ORIGINAL ARTICLE

Visual Loss in a School for the Blind in Nigeria

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Abstract

Background: *There are an estimated 1.4 million blind children worldwide, it has been observed that almost 90% of the so-called blind population (children inclusive) do not have total loss of visual function, but retain a degree of usable residual vision. The study aims to determined the sites and causes of visual loss in the students of a school for the blind in Nigeria, and also the proportion of those students who could benefit from low vision devices.*

Methods: *Forty-five students of the school were examined using the standard World Health Organization/Prevention of blindness examination record for childhood blindness. Refraction and assessment for low vision devices were conducted, where necessary.*

Results: *Glaucoma/buphthalmos (22.2%) and corneal lesions (20%) were the major causes of vision loss. Six students (13.3%) benefited from spectacles and / or low vision devices.*

Conclusion: *Glaucoma/buphthalmos is assuming great significance in this study population, though most of the causes of vision loss are avoidable (77.7%). There is need for low vision service in the schools for the blind in South East Nigeria.*

Keywords: Blindness, low vision, glaucoma, buphthalmos, school.

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Introduction

The prevalence of blindness among children in different regions varies from 0.1/1000 children to over 1.5/1000 children with a global figure estimated at 0.7/1000. This means that there are an estimated 1.4 million blind children worldwide[1], with approximately 85% living in Asia and Africa[2]. Globally, childhood blindness contributes to around 75million blind years[3] (Second only to cataract) translating into a huge economic burden on families and societies, not to mention the immeasurable loss in terms of quality of life to those affected.

However, it has been observed that almost 90% of the so-called blind population (children inclusive) do not have total loss of visual function, but retain a degree of usable residual vision[4]. In fact, studies carried out in East Africa[5] and West Africa[6] indicate that a significant proportion (1/3 - ½) of the visually impaired children enrolled in special schools for the blind and integrated programmes are actually low vision children, whose education, employment prospects, independence and quality of life could all be improved by enhancing and maximizing their vision by means of spectacles and/or low vision devices.

In industrialized countries, certain provisions and mechanisms for normal schooling and socio-economic rehabilitation of these children exist. However, in developing countries such as Nigeria, due to scarce resources, ignorance and traditional factors, these children are hardly able to attain their full potential. Statistics available reveal that not even 10% of blind children in most developing countries are receiving any kind of education, whether special or integrated[7]. Even when they get into these schools, evidence suggests that they hardly have the benefits of appropriate ophthalmic screening prior to enrolment[8].

With the new impetus given by Vision 2020 to the concept of comprehensive eye care through making childhood blindness and low vision priority areas for intervention[3], and the revised "working definition" of low vision of WHO/PBL consultation group[9], it has become pertinent to identify those children who may actually benefit from low vision services. This is better appreciated, as most of the previous studies of severe visual impairment/blindness in Nigerian children did not investigate the proportion of children with low vision using the revised 'working definition', nor conduct assessment for low vision devices.

This study aimed to:- (1) determine the anatomical sites and underlying causes of blindness and low vision in the students of a special education centre for the blind in South Eastern Nigeria and (2) determine the proportion of these students who could benefit from low vision devices.

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Subjects and Methods

This cross-sectional descriptive survey was conducted in June 2005 at the special education centre for the blind, Oji River in Enugu State, Nigeria. Ethical clearance was obtained from the health research ethics committee of the University of Nigeria Teaching Hospital, Enugu, Nigeria. Informed consent was also obtained from all the students prior to interview/examination.

A total of 45 students out of the 52 enrolled students at the special education centre, Oji river were examined. The remaining 7 students did not grant their consent. Only those students aged less than 16years or who were above 16 years but became blind before that age were selected for the study.

The WHO/PBL eye examination record for children with blindness and low vision was used to collect the data, according to the accompanying coding instructions. Distance visual acuity (unaided and with pinhole) was assessed in each eye using the snellens' 'E' tumbling visual acuity test chart. The visual acuity was recorded using WHO categories of vision, both before and after refraction. If the VA was less than 1/60, each eye was tested for ability to count fingers, see hand movements or perceive light. The near visual acuity was assessed using the Lighthouse near visual acuity test (LogMAR discontinuous test). 4.0M (5mm size) optotypes were used to test near visual acuity. They were instructed to copy out the shape of any identified test type. Ability to navigate around two chairs placed 1 metre apart in a well-illuminated classroom was used as the only test of functional vision.

