



Prevalence and Pattern of Strabismus in Ilorin

Prévalence et les tendances du strabisme à Ilorin

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ABSTRACT

BACKGROUND: There is a paucity of studies devoted exclusively to strabismus in children

OBJECTIVE: To determine the prevalence, and pattern of presentation of strabismus among a group of Nigerian school children.

METHODS: A cross sectional survey was carried out among primary school children in Ilorin South Local Government Area in Nigeria. Twenty-one public primary schools grouped into three zones of seven schools each were selected for screening using a cluster random sampling technique.

RESULTS: A total 7,288 children were screened (3766 boys and 3522 girls) This yielded 32 cases of strabismus (19 males and 13 females). Their age ranged from two to sixteen years (mean, 9.5 ± 6.0 years). The prevalence of esotropia 0.30% (95% CI, 0.029%–0.31%) and that of exotropia 0.14% (95% CI, 0.13%–0.15%). Congenital esotropia and accommodative esotropia constituted 50.0% and 18.8% of cases respectively while, exotropia constituted 31.3%.

CONCLUSION: The prevalence of strabismus is low in the study population as has been found in other studied. Like most studies on strabismus; esotropia is the most common variety seen. WAJM 2009; 28(4): 253–256.

Keywords: Strabismus, Children, Prevalence, Ilorin, Pattern, Visual impairment

RÉSUMÉ

CONTEXTE: Il existe peu d'études consacrées exclusivement à un strabisme chez l'enfant

OBJECTIF: déterminer la prévalence, et le schéma de présentation du strabisme chez un groupe d'enfants des écoles nigérianes.

MÉTHODES: Une enquête transversale a été réalisée chez les enfants de l'école primaire à Ilorin du Sud zone de gouvernement local au Nigeria. Vingt et une écoles primaires publiques regroupées en trois zones de chacune des sept écoles ont été sélectionnées pour le criblage en utilisant un cluster de technique d'échantillonnage aléatoire.

RÉSULTATS: Un total de 7288 enfants ont été projetés (3766 garçons et 3522 filles) Cela a produit 32 cas de strabisme (19 mâles et 13 femelles). Leur âge varie de deux à seize ans (en moyenne, $9,5 \pm 6,0$ ans). La prévalence du strabisme 0,30% (IC 95%, 0,029% -0,31%) et celle de exotropie 0,14%. (95% CI, 0,13% -0,15%). strabisme congénital et ésoptropie accommodante constituaient 50,0% et 18,8% des cas respectivement, tandis que, exotropie constitué 31,3%.

CONCLUSION: La prévalence du strabisme est faible dans la population étudiée comme cela a été trouvée dans studied. Like autres plupart des études sur le strabisme; strabisme est la variété la plus couramment observés. WAJM 2009; 28(4): 253–256.

Mots clés: strabisme, Enfants, Prévalence, Ilorin, Motif, Déficience visuelle

INTRODUCTION

With normal visual experience, the eyes gradually adopt their normal convergence angle while, fixation reflex develops.¹ Although binocular single vision (BSV) develops at the age of two years, the fixation reflex does not mature until the age of nine years. Visual acuity remains in a state of flux before then. During this period, the child is vulnerable to strabismus and amblyopia.²

Strabismus occurs in 1.3-5.7% of all children.³ It is a common problem among Caucasian children.⁴ The prevalence of strabismus varies in different parts of the world. While studies in African children showed a prevalence of between 0.5–4.4%,^{5,6} its prevalence in other parts of the world vary between 0.9–7.4%.^{7,8} There have been no reported statistically significant gender difference in the occurrence of strabismus.³

Generally, esotropia is the most common compared to exotropia.^{9, 10} However, studies in non-white populations have shown that exotropia is more common in these children compared to their white counterparts.^{11, 12} It is known that countries farther away from the equator with lower light intensity report a lower prevalence of exotropia.¹²

Early detection of strabismus is important for restoration of normal ocular alignment and establishment of binocular single vision. Despite the fact that strabismus is an important cause of visual impairment among children, there are few studies devoted exclusively to it. The objective of this study is to determine the prevalence and pattern of strabismus among a group of Nigerian school children.

SUBJECTS, MATERIALS, AND METHODS

A cross sectional survey was carried out among Public primary school children in Ilorin South Local Government Area between October 2005 and September 2006.

