

# Prevalence of amblyopia in paediatric cases attending tertiary care hospital

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## Abstract

**Background:** Amblyopia is a rather common condition encountered almost every day in our practice. There are increasing visual demands in our ever more mechanized society, amblyopia has become a growing socio-economic problem. If not recognized and treated early in life, it can permanently impair the patients binocular vision. Steps to alleviate the gravity of problem can be taken only when its predisposing and etiological factors are fully understood and tackled at the earliest. The present study was conducted from this angle so as to find out the prevalence and age distribution of amblyopia and to explore the various factors leading to its development with the study of their relative prevalence. **Aim:** 1. To study the prevalence of amblyopia in patients (up to 18 yrs), attending ophthalmology O.P.D, in a tertiary health care centre. 2. To find out the most common causes of amblyopia in the given population. Inclusion criteria: Patients 1yr and above upto 18 yrs. Exclusion criteria: Children less than 1yr and children with neurological Disorders. Materials: The cases included in the present study were selected from patients attending the outpatient department of ophthalmology and pediatrics, during the period of 1-11-2010 to 30-11-2012. Detail history was elicited, taking into account duration of amblyopia, spectacle wear, birth history and family history. Thorough examination of eye was done, with reference to Anterior as well as posterior segment to find out any cause of Amblyopia. Stereopsis was tested with lang's two pencil test and TNO test. **Results:** Total number of cases with amblyopia were 85 out of 4,570 patients attending O.P.D. with a prevalence of 1.85%. Out of these 85 cases amblyopes maximum cases were having Anisometropic amblyopia and 75% cases were found to have esotropia. 82.5% cases had no stereopsis when checked by TNO test.

**Key Words:** Amblyopia, Stereopsis, Pediatric.

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## INTRODUCTION

Amblyopia is an important public health problem as visual impairment is lifelong<sup>1</sup>. Prevalence of amblyopia varies from country to country and within the population under study. It is a fairly common disease affecting one to five percent of the population of most developed countries<sup>2</sup>. In India amblyopia affects approximately one

to four percent of children<sup>3</sup>. Although there are no well controlled studies from India, a study by Goel *et al* found an incidence of less than one percent in school children and the Incidence was higher in rural schools (0.7%) than urban schools (0.5%) at primary level, probably because of the lack of awareness about regular eye checkup and the use of spectacles among rural population<sup>4</sup>. Socioeconomic factors do not seem to significantly influence the age at presentation of amblyopia<sup>5</sup>. The earlier the onset the greater the deficit. Amblyopia is the most common cause for monocular vision loss in population under 40 years, accounting for more cases than trauma and all other causes combined<sup>6</sup>. If not recognized and treated early in life, it can permanently impair the patients binocular vision. Thus, the choice of profession is considerably limited for a young amblyopic patient. Every attempt should therefore be made by the physician to diagnose the condition promptly and early in life and to

treat it effectively before irreparable damage ensues. Amblyopia till date remains a diagnosis of exclusion. Steps to alleviate the gravity of problem can be taken only when its predisposing and etiological factors are fully understood and tackled with at the earliest. The present study was conducted from this angle so as to find out the prevalence and age distribution of amblyopia and to explore the various factors leading to its development with the study of their relative prevalence<sup>1</sup>.

**MATERIALS AND METHODS**

The cases included in the present study were selected from patients attending the outpatient department of ophthalmology and pediatrics, during the period of 1-11-2010 to 30-11-2012.

**Inclusion Criteria:** Patients 1yr and above upto 18 yrs.

**Exclusion Criteria:** Children less then 1yr and children with neurological disorders

Detail history was elicited, taking into account duration of amblyopia, spectacle wear, birth history and family history. Thorough examination of eye was done, with reference to Anterior as well as posterior segment to find out any cause of Amblyopia. Stereopsis was tested with lang’s two pencil test and TNO test. Unilateral amblyopia is generally defined as a decrease in vision of two or more lines on a visual acuity chart while wearing best correction. BCVA of less than 6/12 bilaterally on the Snellen’s chart/equivalent measure on the Teller’s acuity chart or the Cardiff’s chart in children less than 4 years in the absence of any organic lesion that could result in a decrease in vision.

**OBSERVATION AND RESULTS**

Table 1 shows total number of cases with amblyopia as 85 out of 4570 patients with a prevalence of 1.85%. Out of these 85 cases amblyopes maximum cases were having Anisometropic amblyopia (36.4%), followed by Ametropic type (25.8%), Meridional (23.5%), Strabismic (7.05%), Visual deprivation (4.70%) and only 2.35% belonged to mixed variety.(Table 2)A higher percentage 75% of exotropes were found in our study as compared to 25%esotropes.(Table 3).According to TNO stereoacuity test and Horizontal Lang’s two pencil test, stereopsis was absent in 82.35% and 76.47% amblyopes respectively. The difference between the two tests was statistically not significant, as according to Chi – square test p-value was 0.343.

