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AMBLYOPIA: PREVALENCE, RISK FACTOR AND CLINICAL PROFILE IN SCHOOL GOING CHILDREN IN BUNDELKHAND REGION

Dr. Jitendra Kumar — Professor and Head, Department of Ophthalmology, M.L.B. Medical College, Jhansi

Dr. Amit Rao* — Junior Resident, Department of Ophthalmology, M.L.B. Medical College, Jhansi
*Corresponding Author

Dr. Shikha Tolia — Junior Resident, Department of Ophthalmology, M.L.B. Medical College, Jhansi

ABSTRACT **Background:** In vision 2022-23, amblyopia is a major preventable and treatable cause of low vision in paediatric age group. If not treated at appropriate time, paediatric amblyopia can result into monocular and binocular low vision with associated deterioration in Quality of Life indices in adulthood. This should be the hallmark of the blindness control programme in India. So this study was carried out to assess the magnitude of amblyopia and its associated risk factors in school going children and to correct the amblyopia by whatever treatment modality possible depending upon the type of amblyopia and to follow up the patient for any improvement in it. **Materials and Methods:** This was a prospective, observational study on 100 school going children between 5-16 years of age. All the children were subjected to visual acuity examination. Those children with refractive error were further screened at Hospital. **Results:** Out of 100 cases, 3 cases had amblyopia. Prevalence of amblyopia was 3%. Anisometropia was the most predominant risk factor associated with amblyopia (53%). Anisometropic amblyopia (53%) was most common. Amblyopia was more common in children with lower socio-economic background (40%). Maximum patients had unilateral (80%) and moderate amblyopia (46%). Association between duration of occlusion therapy and visual improvement in children with amblyopia was statistically insignificant (p=0.19). **Conclusion:** Amblyopia is one of the major hidden visual problem in the society which can be prevented by early identification and proper management in appropriate time. Early diagnosis and treatment can prevent and minimize risk of permanent deficit of vision in amblyopia if detected earlier especially before 10 years of age. Screening programs in school going children can detect amblyogenic factors earlier to prevent major permanent deficit in vision by amblyopia so screening of children should be done through school surveys, awareness should be spread through various campaigns among the teachers and parents of the children about amblyopia and its adverse consequences not only on visual impairment part but also functional, psychological, social, economic impact.

KEYWORDS : Amblyopia, Bundelkhand, Children, Occlusion therapy, Prevalence, Risk factors

INTRODUCTION

Amblyopia is diminution of vision, not attributed to the structural abnormality of eye, described as amblyopia ex anopsia. The mechanism of retinal and cortical interaction varies in different conditions. The first mention of amblyopia dates back to the fifth century BC to the old Greek. Back then Hippocrates used the word amblyopia to name conditions that resulted in decreased visual acquity in seemingly healthy eyes. It occurs when there is a major difference between the two eyes in their ability to focus. Any child with visual acquity in either eye of 6/12 or less at the age of 3 to 5yrs or 6/9[1] or less at the age of 6yrs or more, or two line difference in vision of two eyes, diagnosed as amblyopic. In addition to low vision, there is decrease in contrast sensitivity, vernier acquity, spatial distortion and low form sense[2]. An adult person with unilateral amblyopia has three times greater risk, while a child, 17 times that of normal person for decrease in vision in better eye. In strabismus, the foveae in two eyes are directed towards different visual objects, it may cause visual confusion, retinal rivalry, but no diplopia, because of faint image in amblyopic eye. Amblyopia is more common in premature infants, usually have poor prognosis.

AIMS AND OBJECTIVES

Followings are primary objectives of this study

1. To study the prevalence of amblyopia in school going children.
2. To determine the associated causative risk factors leading to amblyopia in school going children.

Secondary.

3. To study the socio demographic profile of amblyopia in school going children.
4. To find out the role of occlusion therapy in relation to age and duration of amblyopia.

MATERIAL AND METHOD

The present study was conducted as a prospective, observational study at Department Of Ophthalmology, M.L.B. Medical College, Jhansi on 100 school going children during the period from June 2022 to May 2023 (12 months). All the school going children between 5-16 years were included whereas children with anterior segment or posterior segment abnormality; any congenital ocular anomaly other than congenital cataract and ptosis and with history of ocular trauma or any ocular surgery were excluded.

All the children fulfilling the inclusion criteria were screened and examined during school visit.

