ORIGINAL RESEARCH

To examine the characteristics of amblyopia in children aged 5 to 15 years

Dr. Amrita Chauhan

Associate Professor, Department of Ophthalmology, Dr S S Tantia Medical College Hospital & Research Centre, Sri Ganganagar, Rajasthan, India

Corresponding Author
Dr. Amrita Chauhan
Associate Professor, Department of Ophthalmology, Dr S S Tantia Medical College Hospital & Research Centre, Sri Ganganagar, Rajasthan, India

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ABSTRACT

Aim: To examine the characteristics of amblyopia in children aged 5 to 15 years.

Material and methods: This cross-sectional study was conducted in Out Patient Department of Ophthalmology in which 2398 children of age 5 to 15 years were evaluated for amblyopia at tertiary care center. Detailed history of patients was taken. Patients with amblyopia of age group 5 to 15 years were included. Slit lamp examination was done for anterior segment assessment. Cycloplegic refraction by streak retinoscope and subjective correction (3 days later)was done in patients with difference in the best-corrected visual acuity (BCVA) between the two eyes of two or more Snellen lines or when best corrected visual acuity (BCVA) was less than 6/12 bilaterally. Eye drop Homatropine (2%) was used for cycloplegia. Ocular alignment and fixation with assessment of extraocular movements . Fundus examination was done by indirect ophthalmoscope.

Results: The mean age of presentation was 11.06± 1.83 years. 73% of the patients were over 8 years old. Out of a total of 100 patients, 53 (53%) were male and 47 (47%) were female, resulting in a male to female ratio of 1.12:1. A total of 120 eyes belonging to 100 individuals were diagnosed with amblyopia. A majority of patients, namely 56 (56%), had unilateral amblyopia. Out of the total number of patients, 44% were diagnosed with bilateral amblyopia. The majority of children, namely 30 (39%), had anisometropic amblyopia, followed by 38 children (38%) with isometropic amblyopia, and 15 children (15%) with strabismic amblyopia. Out of the total number of patients, only 8 individuals, which accounts for 8% of the sample, exhibited concurrent amblyopia.

Conclusion: The majority of individuals with amblyopia appeared at a later stage, with a large percentage having no prior history of therapy. A significant number of patients had anisometropic amblyopia, even those who sought treatment at a later stage.

Keywords: Amblyopia, Children, BCVA

INTRODUCTION

Amblyopia is a leading cause of vision impairment in children.[1] Amblyopia is a condition characterized by a decrease in visual clarity in one or both eyes to a level below 6/12, or a difference of two Snellen lines between the two eyes, without any presence of eye abnormalities that may be corrected by refraction. Amblyopia arises from either improper binocular interplay or lack of form vision.[2,3]Asper various studies conducted in India, prevalence rate of amblyopia ranges from 0.8 to 3.3 %.[4]Based on aetiology, amblyopia is divided into strabismic, anisometropic, combined, isometropic and visual deprivation amblyopia.[8]Inputs that are not fusible in eyes with strabismus or lack of visual stimulus in eyes with deprivation or change in the sharpness of image as in anisometropia, is ometropia or combination of one or both, causes partial disconnection of affected eye, resulting into amblyopia.[2-4]In early age visual system has increased sensitivity to stimuli present in environment and its correct or mation is based on sensory experience. Time of onset, degree, duration and type of disturbance in vision determine the impact on neural circuits. Increased neuroplasticity in young age increases the chance of reversal of am blyopia.[5] Therefore, amblyopia when diagnosed beyond critical period (> 8 yrs), become less responsive to treatment.[2-4] This emphasises the need for early diagnosis and treatment of this correctable condition Amblyopia causes defective binocularvision, reduction in ontrast sensitivity, fine and grossmotor skills as well as ocular motor, visual defects in other non amblyopiceye .[6] Presence of amblyopia increases the risk of bilateral visual impairment.[7]

