

Vision of Strabismic Children in Ilorin, Nigeria

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ABSTRACT

Objective: This study was conducted to evaluate the visual pattern of strabismic children.

Methods: A cross-sectional survey was carried out among primary school children in Ilorin South Local Government Area. A cluster random sampling technique was used to select the subjects for this study. The pattern of vision of children found to have ocular misalignment was studied.

Results: A total of 7288 school children were screened and this yielded 22 cases of esotropia and 10 cases of exotropia. Their ages ranged from 2 to 16 years; 78.1% of the study group had normal vision; 3.1% had low vision and another 3.1% was blind. Eight-two per cent (82%) of the children with esotropia had normal vision, while 4.5% were blind; 70% of the children with exotropia had normal vision; 10% of exotropics had low vision. Twenty-five per cent (25%) of the strabismic population was amblyopic, and the majority of the cases of amblyopia (62.5%) were associated with esotropia. The prevalence of strabismic amblyopia was found to be 0.11%.

Conclusion: The majority of strabismic children had normal vision. The prevalence of low vision and blindness was low. The prevalence of strabismic amblyopia was also low in the study population and most of it was associated with esotropia.

Key words: esotropia, exotropia, amblyopia, children, Nigeria

INTRODUCTION

Visual loss is the most serious consequence of strabismus¹ and is usually due to amblyopia. Strabismic deviation causes visual acuity depression of approximately 34% in the affected eye when compared with visual acuity levels in the normal eye.²

Strabismus is the most common predisposing factor in the development of amblyopia, approximately 40% of children who manifest strabismus develop amblyopia.³ Severe

amblyopia is a significant risk factor for blindness in the strabismic eye.²

Strabismic amblyopia is a sensory adaptation produced by a misalignment of the visual axis. It results from long continued fixation by the dominant eye and facultative suppression of the images of the deviating eye.⁴ This is due to competitive interaction between neurons carrying the non fusible inputs from the two eyes leading to a domination of the cortical vision centres by the fixating eye and a chronically reduced responsiveness to the input from the non fixating eye.⁵

Esodeviations are more commonly associated with amblyopia compared with exodeviations. This is probably because most childhood exotropias are intermittent.⁶

Strabismic amblyopia when detected early is reversible leading to an improvement of the vision of the child.

Information on the visual pattern of strabismic children is scanty. This study was therefore carried out to evaluate the visual pattern of strabismic children, especially as it relates to amblyopia.

MATERIALS AND METHODS

Duration and Location

The study took place at Ilorin South Local Government Area over a period of one year.

Inclusion Criteria

1. A primary school pupil of any of the selected schools
2. A school child with manifest strabismus in the above schools.

Exclusion Criteria

1. A primary school child not belonging to the selected schools.
2. Children with manifest strabismus whose squint is associated with a systemic or ocular pathology e.g., cataract, macular scar, central nervous system diseases e.g., cranial nerve palsies.

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Method of Patient Selection

A cluster random sampling technique was used to select the subjects of this study. Each primary school in the local government area was randomly assigned a code ranging from 001 to 033 and a list was thus compiled of all the public schools. This list formed the sampling frame with each school representing a sampling unit (a cluster). In every cluster, all eligible members were examined to select the subjects of this study (strabismic patients). Samples (clusters) were selected for screening, using a simple random sampling technique from an already drawn sampling frame. Each time a cluster was selected for screening it was deleted from the sampling frame to prevent its further selection.

Proforma

A proforma was designed under two sections. In ‘Section A’, the child’s general information namely identity, age, sex, school and class was collected. In ‘Section B’, information on full ocular examination of the child, namely, visual acuity (with and without pinhole), and with correction was recorded. In addition, information on the type of squint, extraocular motility assessment, anterior and posterior segment examination and information on the refractive state of the eye was collected.

Consent/Ethical Clearance

Consent was obtained from the education authority of Ilorin South Local Government Area and from the parents of the children before commencement of this study. Ethical clearance was also obtained from the ethics committee of the University of Ilorin Teaching Hospital.

Procedure

The children were screened for ocular misalignment using the Hirschberg method and the cover and uncover test. Examination proceeded from the most elementary class in the school and ended in the highest grade – primary six. Children that were found to have ocular misalignment were taken to the hospital at a later date after obtaining consent from their parents. A teacher was assigned by the school authority to accompany the children to the hospital (Ayo Bello Memorial Eye Centre).

Visual acuity was assessed with and without pinhole using the ‘alphabet optotype’ and ‘E’ chart for children who had difficulty with the alphabet optotype. For very young children (< 5 years) visual acuity was assessed using the Kay’s picture chart.

