Original Article

CAUSES OF LOW VISION AND BLINDNESS IN A SCHOOL FOR THE BLIND IN ABUJA

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ABSTRACT

Aim: To investigate the causes of low vision and blindness among the pupils in a school for the blind.

Methods: Full ophthalmic assessment was carried out including visual acuity assessment, anterior and posterior segments examination, and where possible, intraocular pressure. Hence both the anatomical and aetiological causes of low vision/ blindness were determined.

Results: One hundred and eleven pupils were present during the period of the study while 110 consented and participated in the study. The ages ranged from 6-32 years with a mean of 14.5 +/- 5.6 years. Sixty-nine students (62.7%) were aged less than 16 years while 41 (37.3%) were aged 16 years and above. About forty-six percent (46.4%) had PVA of nil light perception (NLP) while 38.2% had PVA of <3/60- LP (category 4). Hence, the prevalence of low vision (PVA <6/18-3/60) in this population was 14.6% while that of blindness (PVA< 3/60) was 84.6%. The commonest anatomic site responsible for visual loss was whole globe (38.2%). This was followed by retina (25.5%), lens (17.3%), cornea (7.3%) and uvea (1.8%). Only 29 (26.4%) had previously undergone any form of eye surgery. The commonest aetiological group in terms of timing of insult causing visual loss was made up of conditions whose aetiology 'cannot be determined' (36.4%). The second commonest group was childhood factors (34.5%). This was followed by hereditary factors (25.5%).

Conclusion: Avoidable childhood factors are the principal causes of blindness in this population. Therefore, there exists an urgent need to tackle these factors to save our future generations from needless blindness.

Keywords: causes, visual impairment, blindness, school for the blind

INTRODUCTION

Visual impairment and blindness have been found to be important public health problems worldwide especially in the developing nations of Africa, Asia and South America.[1] Blindness in an individual takes a drastic toll on him affecting virtually all facets of his life.[2] He becomes dependent on other people for almost all activities of daily living.[2] It interrupts schooling and makes it impossible

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in most cases to discharge one's occupational duties and obligations. Hence, means of livelihood may be lost, making the affected individual an economic burden on his immediate relations, family and anyone around him.[2]

According to World Health Organization (WHO) estimates, about 161 million people had visual impairment of which about 37 million were blind globally as at 2002.[1] More recent estimates in 2010 have put the burden of global blindness and visual impairment at 39 million and 285 million respectively.[3] As high as these figures are, it is estimated that, in the absence of effective interventions, the number of blind people in the world will reach 76 million by the year 2020.[3]

In children, the prevalence of blindness/ visual impairment is also worrisome. An estimated 1.4 million children are blind worldwide, over 90% of whom live in middle-income and low-income countries.[4] Specifically, about one million of these children reside in Asia while about 300,000 live in Africa.[3] The control of blindness in children is therefore considered a high priority within the context of the World Health Organization's (WHO's) Vision 2020 — The Right to Sight programme.[5]

A great deal of information on low vision and blindness epidemiology especially in children has and young adults also been obtained from studies in institutions for the blind. Ezegwui et al[6] reported that cataract was the single commonest cause of severe visual impairment/ blindness accounting for 23.6% of cases in 3 schools for the blind in South-eastern, Nigeria. Others were due to lesions of the cornea (21.4%), whole globe/ phthisis bulbi (21.4%), glaucoma/buphthalmos (9.3%), optic nerve (7.1%) and retina (5%) and blindness was considered avoidable in74.5% of cases. The cornea lesions were mostly attributable to measles and vitamin A deficiency (VAD). In another report from a special education school in Ekiti State, Nigeria by Onakpoya et al[7] cataract was the commonest cause of blindness (26.7%), followed by glaucoma (20%), retinitis pigmentosa (16.7%), and phthisis bulbi (6.7%). Blindness was avoidable in 61% of the cases.[7]

