of thirty-seven in the primary school, eight in special class and seventeen in Owo High school where all the blind students who finished from School for the blind, Owo attend. The ages of the respondents ranged between 6 and 34 years. Only twenty-eight of the study population were aged between 6 and 15 years, the rest were aged between 16 years and 34 years. There were 39 males (62.9%) and 23 females (37.1%). Fifty-eight (93.5%) were Christians and four (6.5%) were Muslims. Fifty-eight (93.5%) respondents were Yorubas, two (3.2%) were Ibos while the other ethnic groups accounted for the remaining two (3.2%).

| Aetiological factor | Frequency | Percentage |
|---------------------|-----------|------------|
| Hereditary | 13 | 21.0 |
| Intrauterine | 23 | 37.1 |
| Childhood | 10 | 16.1 |
| Unknown | 14 | 22.6 |
| Trauma | 2 | 3.2 |
| Total | 62 | 100 |

Table 2: Aetiology of blindness and visual impairment

Fifty-five (88.7%) respondents were blind while seven (11.3%) had low vision. None of them had normal vision. Most respondents: 51(82.3%) had no history of surgery while the remaining 11(17.7%) had history of ocular surgery either in form cataract surgery or trabeculectomy. Anatomical site of loss of vision: As detailed in table 1 the lens ranked highest amongst the sites of loss of vision accounting for 24.2%. The uveal tissue was the least site of loss of vision (4.8%). The aetiological agents for blindness and low vision is as shown in table 2, most respondents: 23(37.1%) had intrauterine agents being responsible for blindness and low vision. However, in 14 respondents (22.6%), the aetiological agent for poor vision was unknown. As shown in table 3, cataract is the leading cause of blindness in this study accounting for 21%, followed by glaucoma and optic atrophy each accounting for 12.9% respectively. Some of the respondents: 27(43.6%) had treatable causes of blindness while 10 (16.1%) had preventable causes of blindness while 25(40.3%) had non-treatable causes of blindness.

| Diagnosis | Frequency | Percentage |
|----------------------|-----------|------------|
| Cataract | 13 | 21 |
| Glaucoma | 8 | 12.9 |
| Toxoplasmosis | 4 | 6.5 |
| Pthisis bulbi | 6 | 9.7 |
| Microphthalmia | 2 | 3.2 |
| Leucoma | 6 | 9.7 |
| Retinitis pigmentosa | 7 | 11.3 |
| Optic atrophy | 8 | 12.9 |
| Squint | 2 | 3.2 |
| Aphakia | 2 | 3.2 |
| Anophthalmus | 1 | 1.6 |
| Maculopathy | 1 | 1.6 |
| Pseudophakia | 1 | 1.6 |
| Refractive error | 1 | 1.6 |
| Total | 62 | 100 |

Table 3: Diagnosis of ocular condition

Prognosis for restoration of vision: Majority of the respondents: 44(71%) had poor prognosis for restoration of vision while the remaining 18(29%) had fair prognosis for restoration of vision. None of them had good prognosis for restoration of vision.

DISCUSSION

The respondents were predominantly Christians, this is in keeping with the predominant religion in Owo community. It is also not surprising that most of the respondents were Yorubas in view of the fact that the host community is a Yoruba community. The fact that some of the respondents are adults could be due to the fact that some of them are in the secondary school. The other factor that is likely to have contributed is that some of them had good vision early in life but later became blind in the course of childhood thereby necessitating their relocation to the school for the blind from other regular schools. Their poor vision could also have contributed to their poor performance in school prior to their enrollment in school for the blind. Most of our respondents never had any form of ocular surgery, this is likely to be related to the fact that a significant proportion had ocular conditions that were not amenable to surgical intervention.