Detailed socio demographic history pertaining to age, gender, socioeconomic status was obtained using questionnaire. Visual acuity of all the children of age group 5-16 years was checked on distant Snellens visual acuity chart then torch light examination of anterior segment and direct and indirect ophthalmoscopy for fundus examination was done. Those children who had reduced visual acuity and abnormal ocular findings were referred to eye OPD in M.L.B. Medical College, Jhansi.

A total 3 cases of amblyopia detected and all of them were studied in detail. The presenting complaints were recorded in chronological order and detailed history of presenting illness was taken. Past history of any ocular trauma or ocular surgery or infection taken. Any history of similar illness in family members was asked.

Then ocular examination for amblyopia was done under following headings:

Visual Acuity

Distant visual acuity was noted on Snellen's distant visual acuity chart. Uncorrected and best corrected visual acuity of each eye was recorded.

Head Posture

Any turn tilt or chin elevation was noted.

Ocular Movements

Ocular movements of both eyes were tested in all nine cardinal direction of gaze.

Anterior Segment

A thorough external examination of anterior segment of each eye was made with torch light during school visit and with slit lamp of those childrens who attended eye OPD of M.L.B. Medical College, Jhansi. Those who had any gross pathology in anterior segment were excluded from the study.

Fundus Examination

A detailed fundus examination of both eyes was carried out under full mydriasis by indirect ophthalmoscope and direct ophthalmoscope.

Hirschberg Test
This test was applied in strabismic amblyopia cases to assess approximate angle of deviation.

Statistical Analysis
Data was compiled using MS Excel and analysed using IBM SPSS software version 21. Data was grouped and expressed as proportions. Chi square test was used to assess the association between proportions and p value of less than 0.05 was considered statistically significant.

RESULT
A total of 100 children were screened between the age range of 5 and 16 years.

Table 1: Distribution According To Sociodemographic Variables Of Children Screened

sociodemographic variables		Number of children	Percentage
Age group (in years)	5-8	31	31%
	9-12	36	36%
	13-16	33	33%
Gender	Male	52	52%
	Female	48	48%

Majority i.e. 36% children belonged to 9-12 years of age and about 52% were males.

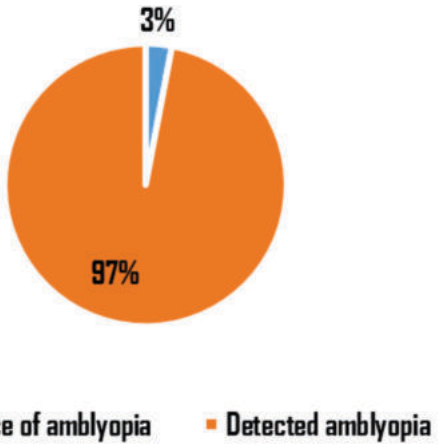

Fig. 1: Prevalence Of Amblyopia In School Going Children

In present study, 3 children had amblyopia (3%). Males comprises of 52% cases. About 40% cases belonged to lower socio- economic background. Anisometropia was the most predominant risk factor associated with amblyopia (53%). Anisometropic amblyopia was most common (53%). Maximum patients had unilateral (80%) and moderate amblyopia (47%). Among 30 amblyopic cases 19 cases (67%) showed improvement in >2 snellens line in visual acuity. The observed association between duration of occlusion therapy and visual improvement in children with amblyopia was statistically insignificant (p>0.05).

DISCUSSION
Amblyopia has become a growing socio-economic problem as it is one of the most neglected common sensory anomalies of the eye. Prevalence of amblyopia in present study was 3% which was quite similar to study done by Saxena et al 8 (2.11%) however in Anjaneyulu et al[3] (6.6%) it was higher than present study. The observed difference in present and study by Anjaneyulu et al[3] could be because that included only government school children while present study included both government and private school children. Difference in prevalence of amblyopia among various study may be due to regional factors, sample size, various methods and criteria used for diagnosing amblyopia.

