

PREVALENCE OF AMBLYOPIA AMONG SCHOOL GOING CHILDREN IN FIELD PRACTICE AREA OF MODEL RURAL HEALTH RESEARCH UNIT (MRHRU), TIRUNELVELI

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Abstract

BACKGROUND : Amblyopia (lazy eye) is the second most common cause of functional low vision in children in developing countries. Amblyopia is an important health problem because it causes profound and lifelong visual impairment. The latest meta-analysis article established 99.2 million people with amblyopia in 2019 worldwide. Understanding the prevalence rate of amblyopia is important for adequate health care planning. This article aims to determine the prevalence of amblyopia and its distribution among school going children in Kallur PHC area.

METHODS : A cross sectional study was conducted in 3432 school going children in field practice area of MRHRU. Demographic data, visual acuity, and detailed ophthalmic examination including anterior segment and posterior segment examination were done.

RESULTS : Prevalence of amblyopia was close to 1 %, with the predominant cause of amblyopia was due to refractive errors, anisometric amblyopia was 89% and strabismic amblyopia 6% and mixed amblyopia was also in equal numbers.

CONCLUSION : The uncorrected refractive error for long time leads to amblyopia. The main complication of amblyopia is an irreversible, lifelong decrease in vision. Parents should be educated on the importance of early vision assessment for their children and the need for follow-up to prevent amblyopia. Screening and providing early treatment for the children with refractive error significantly reduces the load of amblyopia.

KEYWORDS : Amblyopia, refractive error, school children, blindness

INTRODUCTION

Amblyopia is a disorder in which a person experiences poor vision due to harmful visual experience at a very young age.¹ Amblyopia can be both unilateral or bilateral, in this condition there is absence of any obvious structural or pathologic anomalies but can occur due to any one of the following conditions strabismus, refractive errors, and anatomic obstruction in early childhood. Early screening of these factors and treating them has better outcomes.² due to availability of reports from various animal studies it is now understood that amblyopia represents functional and morphological effects of visual deprivation on the visual cortex and the lateral geniculate nucleus.³ The prevalence of amblyopia throughout the world was found to be 1.36% whereas the prevalence of amblyopia in Asia is 1.16%.⁴ The prevalence of amblyopia according to one study done in Central India is found to be 4.3% while another study done in South India claims a prevalence of 6.6%.^{5,6} Amblyopia is a leading cause of vision impairment in children and usually begins in infancy or childhood. Congenital cataract, congenital ptosis and corneal injury or corneal dystrophy can also cause amblyopia but are less common.² Amblyopia

is a public health problem and is relatively common. This is the first study done to determine the prevalence of amblyopia and identify the causes of amblyopia in Tirunelveli. Our desire is to contribute to the improvement of visual screening program that will ensure early detection, diagnosis and management of amblyopia in Tamil Nadu.

OBJECTIVE

Our objective was to estimate prevalence of amblyopia among school children in Kallur PHC area.

MATERIALS AND METHODS

Permission for conducting the study was obtained from Institutional Ethics Committee of Tirunelveli medical college and hospital.



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We conducted a cross sectional descriptive study involving 3432 children aged 5 to 19 years, studying in 35 schools in Kallur, MRHRU (Model Rural Health Research Unit) field practice area, Tirunelveli, established by the Department of Health Research, Government of India which is linked to the Tirunelveli Medical College. It is mentored by the ICMR – National Institute of Epidemiology, Chennai.

MRHRU field practise area has a population of 36,663 and is an area that falls under Papakudi and Mannur blocks in Tirunelveli district; comprising of 14 village clusters. There are 28 Primary Schools, 2 Middle Schools, 2 High Schools and 3 Higher Secondary School. The total number of schools going children in MRHRU field practise area is 3432. All the school going children between the age group of 5 to 19 years were screened by an Ophthalmologist along with an ophthalmology resident simultaneously, with the help of allied health workers including the Principal Investigator (PI). Permission was obtained from all the necessary authorities from District to block level. For children studying up to 8th grade Informed written consent and assent was obtained from parents and students respectively /guardians. For the rest of the children only written consent was obtained.

To diagnose the presence of amblyopia, which is the outcome variable, various examinations were done including Snellen's chart in both English and Tamil were used for estimation of distant visual acuity. In children of lower grades who were not able to read Snellen's letter chart, tumbling E chart was used. Retinoscopy and subjective correction were done for all children. Dilated fundus examination was done using Indirect Ophthalmoscope.