An overwhelming proportion of the respondents were blind, this is in keeping with the findings of Alagaratnam *et al.* in Edinburg¹⁴ in which 81% of the study population had blindness or were severely visually impaired. Kello, *et al.* also established in a blind school study in Ethiopia that 94% of the study population were blind or visually impaired.¹⁰ Our findings is also consistent with that of Hornby, *et al.* in India in which 91.7% of the subjects were classified as been severely visually impaired or blind.¹⁵

The lens ranked highest amongst the anatomical sites of vision loss in our study population. This finding is in tandem with another Nigerian study in which lesions

of the lens was the leading anatomical site of visual loss accounting for 30.7% of the study population.¹¹ It is however at variance with the findings of a study carried out in Ethiopia in which the major anatomical site of visual loss was cornea/pthisis (62.4%).¹⁰ An Indian study established the retina as the leading site of visual loss accounting for 31.1%.¹⁵ The whole globe was identified as the leading site of visual loss in a Chinese study accounting for 25.5% of the study population.⁴ Anatomically the most affected part of the eye in a study carried out in Czech Republic was the retina accounting for 54.2% of the study population.¹⁶ Alagaratnam *et al.* established in Edinburg that the disease or malformation of the CNS or optic nerve was the commonest cause of visual impairment and blindness and was present in 50% of their study population.¹⁴

Intrauterine and hereditary factors ranked high as the aetiological factors in our study population. This finding is not consistent with an Ethiopian study which established childhood factor as the leading aetiological factor accounting for 49.8%.¹⁰

Vitamin A deficiency and measles were the main contributory factors. The effective immunization against measles in Nigeria is likely to have contributed to the reduction of childhood factor as the aetiological factor in our study population. Studies in China⁴ and India¹⁵ however established hereditary factor as being responsible for loss of vision in 30.7% and 34.8% of the study population respectively. The fact that cataract was a leading cause of blindness in our study population is consistent with the findings of another Nigerian study in which cataract accounted for the commonest single diagnosis (23.5%).¹¹ Our findings also correspond to the findings of other Nigerian¹⁷ and African^{18,19} authors. It is likely that some of the respondents in this study were not offered surgery early in life prior to their enrollment in school for the blind. Offering them surgery at this stage may be associated with poor outcome since the outcome of surgery is often poor once abnormal foveal function develops.^{20,21}

This brings to the fore the desirability of prompt diagnosis and treatment of cataract. Community health workers could assist by identifying children with leucocoria in the community and promptly refer them to the ophthalmologists for treatment.

Less than half of our study population had non treatable causes of blindness, this is likely to be related to the fact that some of them may have sought treatment to no avail prior to enrollment at the school for the blind.

This study like other blind school studies even though offered us the opportunity to examine many blind children within a short time is subject to selection bias. The other limitation of this study is that less than half of the respondents were children. A population based

study is likely to be more revealing of the causes of blindness and visual impairment in children.

CONCLUSION

The lens was the leading anatomical site of blindness and impairment of vision. Intrauterine and hereditary factors were the leading aetiological agents for blindness and visual impairment. Cataract was the single commonest diagnosis followed by glaucoma and optic atrophy. Less than half of the study population had treatable causes of blindness.

RECOMMENDATIONS

- 1) The challenge of childhood cataract should be addressed by training community health workers to identify them and promptly refer such cases to the ophthalmologists. There is also an urgent need to train more paediatric ophthalmologists.
- 2) Possible treatment for all children with severe visual impairment or blindness should be explored prior to enrollment in School for the blind.
- 3) Effective preventive strategies should be explored through VISION 2020 to eliminate all the avoidable and preventable causes of blindness in children.
- 4) Population based studies should be conducted to determine the causes of blindness and severe visual impairment in children.

ACKNOWLEDGEMENTS

We appreciate the authority and teachers of the School for the blind Owo for their cooperation. Special thanks to the respondents for graciously accepting to participate in this study. The support of the management of Federal Medical Centre, Owo is hereby acknowledged. We are also grateful to Mr. Olanitori E.B for his contribution to this work. Finally we glorify God for the insight and the strength to carry out this work.