All the pupils were initially seen by two ophthalmologists before seeing the principal investigator for review and for low vision assessment, if necessary. Anterior segment examination was done using torchlight and a simple magnifying loupe (x 2.5). The posterior segments were examined using direct ophthalmoscopes, after dilatation with tropicamide and/or phenylephrine eye drops. All the subjects apart from those absolutely blind underwent refraction with an Optometrist. Dilatation of pupils in these subjects took place only after refraction and low vision assessment. A range of low vision devices (handheld and stand magnifiers, telescopes, spectacle magnifiers) was used for the low vision assessment. Lensel optics, India and Low vision resources centre, Hong Kong brands were used. Data were later entered into a database in Epiinfo Version 6, after cleaning, editing and validation had been done.

Study Definitions

Blindness Best corrected distance visual acuity less than 3/60 in the better eye[10].

Low Vision Person A person who has impairment of visual functioning even after treatment and/or standard refractive correction, and has a visual acuity less than 6/18 to light perception, or a visual field less than 10 degrees from the point of fixation, but who uses, or is potentially able to use vision for the planning and/or execution of a task[9].

Low Vision Devices Appliances (optical or non-optical), which help low vision persons to maximize their visual potential.

Low Vision Care Assistance provided to low vision persons through the use of low vision devices, training in effective use of residual vision, advice on environment and orientation/mobility skills in order to enhance and promote their social, vocational and educational rehabilitation.

Results

A total of 45 students were interviewed and examined. Sex distribution was almost equal; 23 females and 22 males. Age range was 12 33years, with a mean of 19.4 years. Thirty-three of the students (73.3%) were noted to have become blind between the 1st and 16th years of life, while 12 (26.7%) were born blind. Family history of similar conditions was noted among only 6 students (13.3%), with the siblings being implicated in all the 6 cases and parents being implicated in only 2 of the subjects. Two of the subjects had additional disabilities; autism and mental retardation respectively. Using the WHO working definition of low vision, 22 students required low vision care and 23 were absolutely blind. Thirteen (28.9%) of these low vision persons had functional residual vision, and eight (17.8%) had light perception without navigational vision.

The distribution of the visual acuities in the 45 students is shown in Table 1 (Insert Table 1). No student had normal vision. One student moved to category 2 from category 3 after refraction. Prior to enrolment in the school, 15 students (33.3%) had consulted an ophthalmologist before commencing special education. Twenty-one eyes of 13 students had undergone previous eye surgeries; including enucleation (1 person) and couching (3 persons). Other known surgeries undergone were cataract extraction and glaucoma surgery.

Anatomical sites and causes of vision loss:
Visual loss in seven students (15.6%) was mainly due to whole globe lesions:- phthisis bulbi, 3(6.7%), microphthalmos, 3 (6.7%) and enucleation 1 (2.2%). Glaucoma/Buphthalmos accounted for 10 cases (22.2%). Corneal diseases i.e. staphyloma, cornel scars caused vision loss in 9 students (20%), while lesions of the lens accounted for 6 cases of vision loss (13.3%). Retinal and optic nerve lesions accounted for 7 (15.6%) and 4 (8.9%) of these vision loss cases respectively. Among the retinal lesions, 6 were due to retinitis pigmentosa and I due to retinal detachment. Only I case each was attributed respectively to uveal lesion and cortical blindness.

Table 2 shows the distribution of the anatomical sites of vision loss. (insert Table 2) No perinatal /neonatal factor was noted to be a cause of visual loss in these students. However, 16 cases (35.6%) of visual loss were caused by postnatal/childhood factors and 16 (35.6%) cases were of indeterminate aetiology. The childhood factors comprised measles 9 (20%), harmful traditional eye medicines 2(4.4%), trauma 1 (2.2%), Uveitis 1(2.2%), Cortical blindness 1 (2.2%), enucleation 1 (2.2%) and postcouching retinal detachment 1 (2.2%). Ten of the sixteen undetermined aetiological factors were due to glaucoma/buphthalmos, which was noted to be the commonest single cause of visual loss. The aetiology of the vision loss in the 45 subjects, according to the time of the insult resulting in the visual loss, is shown in Table3. (Insert Table 3) Almost 78% (35) had potentially avoidable causes of vision loss, with corneal scar due to measles (9), glaucoma/buphthalmos (10) and cataract/aphakia (6) being the leading causes.

