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Profile of Amblyopia in School going (6-16 years) Children in Bundelkhand region

Ophthalmology

KEYWORDS: Ametropia, Anisometropia, Astigmatism

Dr. Jitendra kumar — Department of Ophthalmology, M.L.B.Medical College/Bundelkhand University, India

Dr. Shweta dwivedi — Department of Ophthalmology, M.L.B.Medical College/Bundelkhand University, India

Dr.Anubhav Sharma — Department of Orthopaedics, M.L.B.Medical College/Bundelkhand University, India

ABSTRACT

Introduction: Amblyopia is one of the common causes of childhood visual impairment. The prevalence of amblyopia usually varies according to the age group of the studied population and the factors prevailing in that region. The upper limit of the critical time when amblyopia can develop is around eight years of age and it can be permanent if corrective measures are not taken in time.

Aim: The purpose of study was to know the profile and pattern of amblyopia in children aged 6-16 years with refractive error Bundelkhand region .

Materials and Methods: In the present retrospective cross-sectional study, 100 children from 6-16 yrs of age who attended the OPD during the period between March 2015 to December 2015, had undergone detailed Ophthalmic examination. The children having vision < 6/12 with out organic lesion were included in the study. The children with strabismus, previous ocular surgery and ocular diseases were excluded.

Results: The percentage of amblyopia was 20% (n=20) with insignificant gender variation (p-value>0.05). Amblyopia due to astigmatism (combined) was in 45% (n=9) followed by Hypermetropia [35% (n=7)] and least in myopia [20% (n=4)]. In 55% cases age of presentation was 6-11 years while rest belonged to > 11 years of age. Binocular amblyopia was more (55%) then unilateral amblyopia (45%).

Conclusion: Refractory errors are second most common cause of paediatrc amblyopia. Amblyopia and associated strabismus can have devastating psychosocial and economical fall outs. Our study emphasizes the need of visual screening of school children and prescribing them correct spectacles at appropriate time.

INTRODUCTION

Amblyopia is an important public health problem leading to visual impairment which is lifelong [1-3]. Refractive error is one of the common causes of amblyopia [4-6]. The prevalence of amblyopia is often underestimated due to lack of awareness and knowledge in parents about refractive errors in children and late ophthalmological referrals for visual screenings [7-9]. The causes of amblyopia include anisometropia, high refractive errors and opacities of the ocular media, strabismus or a combination of two or more aetiologies in the same case [10-12]. But the basic mechanism of amblyopia is either abnormal binocular interaction, or form deprivation in one or both eyes. If timely corrective measures (upper limit of the critical time for development of the Amblyopia eight years) are not taken, lifelong visual impairment can occur [3,10-13]. The main focus of childhood blindness in developing countries like India has been conditions like vitamin A deficiency, trauma, cataract and other causes related to malnutrition, infection, refractive error and poor health [1-4,14,15].

In our study, we retrospectively analysed the profile and pattern of amblyopia in children in the age group between 6 to16 years, at OPD ,Ophthalmology department, M.L.B.Medical college from March 2015 to December 2015.

MATERIALS AND METHODS

In this retrospective, hospital based study, 100 children from 6 years till 16 years of age who attended the OPD during the period from March 2015 to December 2015, were included. All the children had undergone detailed history related to the age of onset, as noticed by the patient or his guardian. Ophthalmic examination included visual acuity by Snellen vision chart, cycloplegic refraction by streak retinoscope, auto-refrectometer, thorough anterior and posterior segment and examination by lamp biomicroscopy, ophthalmoscopy and assessment of the ocular alignment by cover-uncover test and ocular motility. Assessment of the binocular status of the eye was performed with the help of Worth's four –dot test and synaptophore.

An inclusion criterion was best corrected visual acuity in one or both eye 6/12 or less than 6/12 in absence of any organic lesion. Cases of strabismus, previous history of ocular surgery, trauma and diseases affecting the vision were excluded from the study. [10,11]

For ametropic amblyopia: Patients with refractory errors more than > 1.0D spherical in both eyes resulting in vision less than 6/12 or equal to 6/12 in one or both eyes and no associated strabismus or any other ocular pathology.

Anisometric amblyopia: Who had amblyopia in the presence of anisometropia that was 1 D or greater than 1 D in spherical or 1.5 D or greater difference in astigmatism between both the eyes that had persisted for more than 4 weeks after spectacle correction, in the absence of any measurable hetrophoria.

Meridional amblyopia: Who had regular astigmatism equal or more than 1.5 D of astigmatism in both eyes, resulting in decrease of vision in one or both eyes and no associated strabismus. Patients with significant anisometropia (as defined above) along with the difference of 1.5 Diopter =/> between the two eyes were excluded from this category.

RESULTS

The percentage of Amblyopia in our study was 20% (n=20) **[Table-1].** Our study showed gender preference where amblyopic male cases 60% and female amblyopic cases 40% **[Table-2]** (p-value>0.05).

The results showed amblyopia due to astigmatism (combined) in 45% (n=9) followed by amblyopia due to hypermetropia was in 35% (n=7) and least in myopia i.e. 20% (n=4) **[Table-3].** Age of presentation of amblyopia for 6 to 11-year-old age group was 55% and for 12 to 16-year-old age group was 45% (p-value >0.05) **[Table-4].** Binocular amblyopia was more (55%) then unilateral amblyopia (45%) **[Table-5].** Our study showed an amblyopia due to anisometropia (40%) and ametropia (45%) and least in meridional amblyopia (15%) **[Table-6].**

Table 1 : Percentage of amblyopia in our study.

