SCREENING OF ADOLESCENTS FOR EYE DISEASES IN NIGERIAN HIGH SCHOOLS

*B.O. ADEGBEHINGBE, M.K. OLADEHINDE, T.O. MAJEMGBASAN,
H.O. ONAKPOYA AND E.O. OSAGIEDE
**Ophthalmology Unit, Department of Surgery, Obafemi Awolowo University Teaching Hospital
Complex, PMB 5538, Ile-Ife, Osun-State, Nigeria.**

SUMMARY
The effectiveness of pre-entrance eye screening programmes for school age children is still controversial. A point prevalence study of high school adolescents was conducted to determine the magnitude of undiagnosed eye diseases and offer appropriate treatment where feasible.

We conducted eye examination on 1,707 secondary students attending three public high schools in Ile-Ife, Osun State, Nigeria in June 2003. Those who had previously undiagnosed ocular problems were treated and those who had been seeing eye specialist for various eye diseases were encouraged to continue to do so.

Out of the 1,707 students screened, previously undiagnosed eye problems especially refractive errors were found in 13.5%. Allergic conjunctivitis was the commonest ocular disorder, detected in 49% of the entire group. Only 12.5% of those with allergic conjunctivitis had visited an eye specialist at one time or the other. Three hundred and eighty-four students (22.5%) had refractive errors. None of those with refractive errors had an eye examination in the past. Glaucoma was diagnosed in five students (1.3%).

We concluded that eye screening programmes can identify previously undetected eye disorders in the school age population. It is suggested that screening programmes for school age children coupled with immediate referral and follow up procedures are worth while.

Keywords: Adolescent, eye disorders, School eye health, screening.

INTRODUCTION
Screening is defined as the presumptive identification of individuals at risk in a population likely to be affected by asymptomatic or subclinical condition who can benefit by being further investigated[1]. It is a public health intervention measure which has to fulfill certain criteria but which may not always be possible in practice.

The feasibility and cost effectiveness of health screening programmes for school age children remains controversial and many of these programmes have recently been discontinued in different countries[2,3,4].

Vision is an important requirement for learning and communication. Optimal vision is essential for learning, health and educational needs. The magnitude of visual disorders among school age children in Nigeria is yet to be quantified. Various studies show that ocular morbidity is a public health problem[5,6].

There are many screening criteria among which are the DANIDA Support Unit (DANPCB) vision screening programme which uses the visual acuity Snellens 6/9 E chart[7]. Anybody with vision worse than 6/9 Snellen acuity in the better eye is adjudged to have failed the screening test and further examination will be carried out on the subject to ascertain the cause of visual impairment. This is contrary to WHO definition of visual impairment as being the best corrected vision of worse than 6/18 in the better eye[8].

DANPCB screening criteria is more suitable for school children because visual acuity of 6/18 or worse is already grossly subnormal for school children. No visual screening exercise has been reported in the past in Osun State.

This study aimed at determining the frequency of undiagnosed eye problems in an adolescent population through a comprehensive eye examination.

* *Author for correspondence*

PATIENTS AND METHODS

This study was conducted in Ife Central Local Government Area (LGA) of Osun State, Nigeria between May and June 2003 amongst students of Moremi High School, Oranmiyan Grammar School and St. Philips Anglican Grammar School, Omiokum, all in Ile-Ife.

They were the top three schools in an inter-school quiz competition organized for all schools in this Local government area.

The principals of these selected secondary schools were contacted and informed consent obtained after a detail explanation of the purpose, content and benefit of the study.

All the children registered in these schools participated in the study in the order their names appeared in the school register from Junior Secondary School 1 to Senior Secondary School 3.

A comprehensive ocular examination was carried out by a team of one ophthalmologist, three resident ophthalmic trainees, one optometrist and two ophthalmic nurses.

The ophthalmic nurse obtained detailed information from the children with regard to the age, sex, 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.