REFERENCES

- 1 **Foster A.**, Gilbert C., and Rahi J. Epidemiology of cataract in childhood: a global perspective. *J Cataract Refract Surg* 1997;**23** (suppl):601-604.
- 2 **Wilson M.E.**, Trivedi R.H. Paediatric cataract in developing world settings In: Wilson M.E., Trivedi R.H., Pandey S.K. eds. Paediatric cataract surgery: Techniques, complications and management. Baltimore, M.D.: Lippincott Williams and Wilkins; 2005: 303-307.
- 3 **Wilson M.E.**, Pandey S.K. and Thakur J. Paediatric cataract blindness in the developing world, surgical techniques and intraocular lenses in the new millennium. *Br J Ophthalmol* 2003;**87**: 14-19.
- 4 **Hornby S.J.**, Xiao Y, Gilbert C.E., Foster A *et al.* Causes of childhood blindness in the Peoples Republic of China: results from 1131 blind schools students in 18 provinces. *Br J Ophthalmol* 1999;**83**:929-932.
- 5 **Gilbert C.**, Foster A., Negrel A.D. *et al.* Childhood blindness: a new form for recording causes of visual loss in children. *Bull World Health organ* 1993;**71**:485-489. [Medline].
- 6 **Rahi J.S.**, Sripathi S., Gilbert C.E. and Foster A. Childhood blindness in India : causes in 1318 blind school in nine states. *Eye* 1995;**9**:545-550 [Medline].
- 7 **Eckstein M.B.**, Foster A. and Gilbert C.E. Causes of childhood blindness in Sri Lanka: results from children attending six schools for the blind. *Br J Ophthalmol* 1995;**79**:633-636. [Medline].
- 8 World health Organization. *Preventing blindness in children.* Report of a WHO/IAPB Scientific meeting. WHO/PBL/00.77 Geneva: WHO, 2000.
- 9 **Gilbert C.E.**, Anderton L., Dandona L *et al.* Prevalence of blindness and visual impairment in children- a review of available data. *Ophthalmic Epidemiol* 1999;**6**:73-81. [Medline].
- 10 **Kello A.B.** and Gilbert C. Causes of severe visual impairment and blindness in schools for the blind in Ethiopia. *Br J Ophthalmol* 2003;**87**: 526-530.
- 11 **Ezegwu I.R.**, Umeh R.E. and Ezepeue U.F. Causes of childhood blindness: results from school for the blind in South Eastern Nigeria. *Br J Ophthalmol* 2003;**87**(1); 20-23.
- 12 Gilbert C. and Awan H. Blindness in children. *BMJ* 2003;**327**(7418): 760.
- 13 World Health Organization. Global initiative for the elimination of avoidable blindness. WHO/PBL/97.61. Geneva:WHO,1997.
- 14 **Alagaratnam J.**, Sharma T.K., Lim C.S. and Fleck B.W.A survey of visual impairment in children attending the Royal Blind School, Edinburg using the WHO childhood visual impairment data base. *Eye* 2002;**16**(5): 557-561.
- 15 **Hornby S.J.**, Adolph S., Gothwal V.K., Gilbert C.E., Dandona L. and Foster A. Evaluation of children in six blind schools of Andhra Pradesh. *Indian J Ophthalmol* 2000;**48**:195-200.
- 16 **Kocur I.**, Kuchynka P., Rodny S., Barakova D. and Schwartz EC. Causes of severe visual impairment and blindness in children attending schools for the visually handicapped in Czech Republic. *Br J Ophthalmol* 2001;**85**:1149-1152.
- 17 **Umeh R.E.**, Chukwu A., Okoye O. *et al.* Treatable causes of blindness in school for the blind in Nigeria. *J Comm Eye Health* 1997;**10**:14-15.
- 18 **Gilbert C.E.**, Wood M., Waddel K., *et al.* Causes of childhood blindness in East Africa: results in 491 pupils attending 17 schools for the blind in Malawi, Kenya and Uganda. *Ophthalmic Epidemiol* 1995;**2**:77-84. [Pubmed].
- 19 **Waddel K.M.** Childhood blindness and low vision in Uganda. *Eye* 1998;**12**:184-92.[Pubmed].
- 20 **Lloyd I.C.**, Goss-Sampson M., Jeffrey B.G., *et al.* Neonatal cataract: aetiology, pathogenesis and management. *Eye* 1992;**6**:184-96. [Pubmed].
- 21 **Robb R.M.**, Peterson R.A. Outcome of treatment for bilateral congenital cataracts. *Ophthalmic Surg* 1992;**23**:630-56. [Pubmed].