Original Article

OPHTHALMIC NEEDS OF STUDENTS IN A SCHOOL FOR THE BLIND IN ABUJA.

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ABSTRACT

Aim: To investigate for ophthalmic need requiring intervention among the subjects in a school for the blind in Jabi, Abuja.

Methods: Full ophthalmic assessment was carried out including visual acuity assessment, anterior and posterior segments examination, and detailed refraction and low vision assessment where possible. Subjects with ophthalmic conditions requiring further intervention were identified.

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). Eighty-eight subjects (80%) had low vision/ blindness resulting from conditions considered irreversible while 22 subjects (20%) had conditions deemed to require some form of intervention.

Conclusion: On going needs exist among the subjects in this school and these justify periodic assessment among them.

Key words: ophthalmic needs, school, blindness, low vision.

INTRODUCTION

Persons with visual impairment are at great risk of not attaining their maximum educational potentials owing to their visual challenges.[1] This can ultimately result in occupational and economic handicaps. Special education schools have long been employed to meet the educational requirements of visually impaired individuals. Though cases have been made for inclusive education of the visually impaired in regular schools, special schools continued to play an important role.

The schools for the blind are populated by various categories of presumably 'blind' individuals.[2,3] Some are totally blind without any residual vision while others may have varying degrees of low vision which can be

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improved upon by low vision aids yet some others may be blind from treatable causes. Persons with visual impairment have educational needs slightly different from those of the sighted ones. Placing the visually impaired in the appropriate educational environment requires careful and continuous review of the visual status which may change even if slightly with the passage of time. Those that utilize special schools as a way of fulfilling their educational dreams may require various form of assistance to help them maximize the benefits of such institutions. Attention to those needs will allow them to fully utilize the educational opportunities available to them.

A number of studies[4,5] have shown that many presumed but not actually blind individuals have been enrolled into the schools for the blind. In a survey involving 1062 children attending schools for the blind in 4 East African nations of Kenya, Malawi, Uganda, and Tanzania, 11.2% of the subjects were found to have normal vision. These were hence recommended for a change to sighted schools. While 65.2% were blind or severely visually impaired, 3% were due to un-operated cataract[4,5] suggesting that these individuals may not have undergone proper evaluation prior to the enrolment. This latter group of subjects was therefore referred for cataract surgery.

Similarly, reports from schools for the blind in South Africa[6] and Burundi (7)also revealed that 12% and 5.1 % respectively had normal vision. In Burundi, more than 50% of those with lens-related blindness/ visual impairment needed cataract surgery.[7] A report from Ghana has also shown that 43.75% of the students of the school for the blind had residual vision with potential for improvement with aids. Two of these were able to read normal prints at N5 and N8 respectively with spectacle magnifiers while many more benefitted from other forms of visual aids.[8]

In Nigeria, a study among blind and low vision school children in Lagos by Akinsola et al[3] showed that (57.7%) of the subjects had significant improvement in distance and near vision after refraction.[3] Another report from a school for the blind in Afara, Abia State, Nigeria by Umeh et al[9] revealed that 33.9% of the subjects have conditions needing treatment out of whom 19% needed cataract surgery. In another study of the 3 schools for the blind in South-Eastern Nigeria, Ezegwui et al[10] reported that while blindness prevalence was 95.8%, 3.5% were corrected from WHO visual impairment category 4 to 2 while 0.7% were corrected from category 3 to 2 with refraction.[10] In a similar report from a study[2] involving 4 schools of the blind in Oyo State, Nigeria, 26.7% of blindness was found to be due to bilateral cataract, of which 11.6% were operable, hence were referred for cataract surgery.[2]