In the literature, no definite relationship of amblyopia to any particular age group has been described. Anjaneyulu et al[4] observed 50% of amblyopia were between 6-9 years age group and 50% were between 10-15 years age group. Jarwal et al[4] documented maximum prevalence of amblyopia (51.61%) in 5-10 years age group. In the present study, maximum cases (56.66%) of amblyopia were found in the age group between 5-10 years which could be due to decreased compliance for spectacles in 5-10 years age group children after refractive correction, however there was not much difference found in between both the age groups. In our study, amblyopia was noted in 43.3% females and 56.66% males. This was similar to the study of Gupta et al[5] and Jarwal et al[4] in which slight male predominance was observed for amblyopia. An explanation for this gender discrepancy may be due to the bias that fewer girls report to hospitals and schools especially in rural areas and higher male female ratio in general population.

Amblyopia was more common in children with lower socioeconomic background (40%) in our study. These findings were supported by findings of Ikuomenisan et al[6]. This could be probably due to illiteracy and lack of awareness of regular eye check-ups, the importance of using spectacles, less affordability for hospital reach, ignorance of minor complaints, less or no advertisement to aware the population through electronic and print media about the amblyopia. Government needs to promote the awareness in general population similarly like cataract, glaucoma and other preventive blindness condition as because amblyopia is also preventable condition if appropriate preventive measures taken timely otherwise it leads to permanent deficit in visual improvement which is increasing the burden of social blindness.

Most common risk factor associated with amblyopia in present study was anisometropia (53%) followed by strabismus (20%), hypermetropia (10%), myopia(7%), astigmatism (3%), ptosis (3%) and congenital cataract (4%), but no single case of prematurity and low birth weight was observed. Mohammad et al[7] showed a significant association between amblyopia and low birth weight (LBW) as well as preterm birth. However according to The Strabismus, Amblyopia and Refractive Error in Singaporean Children (STARS) study, 13 amblyopia was not associated with LBW, preterm birth, maternal age, or maternal smoking during pregnancy.

Prevalence of anisometropic amblyopia was maximum in our study (53%) than other types of amblyopia. Similar findings were documented by Janti et al[8] and Jarwal et al[4] in which prevalence of anisometropic amblyopia was higher (36.20% and 29.5% respectively). Reason behind Higher prevalence of anisometropic amblyopia than other type of amblyopia could be due to anisometropia being most common risk factors and usually children do not pay attention for unilateral refractive error for long time.

In present study higher percentage of unilateral amblyopia 2 cases (67%) than bilateral amblyopia 1 cases (33%) which could be due to normal physiological phenomenon of brain, which suppresses the eye which is less efficiently working and promote the better eye in a way to improve visual quality resulted in higher number of unilateral amblyopic cases. The present study found that that majority of cases had moderate amblyopia followed by mild and severe amblyopia. Jarwal et al[4] also observed higher percentage of moderate degree of amblyopia 64% as compared to 36% of severe degree of amblyopia. This might be because present study had more of anisometropic amblyopes than Strabismic, and Strabismic amblyopia is associated with severe degree of amblyopia

The present study observed no association between duration of occlusion therapy in between 2 hours, 4 hours and 6 hours eye patching during active time period and visual improvement. Holmes et al[9] concluded that 6 hours of prescribed daily patching produces an improvement in visual acuity that is similar in magnitude to full time occlusion therapy prescribed to treat severe amblyopia (20/100 to 20/400) in children less than 7 years of age. Duration of patching during most active time period of child plays a crucial role to encourage the suppressed eye to improve physiological functioning of eye and to strengthen the retinocortical fibres. Present study got a shorter time of follow up due to covid pandemic situation that influenced the sample size and follow up period of children resulted in slightly different outcome of occlusion therapy in terms of duration of hours of patching taken and visual improvement. Results could have been different in case of larger sample size.

CONCLUSION
Amblyopia is a developmental cortical disorder of the visual pathway that contributes to amblyopia formation essentially due to abnormal visual stimulus reaching the binocular cortical cells which may be multivariate. Present study showed the prevalence of amblyopia in

school going children to be 3% which in itself shows as one of the major hidden visual problem in the society which can be prevented by early identification and proper management in appropriate time. Most common causative risk factor of amblyopia in relation to refractive error was found to be with anisometropia. Early diagnosis and treatment can prevent and minimize risk of permanent deficit of vision in amblyopia if detected earlier especially before 10 years of age. Screening programs in school going children can detect amblyogenic factors earlier to prevent major permanent deficit in vision by amblyopia so screening of children should be done through school surveys, awareness should be spread through various campaigns among the teachers and parents of the children about amblyopia and its adverse consequences not only on visual impairment part but also functional, psychological, social, economic impact.

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