TOTAL CASES (100)	AMBLYOPIA
80	NO
20	YES

Table 2 : Gender distribution of amblyopia

TOTAL CASES (100)	AMBLYOPIA(20)
Males (60)	12 (60%)

Females (40)	8 (40%)

Table 3 : Distribution of type of amblyopia.

SERIAL NO.	TYPES OF AMETROPIA	NO. OF AMBLYOPIA	PERCENTAGE
1.	Hypermetropia	7	35%
2	Myopia	4	20%
3.	Hypermetropic astigmatism	3	15%
4.	Myopic astigmatism	6	30%
Total		20	100%

Table 4 : Age of presentation of amblyopia..

AGE GROUP	NO. OF CASES	PERCENTAGE(%)
6-11 yrs	11	55%
12-16 yrs	9	45%

Table 5 : Laterality of amblyopia.

	No. of Amblyopia	PERCENTAGE(%)
Monocular	9	45%
Binocular	11	55%
Total	20	100%

Table 6 : Types of amblyopia.

AMBLYOPIA	NO. OF CASES	PERCENTAGE(%)
Ametropia	9	45%
Anisometropia	8	40%
Meridonial	3	15%

DISCUSSION

Prevalence of amblyopia varies because of different age-group of studied populations and different factors prevailing in that region, like literacy rate, frequency of visual screening programmes and geographical factors. The population based regional studies in India related to the childhood blindness and prevalence of refractory errors showed prevalence rate of amblyopia to be 1.1% (V Kalikiyavi et al.,) [4]. In another study by Rahi et al., involving nine states in our country, cataract, uncorrected aphakia and amblyopia comprised of 12.3% severe visual impairment [3]. In the urban population, the study reported the prevalence rate of amblyopia to be about 4.4% (GV Murthy et al.,) [14]. In a study done in Andhra Pradesh in India, the prevalence of amblyopia was 6.6% (K Anjaneyulu et al.,) [17].

In South-Asian region the Chinese studies showed prevalence rate which varies between 0.8% to 2.5% in different subsets of population done by (Andrey Chia et al., and Jing Fu et al.,) respectively [18,19]. In a Nepalese hospital based study the prevalence was 1% [20]. Another hospital based study done in Bharatpur, Nepal, the prevalence rate was 1.40% (Gopal Bhandari et al.,) [21]. In our study, the percentage of Amblyopia was 20%, which is higher as compared to past studies [4,14,17,18-21]. It may be due to high literacy rate in the urban population, higher paediatric referrals from peripheral health centres and from visual screening programmes in schools.

In our study, we found gender preference, where the male amblyopia was 60% and female was 40% but the p-value was insignificant ($p > 0.05$). Similar finding was found in study done in Nepal which is demographically very similar to our study region (K Sapkota et al.,) [20].

In our study, bilateral amblyopia was higher (55%) than unilateral amblyopia (45%), which is uncommon and opposite to the study done in Nepal (71% unilateral amblyopia) [20], in Andhra Pradesh by K Anjaneyulu et al., [17] and by Menon et al., where 7% cases were bilateral [24]. Our study however had findings consistent with study of Chung et al., where (49%) amblyopia was bilateral [22].

In our study, astigmatism was the most common refractive error (45%) in amblyopic eyes followed by hypermetropia (35%) and least was myopia (20%). Ametropic amblyopia (45%) and anisometropic amblyopia(40%) and meridional amblyopia was least common (15%). A Nepalese study showed similar findings where amblyopia due to astigmatisum was most common (59.2%) followed by hypermetropia (33.5%). In this study, anisometropic amblyopia was the most common type of amblyopia [20]. Our study was also consistent with recent Chinese study done by Xiao et al., where astigmatism was found in 92%of amblyopic eyes [23].

Ametropia amblyopia is the most common cause of amblyopia in our study which is inconsistent with K Sapkota et al study[20] in which anisometropia was the most common cause of amblopia reason being even if anisometropia is optically corrected, anisokenia may be another amblyogenic factor for development of amblyopia [24]. Severity and prevalence of amblyopia increases as the amount of anisometropia increases [25,26]. Hypermetropic patients with anisometropia of one Diopter difference may have amblyopia, while myopic anisometropic usually do not have amblyopia until anisometropia is large [27]. Unilateral high hyperopia or myopia greater than 6 Diopter can cause severe amblyopia [28,29]. Isometric amblyopia (severe symmetric refractory errors) may cause mild to moderate bilateral amblyopia, more common in hyperops (in excess of +6 Diopter) than in myopes [28]. This is because sharply focused images of objects held closely support the normal visual development in myopia [28]. In meridional amblyopia the mild degree of astigmatism greater than 1.5 Diopter can be amblyogenic [28,29].

In Vision 2020, amblyopia is a major preventable and treatable cause of low vision paediatric age group [30-32]. If left untreated, paediatric amblyopia may result in monocular and binocular low vision [11-14,33-35] with associated deterioration in Quality of Life indices in adulthood. Therefore measures for early detection and dedicated rehabilitation of amblyopia should be a priority and also should be evidence-based. This should be the hallmark of the blindness control programme in India [31,32].

CONCLUSION

We conclude from our study that refractive error is the major cause of amblyopia and if it is not corrected timely, can cause not only the permanent visual morbidity but also cause economical and psychological problem in adult life by not perusing certain occupation because of lack of binocular vision. The results of our study emphasizes the need for more school screening and public awareness programmes for prescribing the correct spectacles and educating the parents to help their children to use them (if needed).

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