Improvement with spectacles and low vision devices:
Two of the students had improvement in distance vision with spectacle corrections. One improved to 6/60 from 4/60 and the other improved from 6/60 to 6/36. The two students who had improvement in distance visual acuity with spectacles further improved to 6/36 and 6/12 with 4x and 3x Galilean telescopes respectively. Six students, including the two with improved distance VA (13.3%) demonstrated ability to read prints better with low vision devices. Out of these 6 students, 3 could identify 4.0M (5mm) print with 32D (8x) stand magnifier; 2 could identify 4.oM (5mm) print with 24D stand magnifier (6x), and one could identify 1.25M print (textbooks print) with a 2x bar magnifier (Insert table 4). The aetiological factors causing visual loss in these six patients were retinitis pigmentosa (2), corneal scar (1), Buphthalmos (1) and Aphakia (2).

Types of Education Recommended
A change in schooling to integrated education was recommended for 2 persons; those who had improvement in both distance and near visual acuity with spectacles and low vision devices.

Table 1: who categories of vision among 45 students before and after refraction

S/N	WHO Category	Visual Acuity	No. of Students Pre - refraction	No. of Students Post - refraction
1.	No Impairment	6/6 6/18	0(0%)	0(0%)
2.	Visual Impairment	<6/18 6/60	1(2.2%)	2 (4.4%)
3.	Severe Visual Impairment	<6/60 3/60	1 (2.2%)	0(0%)
	Blind	<3/60 light perception	20(44.4%)	20(44.4%)
4. K				
5.	Blind (absolute)	No light perception	23 (51.1%)	23 (51.1%)
	TOTAL		**45(100%)**	**45 (100%)**

Table II: major anatomical site leading to vision loss in these 45 students

S/N	ANATOMICAL SITE	NUMBER	%
1.	Whole globe	7	15.6
2.	Glaucoma/Buphthalmos	10	22.2
3.	Cornea	9	20
4.	Lens	6	13.3
5.	Uvea	1	2.2
6.	Retina	7	15.6
7.	Optic Nerve	4	8.9
8.	Others i.e Cortical blindness	1	2.2
	TOTAL	**45**	**100%**

Table III: aetiology of vision loss in these 45 students

S/N	AETIOLOGY CATEGORY	NUMBER	%
1.	Hereditary disease	6	13.3
2.	Intrauterine factor	7	15.6
3.	Perinatal factor	0	0
4.	Childhood factor	16	35.6
5.	Unknown (indeterminate)	16	35.6
	TOTAL	**45**	**100%**

Table IV: Frequency Of Students Who Demonstrated Ability To Read Prints Better With Low Vision Devices

NUMBER OF STUDENTS	PRINT SIZE READ	TYPE OF LOW VISION DEVICE USED
3 (6.7%)	4.0M (5 millimeters)	32 dioptres magnifier
2(4.4%)	4.0M (5 millimeters)	24dioptres magnifier
1(2.2%)	25M (&1.50 millimeters)	18 dioptres magnifier

Discussion

This survey showed almost equal sex distribution, almost similar to a study done in Umuahia, Nigeria.[8] The fact that there were more females in our study, unlike the Umuahia study may be a pointer to the educational trends prevailing in South Eastern Nigeria, in which more males are dropping out of educational institutions, in preference for other ventures.

It was also noted that the mean age of the students (19.4years) is rather too high for an institution that offers primary level of education. This may have to do with delayed enrolment of these children due to various societal and traditional factors such as financial constraints, social stigma associated with blindness and lack of awareness on benefits of special education. Another study[11] noted that another handicap might be the residential/boarding system, which these schools operate; a situation, parents of young blind children may not be comfortable with. They therefore lent their

support to the concept of integrated education, as being practiced in some industrialized countries.

