

OCULAR MORBIDITY IN SECONDARY SCHOOL STUDENTS IN ILE-IFE, OSUN STATE, NIGERIA

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SUMMARY

Aim: The purpose of this study was to determine the causes of ocular morbidity and subnormal vision in secondary school students with the aim of treating and preventing blindness by suggesting possible intervention strategies.

Methods: We conducted eye examination on students from three public high schools in Ile-Ife, Osun State, Nigeria. All the children in the three secondary schools visited were included in the study. They were all interviewed and had a complete eye examination after obtaining informed consent. A visual acuity test, slit lamp examination, fundus evaluation, retinoscopy, and subjective refraction were carried out.

Results: A total of 1,707 students were included in this study and 384 (22.5%) had ocular morbidity. Allergic conjunctivitis was the commonest ocular morbidity detected in 185 (49%) students; 52 (13.5%) students had refractive errors. None of the students with refractive errors had an eye examination in the past; 9 (17.4%) had amblyopia in the more ametropic eye. Glaucoma was diagnosed in 5 (1.3%) students.

Conclusion: Allergic conjunctivitis, undetected refractive errors and glaucoma are common eye disorders among secondary school students. There is a need for school eye screening cum intervention among Nigerian children so as to prevent amblyopia and subsequent blindness.

Key words: adolescent, students, eye disorders, school eye health

INTRODUCTION

There have been many reports on the prevalence of eye diseases and visual impairment in school children in Africa and abroad. Most of these have shown that

uncorrected refractive errors are major causes of ocular morbidity.¹⁻⁶ In addition to refractive errors, muscle imbalance, trachoma, corneal opacity, cataract and glaucoma have been found to be ocular problems in secondary school children.²⁻⁴

Untreated eye and vision problems can interfere with most life experiences. The magnitude of visual disorders among school children in Nigeria is yet to be quantified. Various studies show that ocular morbidity is a public health problem^{5,6} Failure to detect visual impairment early may have a permanent effect on long term visual outcome, educational achievement and self esteem.¹⁻³ A study conducted in Nepal showed that 2.9% of the children had visual morbidity of which 56% was due to refractive error.⁷

In the United States, various professional organizations, including the American Academy of Pediatricians (AAP), recommends preschool vision screening to detect and correct vision problems before school entry. It was recommended that children continue to receive periodic eye and vision examination throughout childhood. Although the need for vision screening in school children in Nigeria has been emphasized,⁸ no group or individual has been able to sponsor a sustainable programme for routine screening of children for eye diseases. Resources for this level of care are rarely available from the government.

The prevention of blindness team of Obafemi Awolowo University Teaching Hospital Complex (OAUTHC), Ile-Ife has embarked on a school eye screening programmes since May 2002 with the aim of providing basic eye screening and promoting eye health among school children in Ile-Ife. The programme is targeted at public schools to enable every child who has no access to eye testing services to have a free examination. This programme also provides training in basic eye screening and eye health to teachers in schools visited.

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This report is the result of our findings during one of our screening programmes. It is hoped that the results of this study will assist in the formulation of a national policy on school eye health programmes.

MATERIALS AND METHODS

A cross-sectional study of 1,707 students from Moremi High School (1,104), Oranmijan Grammar School (367) and St. Phillips Anglican Grammar School (236) was conducted in Ife Central Local Government Area (LGA) of Osun State, Nigerian between May and June 2003. There are eight public secondary schools in Ife Central LGA. Participating public schools were selected by systematic random sampling.

All the children attending these three schools were included in the study. Those students who were unwilling to participate or were absent at the time of the school visit were left out.

The principals of these secondary schools were contacted to inform them of the benefits of the study to gain their consent. Appropriate arrangements were made for screening at a given date and time. An informed consent was obtained from the teachers and students of these schools.

The cooperation of the teachers in the schools was sought. They were trained in vision screening and on how to detect common ocular problems. A short talk on eye health education, using posters and charts, was given to the children at each visit.

The study team consisted of an ophthalmologist, three ophthalmic resident doctors, an optometrist and two ophthalmic nurses. The ophthalmic nurse obtained detailed information from the children with respect to age, gender, class, row in class and presence of any known eye problem. The children were asked whether their parents were aware of their eye problems and if they had consulted any eye care personnel.

The ocular examination performed on the students included: visual acuity unaided, pinhole and with glasses, using the standard Snellens' chart from a distance of 6 meters, extra ocular movements, cover tests. Slit lamp biomicroscope using the hand held slit lamp. Retinoscopy and subjective refraction was done. A cycloplegic refraction using tropicamide was done when needed, followed by subjective refraction after three days.

Fundus evaluation with a direct ophthalmoscope was carried out, and dilated funduscopy was done if the vision was not fully corrected and in cases of traumatic eye injuries.

The diagnostic criteria used in the study were as follows. A diagnosis of myopia was made if the refractive error was more than -0.5 diopter and hypermetropia if the refractive error was more than +1.0 diopter after cycloplegic refraction. The drug used for cycloplegic refraction was tropicamide 1% applied twice, one drop in each eye at 10 minutes interval.

