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Original article

Prevalence of strabismus among pre-school children community in Butajira Town

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Abstact

Background: Though strabismus is a common presenting ocular problem at outpatient clinics of ophthalmology its magnitude in Ethiopia is not known.

Objective: To determine the magnitude and type of manifest strabismus and strabismic amblyopia among pre-school children.

Methods: A cros-sectional study was conducted from December 1999 to January 2000 in Butajira town. Pre-school children were screened for strabismus and strabismic amblyopia.

Results: Out of the total 1894 children screened, 29(1.53%) were found to have strabismus, of which females accounted 58.6% (17) and males 41.4% (12). Esotropia is the commonest type of strabismus (69%) followed by exotropia (24%). Strabismic amblyopia was found in 51.7% the cases. Light ray either from the sun or a bulb was found to be the commonest presumed cause of strabismus. Only seven parents have the knowledge that strabismus could be treated either medically or surgically.

Conclusion: The study has shown that strabismus and strabismic amblyopia are relatively common ocular problems. In addition, it has been observed that there is lack of understanding of the problem and the availability of corrective measures. [*Ethiop. J. Health Dev.* 2001;15(2):125-130]

Introduction

Strabismus or misalignment of the visual axes is a common condition which occurs mainly during childhood. Manifest strabismus (tropia), which presents under binocular viewing has a prevalence rate ranging between 1.2% and 5.6% (1,2,3,4). The consequences of untreated strabismus are amblyopia (usually unilateral reduction of two or more lines of visual acuity without visible organic lesion), loss of binocular vision and cosmetic stigma (5,6,7,8). It also adversely affects the parent-child relationship and the child's psychological development (5,9).

In the majority of cases, strabismus is a treatable condition that requires identification and treatment at early age, particularly before the age of two years. Treatment at early age

will result in best visual acuity in each eye, increased chance of stereopsis (depth perception) and acceptable cosmetic result. It has been shown that there is increased awareness, attentiveness and selfesteem after straightening of the eyes (3,5). Poor parental knowledge, misconception, and misinformation adversely affects the age of presentation and management of strabismus (9).

In Ethiopia, strabismus is one of the common childhood eye problems, which is frequently seen at the out patient departments. However, its magnitude at a community level is not known. This study was designed to determine the magnitude of strabismus and strabismic amblyopia among pre-school children, aged 5 years and below in a community.

Methods

This community based cross-sectional study was conducted in Butajira town between December 1999 and January 2000. The town is located about 135 km south of Addis Ababa in Meskanena Mareko Woreda, Gurage Zone, Southern Nations and Nationalities and Peoples Region (SNNPR). It has 4 "Kebeles" with a total population of 20,000 (1994 census), of which 18% were children aged 5 years and below (10). There are one health center, one ophthalmic center run by an ophthalmologist and five private clinics.

The study population were pre-school children (5 years and below) residing in Butajira town. This age group was selected because childhood strabismus manifests mainly during this age and it is relatively the appropriate age to correct the problem. Neonates were excluded as the fixation reflex is poorly developed in this age group. The sample size was calculated assuming the average estimate prevalence of strabismus of 3% and the sample size was calculated to obtain the minimum sample size required at 95% certainty, and a maximum discrepancy of ±1% between the sample and the underlying population. Based on this, a total of 1118 children were required for the survey.

Three Kebeles were selected by simple random sampling (lottery method). All children aged 5 years or less in the selected Kebeles were registered by two enumerators by making a house to house visit. Screening and examination of children were done after explaining the purpose of the study to the parents and informed consent was obtained. The researcher examined the children for the presence of ocular misalignment by going from house to house. Corneal light reflex (CLR) test at primary, horizontal and vertical gazes was used for screening. Additionally, a parent of each child was asked whether his or her child had strabismus or not.

For those who were found to have manifest strabismus, information about family history of similar condition, gestational age and age of onset of the deviation was obtained from the parents.

All the strabismic children were taken to the ophthalmic center for detailed examinations. These included visual acuity measurement, binocular fixation pattern, quantification of the angle of deviation, cycloplegic refraction, anterior and posterior segment evaluation.