Inclusion criteria: All children in the selected schools between the ages of two and sixteen years were included in the study.

Exclusion criteria: Children below the age of two years and those more than sixteen years were excluded. Children not

belonging to the selected schools were also excluded. Consent was obtained from the educational authority of Ilorin South Local Government Area and the parents of the children before the commencement of this study. Ethical clearance was also obtained from the ethical committee of the University of Ilorin Teaching Hospital.

Seven thousand, two hundred and eighty-eight school children between the ages of two to sixteen were screened for ocular misalignment over a period of one year (October 2005 to September 2006).

Sampling Technique

A cluster random sampling technique was employed to select subject. Each of the 33 public primary schools in the Local Government Area numbered 001 to 033 represented a cluster. The clusters were arranged serially in a sampling frame from which schools were selected randomly for screening using a simple random sampling technique. Numbers 001 to 033 were written on separate pieces of paper then squeezed and placed inside a bag. Papers were picked from the bag after thoroughly shaking, and the school corresponding to the number was selected for screening. Any selected cluster was not replaced back into the bag and the corresponding number on the sampling frame was crossed to prevent its further selection. Every eligible member of a cluster was screened for ocular misalignment to select the cases of the study.

Data Collection

For each child, a questionnaire was completed by an ophthalmologist (I.R) to obtain the child's, age, sex, school and class. Information obtained from the parents included age of the child, age at onset of squint, and nature of the squint (constant or intermittent). This information was provided by any of the child's

parent who was invited to the school. In every school visited, screening for ocular misalignment started from the most elementary class (Nursery or Primary 1) and ended in the highest class (Primary 6 or below).

Hirschberg's cover and uncover test were carried out on every child at a distance of six meters and at near fixation (Child's arm length) with the aid of a bright pen torch and the red cover of a ball pen (near fixation target). The records of the children with ocular misalignment were documented and their parents were invited for an interview at a later date for completion of the questionnaire, and to obtain consent to examine the children further in the hospital. In the hospital (Ayo Bello Memorial Eye Centre), ocular motility test and anterior segment examination were done using a pen torch. Their eyes were then dilated with 1% tropicamide. Fundoscopy was carried out using a direct Ophthalmoscope (Keeler[®]) and indirect Ophthalmoscope (Keeler[®]).

All the findings were documented in the questionnaire designed for the study.

Statistical Analysis:

All collected data were cross checked and analyzed using Epi info 6.04 and SPSS 12.01 softwares.

RESULTS

Over a one-year period (October 2005 to September 2006), 7288 elementary school children (3766 boys, 3522 girls) were screened in 21 public primary schools grouped into three zones of seven schools each. (Table1). The screening yielded 32 cases of strabismus (19 males, 13 females). Although there were more males than females, the difference is not statistically significant ($p > 0.05$).

Table 1: Characteristics of the Screened Population

Zone	No. Screened (n)			School	
	Boys	Girls	Total	Population	% Screened
1.	998	901	1,899	3,145	60.4
2.	1,639	1,546	3,185	4,596	69.3
3.	1,129	1,075	2,204	3,698	59.6
Total	3,766	3,522	7,288	11,439	64.0

The prevalence of esotropia was 0.30% (95% CI, 0.03–0.31%) while that of exotropia was 0.14% (95% CI, 0.13%–0.15%) giving a combined prevalence of strabismus by 0.44% (95% CI, 0.43%–0.45%), Table 2.

Table 2: Prevalence of Strabismus among 7288 School Children

Type	Number (%)		Prevalence (%)
	Male	Female	
Esotropia	13	9	22(0.30)
Exotropia	6	4	10(0.14)
Total	19	13	32 (0.44)

The children studied were in the age range of two to sixteen years with a mean age of 9.5 ± 6.0 years. Majority of those examined were between six to nine years (37.5%) and ten to thirteen years (43.8%). (Table 3).

Table 3: Distribution of Subjects by Age and Sex

Age (years)	Number (%)		
	Male	Female	Total (%)
2–5	2 (6.3)	2 (6.3)	4 (12.5)
6–9	8(25.0)	4(12.5)	12(37.5)
10–13	8(25.0)	6(18.8)	14(43.8)
14–17	1 (3.1)	1 (3.1)	2 (6.3)
Total	19(59.4)	13(40.7)	32(100.0)

There were more males in the six to nine years and ten to thirteen years age groups compared with the other age groups which showed equal proportion of males and females (Table 3).

