

SCREENING OF PRIMARY SCHOOL CHILDREN FOR REFRACTIVE ERROR IN AN URBAN SCHOOL IN LAGOS STATE

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ABSTRACT

BACKGROUND

Refractive errors such as myopia, hyperopia and astigmatism has been implicated as the major causes of treatable but undetected eye defects in school age children. Vision screening is a veritable tool in detecting and preventing these visual impairments in children. This vision screening in primary school children was done in an urban school in Lagos state, Nigeria. This study was conducted to screen primary school children for refractive error and to find out the pattern of visual defects in school age children in an urban city.

METHODS

A cross sectional study on screening for refractive error in school children was carried out in a primary school in Ikeja Local Government Area of Lagos State between November and December, 2012. The study population were school age children from primary 1-6 and the pupils age was 5–11 years. Near acuity was done at 40cm and distance visual acuity for each eye was assessed by an intern Optometrist at 6 meters distance. Those with visual acuity of 6/12 or less were presented with a pinhole and the test repeated. Improvement of visual acuity with pinhole was considered refractive error. Penlight examination was carried out to check for external examination and ophthalmoscopy was done under dim illumination to check the internal status of the eye. The isihara chart was used to assess the color vision.

RESULTS

A total of 580 (340 females and 240 males) Pupils were examined. Of these, 506 pupils (87.24%) had no refractive error but 74 pupils (12.76%) had refractive errors including amblyopia and color vision defects. Myopia was found to be highest refractive 51.35%, followed by hyperopia 29.73%, astigmatism 10.81%, amblyopia 2.70% and color vision 5.41%.

CONCLUSION

A significant refractive errors was observed among primary school children aged 5-11years at a prevalence of 12.76%. Refractive errors can affect a child academic performance in school and

could lead to permanent visual disabilities in adult life if not detected and treated early. Therefore, there is a need to have regular and timely vision screening in primary school children at least at the commencement of school so as to detect those who may suffer from visual impairment. Eye health education and regular vision screening are very crucial in the prevention of visual impairments among school age children.

KEYWORDS: Refractive error, Screening, School children

INTRODUCTION

Vision screening is a practical approach to identifying children needing professional eye services. It is an efficient, economical, cost effective and efficacious manner of detecting and preventing possible vision problems or eye conditions that are likely to lead to visual impairment in school age populations. Vision screening is not diagnostic but it is a practical approach to identifying children needing professional eye services. Visual problems can affect the physical, intellectual, social, academic and emotional development of children even into adulthood. Vision screening must be followed up by appropriate referral, treatment and management of identified problems.

Refractive error can be regarded as a major contributor to visual impairment which is a significant cause of morbidity in children worldwide(5). It is an optical defect intrinsic to the eye which prevents the light from being brought to a single focus on the retina thus reducing normal vision (1). Refractive errors have been found to increase with age and thus require vision screenings to continue throughout the school age years. Most of the children with uncorrected refractive error are asymptomatic and hence screening helps in early detection and timely interventions.

Risk factors for most of the visual impairments include family history/genetics, age, ethnicity, gender, chronic disease and poverty.

MATERIALS AND METHODS

This study was conducted between November and December 2012. The screening was conducted as part of the health programme of the school and consents were obtained from the school and parents of the pupils. An initial eye health education was done in one of the school PTA meeting to sensitize parents and teachers on the importance of school vision screening and eye health.

The distant vision each pupil was tested using Snellen chart. The distance visual acuity was tested at with the chart at 6 meters. The near visual acuity was tested with a near card at 40cm. If uncorrected vision was <6/12 in either eye, the child was declared to have defective vision. A cover-uncover test was then performed to confirm the diagnosis if strabismus was present. The eye movements were tested in 6 cardinal directions to rule out paralytic or restrictive strabismus. Anterior segment was examined with flashlight to rule out any pathology. The visual acuity, type of refractive error and correction was noted in children that were wearing spectacles. Myopia was considered when the measured objective refraction was more than or equal to -0.75 spherical equivalent diopters in one or both eyes. Hyperopia was considered when the measured objective refraction was greater than $+2.00$ spherical equivalent diopters in one or both eyes provided no eye was myopic. Astigmatism was considered to be visually significant ≥ 1.00 D. basic ocular health was assessed by a penlight and an ophthalmoscope to determine the internal eye health and to check for diseases such as cataract and glaucoma. Children with eye defects and or refractive errors were referred to the community optometrist for further evaluation and treatment.