Visual acuity was determined using Snellen's illiterate "E" chart after teaching E-game in co-operative children above the age of three and half years. Pinhole test was used for those who had subnormal visual acuity. A difference of two or more lines of visual acuity between the two eyes was considered as amblyopia. The corneal light reflex, steadiness and maintenance of fixation (CSM) method was sued to identify visual acuity asymmetry between the tow eyes for preverbal and uncooperative children. Additionally, binocular fixation pattern was performed to identify and quantify the severity of amblyopia, and those who had moderate to severe fixation preference were assumed to be amblyopic.

Heterotropia was classified according to the direction of the deviation as esotropia, exotropia and vertical deviation. Further it was subclassified as congenital or acquired esotropia and intermittent or constant exotropia. Infantile (congenital) esotropia was diagnosed when the misalignment was reported by parents to have occurred before the age of six months and those who were noticed beyond this age were considered as cases of acquired esotropia. Intermittent exotropia cases were those with occasional deviations as opposed to constant ones who always manifest it. Strabismus cases of sensory origin are also included in the study.
Parents of strabismic children were interviewed about the causes, treatment and consequences of this disorder. Finally, health education was provided to all parents of strabismic children about the causes,

treatment options and the functional as well as psychological consequences of strabismus. All strabismic children were referred to the ophthalmic center for further management and follow-up.

Data was analyzed using Epi-info version 6 statistical package and proportions were used for analyzing the results.

Results

A total of 2007 children were registered and 1894 (889 males and 1005 females) were available for screening. Among the screened, 29(1.53%) were found to have manifest strabismus. The prevalence was slightly higher for females (1.69% (17/1005)) than for males (1.35% (12/889)), but the difference is not significant. As shown in Table 1, most of

the cases were between the age of two and five years. Esotropia was found in 20/29 (69.1%) of the cases and exotropia in 7/29 (24%). Acquired esotropia cases accounted for larger proportion, 12/29 (41.4%) than congenital esotropia 8/29 (27.6%). Intermittent exotropia was more prevalent than constant exotropia. Two cases of sensory esotropia were included in the acquired esotropia. Strabismic amblyopia was found in 15/29 (51.7%) of the cases, excluding the tow cases of sensory esotropia. The largest proportion of amblyopia was associated with acquired esotropia. Neither the cases of intermittent exotropia nor hypertropia were found to have amblyopia (Table 2).

Clinically significant cycloplegic refractive error of +2.50 diopter (D) sphere or more was fond in 13/29 (45%) of the cases. Ten out of 29(34.5%) of the strabismic children had family history of strabismus. None of the strabismic children had been treated for the ocular deviation either non-surgically or surgically.

Twenty-four mothers and 5 fathers of strabismic children were interviewed regarding their knowledge, attitude and practice about strabismus. Majority of the parents (65.5%) were illiterate. Educational level had no influence on the parents response.

Exposure to light ray during early infancy was presumed as the commonest cause of strabismus (Table 3). Moreover, most of the parents did not know that strabismus is a treatable condition. Eventhough, 7/29 (24.1%) of the parents knew that strabismus could be treated medically or surgically, none of their children were treated for various reasons.

Concerning the consequences of strabismus, 9(31%) of the parents considered cosmetic effect as the only consequence of untreated strabismic child, while 7(24.1%) parents responded that it can cause poor vision and has cosmetic effect, whereas, for parents considered poor vision as the only consequence of strabismus.

Discussion

The prevalence rate (1.5%) of manifest strabismus found in our study is comparable with the report from Cameroon (1.2%) (1) and Taiwan (1.62%) (4). However, the study in Cameroon included clinical patients of all age while that from Taiwan included elementary school children. In addition, the screening methods they used were not mentioned. On the otherhand, a prevalence rate of 5.6% was found among children born within one year period and screened at the age of 5-6 years with cover-test (3). The reason for the high prevalence rate of childhood strabismus in this study could be due to the already existed strabismus is most likely to manifest in the age group they have included. In addition to this, the screening method they have used was also more accurate than that we used. The screening method (CLR) we have used is less accurate than the other methods of screening, which can be affected by the pupillary size and it is also not possible to control accommodation. Therefore, the possibility of overlooking is there, particularly small angle deviation. We preferred corneal light reflex as a screening method because it doesn't need cooperation and attention which is difficult to obtain in younger children. Moreover, it can be performed at a distance and, therefore, is applicable for those who are frightened by

the examiner. It is also less time taking to do for a community based screening. History of strabismus taken from the parents was helpful to identify the cases, particularly intermittent exodeviation. Despite the limitations, our study has shown the magnitude of the problem among pre-school children in the community.

