

Causes of Visual Impairment among Students in Disability-Inclusive Schools in Onitsha Anambra State, Nigeria

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ABSTRACT

Background: Visual impairment could limit learning and development among school students. Identifying of causes of visual impairment would facilitate planning eye care of students in disability-inclusive schools. **Objective:** To determine the causes of visual impairment among students in disability-inclusive schools in Onitsha, Anambra, State Nigeria. **Materials and Methods:** A comparative study of visually-impaired and normally-sighted students. Study participants who were matched for educational level, age, and gender were selected in the ratio of one visually-impaired student to 4 normally-sighted students. The study tools included interviewer-administered questionnaire, visual acuity measurement, refraction, ocular examination. **Results:** There were 3 disability-inclusive schools in Onitsha from which 50 students comprising all the 10 visually-impaired students and 40 normally-sighted counterparts were studied. There were 3 females and 7 male visually-impaired students and 12 females and 28 normally-sighted students; the age range was 10 – 24 years; median – 17 years. All the visually-impaired students were blind and optical aids could not improve their vision. Four (10.0%) normally-sighted students had low vision in their better eyes and another 2 (5.0%) mild visual impairment. Cataract, buphthalmos, retinal diseases and congenital ocular malformation were the causes of visual loss in the visually-impaired students; among the normally-sighted students' vernal conjunctivitis and ametropia were the ocular problems. **Conclusions:** Most causes of ocular morbidity in both visually-impaired and normally-sighted student studied are avoidable. There is need for primary eye care services in the schools. Eye examination as part of pre-admission requirements is recommended. The visually-impaired students should be referred to ophthalmologists.

Key words: Blindness, Visual impairment; Disability-inclusive school, Nigeria.

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INTRODUCTION

Good eyesight is essential for human socio-economic progress.[1] In children, good eyesight is also vital for learning and psycho-motor development.[2] A visually-impaired child is indeed handicapped and would most likely not achieve his or her full potential.[3] Visual loss in children is a tragedy as it results in frustrating, life-long blind-person years and without positive intervention consigns the afflicted to the alley of poor productivity, neglect, poverty and loss of self-worth.[1-3]

Fortunately, governments, non-governmental organizations, parents and philanthropists make efforts to mitigate the negative impact of blindness on school age children by providing educational opportunities for such children. There are different models of educating visually challenged children. These include schools for the handicapped that bring together children with different types of disabilities; the special schools for the blind that assemble and train only visually impaired children; and the disability-inclusive schools that train both the visually impaired and normally sighted students in the same school, the same classrooms and within the same boarding facilities.

In Onitsha Nigeria, there are 3 disability-inclusive schools for secondary school pupils. The schools are Christ the King College (CKC), Dennis Memorial Grammar School (DMGS) and Queen of the Rosary College (QRC). Two schools (CKC and DMGS) are boys-only boarding schools while QRC catered for girls alone. Each of these schools has continuously performed the assignment of educating both the normally sighted and visually impaired students for over 50 years.

However, there are no reports on the causes of visual loss among the visually impaired students in Anambra State. On the other hand, it is not certain that some students presumed to be normally sighted do not indeed have low vision. Information on the visual status of the students in these schools will aid

in planning blindness prevention action as part of school eye health programme.

In an effort to provide the needed information, a survey of disability inclusive schools in Onitsha Anambra State Nigeria was embarked upon. This article is a report on the causes of eye diseases and visual impairment among students in disability-inclusive schools in Onitsha, Nigeria.

MATERIALS AND METHODS

This was a comparative study which was conducted in March 2023. All the 3 disability inclusive schools in Onitsha were involved in the study. The schools included two male-only schools (CKC and DMGS) and one female-only school (QRC). Ethical approval for this study was obtained from the Anambra State Ministry of Health Research Ethics Committee. Permission to conduct the study was obtained from the authorities of the schools. The consent of the parents or guardians of the students was obtained. The affirmation of each student was also obtained. Confidentiality of information obtained from the participants was ensured.