The data containing details of history and examination were tabulated and analysed using SPSS version 26. Descriptive measures like frequency and percentages were used to identify the distribution and prevalence of amblyopia.

OPERATIONAL DEFINITIONS

Unilateral amblyopia was defined as 2-lines interocular difference in VA with at least 6/12 or worse in the worse eye (with unilateral amblyogenic factors). Bilateral amblyopia was defined as VA 6/12 or less in both eyes (with bilateral amblyogenic factors).¹¹

Classification of amblyopia for each patient amblyopia was classified as strabismic, anisometric, mixed and deprivation amblyopia. Anisometric amblyopia is defined as any amblyopia that occurs due to refractive cause with at least 1 dioptre between 2 eyes, Strabismic Amblyopia was defined as deviation of one eye with loss of eye parallelism, mixed amblyopia is a condition 2 or more causes of amblyopia co-

exist in the same person, Deprivation/stimulus deprivation amblyopia is where deprivation happens when eye diseases prevent the light stimulus from reaching the retina, thus forestalling the normal visual process.¹²

RESULTS

A total of 3432 children were screened between the ages of 5 and 19 years. Out of them 1659 (48.30%) were boys and the rest were girls. 1893 (55.15%), 1463 (43.62%) and 76 (2.21%) children were in the age groups of 5 to 9 years, 10 to 14 years, 15 to 19 years respectively. 53.61%, 28.05%, 17.01% and 1.31% of the students were studying in primary, middle, secondary and higher secondary schools respectively. Predominate number of the students were from nuclear families (75.40%), most of the fathers and mothers of these children were self-employed (32%) or farmers (25%) or labourers (17%). (Table 1)

Table 1 :Descriptive table containing socio demographic characteristics and ocular morbidity

CHARACTERISTICS		COUNT	PERCENTAGE
Education Category	Primary	1840	54%
	Secondary	963	28%
	High School	584	17%
	Higher Sec School	45	1%
Sex	Male	1659	48.30%
	Female	1773	51.70%
Age Category	5-9	1893	55%
	10-14	1463	43%
	15-19	76	2%
Family Type	Nuclear Family	2589	75.4%
	Joint Family	649	18.9%
	Single Parent	160	4.7%
	Guardian Custody	26	0.8%
	Others	8	0.2%
Father Occupation	Unemployed	326	9.5%
	Laborer	582	17.0%
	Self-employed	1124	32.8%
	Farmer	850	24.8%
	Clerical	182	5.3%
	Shop Keeper	167	4.9%
	Semi professional	16	0.5%
	Professional	11	0.3%
Mother Occupation	Unemployed	267	7.8%
	Laborer	615	17.9%
	Self-employed	1131	33.0%
	Farmer	879	25.6%
	Clerical	316	9.2%
	Shop Keeper	145	4.2%
	Semi professional	18	0.5%
	Professional	6	0.2%

Amblyopia

Out of the total students screened, 0.96 % of them had amblyopia (figure 1), anisometric type of amblyopia was found in 28 students (84.84%), Strabismus alone and mixed type of amblyopia was found in 1 (3.03%) and 2

(6.06%), While stimulus deprivation amblyopia was found in 2 (6.06%). (Table 1) bilateral amblyopia was found in 15 students (45.46%) while unilateral amblyopia was found in 18 (54.54%). (Table 2) (Table 3)

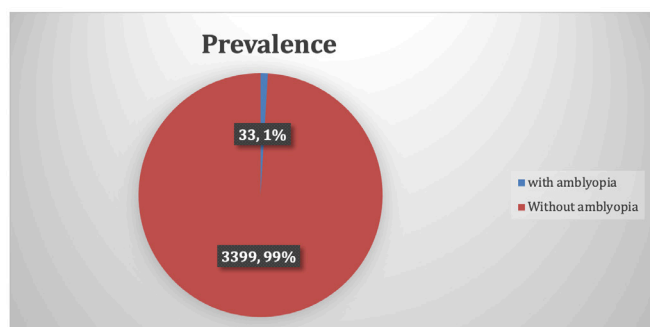


Figure 1: Prevalence of amblyopia

Table 2: Classification of Amblyopia

CHARACTERISTICS	UNILATERAL	%	BILATERAL	%	TOTAL
Strabismic amblyopia	1	100	0	0	1
Anisometric amblyopia	15	48.27	13	51.73	28
Mixed amblyopia	1	50	1	50	2
Stimulus deprivation amblyopia	1	50	1	50	2