Extraocular motility assessment and anterior segment examination were then done using a bright pen torch. Funduscopy was done using a Keeler ophthalmoscope. A pilot survey had earlier been carried out on 14 eyes of 7 children selected randomly from the schools to compare

cycloplegic refraction using one per cent (1%) tropicamide and a non cycloplegic refraction using a topcon 8000 autorefractometer. The results showed that the difference between the two was not statistically significant. For this study, a non-cycloplegic refraction was done using a topcon 8000 autorefractometer followed by a subjective refraction. The pupils were then dilated with one per cent (1%) tropicamide and a direct and indirect ophthalmoscopy was performed to rule out any organic pathology.

Children whose visual acuity in either or both eyes could not be improved with their best possible correction and those that improved, but could not be corrected to normal vision (6/9), in the absence of any ocular abnormality to explain the depressed vision, were classified as amblyopic. This was confirmed by asking them to read the Snellen linear optotype acuity chart. An improvement by two or more lines confirmed amblyopia.

Statistical Analysis

All records were cross checked, entered and analyzed using Epi info version 6.04, SPSS 12.01 and a pocket size scientific calculator.

RESULTS

A total of 7288 school children (3766 boys, 3522 girls) were screened over a one-year period. Thirty-two cases of strabismus were diagnosed. There were 22 cases of esotropia and 10 cases of exotropia made up of (19 males and 13 females). Their ages ranged from 2-16 years, with a mean of 9.5 years (SD ± 5.92). Seventy-eight per cent (25) of the strabismic population had normal vision; 3.1% (one child) was blind. Also low vision was found in 3.1% (table 1).

Table 1. Visual pattern of the strabismic population

Visual acuity (Better eye)	Number	Percentage
Normal vision (6/6 – 6/18)	25	78.1
Low vision (<6/18 – 3/60)	1	3.1
Blind (<3/60)	1	3.1
Non-response	5	15.6
Total	32	100.0

Eighteen (82.0%) of the esotropic patients had visual acuity in the normal range in their better eye, while one (4.5%) was blind (figure 1). Similarly, 7 (70%) of the exotropic patients had normal vision while 1 (10%) had low vision. Seventy-one per cent (71%) had normal vision in the strabismic eye; while 22% and 7% had low vision and blindness respectively (figure 2). Eight (25%) of the strabismic population were amblyopic (figure 3.)

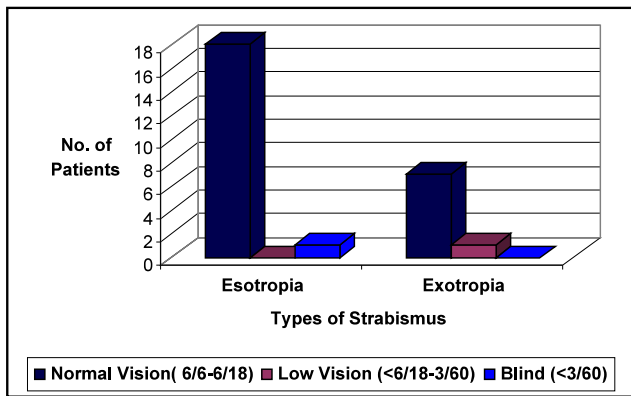


Figure 1. Visual pattern in relation to types of strabismus

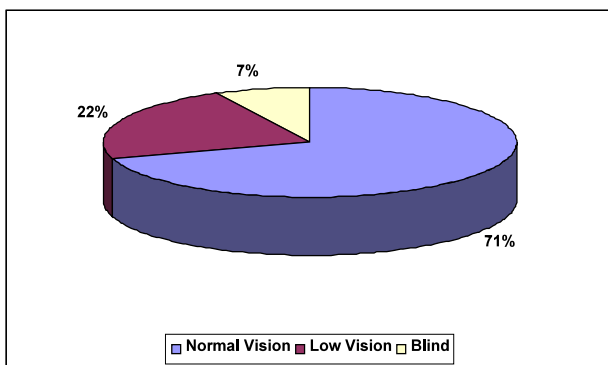


Figure 2. Vision in the strabismic eye

The majority of cases with amblyopia (62.5%) were associated with esotropia while 37.5% were associated with exotropia (table 2). Strabismic amblyopia had a prevalence of 0.067% among cases of esotropia and 0.041% among cases of exotropia in the study population. The combined prevalence of strabismic amblyopia was 0.11%.