Inclusion criteria were students of the disability inclusive school who had been enrolled for at least six months and were willing to give consent for the study. Students who withheld consent or were too sick to participate were excluded from the study.

In the present study blindness was defined as visual acuity $<3/60$; low vision was taken as acuity $<6/18 - 3/60$ and visual impairment was acuity $<6/18$. Ametropia (refractive error) was defined as ± 0.50 diopter for both spherical and astigmatic errors.

The study was designed to select the participants in the ratio of one visually impaired student to 4 normally sighted students. The minimum sample size was calculated with the aim of achieving 5% probability of Type I error and 80% power as described by Hazra and Gogtay.[3] An envisaged dropout rate of 25% taken into consideration in the calculation. Adjustment for unequal sized groups

was achieved with the formula described by Hazra and Gogtay.[4]

The calculated minimum sample size was 45 students in the ratio of 9 visually impaired students to 36 normally sighted students. The students were matched for age, gender and educational level (class). Multistage sampling technique was used. The first stage involved the use of total enumeration technique to select all the 10 visually impaired students who were enrolled. The second stage involved the selection of four normally-sighted students who were classmates of the visually-impaired students and of the same age and gender. A list of all matching students in the same class with each sighted student was drawn. Using a table of random numbers 4 normally sighted students for one visually impaired student were selected, thus, 10 visually impaired and 40 normally sighted students were studied.

The study tool included an interviewer-administered pre-tested questionnaire used to obtain information on socio-demographic characteristics, ocular history, visual acuity measurement, anterior segment examination, refraction and posterior segment examination using direct ophthalmoscopy as well as diagnosis. Visual acuity was obtained using the Snellen chart, separately for each eye at a distance of 6 metres in ordinary daylight, anterior segment examination was done with a pen torch, the posterior segment was examined with a direct ophthalmoscope and refraction was done using a retinoscope.

The data were entered into IBM SPSS version 23 (SPSS, Inc., IBM Corp., Chicago Illinois, USA), double-checked and analysed. Data obtained were analysed using descriptive such as mean, median, percentages or proportions. Inferential statistics with alpha at 0.05 was used.

RESULTS

The calculated minimum sample size was 45. However, 50 students made up of all the 10 visually impaired students and 40 normally sighted counterparts were studied. There were 3 females and 7 male visually impaired students. The class-

matched normally sighted students comprised 10 female and 30 male students. Four visually impaired students were at CKC, and 3 each were at DMGS and QRC. The age range was 10 -24 years; median – 17 years. Table 1 shows the age distribution of the students. There was no statistical difference in the ages of the visually impaired and normally sighted students ($p>0.05$). Both junior and senior secondary school students participated in the study. Table 2 shows the class distribution of the students.

Table 3 shows distribution of presenting visual acuity in the better eye of the students. All the visually impaired students were blind and optical aids could not improve their vision. Four (10.0%) normally sighted students had low vision in their better eyes and another 2 (5.0%) acuity 6/12 – 6/18, suggesting mild visual impairment. The visual obscuration in the normally sighted students was caused by ametropia and improved with simple spectacles. But none of the 4 students had optical aids.

Table 4 shows the ocular findings in both the visually impaired and normally sighted students. Thirty out of 40 (75%) normally sighted students had ocular disorders, namely, refractive errors and allergic conjunctivitis, with refractive errors predominating. Among the 21 normally sighted students with refractive errors, 12 had myopia, 7 astigmatism and 2 hypermetropia. None of the blind students had ametropia as the primary cause of visual loss. The major causes were congenital cataract and congenital glaucoma.