Congenital esotropia was the most common form of strabismus seen (50.0%), while accommodative esotropia was the least common (19.0%). However, exotropia accounted for 31% cases of strabismus seen.

DISCUSSION

Prevalence of strabismus

The prevalence of strabismus was this study is 0.44%. This is similar to the findings in previous studies. A prevalence of 0.5% was found in Tanzania,⁶ while in southern India,¹³ the

prevalence was 0.7%. In Ibadan, western Nigeria¹⁴ and in eastern Nigeria¹⁵ a prevalence of 0.4% each was found. A prevalence of 0.9% was found in the Sultanate of Oman.¹⁶

However, the prevalence of strabismus in this study is lower compare to previous reports from southern Ethiopia⁵ 4.4%, in United State of America⁸ 3.1%, in Japan¹⁸, 1.28% and in Ireland¹⁹ 3.98%. Similarly, higher prevalence were found by other workers in Cameroon²⁰ (1.22%), in Ibadan, western Nigeria²¹ (2.6%), In Kaduna, northern Nigeria²² (2%) while Idewu¹⁷ in Lagos, Nigeria, reported a prevalence of 1.36%.

In Enugu, eastern Nigeria, two separate studies^{23,24} found low prevalence rates of 0.08% and 0.06% each. The variability in the prevalence of strabismus in different regions of the world may suggest the influence of social and environmental factors on strabismus. This will also explain why our finding is different from the findings of some previous studies stated earlier.

Forms of Strabismus

The predominant type of strabismus in this study is esotropia accounting for 68.75% cases while exotropia accounted for 31.25%. This is similar to findings of various studies done in different parts of the world. In a study in Ethiopia¹, it was found that esotropia and exotropia constituted 78.1% and 20.8% of cases respectively. While a study in the United State of America⁹ esotropia and exotropia constituted 75% and 25% of cases respectively. In Ibadan,¹⁴ esotropia constituted 80% of cases while exotropia constituted 20%. Esotropia constituted 59.6% and exotropia 40.5% of cases studied in Lagos.²⁵ Similarly, in Ireland (U.K.),¹⁹ it was found that esotropia was five times more common than exotropia. In Jos, northern Nigeria,²⁶ esotropia was found in 62.5% cases and exotropia in 37.5% cases studied.

However, in studies done in other parts of the world, exotropia was the predominant type of strabismus seen. In Cameroun,²⁰ exotropia was found in 75% cases and esotropia in 25% cases studied. This was similar to the findings

of a study in Jos, northern Nigeria.²⁷ In Ilesha, western Nigeria, a study,²⁸ found exotropia in 70% of the cases and esotropia in 30%. Workers in Hong kong²⁹ reported exotropia in 65.2% of cases and esotropia in 27.4% with microtropia accounting for 7.4%.

The above findings illustrate the wide variation in the pattern of esotropia and exotropia in different parts of the world. The reason for this is not known but Rachael and Jenkins¹² suggest that duration and intensity of sunlight as well as racial factors may play a major role. The higher the intensity of light (as is the case in the tropical region of the world), the higher the frequency of exotropia. The higher prevalence of esotropia in this study despite a high duration and intensity of sunlight may be due to racial factors.

Related to Age and Sex

Children in the age group 10–13 years constituted the dominant age group of cases recruited into this study. In a similar study in Ibadan,¹⁴ the predominant age group was zero to five years which constituted 55.0% of cases studied.

Males constituted 59.4% of cases in this study with females constituting 40.6%. This is similar to the findings of some previous studies in northern Nigeria.^{22,27} However, the finding of this study is at variance with those of some previous authors in which females predominated. In Ibadan,¹⁴ females, constituted 60% of the cases while males constituted 40%. In Ethiopia,³⁰ females constituted 58.6% of cases seen while males formed 41.4%. Similarly, females constituted 61.7%, while males constituted 38.3% of cases studied in Lagos.²⁵

Conclusion

The prevalence of strabismus is low in the population studied. Like most studies done earlier, esotropia is the most common variety seen.

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