Among various ocular morbidities found in those with amblyopia, simple myopia was the commonest, it was cause found in 69% of those with Amblyopia. While mixed astigmatism was found in 9% of those with the outcome, the rest of the diseases like simple hypermetropia, corneal opacities, ptosis have been found at a similar proportion of 3%, there are 2 (6%) cases where amblyopic cases have multiple ocular morbidities occurring together. (Table 3)

Table 3: Distribution of various ocular morbidities in children with Amblyopia

EYES	OCULAR MORBIDITIES	COUNT	PERCENTAGE
Right Eye	Simple Myopia	10	30.3%
	Squint	1	3.0%
Left Eye	Cornea Opacity	1	3.0%
	Simple Myopia + Squint	1	3.0%
	Simple Hypermetropia	1	3.0%
	Simple Myopic Astigmatism	1	3.0%
	Mixed Astigmatism	1	3.0%
	Congenital Hydrocephalus	1	3.0%
Both Eye	Ptosis	1	3.0%
	Simple Myopia	13	39.4%
	Simple Hypermetropia Astigmatism + Ptosis + Squint	1	3.0%
	Mixed Astigmatism	1	3.0%
	Total	33	100

Amblyopia is similarly distributed across those in primary (0.8%), middle (1%) and secondary (1%) schools, but those in higher secondary (6.7%) have a much higher proportion compared to other groups. Males (0.9%) and female (1%) students were affected in similar proportions by the outcome. More proportions (2.6%) of those in ages 15-17 were affected by the outcome compared to other age groups like 5-9 (0.7%), 10-14% (1.2%), higher proportions of those living in nuclear (1%) and joint families (0.9%) are affected by the disorder compared to those living with a single parent (0) or

a guardian (0).

DISCUSSION

Our study comprised of school going children from ages 5-19, from rural background in Tamil Nadu's Tirunelveli district. The prevalence of amblyopia in our study was 0.96% which is comparable to studies conducted all over the world (1.36%-2.66%). (4) A study done to estimate prevalence of amblyopia among school going children in Qassim province, KSA showed a higher prevalence rate of 3.9%. (7) A systematic review estimates pooled prevalence of amblyopia worldwide among children was 1.36%, specifically in Asia it was estimated to be 1.16% which is in line with our findings.⁸ In our study, bilateral amblyopia (45.45%) was slightly less than unilateral amblyopia (54.55%), which is common and similar to study done in rest of India including one done in Andhra Pradesh by K Anjaneyulu et al., and Kerala by Menon et al., where 7% cases were bilateral. (6,8,9) but our study only shows a small difference between them, while other studies have recorded a larger gap. Our study had similar proportions of males (45.46%) and females (54.54%) being affected, the slight difference can also be largely attributed to slightly larger amounts of female participants in the study.

Anisometric type of amblyopia was the commonest type similar to many other studies (6,9,10) the most common cause of anisometropia was myopia, which was the only cause found in 69% of those with Amblyopia. While mixed astigmatism can be attributed for 6% of the outcome, the rest of the causes like simple hypermetropia, corneal opacities, ptosis have contributed 3% each, there are 2 (6%) cases where amblyopia can be attributed to multiple etiological factors. Many other studies have astigmatism as the primary cause of amblyopia. (6,10) The most important cause of stimulus deprivation amblyopia in our study was ptosis and corneal opacities. Anisometropia being the most prominent is very important finding as this is most easily treatable type.

CONCLUSION

The prevalence of amblyopia that was identified was mostly in line with a few other studies done in India, but amblyopia is a rarely studied phenomenon and we need more studies from different parts of India to understand the real burden of the issue. We recommend educating parents on the importance of early vision assessment for their children and the need for follow-up to prevent amblyopia. Screening and providing early treatment for the children with refractive error significantly reduces the load of amblyopia which does happen though several public health programs with great

foresight but care should be taken to ensure interventions well received by the students who had been subscribed glasses, this could also be done by educating teachers on the importance of the same. Those studies who were found with issues though our study were appropriately treated at Tirunelveli Medical College and Hospital.

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