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A Descriptive Study of Amblyopia in Children: A Hospital Based Study

Imtiyaz A. Lone¹, Natasha Koul², Reyaz A. Untoo³

¹Associate Professor, Post-Graduate Department of Ophthalmology, Sher-i-Kashmir Institute of Medical Sciences Medical College, Srinagar; ²Post-graduate Scholar, Post-Graduate Department of Ophthalmology, Sher-i-Kashmir Institute of Medical Sciences Medical College, Srinagar; ³Professor & Head, Post-Graduate Department of Ophthalmology & Principal, Sher-i-Kashmir Institute of Medical Sciences Medical College, Srinagar.

ABSTRACT

Introduction: Amblyopia is the most common cause of visual impairment in children. The prevalence of amblyopia in children has been estimated at between 1% and 4%. Most cases are associated with strabismus, anisometropia or a combination of strabismus and anisometropia.

Aims and objectives: To assess the profile of patients with visual disability due to amblyopia in Kashmir and to suggest measures for restricting visual disability due to Amblyopia.

Methods: This prospective study was conducted in the Postgraduate Department of Ophthalmology Sher-i-Kashmir institute of Medical Sciences Medical College, Srinagar during a period of 12 months from 1st March 2015 to 29th February 2016. All the patients between 30 months to 19 years of age with amblyopia who attended the Ophthalmology OPD were included in the study. Visual acuity measurements were done using Snellens chart for older patients and for 2-4 year old children by using Cardiff acuity cards, Kay picture test or Teller test.

Results: The mean age of the 103 children was 12.25 years (± 2.89) ranging from 4-19 years with 58 males and 45 females. 64 children were amblyopic in right eye, 37 in left eye and 2 had bilateral amblyopia. The cause of the amblyopia was strabismus in 32 children (31%), anisometropia in 60 (58%), and both strabismus and anisometropia in 5 (5%). 5 children had amblyopia due to congenital cataract with 1 of them having bilateral amblyopia. One child had amblyopia due to severe congenital ptosis.

Conclusions: There were significantly greater number of anisometropic amblyopia patients than strabismic amblyopia ($p < 0.01$).

Key Words: Amblyopia, Anisometropia, strabismus

INTRODUCTION

The term 'amblyopia' comes from the Greek word 'amblupos' which means 'dim-sighted' (1). Amblyopia occurs when there is suboptimal vision in one or both eyes despite best-corrected spectacle correction, and when there are no other anatomical ocular or cerebral visual pathway abnormalities to explain this visual impairment (2). It occurs as a result of disrupted or incomplete visual development during early childhood (3, 4).

Normal visual development commences at childbirth when the child opens his/her eyes for the first time. It improves very rapidly in the first 6 months of life and then more gradually, reaching adult levels when the child is aged 4-6 years.

This is accompanied by differential development of the retina, foveal region, increased synaptic density within the primary visual cortex, and pruning of extraneous neuronal receptive fields; all of which result in improved spatial resolution and contrast sensitivity (i.e. vision). This process is a competitive one, with neurons from each eye competing for space within the cortex (5,6).

Well-known ocular risk factors to amblyopia include high hypermetropia ($>4.00D$), high myopia ($>8.00D$), astigmatism ($>2.00D$), lid ptosis, childhood cataract and strabismus (2, 7).

Amblyopia can be classified as either being unilateral or bilateral. Unilateral amblyopia occurs when the visual im-

Corresponding Author:

Imtiyaz A. Lone, Associate Professor, Post-Graduate Department of Ophthalmology, Sher-i-Kashmir institute of Medical sciences Medical College, Srinagar, Ph: 091-7298715306; E-mail: imtiyazalone@yahoo.co.in

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age in one eye is compromised or blurred so that, that eye is selectively disadvantaged. In contrast, bilateral amblyopia can occur when there are similar levels of obstruction/blur in both eyes. This is often the result of high uncorrected refractive error (e.g. hypermetropia, myopia or astigmatism) or equal obstruction in both eyes. Amblyopia can also be classified according to etiology (i.e., refractive, strabismic or deprivational) (2). In general, refractive amblyopia is more common than strabismic amblyopia. Clinically, amblyopia is defined by two or more lines difference in visual acuity between the eyes, (8) however other monocular visual functions are also affected, including grating acuity, vernier acuity and contrast sensitivity. Another classification based on visual acuity in amblyopic eye is:

Mild : V.A > 6/ 24

Moderate : V.A 6/24 -6/60

Severe : V.A < 6/60

AIMS AND OBJECTIVES

The present study was done to assess the profile of patients with visual disability due to amblyopia in Kashmir and to suggest measures for restricting visual disability due to amblyopia.

MATERIALS AND METHODS

The present study was conducted in the post-graduate department of Ophthalmology Sher-i-Kashmir institute of Medical Sciences Medical College Hospital, Srinagar. Children between 30 months and 19 years of age with two or more lines difference in visual acuity of two eyes or $\leq 6/12$ best corrected visual acuity (BCVA) in bilateral cases and having anisometropia, strabismus, congenital cataract or ptosis were included in the study. Patients having some other disease in the eye responsible for low vision like any macular disorders, pathological myopia, history of trauma and those not falling within the age group taken for the study were excluded from the study.

The patients were registered on a pre-structured proforma which included patients demographic details, visual acuity, pin hole vision testing, refraction, retinoscopy, anterior segment examination and fundus examination.