METHODS

The study was a descriptive interventional 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 based on the standardized WHO/PBL Eye Examination Record for Children with Blindness and Low Vision.[11] Socio-demographic, medical ocular history by consulting the school's record where available and by speaking with 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. Under normal day light supplemented with fluorescent electric light in their classroom, the chart was placed at a distance of 6m and the subject was asked if he/ she could see and read. If a subject was unable to see the largest print (6/60), the charts were successively moved 1m closer to the subject until he/ she was able to see the largest optotype. This was recorded as 6/60, 5/60, 4/60, 3/60, 2/60, or 1/60. Alternatively, fingers were presented successively at different distances and results recorded as above. If a subject was unable to see/ read the largest optotype or count fingers at a distance of 1m, hand movement (HM) was tested by waving the hand in front of the eye. This was recorded as HM if identified. If this was not attainable, perception of light (PL) was tested by shinning a pen-torch into the eye. This was recorded as PL if correctly visualized but if not, the visual acuity was recorded as nil perception of light (NPL). Categories of visual impairment were classified and recorded according to the World Health Organization's (WHO) categories.[12]

For all those who had some improvement in vision with pin hole or subjects aids, refraction was done by the principal investigator assisted by the optometrist with the use of Welch Allen retinoscopes, autorefractometer, trial frames and lenses in all those in whom it was possible in order to get the best corrected visual acuity (BCVA). Where necessary, that is when subjects exerted excessive accommodation, cycloplegic refraction was performed with 1% cyclopentolate instilled into the lower conjunctival fornix of each eye at intervals of 10 minutes (a total of 3-4 drops).

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.

All subjects with residual vision of at least 1/60 (logMAR 1.6) were selected and taken in batches to the Low Vision Clinic of the State House Medical Centre, Asokoro, Abuja for detailed low vision assessment using a series of magnifying lenses. This was carried out by the author in conjunction with one of the optometrist who had training and experience in low vision. The parents/ guardians were invited and some of them were part of this aspect of the work that involved moving the subjects out of the school premises. In performing the low vision assessment, logarithm of the minimum angle of resolution (Log MAR) distance and near charts were employed. The distance charts were placed at 4m, 3m, 2m, 1m, 0.5m as was necessary while the near chart were held at 40, 30, 25, 20, 15, 10cm as appropriate.

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.[12]

Low vision: referred to patients with the best corrected vision in the better eye of less than 6/18 and at least 3/60 on the Snellen's Chart, or a visual field less than 10 degrees from the point of fixation, for which treatment is not possible. Blindness: Is best corrected visual acuity worse than 3/60 (including light perception and no light perception) in the better eye. However, for the purposes of carrying out low vision assessment on the students, a functional definition[11] of low vision was used. This defines a person with low vision as one who has impairment of visual functioning even after treatment and/or standard refractive correction, and has a visual acuity of 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. [11]

Normal vision: best corrected visual acuity equal to or better than 6/18 (Snellen's).

Data were recorded on the WHO Eye Examination Record for Children with Blindness and Low Vision.[11]

Subjects who showed some improvement in their vision with refraction or low vision and those who had conditions thought to require further treatments were informed and their parents/ guardians contacted. The necessary spectacles and low vision aids were procured and dispensed. Arrangement was made to offer the necessary ophthalmic interventions identified.

RESULTS

A total of 120 students were officially registered in the school. Nine (9) of them were not around during the period of the study; hence 111 were enumerated of which 110 were examined. One person refused to be examined. This gives response rate of

99.1%. There were 70 (63.6%) males and 40 (36.4%) females giving a male to female ratio of 1.75:1. The ages of the subjects ranged from 6 to 32 years with a mean of 14.52 (+/- 5.6) years and modal age of 11 years.

Analysis of the age of the students at the time of onset of visual problems showed that 60 (54.5%) were within their childhood ages of 1-15 years. This was followed by those that had the onset from birth (33, 30%). Details of this are as shown in Figure 2.

Twenty-nine (29, 26.4%) subjects (52 eyes) had had one form of eye surgery or the other in at least one eye while eighty-one (81, 73.6%) had not. The types of surgery were unknown in 23 eyes, 17 eyes had undergone cataract surgery while 8 (15.4%) had glaucoma surgery. In addition, 2 other children (part of those who have not had eye surgeries) had their both eyes removed by suspected ritualists. This is as shown in Figure 3.