Mosuro et al[8] reported that the commonest aetiologies of blindness among subjects in 4 schools for the blind in Oyo State, Nigeria were childhood factors mainly measles keratopathy/ vitamin A deficiency (29.1%), congenital/ developmental cataract (26.7%), optic atrophy (14%) and congenital/ infantile or juvenile glaucoma (12.8%). However, a report from a school for the blind in Lagos, Nigeria by Akinsola et al (9)showed that aetiologies of low vision were due to hereditary factors(38.5%), 23.1% intra-uterine(23.1%), others (15.4%) and unknown factors(23%). Varying findings have also been reported from elsewhere in the world.[10-16]

Reports have shown that it is not everybody enrolled in the schools for the blind that is actually blind as a number of studies done in schools for the blind have revealed the presence of people with low vision as well as the existence of treatable/ correctable

blindness in these institutions.[8,17] These are people who ought not to be in those schools in the first place had appropriate evaluation/ treatment been carried out. [8,17]

METHODS

The study was a descriptive cross-sectional study carried out among the students of the Federal Capital Territory School for the Blind, Jabi, Abuja, Nigeria from January to May 2016. Ethical approval was obtained from the Health Research Ethics Committee of National Hospital Abuja. A written informed consent was obtained signed by either the participant and/or by his/ her class teacher, parent or guardian (where available). All the students who consented were included totaling 110. A questionnaire was administered by the author (lead researcher), based on the standardized WHO/PBL Eye Examination Record for Children with Blindness and Low Vision.[18] Socio-demographic, medical ocular history by consulting the school's record where available and by speaking to the parents/ guardians on phone.

The presenting visual acuity (PVA) was assessed uniocularly and then binocularly, unaided first then with the subject's present spectacles/ visual aids, if any. In absence of normally worn visual aids, visual acuity was also tested aided with a pin hole. Snellen's visual acuity charts, 'E' charts, LogMAR charts and Lea picture charts were employed as appropriate. Categories of visual impairment were classified and recorded according to the World Health Organization's categories.[19]

Examination of the ocular adnexa and anterior segment was done with a pen torch and a magnifying (binocular) loop (x2.5). Fundus examination of those in whom enough media clarity permitted such was carried out using direct ophthalmoscope. Fundus examination after pupillary dilatation (with commercially available 1% tropicamide and 10% phenylephrine eye drops) was done using a hand-held binocular indirect ophthalmoscope where indicated, that is in those whom posterior segment pathology was thought to contribute significantly to their visual impairment. Intraocular pressure measurement was done with a hand held Perkins® tonometer using commercially available tetracaine hydrochloride 0.5% anesthetic drops and fluorescein strips.

The subjects were classified into the following categories of visual acuities: blind, low vision and normal vision as defined by WHO based on both the presenting and the best corrected visual acuity.[19] Data were recorded on the WHO Eye Examination Record for Children with Blindness and Low Vision.[18] The main anatomical site, as well as the underlying cause of visual loss for the eye was determined and recorded. If the causes were different in the two eyes the more preventable or treatable cause was selected. Hence subjects were classified according to their visual acuity while both the anatomical and aetiological causes of low vision/ blindness were determined. Data were analyzed using SPSS version 21 software

RESULTS

A total of 110 subjects participated in the study. These were made up 70 (63.6%) males and 40 (36.4%) females giving a male to female ratio of 1.75:1. The ages of the respondents ranged from 6 to 31 years with a mean of 14.52 (+/- 5.6) years. A majority of them (46.4%) had PVA of no light perception (NLP) while 38.2% had PVA >3/60- Light Perception (LP).

Table 1: Presenting Visual Acuity in the Better Eye

Visual Acuity	Frequency	Percent
6/18 or better	0	0.0
Less than 6/18 - 6/60	6	5.5
Less than 6/60 -3/60	10	9.1
Less than 3/60 – PL	42	38.2
No light perception	51	46.4
Not Tested (uncooperative)	1	0.9
Total	110	100.0

Therefore, the prevalence of low vision (PVA <6/18- 3/60) in this population was 14.6% while that of blindness (PVA< 3/60) was 84.6%.

The most predominant pathologies were those affecting the whole globe (38.2%), mainly phthisis bulbi. This was followed by conditions involving the retina (Table 2).