DISCUSSION

In this study, 78.1% of the total study population had visual acuity in the normal range, while 3.1% had low vision and blindness. Also 81.8% and 70.0% of pupils with esotropia and exotropia had their visual acuity in the normal range. Low vision occurred in 10% of exotropic pupils, while blindness

Table 2. Amblyopia in relation to type of strabismus

Type	Number of cases		Non response	Total	% of total amblyopia	Prevalence
	With amblyopia	Without amblyopia				
Esotropia	5 (22.7%)	14 (63.6%)	3 (13.6%)	22 (100%)	62.5 (5)	0.067
Exotropia	3 (30.0%)	5 (50.0%)	2 (20.0%)	10 (100%)	37.5 (3)	0.041
Total	8	19	5	32	100.0 (8)	0.108

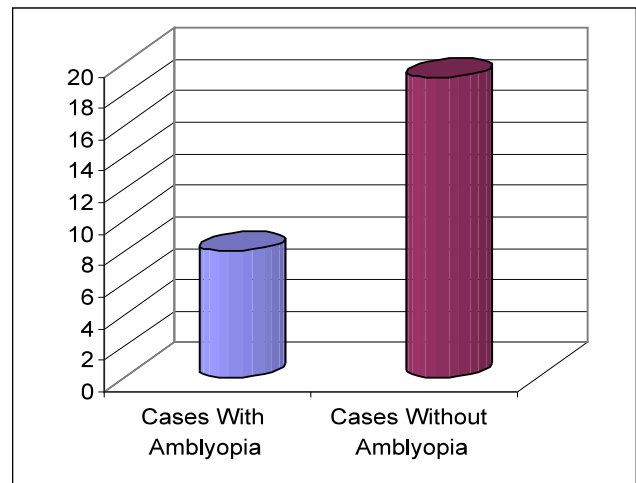


Figure 3. Distribution of amblyopia in the study population

occurred in 4.5% of the esotropic pupils. The fairly good visual status of the strabismic population may be due to the low prevalence of strabismic amblyopia in this population. Since most cases of exotropia are intermittent, this may also explain the fairly good vision observed in the exotropic population.⁶ Vision in the involved eye in unilateral strabismus or the non-dominant eye in bilateral cases, 71% of cases had normal vision in the involved eye, while 22% had low vision in the involved eye. One child was blind, representing 7% of the involved eyes in the cases studied.

Our results are similar to the findings of Abebe⁷ in Ethiopia. He found that 69% of cases have normal vision in the involved eye and 20.0% have low vision in the involved eye; 11.0% of cases were blind in the involved eye.

In the 'Ilorin Study' amblyopia was found in 25% of the strabismic patients. This differs from the findings of Abebe⁷ in Ethiopia, where amblyopia was found in 33% of the strabismic patients. However the findings of Abeba and Abebe⁸ and Marrakchi et al.⁹ do not correspond to the Ilorin study. Amblyopia occurred in 51.7% of cases studied by Abeba and Abebe in Ethiopia and in 58.0% of cases studied by Marrakchi et al. in Tunisia.

The results of the Ilorin study show similarities when comparing the prevalence of strabismic amblyopia (0.11%) with studies of Matsuo and Matsuo¹⁰ in Japan and Balogun¹¹ in Lagos, who found the prevalence of strabismic amblyopia to be 0.14% and 0.20% respectively.

These findings however, are not consistent with the findings of some other authors.^{12,13,14} For example, in the United States, Friedman et al.¹² found a prevalence of 0.5%; while in Madagascar, Auzemery et

al.¹³ found a prevalence of 0.37%. In the Sultanate of Oman,¹⁴ Lithander found a prevalence of 0.48%.

In the Ilorin study, 62.5% of amblyopia was associated with esotropia while 37.5% was associated with exotropia. This is consistent with the findings of Abebe⁷ in Ethiopia where 86% of the amblyopia was associated with esotropia and 14% with exotropia. Thus esotropia is more likely to be associated with amblyopia than exotropia.

Amblyopia was found in 22.7% of cases of esotropia and 30% of cases of exotropia in this study. This is much lower than the findings of Ebana Mvogo et al.¹⁵ in Cameroon where amblyopia occurred in 68.6% of esotropia and 59.3% of exotropia.

CONCLUSION

Visual loss is the most serious consequence of strabismus and this is due mainly to amblyopia. Information on the visual pattern of strabismic children is scanty. This study is the first to look at strabismus in a population of school children in Ilorin. The majority of strabismic children had normal vision. The prevalence of strabismic amblyopia was low in the study population and most of it was associated with esotropia.

Results from other countries show a rather wide variety of strabismic eyes associated with amblyopia. More studies should be undertaken throughout Nigeria to see if any pattern emerges.

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