Table 3 shows the presenting visual acuity (PVA) in the better eye, 6 (5.5%) of the subjects had PVA <6/18 to 6/60; 10 (9.1%) had <6/60 to 3/60 while majority of them (49.1%) had PVA of no light perception (NLP). None of the students had PVA of 6/18 or better. 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%.

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

Vision improved with pin hole in 20 (18.2%) of the subjects and these underwent refraction. Of all the subjects in whom refraction was attempted, it was successful in only 7 as some improvement was recorded (Table 2). The rest subsequently underwent low vision assessment.

Thus, one of the subjects was improved from WHO category 2 to 0 (normal vision) and this represents the best outcome obtained. Three others improved by at least 1 category in at least 1 of the eyes with 1 of them improving from blindness (<3/60) to low vision (6/24). Three others remained in the same WHO category despite recording some improvement following refraction (Table 2).

Low vision assessment (LVA) was done for 25 (22.7%) of the students. However, it was in only 11 (10%) that this was successful giving fairly good results (Table 3).

Table 2: Refraction Results of 7 Students that Had Some Improvements

S/No	Entry VA	Refraction Result	BCVA
1	RE: 3/60, N24	RE : -12.00DS/-1.25DC x 015	RE: 6/12, N12
	LE: 5/60, N24	LE : -9.50DS/- 0.75DC x 180	LE: $6/12^{+2}$, N12
2	RE: $6/36^{+1}$, N48	RE : +3.00DS/-0.75DC x 100	RE: 6/24, N18
	LE: 6/36, N48	LE : +3.00DS/-0.50DC x 90	LE: 6/24, N18
3	RE: 3/60, <N48	RE : -4.00DS/-0.75DC x180	RE: 6/36, N24
	LE: 3/60, <N48	LE : -3.75DS/-0.75DC x180	LE: 6/36, N24
4	RE: 2/60, N48	RE : +5.00DS/-2.00DC x90	RE: $6/24^{-1}$, N24
	LE: 2/60, N48	LE : +4.00DS/ -2.00DC x90	LE: 6/24, N24
5	LE: 4/60, <N48	LE : -8.00DS/-1.00DC x80	LE: 3/36, N36
6	BE: 6/60, N48	BE: +4.00DS/-1.00DC x90	BE: 6/24, N18
7	RE: 6/60, <N48	RE : +2.50DS/-3.00DC x90	RE: 6/24, N24
	LE: $6/60^{+1}$, <N48	LE : +2.75DS/ -2.00DC x90	LE: 6/24, N24

Key: RE= Right Eye; LE= Left Eye; BE= Both Eyes; DC= Dioptre Cylinder; DS= Dioptre Sphere; NLP= No Light Perception

Table 3: Result of Low Vision Assessment (LVA)