While 6 visually impaired and 25 normally sighted students were not sure of the cause(s) of the problems. Two visually impaired students said that their eye problems were present at birth thus suggesting congenital aetiology. Of the remaining 2 visually impaired students one said the problem was due to use of native drugs to treat the red eye and the other said that it was due eye injuries. The problem in 5 normally sighted students who had what they described as “serious itching” said that the problem commenced within a year of the present study. These students had allergic conjunctivitis.

Table 1: Age distribution of the participants

Age (Years)	Visually impaired (%)	Normally sighted (%)
≤ 12	0 (0.0)	10 (25.0)
13 – 16	2 (20.0)	27 (67.5)
17 – 20	6 (60.0)	3 (7.5)
20 – 24	2 (20.0)	0 (0.0)
Total	10 (100.0)	40 (100.0)

Optic atrophy	1 (10.0)	0 (0.0)
Microphthalmos	1 (10.0)	0 (0.0)
Anophthalmos	1 (10.0)	0 (0.0)
Refractive error	0 (0.0)	21 (52.5)
Allergic conjunctivitis	0 (0.0)	9 (22.5)
No abnormality	0 (0.0)	10 (25.0)
Total	10 (100.0)	40 (100.0)

Table 2: The Class of study study participants

Class*	Visually impaired (%)	Normally sighted (%)
JSS 1	3 (30.0)	12 (30.0)
JSS 2	0 (0.0)	0 (0.0)
JSS 3	1 (10.0)	4 (10.0)
SSS 1	4 (40.0)	16 (40.0)
SSS 2	0 (0.0)	0 (0.0)
SSS 3	2 (20.0)	8 (20.0)
Total	10 (100.0)	40 (100.0)

*JSS = Junior Secondary School; SSS = Senior Secondary School

Table 3: Presenting visual acuity (better eye)

Acuity (Snellen)	Visually impaired students (%)	Normally sighted students (%)
6/6 – 6/9	0 (0.0)	34 (85.0)
6/12 – 6/18	0 (0.0)	2 (5.0)
6/24 – 6/36	0 (0.0)	4 (10.0)
6/60 – 3/60	0 (0.0)	0 (0.0)
<3/60 – LP*	4 (40.0)	0 (0.0)
NPL**	6 (60.0)	0 (0.0)
Total	10 (100.0)	40 (100.0)

*LP= Light perception; **NPL =No perception of Light

Table 4: Ocular diagnosis

Diagnosis	Visually impaired [n = 10] (%)	Normally sighted [n =40] (%)
Cataract	2 (20.0)	0 (0.0)
Congenital glaucoma	2 (20.0)	0 (0.0)
Corneal opacity	1 (10.0)	0 (0.0)
Retinal detachment	1 (10.0)	0 (0.0)
Retinitis pigmentosa	1 (10.0)	0 (0.0)

DISCUSSION

The results of the present study suggest that most of the visually impaired students did not know the causes of their visual loss. This is hardly surprising. The visual loss occurred at birth or early childhood. Therefore, the sources of information to the students about the cause(s) of their vision impairment would be their parents or the health worker treating them. The definitive diagnosis would be made by the physician, usually the ophthalmologist. Thus, unless informed by the attending physician (ophthalmologist) most parents would at best guess the diagnosis.

Ocular evaluation showed that the causes of visual loss in the students were congenital, hereditary and acquired disorders, affecting the anterior segment or posterior segment or whole globe. Anophthalmos and micro-ophthalmos are congenital disorders associated with genetic defects²; retinitis pigmentosa is a genetic disease with strong hereditary tendency. [5] It is a relatively common retinal disease in Nigeria. [6,7] Optic atrophy results from a lesion in any part of the primary visual pathway. [8] The causes of lesion include trauma, central nervous system infections, demyelinating diseases, intracranial space occupying lesions, and severe malnutrition. Corneal opacity could be the result of treating ocular ailment with topical traditional eye medicines, which practice is rife throughout Nigeria. [9,10] On the other hand, complicated cataract most likely resulted from inadequately managed intraocular inflammation. Retinal detachment co-existing with aphakia suggests that the detachment was secondary to cataract surgical intervention. The

retinal detachment in this instance is considered acquired.