Esotropia was the commonest type of tropia (69%) in our study, followed by exotropia (24%) which is comparable with other studies (3,4,5,6). The frequent occurrence of intermittent exotropia as compared to constant exotropia is quite clear as it is the most common type of exotropia seen in children. It is not uncommon to find positive family history of strabismus which was the case in our study (34.5%). Eventhough, the inheritance pattern is not well described, most authorities agree on multifactorial inheritance (5,8).

The larger proportion of strabismic amblyopia in our study (51.7%0 is fairly comparable with the proportion found in Tunisia (58%) (11). The high prevalence rate of amblyopia among cases with acquired esotropia could be explained by their frequent use of the non deviated eye for fixation and absence of alternate fixation unlike the cases of infantile esotropia (5). On the other hand, most of the exotropia children had intermittent exotropia in which amblyopia is unlikely. This significant childhood problem and its adverse effect can be prevented if identified and treated at early age. Mass screening at pre-school and during infancy has been found to be a viable solution for early identification and treatment (7). Fixation preference and 10 PD fixation (for small angle deviation) tests are reliable with good sensitivity and specificity for diagnosis of strabismic amblyopia in preverbal children (12,13,14).

A significant number of parents of strabismic children did not know what really causes the strabismus and its treatment. As a result, most of the children were not taken to an eye center for treatment. Poor knowledge of the parents, economical problems and lack of general anesthetic facility to handle such cases at a nearby area were among the reasons for not seeking medical help for this disorder.

In general, we can see a significant degree of misconception and uncertainty of the parents. Parental understanding about poor vision (amblyopia) resulting from strabismus was very poor compared with the study done in developed countries (9).

In conclusion, this study has shown the magnitude of manifest strabismus and strabismic amblyopia to be a significant ocular problem. Untreated strabismus leads to functional and psychological disturbances affecting the quality of vision and life. There is an indication that parents of strabismic children had significant lack of knowledge, misconceptions and uncertainties about this disorder. Health education is required to increase awareness of the public about strabismus. Periodic continuing medical education on pediatric ophthalmology also needs to be conducted for health professionals working at different levels of health institutions, particularly pediatricians for early identification and referral of strabismic children to prevent strabismic amblyopia and other adverse effects.

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Tables

Table 1: The frequency and age distribution of the different types of heterotropia, Butajira, 2000.

Type of strabismus	Age (Years)					Total
	<1	1-2	2.1-3	3.1-4	4.1-5	
Esotropia						
Congenital	2	2	1	2	1	8(27.6%)
Acquired	0	1	3	5	3	12(41.4%)
Exotropia						
Intermittent	0	1	0	1	2	4(13.8%)
Constant	0	0	0	0	3	3(10.3%)
Vertical tropia	0	0	1	1	0	2(6.9%)
Total	2	4	5	9	9	29(100%)

Table 2: Amblyopia in relation to he type of tropia, Butajira, 2000.

Type of tropia	Number of cases (%)
	2(13.3)
	10(66.7)
Exotropia	
Constant	Esotropia
Intermittent	Congenital
	Acquired
	3(20.0)
	0(0.0)
Vertical tropia	0(0.0)
Total	15(100)

Table 3: Responses of parents regarding the causes, treatment and consequences of strabismus, Butajira, 2000.

Parents' response	No. of responses (%)
Light exposure	13 (44.8)
Febrile illness	3 (10.3)
Convergence exercise	2 (2.9)
Eye Disease	1 (3.4)
Don't know	10 (34.8)
Treatment	
Nonsurgical/surgical	7 (24.1)
Holy Water	2 (6.9)
Don't know	20 (69.1)
Consequences	
Cosmetic	9 (31.1)
Cosmetic& Poor vision	7 (24.1)
Poor Vision	4 (13.8)
Deviation increases	3 (10.3)
Don't know	6 (20.7)

Figures

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