Ocular examination included visual acuity measurement using the standard Snellens' chart at 6 meters. Subjects whose visual acuity was less than 6/9 in any eye were subjected to further ophthalmic review and refraction.

Penlight examination of the anterior segment and fundoscopy sometimes with papillary dilatation using 2.5% phenylepherine if necessary was done by the ophthalmologist. Those whose visual acuity improved with pinhole were refracted. Refraction was done without cyclopegia but fogging was employed using high powered plus lenses.

All data were entered into a computer using the software SPSS statistical package version [10].

RESULTS

A total of 1,707 pupils were screened in the three secondary schools. The age and sex distribution of the study population is as shown in Table 1. There were 802 males and 905 females in the study population with an overall male to female ratio, of 1:1. The age range was 8 years to 22 years. The mean age was 13.5 years (SD = +/-1.25)

Table 1 Age and sex distribution of all the adolescents screened

Age in years	Sex 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(47.0)**	**905(53.0)**	**1,707(100)**

Of the 1,707 students screened, 384 (22.5%) had previously undiagnosed eye disorders (Table 2).

Table 2 Age and sex distribution of school children with eye disorders

Age in years	Sex 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(100.0)**

There were more female students (53.7%) with ocular disorders than males (46.4%). The difference noted was not statistically significant, P value = 0.112. There was a preponderance of eye disorders in those students aged 13 to 15 years (48.7%). Table 3 demonstrates the frequency of eye disorders. The most common ocular disorder was allergic conjunctivitis (49.0%).

Refractive errors were found in 52 students (13.5%). Twenty-three (6.1%) had infective conjunctivitis, while another 23 students (6.1%) had chalazion. Twenty two students (5.9%) had squint, this findings was significantly more often noted in male students (3.4%) than in their female counter part (2.3%) (P value = 0.0012). Other eye disorders were amblyopia (3.3%), cataract (1.3%), corneal opacity (1.6%), presumed ocular toxoplasmosis (0.8%) and phthisis bulbi (0.8).

Table 4 shows the various types of ametropia in the least ametropic eye in 52 students. Myopia

(51.9%) was the most common spherical refractive error detected while myopic astigmatism is most common type of astigmatic errors. Mixed astigmatism is the least common error (3.9%) observed. Of the 69 students (18.2%) who had uncorrected visual acuity of 6/9 or worse, the better eye, only 52(13.6%) had refractive errors, that is at least + or -0.75 sphere, or + or -0.50 cylinders or both.

Table 3 Type and frequency of eye disorders in 384 school children

Eye disorders	Sex Male (%)	Female (%)	Total (%)
Refractive error	27(7.0)	25(6.5)	52(13.5)
Allergic conjunctivitis	87(22.7)	101(26.3)	185(49.0)
Infective conjunctivitis	12(3.1)	11(2.9)	23(6.0)
Cataract	2(0.5)	3(0.8)	5(1.3)
Glaucoma	3(0.8)	2(0.5)	5(1.3)
Amblyopia	7(1.8)	5(1.3)	12(3.1)
Squint	13(3.4)	9(2.3)	22(5.7)
Corneal ulcer	1(0.3)	3(0.7)	4(1.0)
Corneal opacity	4(1.0)	2(0.5)	6(1.5)
Presumed ocular toxoplasmosis	2(0.5)	1(0.2)	3(0.7)
Phthisis bulbi	2(0.5)	1(0.3)	3(0.7)
Chalazion	12(3.1)	11(2.6)	23(5.7)
Total	**178(46.35)**	**206(53.65)**	**384(100.0)**

Table 4 Types of ametropia in the least ametropic eye in 52 patients

Ref. error type	Sex Male (%)	Female (%)	Total (%)
Myopia	13(25.0)	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(0.0)	2(3.9)
Total	**27(51.9)**	**25(48.5)**	**52(100.0)**

DISCUSSION

School screening for uncorrected refractive errors and other eye conditions causing visual impairment has been the subject of many studies during the past few years[5-9]. It's proponents suggest that school vision screening provides an effective way to identify children who require vision therapy, especially glasses[10]. To benefit from the screening, children with abnormal screening results must receive follow-up eye care. This study was conducted in order to detect visual disorders like amblyopia, refractive errors and squint that may predispose them to poor educational performance.