DISCUSSION

The ages of the subjects ranged from 6 to 32 with a mean age of 14.5 years and a median of 10 years. Sixty-nine (62.7%) were within the childhood ages <16 years (i.e. 15 years or less). This is different from the report by Ezegwui et al[6] and Mosuro et al[8] who reported that majority of the subjects encountered in their studies were older than 15 years. The fact that most of the subjects in this present study belong to the paediatric age group may not be unconnected with the fact that the school is actually a primary School for the Blind. Analysis of the presenting visual acuity (PVA) in the better eye showed that 51 (46.4%) of the students had PVA of No Light Perception (NLP). Six (5.5%) had PVA of <6/18- 6/60; 10 (9.1%) had <6/60- 3/60 while 42 (38.2%) had <3/60- PL. Thus, a total of 93 (84.5%) were blind according to WHO definition having a PVA of less than 3/60 in the better eye. Therefore, the prevalence of blindness (PVA< 3/60) in this population was 84.5% while that of low vision (PVA <6/18- 3/60) was 14.5%. None of the subjects had PVA of 6/18 or better. These findings are similar to those reported from studies in other schools[18,65] for the blind in Nigeria.

The major anatomical site of abnormality affected the whole globe in 38.2% of the subjects while in another 25.5% it affected the retina. Other anatomical site with high frequency included the lens (17.3%), optic nerve (9.1%) and cornea (7.3%). These findings are similar to those reported from other school for the blind in Nigeria. Mosuro et al[8] reported that the main anatomical site of abnormality was whole globe in 47.7% of their series, while cornea was affected in

Anatomical Diagnosis		**Ages (Years)**				**Total (%)**	**x^2(p-value)**
		≤ 15		**16+**			
		M	***F***	***M***	***F***		
Whole Globe	*Phthisis*	20	7	4	7	38 (17.3)	P= 0.181
	Anophthalmos	2	0	0	0	2 (0.90)	
	Microphthalmos	0	2	0	0	2 (0.90)	
	Buphthalmos	2	5	6	9	22 (10.0)	
	Glaucoma	1	4	8	1	14 (6.4)	
	Removed	4	0	1	0	5 (2.3)	
Cornea	*Scar*	6	2	4	2	14 (6.4)	P= 0.709
	Staphyloma	2	1	1	2	6 (2.7)	
Lens	*Cataract (Complicated)*	10	0	2	2	14(6.4)	
	Cataract (Operable)	4	0	1	0	5 (2.3)	
	Aphakia	4	2	2	2	10 (4.6)	
	Other (IOL)	4	5	0	0	9 (4.1)	
Uvea	*Uveitis*	0	2	2	0	4 (1.8)	
Retina	*Dystrophy*	14	6	9	5	34 (15.5)	P= 0.336
	Retinal Detachment	0	0	2	0	2 (0.9)	
	Macular Hole	0	0	2	0	2 (0.9)	
	Macular Scar	0	2	0	0	2 (0.9)	
	Other Retina Abnormalities	6	4	2	1	13 (5.9)	
Optic Nerve	*Atrophy*	9	5	2	2	18 (8.2)	P= 0.08
	Hypoplasia	0	0	2	0	2 (0.9)	
Refractive Error		2	0	0	0	2 (0.9)	
Total		**90**	**48**	**50**	**32**	**220 (100.0)**	

Table 2: Detailed Analysis of the Main Anatomical Site of Abnormality Leading to Visual Loss

Table 3: Detailed Analysis of Aetiology of Visual Loss in the Eyes (N=220)