Reduction in visual acuity can become permanent if timely intervention is not taken. Irreversible visual impairment caused by amblyopia in a person causes low self esteem, increased fear of losing vision in fellow eye and less career options.[8]Amblyopia also affects social interaction, with effect on activities and education which affect self image and self esteem, therefore it has a great impact on health related quality of life. [7]Treatment of amblyopia involves patching, optical correction of significant refractive errors, pharmacological treatment and other alternate therapy.[9] Majority of children under 7 years of age with moderate degree of amblyopia in a study by Paediatric Eye Disease Investigator Group (PEDIG) showed improvement in vision after initiating treatment.[10] Amblyopia prevention requires timely correction of refractive errors and deviation of eyes. Early search for contributing factors with widespread increase in awareness among parents is essential for timely initiation of treatment and can significantly, decrease morbidity caused by amblyopia. In our study, we prospectively analysed the profile of amblyopia in children of the age group between 5 to 15 years.

MATERIAL AND METHODS

This research was undertaken at the Out Patient Department of Ophthalmology at a tertiary care facility. It included the evaluation of 2398 children, aged 5 to 15 years, for amblyopia. A comprehensive medical history of the patients was obtained. Included in the study were patients between the ages of 5 - 15 who had amblyopia. Patients who were older than 15 years of age, younger than 5 years of age, and had sensory deprivation amblyopia (which is caused by known sensory deprivation factors such as media opacities and ptosis) were not included in the study. Detailed history ofpatients was taken and visual acuity was assessed by Snellen chart. Slit lamp examination was done for anterior segment assessment. Cycloplegic refraction by streak retinoscope and subjective correction (3 days later) was done in patients with difference in the best-corrected visual acuity (BCVA) between the two eyes of two or more Snellen lines or when best corrected visual acuity (BCVA)wasless than 6/12 bilaterally. Eye drop Homatropine (2%) was used for cycloplegia. Ocular alignment and fixation with assessment ofextraocular movements. Fundus examination was done by indirect ophthalmoscope. Assessment of the binocular status of the eye was performed with the help of the Worth's four-dot test and Bagolini's striated glasses.

STATISTICAL ANALYSIS

Data was compiled and entered in MS excel sheet and analysis was carried out using Statistical Package for Social Services (IBM SPSS version 24) for windows. Analysis was performed by descriptive statistical analysis using ratio and proportions and Chi-square test for categorical variables.

RESULTS

Among the 2398 patients, 120 eyes of 100 individuals were diagnosed with amblyopia. The mean age of presentation was 11.06± 1.83 years. 73% of the patients were over 8 years old. Table 1. Out of a total of 100 patients, 53 (53%) were male and 47 (47%) were female, resulting in a male to female ratio of 1.12:1. A majority of patients, namely 53 (53%), had not had any prior therapy for amblyopia. Table 2 A total of 120 eyes belonging to 100 individuals were diagnosed with amblyopia. A majority of patients, namely 56 (56%), had unilateral amblyopia. Out of the total number of patients, 44% were diagnosed with bilateral amblyopia.

Out of the 56 individuals with unilateral amblyopia, the right eye was more afflicted than the left eye. The right eye was impacted in 30 individuals, accounting for 30% of the total, while the left eye was damaged in 26 cases, accounting for 26%. The majority of children, namely 30 (39%), had anisometropic amblyopia, followed by 38 children (38%) with isometropic amblyopia, and 15 children (15%) with strabismic amblyopia. Out of the total number of patients, only 8 individuals, which accounts for 8% of the sample, exhibited concurrent amblyopia. In our investigation, anisometropic amblyopia was the predominant kind of amblyopia. The prevalence of hypermetropic astigmatism was highest in amblyopic eyes. Table 3

Table1: Distribution of patients according to age group

Age Group (in years)	Number of patients	Percentage(%)
5-8years	27	27
8-10years	32	32
10-13years	20	20
13-15years	21	21
Mean Age	11.06± 1.83	

Table2: History of previous treatment

History of previous treatment	Number of Patients	Percentage(%)
Absent	53	53
Present	47	47
Total	100	100

Table3: Distribution of refractive errors in amblyopic eyes.