To validate the data, frequencies, percentage and their 95% confidence intervals were calculated. Variables like age group and gender were also considered. A written individual vision screening report for each pupil was sent to all parents and the school was submitted an overall report for all pupils showing details of detected vision problems, remedies and recommendation.

RESULTS

A total number of 580 students were screened. Of these 74 pupils representing 12.76% had refractive error including amblyopia and color vision defects. A total number of 506 pupils had no refractive error. This represented 87.24% of the total population. The prevalence of refractive error was 51.35% for myopia, hyperopia was 29.73%, astigmatism was 10.81%, amblyopia was 2.70% and color vision defects were 5.41%.

GENDER DISTRIBUTION OF PUPILS

CHARACTERISTICS	number	percentage
Male	280	48.28%
Female	300	51.72%
Total	580	100%

AGE GROUP IN YEARS

AGE-GROUP	CHARACTERISTICS
3 - 4	70(12.07%)
5- 6	120 (20.69%)
7- 8	180 (31.04%)
9- 10	200(34.48%)
11 - 12	10 (1.72%)
Total	(100.0%)

TABLE SHOWING THE TOTAL NUMBER OF PUPILS WITH AND WITHOUT REFRACTIVE ERRORS.

CHARACTERISTICS	number	percentage
Refractive error	74	12.76%
No refractive error	506	87.24%
Total	580	100%

DISTRIBUTION OF REFRACTIVE ERRORS IN PUPILS

REFRACTIVE ERROR	number	percentage
MYOPIA	38	51.35%
HYPEROPIA	22	29.73%
ASTIGMATISM	8	10.81%
AMBLYOPIA	2	2.70%
COLOUR VISION	4	5.41%
TOTAL	74	100%

DISCUSSION

The lack of access and utilization of school age children to eye care services portends great danger to their educational, behavioral, developmental and quality of life. Children have been found to be the least likely group to have an eye examination. This makes them vulnerable to avoidable visual impairments in childhood.

Visual impairments can be associated with developmental delays which often go beyond childhood into adulthood. Reports of studies carried out in America(9) showed that vision disorders were rated as the fourth most common disability and the most prevalent handicapping condition in childhood. Statistics (10) from the World Health Organization showed that 80% of all visual impairment can be avoided or prevented and every minute a child in our world goes blind. The fact that visual impairments can be avoided or prevented in early childhood further highlights the significance of vision screening. Vision screening has been found to be a viable tool in the early detection and prevention of most visual problems in childhood. The lack of access of children to proper vision care can be mitigated by the introduction of mandatory yearly vision screenings in schools.

The studies by Nkanga (6) in Enugu and Faderin(7) in Lagos, both in cosmopolitan cities, also observed a high prevalence (7.4% and 7.3% respectively) of refractive error. The differences in the prevalence of refractive error in these studies, may also in part, be related to differences in sample size and methodologies used in identifying pupils with refractive error. Chuka-Okosa(2) in her study on refractive error in rural school children in Nkanu West LGA of Enugu State, South-Eastern Nigeria reported a prevalence of 1.97%. The prevalence of refractive error in this study is above the World Health Organization prevalence of 2–10% worldwide (1).

CONCLUSION

In conclusion, children are born with all the eye structure necessary to see but they learn to use them gradually as these structures develop with their physical growth. Children vision continues to develop throughout their pre-school years and the visual system is usually fully developed by the time the child finishes primary school. Any vision anomaly that is not detected early in any of the stages of eye development in children can lead to a permanent visual impairment. Refractive errors have been found to increase with age and thus require vision screenings to continue throughout the school age years.

Vision screening can detect refractive errors, strabismus, amblyopia, color vision deficiency, eyelid abnormalities, congenital defects, and systemic eye diseases. Stages of vision screening include the pre-school and school age vision screenings. Refractive errors are avoidable causes of visual impairment in school children. It can be corrected with eye glasses and /or visual therapy. Untreated refractive error can result in amblyopia.

Finally, the prevalence of Refractive Error in primary school children in an urban school in Lagos, Nigeria was 12.76 % and most pupils had no refractive error (87.24%). Though this study showed the magnitude of refractive error in school children in an urban school in Lagos State, the findings cannot be entirely representative of the general children population.

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