

# Amblyopic Risk Factors and its Prevalence among Growing Children in Our Population

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## ABSTRACT

**Aim:** To assess Amblyopic risk factors and its prevalence among growing children in our population

**Study design:** A Cross sectional study was designed to be carried out at out patient department CMH Lahore from Nov 2014 to Nov 2015.

**Methods:** The study was conducted at eye department CMH Lahore from Nov 2014 to Nov 2015 which provides tertiary level eye care facilities. During this period a total of 1192 children aged 5–15 years were examined at this Center's Pediatric Ophthalmic Unit. All the children were subjected to complete visual assessment. Snellen acuity chart was used to document initial vision in both eyes. Those who fail to read standard 6/6 criteria of normal vision were further evaluated with dilated fundus examination and cycloplegic refraction. Squint was assessed with help of cover uncover supplemented by prisms and corneal reflection test.

**Results:** A total of 1192 children were screened and 43 (3.60%) among the recruited cases were found to have reduction of best correctable visual acuity either in one eye or both eyes.. There were 609 (51.09%) males and 583 (48.90%) females. 26 (60.4%) documented cases of amblyopia were less than 10 years of age. Anisometropia seems to be the leading risk factor in growing age causing loss of vision 14(32.5%). Meridional accounting 11(25.5%), strabismus 9(20.9%), stimulus deprivation (13.9%) and combined 3(6.9%). The prevalence of amblyopia among growing children visiting to eye OPD CMH Lahore was found to be 3.60% which is closely related to any other published material on amblyopia.

**Conclusion:** Detection of Amblyopia in early years by screening is essential since it is manageable in many cases thereby preventing visual disability in later life.

**Keywords:** Amblyopia, Screening, Strabismus, Prevalence.

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## INTRODUCTION

Every year a substantial population of children residing in different parts of the world suffers from visual impairment during their growing period. Amblyopia is technically defined as reduction of best correctable visual acuity either in one eye or both eyes as a consequence of poor or abnormal binocular interactions and form vision deprivation during childhood years of life for which no ocular pathology can be observed on ocular examination<sup>1</sup>. Amblyopia seems to be the leading cause of monocular visual impairment in both children and adults as documented in many studies<sup>2, 3,4</sup>. High refractive error, strabismus, anisometropia and media opacities were major amblyogenic factors leading to non recoverable loss of vision in adulthood.

Several studies mentioned in literature have evaluated the prevalence of amblyopia in their respective population in the past. One such study

carried out in Australia in 6 years old children found it to be 1.8%. Another study performed among children aged 7 years in the Avon Longitudinal Study of Parents and Children estimated it to be 3.6%<sup>5,6</sup>. In another study by Doshi et al the prevalence of amblyopia in United States is stated to be 1-4%.

The basic aim behind conducting our study is to determine prevalence of Amblyopia in growing children which seems to affect a significant portion of children due to various risk factors like refractive errors; strabismus and media defects which prevent formation of clear image on retina needed for visual maturation. Moreover portion of population have different risk factors are also documented to analyze which risk factor is more prevalent leading to Amblyopia if remain untreated timely. Since no adequate system for visual screening currently persists in our system Amblyopia is usually identified in later age when child grows older and presented with visual insufficiency either in school going period or further later on job. Visual maturation usually starts in early childhood period and patient harboring any amblyogenic factor during these years is liable to develop amblyopia. Since these risk factors like

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refractive errors, strabismus, media opacities like cataract are treatable<sup>8,9</sup> visual screening should be made a regular component of childhood assessment and appropriate treatment should be started in documented cases forthwith.

## MATERIAL AND METHODS

A cross sectional study was conducted at eye department CMH Lahore from Nov 2014 to Nov 2015 which provides tertiary level eye care facilities. During this period a total of 1192 children aged 5–15 years were seen at this Center's Pediatric Ophthalmology Unit after taking written informed consent. Exclusion criteria include trauma and organic eye disease. Inclusion criteria include all cases other than exclusion criteria with poor vision suspected to have refractive error, strabismus or media opacity. Snellen acuity chart was used to document initial vision in both eyes. Those who fail to read standard 6/6 criteria of normal vision were further evaluated with dilated fundus examination and cycloplegic refraction. 0.5% Tropicamide and 1% cyclopentolate were used to relax accommodation. Squint was assessed with help of cover uncover test supplemented by prisms and corneal reflection test. Refractive errors like Hypermetropia, myopia and astigmatism were assessed by using Retinoscopy procedure and autorefractor and best possible spectacles were advised. Media opacities like cataract were ruled out by slit lamp examination.