Refractive Errors	Number of amblyopic eyes	Percentage(%)
Hypermetropia	19	19
Hypermetropic Astigmatism	38	38
Myopia	9	9
Myopic Astigmatism	34	34
Total	100	100

DISCUSSION

Amblyopia causes decrease invision without any ocular abnormality. Strabismus, unequal refractive errors(anisometropia) or combination of both, deprivation of visual stimulus and high refractive errors(isoametropia), when present in a child in early phase of life causes amblyopia. Early recognition of this visual impairment in children, before the critical age i.e. 8 years as suggested in many studies improve visual prognosis. However treatment can be started even after 8 years but the outcome is not so favourable. Knowing the contribution of each type of amblyopia for the causation of visual impairment helps in formulating an effective strategy to enhance visual prognosis as well as prevent irreversible visual impairment. In our study, Out of 2398 patients,120 eyes of 100 patients were found amblyopic. Average age of presentation was 11.06± 1.83 years. The majority of patients i.e.73(73%) presented were above 8 years which is higher than the average age seen in the studies done by Al Haddad et al. in Lebnan[11] (6.2 ± 6.1 years), Menon et al.(7.97±6.18 years) in India.[12] However our findings are consistent with the studies done by Saxena et al.[13] (16.1 ± 14 years),Bhandari et al.[14] (9.3±3.9 years) in Nepal. The majority of patients i.e.73(73%) presented were above 8 years. Late age of presentation in our study demands urgent need to do screening of children in population and schools and increase awareness among parents about amblyopia. Patients with isometropic amblyopia were seen more commonly between ages of 5to10years, while those with anisometropic amblyopia, presented more commonly in the later age group i.e. between 11 to 15 years. This shows that patients with unilateral amblyopia remained undetected till a later age In our study, 53 patients (53%) of total 100 patients were male and 47 patients (47%) were female, thus male to female ratio was found to be 1.12:1. Many studies like, Marthala et al.[15] and Gupta et al. [16] found higher proportion of male patients with amblyopia than female, for which they explained that, fewer girls reported. However, this gender preference was not significant in our study. In our study, Most of children i.e. 30(39%) had an isometropic amblyopia followed by isometropic in 38 children (38 %) and strabismic amblyopia in 15 children (15%). Only 8 patients(8%) had combined amblyopia. Anisometropic amblyopia was the most common type of amblyopia in our study. Anisometropicamblyopiawaspresentinthelargestproportioninindianstudiesdoneinwardha[17],Assam[18],Nagpur[19].Higherproportionofpatientswithrefractiveamblyopia(anisometropicandisoametropicamblyopia)issupportedbymanystudiesshowinguncorrectedrefractiveerrorsasoneofthemajorcauseofvisualimpairment.[31-33]FewotherstudiesdoneinIndiai.e.Menonetal.[12]inDelhi,Marthalaetal.[15]inKarnatakaandAl Haddad et al.[11] in Lebnan hadgreater proportion of children with strabismic amblyopia.On the contrary, uncorrected refractive error was the major cause of amblyopia in our study. In our study, Majority of patients i.e. 56(56%) had unilateral amblyopia. 44 patients (44%) had bilateral amblyopia. Studies done in Karnataka by Marthala et al.[11] and in Delhi by Menon et al.[12] had similar finding. However studies done in Assam by Magdalene et al.[18], in Dehradun by Gupta et al.[16]had bilateral am blyopia, more common than unilateral amblyopia.

There was no history of prior treatment in 53children(53%).Significantnumberofchildrenpresentingabove14yearsofagehadnohistoryofprevioustreatment. This shows that, unilaterality and lack of awareness among parents for screening programmes is responsible for delay in diagnosis of amblyopia. In our study, out of 120 amblyopic eyes of 100 patients, astigmatism was the most common refractive error (72 %) followed by hypermetropia (19%) and least was myopia (9%).

Hypermetropic Astigmatism was present in 38amblyopic eyes(38%). Our findings are consistent with studies done by Gupta et al.[16]in Dehradun However, Menon et al.[23] had hypermetropia as the most common refractive error.