Astigmatism was recorded if the refractive error was more than 0.50 diopter cylinder.

The students with sub-normal vision (VA<6/9) that did not improve with refraction in the absence of external eye, anterior segment, or posterior segment pathology but in the presence of conditions that give rise to amblyopia, i.e., strabismus, astigmatism, or anisometropia were labeled as having amblyopia.

Strabismus was diagnosed using corneal light reflex combined with cover tests. Any student suspected of having strabismus was brought to the eye clinic at OAUTHC for further orthoptic evaluation. Those cases with refractive error were given prescriptions for glasses. Those found to have other treatable problems like glaucoma, cataract and strabismus were referred to OAUTHC, Ile-Ife for treatment.

All data were entered into a computer spread sheet using descriptive analysis on the commercially available software SPSS statistical package version 10. All *p* values quoted are two-sided and considered statistically significant when the values are below 0.05.

RESULTS

A total of 1,707 students were examined in the three secondary schools. Their age range was 8 to 22 years, with mean age of 13.5 years +/- 1.25 (SD). There were 802 males and 905 females with a male to female ratio of about 1 : 1. The age and gender distribution of the study population is as shown in table 1.

Table 1. Age and gender distribution of all the students screened

Age (yrs)	Male	%	Female	%	Total	%
8-10	36	(2.1)	37	(2.2)	73	(4.3)
11-13	279	(16.3)	345	(20.2)	624	(36.6)
14-16	417	(18.6)	377	(22.8)	694	(40.7)
17-19	147	(8.6)	131	(7.67)	278	(16.3)
> 20	23	(1.3)	15	(0.9)	38	(2.2)
Total	802	-47	905	-53	1707	-100

The data in table 2 indicates that 384 (22.5%) students had previously undiagnosed eye disorders. There were more females (53.7%) with ocular disorders than males (46.4%). The difference noted was not statistically significant, (P = 0.112). There was a preponderance of eye disorders in those students aged 14 to 16 years (41.6%).

Table 3 shows the frequency of eye disorders. The most common ocular disorder was allergic conjunctivitis 185 (49.0%). Refractive errors were found in 52 (13.5%) students. Infective conjunctivitis and chalazion were found in 23 (6.0%) students each. Twenty-two (5.7%) students had strabismus. There were more male students (3.4%) than females students (2.3%) with strabismus and

this difference was found to be statistically significantly ($P = 0.0012$). Other eye disorders were amblyopia 12 (3.1%), corneal opacity 6 (1.5%), cataract 5 (1.3%), glaucoma 5 (1.3%), presumed ocular toxoplasmosis and phthisis bulbi 3 (0.7%) each.

Table 2. Age and gender distribution of 384 students with eye disorders

Age (yrs)	Male	%	Female	%	Total	%
8-10	5	(1.3)	6	(1.6)	11	(2.9)
11-13	56	(14.9)	56	(14.9)	112	(29.4)
14-16	70	(18.2)	90	(23.4)	160	(41.6)
17-19	39	(10.1)	49	(12.8)	88	(22.9)
> 20	8	(2.1)	5	(1.3)	13	(3.4)
Total	178	-46.3	206	-53.7	384	-100

Table 3. Type and frequency of eye disorders in 384 students

Eye Disorders	Male	%	Female	%	Total	%
Allergic conjunctivitis	87	-22.7	101	-26.3	185	-49
Refractive error	27	-7	25	-6.5	52	-13.5
Infective conjunctivitis	12	-3.1	11	-2.9	23	-6
Chalazion	12	-3.1	11	-2.6	23	-6
Squint	13	-3.4	9	-2.3	22	-5.7
Amblyopia	7	-1.8	5	-1.3	12	-3.1
Corneal opacity	4	-1	2	-0.5	6	-1.5
Cataract	2	-0.5	3	-0.8	5	-1.3
Glaucoma	3	-0.8	2	-0.5	5	-1.3
Corneal ulcer	1	-0.3	3	-0.7	4	-1
Presumed ocular toxoplasmosis	2	-0.5	1	-0.2	3	-0.7
Phthisis bulbi	2	-0.5	1	-0.3	3	-0.7
Total	178	-46.3	206	-53.7	384	-100

Table 4 shows the pattern of ametropia among the 52 (13.5%) affected students. Myopia 27 (51.9%) was the most common spherical refractive error detected while myopic astigmatism 9 (17.3%) was the most common type of astigmatic error. Mixed astigmatism was the least common error 2 (3.9%) observed.

Of the 69 (18.2%) who had uncorrected visual acuity of 6/9 or worse, in the better eye, 52 (75.4%) had refractive errors, that is at least + 1.00D or - 0.50D sphere, or + or - 0.50 cylinders or both. None of the students had refractive errors higher than +/- 6.00Ds. However, 9 (17.3%) of those with refractive error had already developed amblyopia by the time we conducted this study.