All the children also underwent dilated fundus posterior segment examination to rule out any disease in vitreous or retina responsible for decrease vision. The data was analyzed using SPSS. Descriptive statistics were used to describe the clinico demographic data and the results were displayed as frequency and percentage for gender, laterality and cause.

## RESULTS

A total of 1192 children were screened and 43(3.60%) were found to have reduction of best correctable visual acuity either in one eye or both eyes. There were 609(51.09%) males and 583 (48.09%) females. 26(60.4%) documented cases of amblyopia were less than 10 years of age. Anisometropia seems to be the leading risk factor in growing age causing loss of vision 14(32.5%). Meridional accounting 11(25.5%), strabismus 9(20.9%), stimulus deprivation (13.9%) and combined 3(6.9%). The average age of the recruited population was 10.2 years. Unilateral cases 32(74.41%) were more than Bilateral cases 11(25.5%) with no significant sex difference.

Table 1: Distribution of Patients by gender having Amblyopia.

Gender	n	%age
Male	609	51.09
Female	583	48.90

Table 2: Distribution of Patients by laterality having Amblyopia.

Laterality	n	%age
Bilateral	11	25.5
Unilateral	32	74.41

Table 3: Patient distribution by risk factors having Amblyopia.

Amblyogenic risk factor	n	%age
Anisometropic	14	32.5
Astigmatic	11	25.5
Stimulus deprivation	06	13.9
Combined	03	6.9
Strabismus	09	20.9

## DISCUSSION

Visual impairment is a major global health problem and amblyopia is still responsible for a significant proportion of blindness in both developing and developed countries. Prevalence of amblyopia is reported differently in literature among studies carried out in different parts of the world. It may be due to racial and geographical factors affecting a particular study or method of visual assessment. The prevalence of amblyopia documented in literature varies among differently studies roughly between 1 to 6% depending probably upon the criteria standardized in the respective study for visual assessment. In the Blue Mountains area west of Sydney the prevalence of amblyopia in an Australian population was documented 3.9%<sup>2</sup>.

In a Turkish study amblyopia was expected to be present in 5.5% of the respective population of children<sup>10</sup> and an Iranian study<sup>11</sup> concluded it to be 1.9% in the target population of students<sup>10,11</sup>. Chinese study conducted by Jing Fu and associates calculates it to be 2.5% and its target population was average age of 12.4 years while another study by Andrey Chia and colleagues reported a rate of 0.8% amblyopia in their population of children.<sup>12,13</sup> The prevalence of amblyopia among children in our study was found to be 3.60% which is closely related to other published studies on amblyopia. Vision screening programs in the community, including school screening and seminars on parents awareness are essential to detect children suffering from amblyogenic factors early and treated promptly. Such screening programs need to be implemented on a adequate scale. In case the treatment is started after a particular age limit, visual improvement may seem to vary from unsatisfactory to almost negligible

depending upon density of amblyopia. Moreover in our study uncorrected refractive errors and strabismus seems to contribute majority of cases. Anisometropia was found to contribute for the highest number of amblyopia patients i.e., 14(32.5%) followed by meridional 11(25.5%), strabismus 9(20.9%), stimulus deprivation (13.9%) and combined 3(6.9%). Early detection of amblyopia and its treatment can reduce the overall prevalence as well as morbidity as documented by many studies in different parts of the world<sup>14</sup>.

Since visual loss varies among patients with some cases requiring more long term treatment than others, hence, the management protocols for various amblyogenic factors need to be standardized by further trials. Our current study also demonstrates that early screening has a role in terms of early segregation of cases followed by rapid treatment thus decreases chances of complications in older age, We suggest that effective screening and early diagnosis are key public health concerns in addressing amblyopia. Late diagnosis and poor initial acuity lead to a poor response to treatment is already established by various studies<sup>15</sup>.

To conclude, we agree with all these past reports in terms of beneficial effect of early detection of amblyopia and its management in preventing amblyogenic influence in growing children. Best protocol for management can only be determined with thorough future case trial studies since so many factors are involved. Our limited research suggests that screening definitely has a favorable role in assessing visual status early and it seems to provide a base on which adequate visual therapy can be carried out successfully for visual salvation, decreased risk of complications and early recovery and rehabilitation period. However how much time amblyopia will last varies from case to case but still a positive response could be of benefit. However, more light into the subject requires further exhaustive case control studies to assess the long term benefit and safety of therapy in curing amblyopia for the service of humanity.

## CONCLUSION

Detection of amblyopia in early years by screening is essential to prevent visual disability in later life. Early therapy seems to be effective in regressing and stabilizing vision. More evaluation studies on etiological factors are required to improve final prognosis. Eyes must be monitored closely after

initial evaluation, regardless of initial visual status, as many cases may still require meticulous followup depending upon causative amblyogenic factor.

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