S/NO	Entry VA log MAR (Snellen's VA) and Near Vision	Low Vision Aids	Outcome VA log MAR (Snellen's VA)
1	RE : 1.1 log MAR (2/36), Near 1.0M	RE: 2.5x Telescope Near: +12D hand held Mag	RE: 0.9 log MAR (2/24); Near: 0.8M
2	RE : 0.9 log MAR (2/24) ; Near 0.8M	RE: 4x Telescope; Near: +12D Hand held Magnifier	RE: 0.8 log MAR (2/18); Near: 0.4M
3	LE: 1.3 log MAR (2/60); Near 0.9M	LE : 4x Spec Mag ; Near : +16D Dome Mag	LE 0.9 log MAR (2/24); Near 0.7M
4	BE: 1.6 log MAR (1/60); Near 1.6M	BE: -6.00DS/-0.50DC x 180 Add +4.00DS	BE: 1.4 log MAR (1/36); Near 1.4M
5	RE : 1.4 log MAR (1/36) ; Near 1.2M	RE: 4x Telescope; Near: +12D LED Hand Mag	RE 1.2 log MAR (1/24); Near 1.0M
6	BE: 1.3 log MAR (2/60); Near: 1.2M	BE: x4 Clip-on Mag; Near: +12D Spec Mag	BE: 0.9 log MAR (2/24); Near 1.0M
7	LE: 0.9 log MAR (2/24); Near: 0.8M	LE: x4 Telescope; Near: +8D Stand Mag	LE: 0.8 log MAR (2/18); Near: 0.7M
8	BE: 1.4 log MAR (1/36); Near: 1.1M	BE: x4 Telescope Near: +12D Microscope	BE 1.1 log MAR (2/36), Near 0.8M
9	RE: 1.1log MAR (2/36); Near: 0.9M	RE: x6 Telescope; Near: +24D Hand-held Mag	RE: 0.8 log MAR (2/18); Near: 0.5M
10	LE: 0.9 log MAR (2/24); Near: 1.1M	LE: x4 Spec Mag; Near: +16D Bar Mag	LE: 0.8 log MAR (4/36); Near 0.9M
11	BE: 1.3 log MAR (2/60); Near: 1.2M	BE: x3 Spec Mag; Near:+12D Dome Mag	BE: 1.0 log MAR (2/36); Near: 0.9M

Key: RE= Right Eye; LE= Left Eye; BE= Both Eyes; VA= Spec = Spectacle; Mag = Magnifier;

Six other subjects (5.4%) had various ophthalmic conditions requiring further intervention. Thus, cataract surgery was recommended for 3 subjects who had cataract considered operable. Likewise, Nd:YAG laser posterior capsulotomy was recommended for 2 persons with posterior capsule opacification following cataract surgery while enucleation was recommended for 1 child with a painful blind eye with staphyloma secondary to buphthalmos.

The recommended spectacles and low vision aids were subsequently procured for them. One of the students who were pseudophakic with posterior capsule opacification and needed Nd: YAG laser posterior capsulotomy subsequently had the procedure performed

for him. This improved his vision from 2/60 to 6/24 but he was found to have eccentric fixation. The 3 subjects with operable cataract were not able to undergo the cataract surgery. The parents of one subject declined surgery. One student did not come back to school and could not be reached after he went home on holidays while the other subject could not be brought to hospital for some reasons. A number of eye drops including antibiotics (chloramphenicol, ciprofloxacin), antiallergics, lubricants and anti-glaucoma were provided as a necessary as part of the intervention.

All the students examined were already enrolled in a school for the blind and it was only 1 (0.9%) student that a change of school to sighted school was recommended. All the others did not qualify for a change of school.

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 finding contrasts with the reports by Ezegwui et al[10] and Mosuro et al[2] who found 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 attributable to 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[9] for the blind in Nigeria.

Prior to refraction and low vision assessment, vision was tested with pin hole. There was some improvement in vision with pin hole in 20 subjects (18.2%). Refraction was successfully done for 7 (6.4%) of the subjects while 11 (10%) others underwent low vision assessment successfully. One subject's vision improved from low vision (WHO category 2) to normal vision (WHO category 0) following refraction. Three others improved by at least one category in at least one eye with one moving from blind to low vision category 1 (from <3/60 to 6/24). However, three others, despite some improvement in vision still remained within the same WHO category.

Of the 11 (10%) subjects who had improvement in vision with low vision aids, two and three of the subjects respectively achieved an improvement in distance vision amounting to a gain of -0.4 log MAR and -0.3 logMAR in at least 1 eye. Three (3) others each gained -0.1 log MAR and -0.2 logMAR respectively. For distance aids, 9 did relatively well with telescopic magnifiers; 4 preferred spectacle magnifiers while 2 needed bifocal spectacles. The magnifications ranged from x2.5 to x6. Regarding the aids for near vision, 6 preferred hand held magnifiers; 2 needed each of dome, bar and spectacle magnifiers while for 1 person each, a stand magnifier and microscope was recommended. The powers of these near vision aids ranged from +8D to +24D with magnification of up to x6. With the assistance of a non-governmental organization, these aids were procured and

dispensed to the subjects soon after the study results were reported to the school management. The subjects found the aids useful. Most of the subjects studied had poor prognosis for vision because they had irreversible and total loss of vision (visual acuity of no light perception from conditions that are no longer amenable to treatment). It is, however, considered that vision is 'likely to improve' in 20.1%.