While cataract, congenital glaucoma, and retinal detachment are treatable, vision in retinitis pigmentosa could be enhanced with low vision aids. Therefore, nearly 80% of the ophthalmic disorders in the students is avoidable. Reports from schools for the blind in South East, Nigeria shows that 64.2% of the causes of blindness were avoidable with cataract, hereditary diseases, and glaucoma as main causes. [11] Based on the findings, it is concluded that a significant proportion of visual loss in the students had been due to poorly managed eye disorders. Nwosu[12], had reported that the causes of blindness in young adults in Anambra State, Nigeria were due to neglected or poorly treated congenital or childhood eye disorders.

The findings in the present study are comparable to those from schools for visually handicapped in different parts of Nigeria and elsewhere. A study by Umeh et al [13] at the school for the blind, Afara Umuahia, Abia State, Nigeria, reported that cataract and corneal opacities constituted nearly half of the ocular disorders. Cataract was also reported to be the commonest eye disorder accounting for 26.7% of the cases in a study in Ekiti, South West Nigeria. [14] In Lagos, Nigeria, hereditary diseases were the commonest findings. [15] Measles and harmful traditional eye medications were the common causes reported in studies in Eastern Africa. [16]

On the other hand, the ocular findings in normally sighted peers within the same school were allergic conjunctivitis and refractive errors and some of these students had visual impairment. These findings compare with previous reports on ocular diseases in primary and secondary schools in different parts of Nigeria. Allergic conjunctivitis were the commonest ocular findings in children in Anambra State, Nigeria. [17] Studies in Southwest, Nigeria documented cataract, corneal opacity, glaucoma and retinal detachment as the major causes of visual loss in secondary schools' students. [14,15,18] However, unlike the present study, these studies referred were not conducted among the visual impaired and their

matched peers in inclusive schools. In any case, the findings in all the studies encapsulate the ocular health needs of students in different parts of Nigeria.

Three out of 4 normally sighted students that participated in the present study had ophthalmic disorders that could interfere with their education if not handled timeously. But none had received medical attention for the problems. Given the relatively small sample studied, the findings in the present study may be tip of the iceberg. But at the time of the study, none of the inclusive schools had facilities for primary eye care and there was no arrangement for vision screening of students even outside the schools. It is therefore recommended that eye care be incorporated into school health programme throughout Anambra State, indeed throughout Nigeria. These would, expectedly, enable early detection and prompt treatment of students with ocular disorders.

The inclusive schools should also have special arrangement with eye care specialists for frequent evaluation of visually impaired students. The current practice in which there is no medical assessment of the students before admission into inclusive schools leaves much to be desired. Some causes of visual loss in the visually challenged students may also affect other systems and even endanger life. A common cause of childhood eye disorder is congenital rubella syndrome due to intrauterine rubella infection. Apart from eyes, rubella virus infection also causes heart and ear defects in the fetus. [2] Children with congenital rubella syndrome thus require holistic care by an ophthalmologist, cardiac physician and oto-rhino-laryngologist. Therefore, a pre-admission medical examination will expectedly detect such multi system health problem and dully alert the school authorities of the health needs of such students.

A limitation of this study is the small sample size. However, all visually impaired students were enrolled in the study. The study is strengthened by the 4:1 enrolment of normally sighted and visually impaired students.

In conclusion, most of the causes of ocular morbidity in both visually impaired and normally sighted student studied are avoidable. There is need for primary eye care services in the schools. Eye examination as part of pre-admission requirements for the schools will detect the eye problems which if neglected would adversely affect the academic performance of the students. It is important that the visually impaired students should be examined by the ophthalmologists especially before admission into any inclusive school.

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Data availability: The data used to support the findings of this study are available from the corresponding author upon reasonable request.

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