CONCLUSION

The majority of individuals with amblyopia appeared at a later stage, with a large percentage having no prior history of therapy. A significant number of patients had anisometropic amblyopia, even those who sought treatment at a later stage.

REFERENCES

1. Ambastha A, Kusumesh R, Sinha S, Sinha BP, Bhasker G.Causes of visual impairment in applications for blindnesscertificates in a tertiary center of Bihar and its role in healthplanning. Indian J Ophthalmol 2019;67:204-8.
2. SaxenaR,SinghD,GantyalaSP,AggarwalS,SachdevaMM,Sharma P. Burden of ocular motility disorders at a tertiarycare institution: A case to enhance secondary level eye care.Indian J Community Med 2016;41:103-7.
3. Saxena R, Sharma P, Gopal S. National consensus statementregarding pediatric eye examination, refraction, andamblyopia management. Indian J

Ophthalmol 2020; 68:325-32.
4. Grant S, Moseley MJ. Amblyopia and real-world visuomotortasks. Strabismus 2011;19:119–28.
5. Wong AM. New concepts concerning the neural mechanismsof amblyopia and their clinical implications.Can JOphthalmol.2012;47(5):399-409.
6. GopalSK,KelkarJ,KelkarA,PanditA.Simplifedupdateso nthe pathophysiology and recentdevelopmentsin thetreatmentof amblyopia: A review. Indian J Ophthalmol 2019;67:1392-9.
7. Keech RV, Kutschke PJ. Upper age limit for the developmentof amblyopia. J Pediatr Ophthal Strab 1995;32:89-93.
8. Celik NB, Kose AO, Celik HU, Imamoglu S. BCSC Pediatric Ophthalmology and Strabismus. Section. 2020;6:10203
9. Deepti J, Shanti P, Nitin M, Govind S. Profile of amblyopia in children of age 5 to 15 years at tertiary care center. Int J Health Clin Res. 2021;4(8):129–132.
10. Li YP, Zhou MW, Forster SH, et al. Prevalence of amblyopia among preschool children in central south China. Int J Ophthalmol. 2019;12(5):820–825.
11. Al-Haddad C,Keaik M. Clinical profle and treatmentoutcomesof amblyopia across age groups. Middle East Afr JOphthalmol2019;26:71-6.
12. Menon V, Chaudhuri Z, Saxena R, Gill K, Sachdev MM.Profle of amblyopia in hospital referral practice. Indian JOphthalmol.2005;53:227-34.
13. Saxena R, Singh D, Gantyala SP, Aggarwal S,Sachdeva MM,Sharma P. Burden of ocular motility disorders at a TertiaryCare Institution: A case to enhance secondary level eye care.Indian J Community Med 2016;41:103-7.
14. Bhandari G, Byanju R, Kandel RPPrevalence and Profle ofAmblyopia in Children at Bharatpur Eye Hospital. AnnPediatr Child Health.2015;3(8): 1085.
15. Marthala H, Kamath G, Kamath M, Kamath SJ. Clinicalprofle of amblyopia in a tertiary care teaching hospital inSouthern India. Indian J Ophthalmol 2017;65:258-9.
16. Gupta M,Rana SK, Mittal SK, Sinha RN. Profile ofAmblyopia in School going (5-15 years) Children at StateLevel Referral Hospital in Uttarakhand. J Clin Diagn Res.2016;10(11):SC09-SC11.
17. Sachin Daigavane "Clinical Profile Of Amblyopia In ATertiaryHealthCareCentreInCentralIndia"IOSRJournalofDental and Medical Sciences (IOSR-JDMS), 2018; 17(3):59-62.
18. Magdalene D, Bhattacharjee H, Choudhury M, Multani PK,Singh A, Deshmukh S, et al. Community outreach: Anindicator for assessment of prevalence of amblyopia. Indian JOphthalmol2018;66:940-4.
19. Deshmukh MR, Madan AH, Painjane KR, et al. Clinicalprofile of amblyopia patients between 5-15 years of age. J.Evid. Based Med. Healthc. 2016; 3(93): 5116-5119.