**Table 1:** Prevalence of amblyopia in patients (up to 18yrs)

| Total Number of patients attending OPD | Total Number of patients Diagnosed with Amblyopia | Prevalence of Amblyopia in Patients attending the OPD |
|----------------------------------------|---------------------------------------------------|-------------------------------------------------------|
| 4570                                   | 85                                                | 1.85%                                                 |

**Table 2:** Types of amblyopia (n - 85)

| Sr. No. | Type of amblyopia  | Prevalence | Percentage |
|---------|--------------------|------------|------------|
| 1       | Strabismic         | 06         | 7.05       |
| 2       | Anisometropic      | 31         | 36.4       |
| 3       | Mixed              | 02         | 2.35       |
| 4       | Meridional         | 20         | 23.5       |
| 5       | Ametropic          | 22         | 25.8       |
| 6       | Visual deprivation | 04         | 4.70       |

**Table 3:** Type of squint (n – 20)

| Gaze       | Esotropia | Exotropia |
|------------|-----------|-----------|
| No.        | 15        | 05        |
| Percentage | 75        | 25        |

**Table 4:** Stereopsis among amblyopes (n-85)

| Test for stereopsi              | Stereopsis present | Stereopsis absent | Percentage with no stereopsis |
|---------------------------------|--------------------|-------------------|-------------------------------|
| TNO Test                        | 15                 | 70                | 82.35%                        |
| Horizontal Lang Two pencil test | 20                 | 65                | 76.47%                        |

**DISCUSSION**

Amblyopia and amblyogenic factors are the commonest target conditions for preschool vision screening and previous reports have stressed that the treatment of amblyopia is not effective after 8 years of age. Studies have shown that early screening for amblyopia results in better outcomes<sup>1,2</sup>. However, recent reports have supported the view that age is not a barrier for the success of amblyopia therapy<sup>3</sup>. A study done in older children (>6yrs) have reported a substantial improvement in visual outcome in nearly 90% of the children with full time occlusion<sup>5</sup>. Taking these reports into consideration, it was decided to screen the children in the age group of 1 - 18 years and as children constitute 35-40% of the general population, school going children formed an important large target group<sup>6</sup>. This observational and time bound study was done between November 2010 -October 2012 in patients (up to 18 yrs of age) attending ophthalmology OPD. Out of the 4570 students examined 85 students were found to have amblyopia i.e. Prevalence of amblyopia was found to be 1.85% in our study which is comparable to other studies, like VKalikiyayi, TJ Naduvilath, AK Bansal, L Dandona 1%<sup>7</sup>, Rodriguez MA, Castro Gonzalez M (Columbia) 07%-1.85%<sup>8</sup>, Jensen H, Goldschmidt E (Denmark) 07%- 1.85%<sup>9</sup>, Auzemery A, Andriamanamihaja R, Boisier P(Madagascar 07% - 1.85%)<sup>10</sup>. A higher prevalence of anisometropic amblyopia (36.47%) was found in our study when compared to strabismic amblyopia (7.14%) that was comparable to Shah *et al* study<sup>11</sup>, which reported a higher prevalence of anisometropic amblyopia (43%) compared to 37% of strabismic amblyopia in Pakistani children in the age group of 3-14 years. Similarly, in the Attebol *et al* study<sup>12</sup> done on adult population, prevalence