Aetiology of Visual loss		**Ages (Years)**				**Total (%)**
		≤ 15		**≥ 16**		
		M	***F***	***M***	***F***	
Hereditary Diseases	*Chromosomal*	0	0	0	0	0 (0.0)
	Mitochondrial	0	0	0	0	0 (0.0)
	Autosomal dominant	0	0	0	0	0 (0.0)
	Autosomal recessive	0	0	0	0	0 (0.0)
	X-linked	0	0	0	0	0 (0.0)
	Cannot specify	22	13	12	5	52 (23.6)
Intrauterine Factor	*Rubella*	2	0	0	0	2 (0.9)
	Toxoplamosis	2	0	0	0	2 (0.9)
	Drugs/alcohol	0	0	0	0	0 (0.0)
	Other intrauterine factors	0	2	0	0	2 (0.9)
Perinatal/Neonatal factor	*Cerebral hypoxia/injury*	0	0	0	0	0 (0.0)
	Retinal Detachment (ROP)	2	0	0	0	2 (0.9)
	Ophthalmia Neonatorum	0	0	0	0	0 (0.0)
	Other perinatal factor	0	0	0	0	0 (0.0)
Postnatal/ Infancy/ Childhood factors	*Vitamin A deficiency*	0	0	0	0	0 (0.0)
	Measles	22	8	9	8	47 (21.4)
	Neoplasm	0	0	0	0	0 (0.0)
	Trauma	2	2	4	1	9 (4.1)
	Harmful traditional practices	10	5	5	2	22 (5.0)
	Other Post natal/infancy factors	0	0	1	1	2 (0.9)
Unknown Aetiology	*Cataract*	22	7	5	4	38 (17.3)
	Glaucoma/Buphthalmos	3	9	14	10	36 (16.8)
	Retinoblastoma, no FH	0	0	0	1	1 (0.5)
	Abnormality since birth	0	2	0	0	2 (0.9)
	Other undetermined conditions	3	0	0	0	3 (3.2)
Total		**90**	**48**	**50**	**32**	**220 (100.00)**

The greatest proportion of eyes had low vision/ blindness attributable to conditions arising from post-natal/ infancy/ childhood factors (36.3%).

lens in 26.7%, and retina/ optic nerve was affected in 18.6%. Whole globe lesions report by Umeh et al[17] affecting 30.7% of the subjects. This was followed by lens (24.2%), cornea (17.7%), optic nerve (9.7%) and retina (6.5%). Similarly, Ezegwui et al[6] reported that conditions affecting the whole globe (including glaucoma/ buphthalmos) were second only to cataract as most common finding in their series affecting 30.7% (versus 31.4% for lens), followed by cornea (21.4%), retina (7.9%) and optic nerve (7.2%). In contrast to these, reports from a school for the blind in Owo, Ondo State, Nigeria by Omolase et al[74] showed lens-related causes to be the most common pathology affecting 24.2%.

Among the 38.2% of the subjects whose eye problems were attributable to lesions of the whole globe, the most common pathology was phthisis bulbi found in 17.3% of eyes. Other pathologies noted were buphthalmos (10.0%), glaucoma (6.4%) and eyeball enucleated (2.3%). In the cohort reported by Umeh et al,[17] phthisis bulbi was found in 22.6% of the subjects just as 24.4% was due to the same cause in the report by Mosuro et al.[8] On the other hand, Kehinde et al,[20] reporting from a school for the blind and a rehabilitation centre both in Kaduna, north-central Nigeria, found that 27% of blindness and severe low vision were due to phthisis/ disorganized globe, this being the most common anatomical diagnosis. All these cases were said to be related to childhood measles infection.[20]

Factors occurring in the post-natal/ infancy/ childhood period were responsible in 36.4% of the eyes. Of these, measles infection was implicated in 21.4%%. Others were harmful traditional practices (10.0%) and trauma (4.1%). From 4 schools of the blind in Oyo State, southwest Nigeria, Mosuro et al[8] had, similarly, reported that the most common period of onset of blindness was between one year of age and puberty as seen in 39.5% of their cohort.

Similarly, Ezegwui et al[6] reported from schools for the blind in southeast Nigeria that childhood factors constituted the major aetiology of blindness occurring in 38.6% of their subjects. These comprised measles (64.8%), trauma (18.5%), and harmful traditional eye medication (16.7%). Kehinde et al[20] also reported that measles was responsible for blindness in 35.1% of a series form a school for the blind in Kaduna, Nigeria. Other reports elsewhere in Africa have also shown that significant blindness result from childhood factors including East Africa,[10] Burundi,[12] Malawi,[14] Ethiopia,[15] and Zimbabwe.[16]

In conclusion, avoidable causes mainly occurring in the childhood period were the major causes of low vision and blindness in this population. Provision of adequate preventive, therapeutic and curative measures will go a long way in reducing these occurrences to the barest minimum.

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