Testing and examination protocol included:

- Visual acuity measurement using Snellens chart for older patients and for 2-4 year old children by using Cardiff acuity cards, or Teller test.

- Ocular motility.
- Squint evaluation.
- Refraction with and without cycloplegia.
- Detailed anterior segment examination with slit-lamp microscope.
- Fundus examination (with direct and indirect ophthalmoscope).

RESULTS

A total of 32528 patients attended Ophthalmology OPD during the study period out of whom 8245 were in the 2-19 year age group. 103 patients were registered for the purpose of the study based on inclusion and exclusion criteria. This roughly puts the prevalence of amblyopia in this age group at 1.25%.

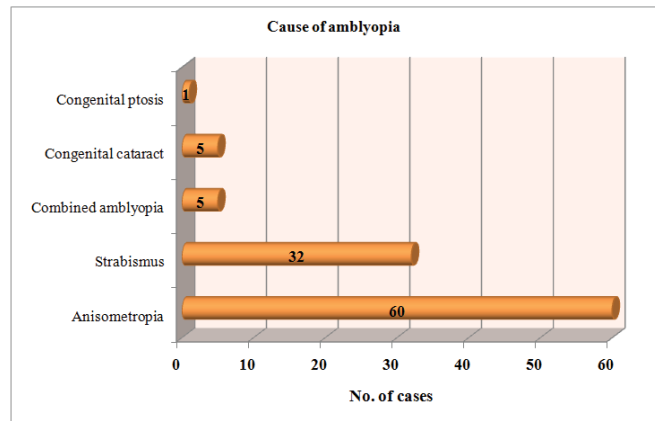
The mean age of the children was 12.25 years (± 2.89) ranging from 4-19 years. There were 58 males and 45 females. 64 children (62.14%) were amblyopic in the right eye, 37(35.92%) in the left eye and 2 (1.94%) had bilateral amblyopia. Thus there were a total of 105 amblyopic eyes

Table 1: BCVA in the 105 eyes

BCVA	No. of eyes	Percentage
$\leq 6/12$ but $> 6/24$	57	54.3%
$\leq 6/24$ but $> 6/60$	37	35.2%
$\leq 6/60$	11	10.5%
Total	105	100%

The cause of the amblyopia was strabismus in 32 children (31%), anisometropia in 60 (58%), and both strabismus and anisometropia in 5 (5%). 5 children had amblyopia due to congenital cataract. One child had amblyopia due to severe congenital ptosis.

Table 2: Cause of Amblyopia



Among those with strabismic amblyopia (pure or combined anisometric and strabismic), 32 patients (86.5%) had esotropia and 5 (13.5%) had exotropia.

65 patients had anisometric amblyopia (pure or combined). Out of these 43 patients (66.2%) had hypermetropic anisometropia, 17 (26.1%) had myopic anisometropia and 5(7.7%) had astigmatic anisometropia.

Among 43 patients with hypermetropic anisometropia, the degree of anisometropia ranged from +1D to +6.5 D. Of the total of 17 patients with myopic anisometropia, the degree of anisometropia ranged from -2 D to -4.5 D. 5 patients had astigmatic anisometropia which ranged from -1 D to -2.5 D.

DISCUSSION

Amblyopia is one of the most common causes of visual impairment in both children and adults with a prevalence varying between 0.2% and 12% depending on the subsets of the population studied (9,10). Lack of adequate understanding or knowledge about this preventable and easily treatable condition, provided compliant treatment is started early, is often the reason why very few patients are referred to eye hospitals or specialists for the amelioration of the same especially in a developing country like India.(11)

Amblyopia and associated strabismus can have devastating psychosocial and economic fall-outs. Failure to develop binocular vision and unilateral or bilateral visual impairment may prevent the individual from pursuing certain occupations. Severe amblyopia is also considered a significant risk factor for blindness in case an individual loses sight in the fellow eye.

Though the present study suffers from a selection bias, as the data is hospital based, this analysis may form the basis of future population-based studies. However, one advantage of a study in a hospital referral practice with a very wide base of patients coming from all parts of the state, is the immense variety and numbers that can be seen, which can be utilized to elucidate the clinical profile of that condition under as ideal a circumstance as possible.

Another important factor that this study reveals is the relatively older ages of presentation to a specialty clinic irrespective of the sub-type of amblyopia present. Seven to eight years is the critical time after which therapeutic measures for the treatment of amblyopia become less effective and unfortunately the average age of presentation of most patients to the hospital in our study was more than that (12.25 years). This reiterates that efforts to screen patients for amblyopia and educate personnel at every level to suspect, diagnose, treat or refer the patient as soon as possible. Prevalence of amblyopia in our study was found to be 1.25% in children aged between 30 months - 19 years. Amblyopia was more

prevalent in males than females, though the difference was not statistically significant ($p=0.20$). The most common cause of the amblyopia in our study was anisometropia (58%) followed by strabismus (31%), and both strabismus and anisometropia (5%). It is precisely the most common form of amblyopia that is often overlooked, as unlike strabismus pure anisometropia is not usually noticeable to those around the child concerned.

CONCLUSION

Amblyopia is one of the causes of visual impairment in children with anisometropia and strabismus being the main reason. However the corrective measures if taken at the earliest prevent the devastating psychosocial and economic fall-outs.

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Conflicts of Interest : Nil

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