Unlike this study, where 22.5% of the 1,707 adolescent screened had previously undiagnosed eye problems, the prevalence of undetected vision problems among school children in the USA is estimated to be between 5% to 10%[11]. The prevalence of undetected ocular morbidity according to a survey among secondary school children in Enugu, Nigeria was 10%[6]. There was higher prevalence (22.5%) of undetected ocular problems in our study, the difference in sample size and the age range in study population may account for this discrepancy.

The most common ocular disorders among school children in the USA were strabismus, amblyopia and optical problems impairing visual acuity and depth perception[11].

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].

The prevalence of significant refractive errors and other eye diseases among secondary school students aged 11-27yars in Tanzania has also been studied. 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 children aged 5-15 years in Durban area of South Africa, refractive error was the cause in 63.6% of 191 eyes with reduced vision, amblyopia in 7.3%, retinal disorders in 9.9%, corneal opacity in 3.7%[14].

In our study refractive errors were seen in 52 students (78.3%) of the 69 students (138 eyes) who had impaired vision. Other causes of impaired vision among these students were amblyopia (17.4%), squint (4.3%), corneal opacities (4.3%), Glaucoma (1.4%) and cataract (1.4%). Allergic conjunctivitis was the most common ocular morbidity (49.0%) in out study. This is in agreement with the findings of Okosa[6]. Refractive errors were the most common ocular problem in the various studies conducted by Abiose et al[9], Nkaga and Dolphin[15], and Yoloye[16]. This was found to occupy the second place in our study (13.6%).

In any vision-screening programme for children, decisions need to be made as to the level of acuity that denotes 'failure'. In our study, a cut off of <6/9 in either eye was used to decide abnormal vision. Though in a vision screening programme in India where an exactly similar cut off of 6/9 was also used more than 60% of the prescriptions were less than 1.00 Dioptre sphere[17] and the long term continuous use of spectacle by these children could not be determined. A cut off level of 6/12 in the better eye to determine abnormal vision has been suggested[18,19].

We employed the <6/9 cut off level in either eye for abnormal vision in our study because majority (67.8%) of the children with this level of visual acuity had one visual complain or the other despite their low degree of refractive errors. 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.

There are few data available on the prevalence and types of refractive errors in children in developing countries, myopia (5.6%) was the most common refractive error among school children in Tanzania[13] but in the USA the prevalence of refractive errors was estimated to be 5% to 10%,while the prevalence of amblyopia was 1% to 5% in school children[18]. 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[17].

The inability to do full cycloplegic refraction would appear a major limitation of this study. Deliberate effort was made to overcome this limitation by fogging our subjects with high plus lenses while they fixate at a distance for objective refractions.

We found 5(1.3%) and 22(5.7%) children with previously undetected cataracts and squints respectively; fifteen students (67.2%) had squint due to uncorrected refraction error. This highlights the need for a vision-screening programme.

The low prevalence of amblyopia in our study agrees with the findings of other workers in Nigeria[5,6,9]. Most of these cases were due to uncorrected anisometropia. The importance of early therapeutic intervention in other to achieve complete visual rehabilitation in those with amblyopia cannot be overemphasized.

CONCLUSION

The high prevalence of uncorrected significant refractive errors and ocular morbidity due to allergic conjunctivitis, chalazion and squint (strabismus) among the study population justifies a regular school eye screening/health education programme in secondary schools in Nigeria. In addition, there is the need for a national survey to evaluate such disorders amongst young Nigerian adolescents, as this will provide data for health planning and promotion.

ACKNOWLEDGEMENTS

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