of anisometropic amblyopia (50%) was found to be higher when compared to strabismic amblyopia (19%). However, there are reports of the prevalence of strabismic amblyopia to be<sup>13</sup> higher than anisometropic amblyopia in younger age groups (< 7 years)<sup>14,15</sup>. In accordance with Thiagarajan's (1972)<sup>16</sup> series of 149 cases, 75 cases (50%) had anisometropic amblyopia, while Fernandez (1968)<sup>17</sup> got a lower figure of 61 cases (39.6%) out of 154 amblyopes. Ingram (1977)<sup>18</sup> studied 699 amblyopic eyes of which 216 had anisometropic amblyopia (32%). Goel Maheshwari *et al* (1983)<sup>19</sup> studied 44 amblyopic patients of whom 29 were anisometropic (61.3%). Usharanigantayat (1974)<sup>20</sup> in a study of 38 amblyopes found strabismic amblyopia in 28.7% cases. Thiagarajan (1972)<sup>16</sup> found ametropic amblyopia in bigger numbers (24.9%) and Fernandez (1968)<sup>17</sup> found them in very low number (3.2%). Goel *et al* (1983)<sup>19</sup> found 11 out of 44 cases (25%) of ametropic amblyopia in their series. Prevalence of combined mechanism amblyopia was 2.35%, meridional amblyopia (23.5%), ametropic amblyopia (25.9%), and that of visual deprivation amblyopia being 4.7%. In our study there was a higher prevalence of exotropia (75%) than esotropia (25%). This can be compared to another south Indian study<sup>21</sup> which also showed higher prevalence of exotropia (70%). Downing (1942 -43)<sup>22</sup> and Helveston (1962 - 63)<sup>23</sup> noted esotropia in 72% and 83% cases respectively and exotropia in 27% and 16% cases respectively. Oliver *et al* (1971)<sup>24</sup> got esotropia in 87% cases and exotropia in 12% cases. Almost reversal of these figures is seen in studies of Yassar *et al* (1972)<sup>25</sup>, who noted 67% cases of exotropia and 33% cases of esotropia in their study of ocular deviation associated with amblyopia. According to TNO stereoacuity test and Horizontal Lang's two pencil test, stereopsis was absent in 82.35% and 76.47% amblyopes respectively in our study. The difference between the two tests was statistically not significant, as according to Chi - square test p-value was 0.343. All the children diagnosed with amblyopia were counseled about occlusion therapy along with the parents and the need of compliance to occlusion therapy was stressed upon. The fact that amblyopia is not known to resolve spontaneously<sup>18</sup>. Implies that school vision screening definitely helps in the early detection of amblyopia and thereby, the earlier institution of treatment. In the population under study, previous diagnosis and treatment of amblyopia are uncommon. Therefore, this prevalence reflects the natural frequency of pathology in the absence of effective surveillance and intervention, indicating the full magnitude of the public health challenge. Vision 2020 lays stress on rehabilitation of pediatric low vision, of which amblyopia is a major preventable and treatable cause<sup>26</sup>. Amblyopia, being a major cause of monocular or binocular low vision in adulthood<sup>27</sup>, with the associated deterioration in the QOL indices, measures for the early detection and treatment of amblyopia should be taken up on a priority basis and for another principle of the evidence based planning that has been the hallmark of the National Blindness Control Programme in India.

binocular low vision in adulthood<sup>27</sup>, with the associated deterioration in the QOL indices, measures for the early detection and treatment of amblyopia should be taken up on a priority basis and for another principle of the evidence based planning that has been the hallmark of the National Blindness Control Programme in India. It is a regrettable fact that the majority of strabismic children are seen too late to effectively prevent amblyopia. Also high refractive errors or anisometropia remain undetected till frank visual deterioration and amblyopia sets in. It is to be emphasized that there has to be a joint community effort including the parents, teachers, nurses, general practitioners, pediatricians and ophthalmologist to screen children at large and high risk cases in particular.

## CONCLUSION

Based on the above observations and results, the prevalence of amblyopia was found to be 1.85% in our study. The classification of amblyopia was noted as follows.

1. Strabismic amblyopia – 06 (7.05%)
2. Anisometropic amblyopia – 31 (36.4%)
3. Mixed Strabismic and Anisometropic - 2 (2.35%)
4. Meridional amblyopia – 20 (23.5%)
5. Ametropic amblyopia – 22 (25.8%)
6. Visual Deprivation amblyopia – 4 (4.7%).

A higher percentage of exotropes (75%), were found in the study than esotropes (25%). According to TNO stereoacuity test and Horizontal Lang's two pencil test, stereopsis was absent in 82.35% and 76.47% amblyopes respectively. The difference between the two tests was statistically not significant, as according to Chi - square test p-value was 0.343. The fact that amblyopia is not known to resolve spontaneously<sup>18</sup> implies that school vision screening definitely helps in the early detection of amblyopia and thereby, the earlier institution of treatment. In the population under study, previous diagnosis and treatment of amblyopia are uncommon. Therefore, this prevalence reflects the natural frequency of pathology in the absence of effective surveillance and intervention, indicating the full magnitude of the public health challenge. Vision 2020 lays stress on rehabilitation of pediatric low vision, of which amblyopia is a major preventable and treatable cause<sup>26</sup>. Amblyopia, being a major cause of monocular or binocular low vision in adulthood<sup>27</sup>, with the associated deterioration in the QOL indices, measures for the early detection and treatment of amblyopia should be taken up on a priority basis and for another principle of the evidence based planning that has been the hallmark of the National Blindness Control Programme in India.

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