All the subjects involved in this study were already enrolled in the school for the blind. Recommendation for a change of school to sighted school was made for only 1 student (0.9%) whose vision improved to normal (6/12) with spectacles. In many studies[2,9,13] in other schools for the blind, majority of the subjects also did not qualify for a change of school.

In addition to providing spectacles and low vision aids for 7 and 11 subjects respectively as part of the interventions, Nd:YAG laser posterior capsulotomy was performed in one eye of one of the subjects with posterior capsule opacification post cataract surgery. This improved his vision 2/60 to 6/24 but he was found to have eccentric fixation. Cataract surgery was recommended for the 3 subjects with operable cataract. However, they were not able to undergo the surgery even though free surgeries were offered. The parents of one subject declined surgery saying that since the blindness started from birth, they were not convinced that surgery was necessary. Another did not come back to school and could not be reached after travelling home on holidays while the other subject, after he travelled back home, could not be brought to hospital for some reasons including lack of time on the part of the guardian. In addition, in 1 subject with staphyloma causing painful blind eye, enucleation was recommended/ offered the guardian declined.

Many reports from other schools for the blind have also shown that a few of the subjects need some form of treatment/ aids. Following their study in a school for the blind in southeast Nigeria, Ezegwui et al (10) recommended the following therapeutic interventions for selected subjects: spectacles (4.3%), low vision aids (7.9%), surgical interventions (cataract surgery and optical iridectomy (17.9%).

Similarly, Umeh et al[9] reported that 33.9% of their cohort had conditions needing treatment: 18% needed cataract surgery while the rest needed optical iridectomy. Similarly, following their assessment, Mosuro et al[2] provided a variety of low vision aids for 12.8% of the students of the schools for the blind in Oyo State, Nigeria. A fewer number were also referred for cataract surgery. Other reports indicating varying need for different interventions in students of schools for the blind include Chirambo et al[14] (in Malawi), Schwab et al[15] (in Zimbabwe), Muecke et al[16] (in Myanmar), and Sia et al[17] (in Cambodia). Lack of awareness regarding the possibility and or availability of treatment, on the part of parents, may explain the enrolment of children with treatable conditions into the school.

Following intervention/ correction with spectacles and low vision aids, 81.8% (as against 84.5%) of the subjects were blind having best corrected visual acuity (BVA) of <3/60; 16.4% (as against 14.5%) had low vision (BCVA <6/18- 3/60) while 0.9% had normal vision (BCVA >6/18).

Other authors have also report improvement in vision with refraction and/or low vision assessment in some students of some schools

for the blind. In the report by Ezegwui et al[10] from a school for the blind in south-eastern Nigeria, 4.3% had improvement in their vision following refraction while another 7.9% achieved some improvement using low vision aids, hence these were recommended for them. Akinsola et al (13) also reported from the Pacelli School for the Blind, Lagos, that 57.7% of the students had significant improvement in distance and near vision after refraction while 31% had improvement in their reading with low power magnifying lenses.[13]

In a study covering all 4 schools for the blind in Oyo State by Mosuro et al,[2] 12.8% of the subjects recorded improvement in both distance and near vision with low vision devices. These devices were provided for them. Subsequently, the authors went a step further and followed up the students monthly for 6 months to assess the impact of the low vision devices on their academic performance and daily activities. At the end, the students all found the devices very helpful in studying in school and carrying out tasks at home.

In conclusion, subjects in this school for the blind have significant ophthalmic needs requiring interventions capable of improving their quality of life. This realization makes periodic assessments necessary as these needs may change over time.

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