In fact this concept may have to be adopted in our environment as studies have shown that blind children can easily assimilate more than 80% of teaching and experience in the regular classroom if they are provided with the correct material in the correct form at the correct time.[7] Integrated education is now recognized as the economically viable, psychologically superior, and socially acceptable model to bring all those low vision and blind children (reached and unreached) into the mainstream of education. We share a similar view with Mani[7] that special schools should change their role by serving mainly blind children who cannot benefit by integration, particularly those of them with multiple disabilities.

In the same vein, it is necessary to have children examined by an ophthalmologist before enrolment into special education. This will help identify those who can be helped with spectacles, low vision devices and surgery. Unlike in industrialized countries, where highly specialized manpower and adequate facilities allow identification and treatment of babies and children with eye problems, Nigeria still grapples with problems of inadequate and inequitable distribution of manpower and facilities, and an extremely large rural population. This study like others has demonstrated that the major causes of vision loss in children and young adults are avoidable and are amendable to primary, secondary or tertiary prevention of blindness measures.[8, 11,12]

Based on anatomical classification, glaucoma /buphthalmos, corneal lesions, whole globe lesions and retinal lesions were the leading causes of vision loss in these children. However, if glaucoma/ buphthalmos are considered as whole globe lesions, then invariably the whole globe becomes the commonest single site of abnormality leading to visions loss (37.8%). The trend is at a variance with the findings by other authors[8,11,13] that cataract was the single commonest cause. This fresh observation may be a pointer to the concerted efforts made towards cataract blindness in recent years, at the expense of glaucoma blindness, coupled with the advances in modern cataract microsurgical techniques and increased early identification/diagnosis of cataracts in people, including children.

With the prominence of glaucoma/buphthalmos noted in this study, there is now an emerging need to evolve improved methods for screening and early diagnosis and treatment of glaucoma in the developing world, even among children. The problems associated with screening for glaucoma at the population level[14], though numerous will have to be addressed urgently if the trend observed in this study is to be curtailed. The fact that glaucoma as a condition, may be genetically determined also brings up the need now for intensified genetic counseling services and genetic studies in developing countries.

The call by other authors[11] for development of pediatric ophthalmology is also supported by our study, which noted the presence of a large proportion of these blind children with visual loss of indeterminate etiology, a pointer to the paucity of diagnostic facilities available to eye care workers and researchers in Nigeria. The high proportion of retinitis pigmentosa noted also makes it more imperative for genetic counseling services and health education be provided in South Eastern Nigeria.

No perinatal aetiology of visual loss was recorded in our study. Probably, as we develop paediatric ophthalmology services in our county, along with improving neonatal care, more surviving low birth weight/premature babies may present later with retinopathy of prematurity, which is already being diagnosed and treated with little difficulty in developed centers. In fact, a blind school study undertaken in South Africa showed that 10.6% of the children were blind from retinopathy of prematurity.[15]

Corneal lesions such as scarring and staphyloma remain a major cause of visual loss in Nigerian children, as was noted also in other studies[8,11]. Though it is usually difficult in studies such as this to determine the actual cause of corneal scaring, it is know that it is usually associated with measles, Vitamin A deficiency, trauma, use of harmful traditional eye medicines, ophthalmia neonatorum and other infectious causes. Measles is believed to have played a significant contributory role to majority of the corneal blindness noted in this study, as a history of the infection was obtained in nine of the children. As was noted in this study, 3 students had microphthalmos, which may have been part of he congenital rubella syndrome. Such congenital anomalies may be due to genetic disease or intrauterine factors though aetiology is unknown in the majority.[16]

This study has also shown the need for provision of low vision service in the schools for the blind, as well as the general population. There is now an emerging awareness of the needs of children with low Vision, especially now that the clamour for integrated education is becoming intensive. As noted in other studies, [5,17] a significant proportion of students in schools for the blind could be helped to read prints with spectacles and/or

low vision programmes as studies show that 10-15% of the children can have improved vision with spectacles alone.[12]

The results of improved vision for these children are of course better educational opportunities with improved integration and quality of life. The establishment of a comprehensive low vision service programme, along with the development of integrated education and pediatric ophthalmological services in Nigeria will definitely alleviate the suffering of the teeming population of children with blindness and low vision disorders.

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