Table 4. Types of ametropia in the least ametropic eye in 52 students

Ref. Error type	Male	%	Female	%	Total	%
Myopia	13	-25	14	-26.9	27	-51.9
Hypermetropia	5	-9.6	4	-7.7	9	-17.3
Myopic Astigmatism	4	-7.7	5	-9.6	9	17.3
Hypermetropic Astigmatism	3	-5.8	2	-3.9	5	-9.6
Mixed Astigmatism	2	-3.9	0		2	-3.9
Total	27	-51.9	25	-48.5	52	-100

DISCUSSION

The prevalence of ocular morbidity was 22.5%; – 49% and 13.5% had allergic conjunctivitis and refractive error respectively. None of the students with ocular morbidity had visited an eye specialist nor had treatment for their eye disorders in the past.

School screening for uncorrected refractive errors and other eye conditions causing visual impairment has been the subject of many studies for some time.⁵⁻⁹ Its proponents suggest that school vision screening provides an effective way of identifying children who require vision therapy, especially glasses.¹⁰ To benefit from the screening, children with abnormal screening results must receive follow-up eye care.

The prevalence of undetected vision problems among school children in the USA is estimated to be between 5% and 10%. In the Baltimore vision-screening project the estimated prevalence of visual morbidity was found to be 3.9%, 3.1%, and 8.2% for amblyopia, strabismus and refractive errors respectively.¹² A study conducted by Okosa in Enugu, eastern Nigeria found undetected ocular morbidity to be 10% among secondary school children.⁶ The large difference in the prevalence of undetected ocular problems in this study and those of Enugu and Baltimore studies may be due to differences in the setting, sample size and study design.

Allergic conjunctivitis was the most common ocular morbidity (49.0%) in our study. The majority of the affected school children were actually having the clinical features of the various forms of allergic conjunctivitis at the time of this study. The clinical presentation varies greatly from mild to severe disease, though none had vision threatening complications. Anti-allergic drugs such as spersallerge and alomide were prescribed to those affected, with subsequent referral to the OAUTHC eye clinic for follow-up. Allergic conjunctivitis has not been documented as a major cause of morbidity in any of the previous similar studies.

Refractive error was the second commonest cause of ocular morbidity in our study. Myopia was the most prevalent refractive error (51.9%) followed by

hypermetropia and myopic astigmatism, both representing 17.3% of all cases of refractive errors seen.

The prevalence of significant refractive errors and other eye diseases among secondary school students aged 11-27 years in Tanzania has also been studied.¹³ Myopia was the leading refractive error (5.6%). Amblyopia (0.4%), strabismus (0.2%) and other treatable eye disorders were uncommon.¹³ In a study conducted on a sample of 191 eyes in children aged 5-15 years in the Durban area of South Africa, 63.6% had refractive errors, 7.3% had amblyopia, 9.9% had retinal disorders, and 3.7% had corneal opacity.¹⁴

Refractive errors were the most common ocular problem in the various studies conducted by Abiose et al.,⁹ Nkanga and Dolphin,¹⁵ in various parts of Nigeria unlike in this study where it was the second most common ocular problem (13.5%).

The most significant finding of the Ile-Ife study is that 17.3% of the refractive errors in the students could not be fully corrected and had no other ocular pathology and hence had already developed amblyopia. This represents 77.3% of all cases of amblyopia found and is much higher than what was found in studies from eastern Nepal (9%),⁷ Chile (6.5%),¹⁶ and China (5%).¹⁷ Other causes of impaired vision in our study were squint (4.3%), corneal opacities (4.3%), Glaucoma (1.4%) and cataract (1.4%).

We found that 3.9% of the students in our study had visual acuity of 6/9 or worse in either eye, however in the Indian study, 5.1% of the children in school had a visual acuity of <6/12 in the better eye while 12.5% had a visual acuity of 6/9 or worse in either eye.¹⁸ Variation in the study population could account for the difference recorded in the proportion of school children with subnormal vision in the two studies.

There were 5 (1.3%) and 22 (5.7%) children with previously undetected cataracts and strabismus respectively in our study; the strabismus in 17 (77.3%) of the children was due to uncorrected refractive errors. This highlights the need for a vision-screening programme in secondary schools.

The prevalence of amblyopia in our study is higher than the findings of other researchers in Nigeria.^{5,6,9} Most of these cases were due to uncorrected anisometropia. The importance of early therapeutic intervention in order to achieve complete visual rehabilitation in those with amblyopia cannot be overemphasized.

CONCLUSION

The high prevalence of undetected ocular morbidity and uncorrected significant refractive errors leading to permanent visual defects among the students in this study justifies a regular school eye screening/health education programme in secondary schools in Nigeria.

A child with visual impairment has to bear the scourge of visual disability for the years to come. A developing country like Nigeria cannot afford to bear the social and economic burden of caring for the visually impaired and the blind. In view of the above facts, there is need for a national survey to assess the magnitude of such disorders amongst Nigerian children and adolescents, as this will provide data for health planning and promotion.

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