

# Original Article

## Profile of Amblyopia In Patients Attending Out Patient Department In A Tertiary Health Care Centre, Goa

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### Abstract

**Background:** Childhood blindness is one of the priorities in Vision 2020: the right to sight. Amblyopia is one of the causes of avoidable childhood blindness and is caused by opacities of the ocular media, occlusion, strabismus, anisometropia, and uncorrected high refractive errors. Along with appropriate intervention the visual impairment as a result of it can be reduced.

**Aim:** The objective of the research was to study the profile of amblyopia in patients attending outpatient department in a tertiary health care centre, Goa

**Setting:** Tertiary Health Care Centre , Goa ( Goa Medical College).

**Design:** Cross- sectional Study.

**Methodology:** The study was carried out over a period of three months and a total of 720 patients were screened in the age group of 5 to 15 years. A detailed ophthalmological examination was carried out and any organic cause of visual impairment ( 6/12 or more) was ruled out. Those patients who were already under treatment for amblyopia were excluded from the study.

**METHOD OF STATISTICAL ANALYSIS** - Chi Square Qualitative Test for different proportions

**Result:** The total percentage of amblyopia was 3.47%, with insignificant gender predisposition. The percentage of amblyopia was higher in the age group of 10 -15 years as compared to 5 -10 years though not statistically significant. The proportion of unilateral amblyopia (88%) was greater than bilateral amblyopia (12%). The most common type of Amblyopia was Anisometropic (40%), followed by Strabismic (36%). Most patients presented with moderate Visual Impairment (44%).

**Conclusion:** Refractive errors are the most important cause of amblyopia followed by strabismus. Amblyopia not only causes visual morbidity but also has psychological and social impact in adulthood as most individuals are deprived of career opportunities that require binocular vision. Hence the need of the hour for institution of school screening programs for detection of amblyopia.

**Key Words:** Amblyopia, Anisometropia, Visual Impairment.

### Introduction

Childhood blindness is one of the priorities in Vision 2020: the right to sight<sup>1</sup>. It is estimated that there are 1.4 million blind children in the world, two thirds of whom live in the developing countries<sup>2</sup>. It is estimated that at least 200 000 children in India have severe visual impairment or blindness and approximately 15,000 are in schools for the blind<sup>3</sup>. Amblyopia is one of the causes of avoidable childhood blindness and is described as a developmental defect of spatial visual processing that occurs in the central visual pathways of the brain<sup>4</sup>. Amblyopia is caused by opacities of the ocular media, occlusion, strabismus, anisometropia, and uncorrected high refractive errors<sup>5</sup>. The pathology being abnormal binocular interaction and foveal pattern vision

deprivation or a combination of both factors<sup>6</sup>. Children are sensitive to amblyopia is during the first 2 to 3 years of life, and this sensitivity gradually decreases until the child reaches 6 or 7 years of age, when visual maturation is complete and the retinocortical pathways and visual centers become resistant to abnormal visual input<sup>7</sup>.

Hence the need of the hour for periodic screening programs in schools for early detection and treatment.

### Methodology

The study was a cross sectional study carried out in the outpatient department of Goa Medical College from June to August 2017 over a period of 3 months which

included patients in the age group of 5- 15 years. A total of 25 patients were detected to have amblyopia among the 720 patients that were screened over a period of 3 months.

### Inclusion Criteria

All patients in the age group of 5 to 15 years that presented with a Visual Acuity which showed at least a two line difference between the eyes as recorded by Snellen's Chart with no organic cause known to be detected.

Bilateral Amblyopia- Patients that presented with a Visual Acuity of less than 20/40 in each of the eyes.

### Exclusion Criteria

1. Patient's already being treated for amblyopia
2. Patients who have undergone squint surgery
3. Patients with strabismus presenting with alternating fixation.
4. Patients with phorias
5. Patients who present with decrease in vision due to other factors- nutritional amblyopia, toxic amblyopia, neurological diseases, macular and retinal degenerations.

A detailed ophthalmological evaluation included:

Visual Acuity - Tested by Snellen's Visual Acuity and Leah's Symbols.

Anterior segment examination with Slit Lamp Biomicroscopy.

Cycloplegic refraction was carried out along with a dilated fundus examination.

Best Corrected Visual Acuity with the suitable Lenses. Amblyopia was defined as a decrease of visual acuity in one eye when caused by abnormal binocular interaction or occurring in one or both eyes as a result of pattern vision deprivation during visual immaturity, for which no cause can be detected during the physical examination of the eye and which in appropriate cases, is reversible by therapeutic measures.

The different types of Amblyopia is defined as

1. Strabismic amblyopia<sup>8</sup>- it results from binocular interaction where there is continued monocular suppression of the deviating eye.
2. Anisometropic amblyopia<sup>8</sup>- due to difference in refractive error between the eyes may result from a difference of 1.0 dioptre sphere and may even coexist with microstrabismus.
3. Stimulus deprivation<sup>8</sup>- it may be unilateral or bilateral, unilateral caused by opacities in the media or ptosis.
4. Bilateral ametropic<sup>8</sup> or Isoametropic- due to highly symmetrical refractive errors usually hypermetropic.
5. Meridional amblyopia<sup>8</sup>- results from image blurring in one meridian. It can be unilateral or bilateral and is caused by uncorrected astigmatism of > 1 D.

The visual impairment was graded according to WHO (1993) International Statistical Classification of Disease and Health related problems 10th revision.

Results were analyzed with the help of graphs, pie charts, tables.

## Results

Among the 720 patients, number of amblyopic patients were 25 (3.47%).

	No. of patients	Percentage
Amblyopia	25	3.47%
No Amblyopia	695	96.53%
Total	720	100%

Table1: Percentage of Amblyopia

Sex	Number of cases	Percentage
Male	15	60%
Female	10	40%
Total	25	100%
Unaffected males	355	49.3%
Unaffected females	340	47.22%

Table 2: Sex Distribution

Ages	Males (%)	Females(%)
5- 10 years	6 (40%)	4(40%)
10 -15 years	9(60%)	6(60%)

Table 3: Age- Sex distribution

Types of Amblyopia	No. of Patients	Percentage (%)
Anisometropic	10	40
Strabismic	9	36
Stimulus Deprivation	3	12
Isoametropic/ Bilateral ametropic	2	8
Meridional	1	4
Total	25	100

Table 4: Distribution of the types of amblyopia

S.No.	Difference in dioptric power	Visual Acuity	Log MAR
1	9	20/600	1.5
2	4	20/400	0.6
3	2	20/80	1.3
4	3.75	20/200	1
5	2.5	20/80	1.5
6	4.5	20/200	1
7	3.5	20/125	0.8
8	8.25	20/600	0.6
9	2.25	20/63	0.5
10	2	20/125	0.3

Table 5: Anisometropic Amblyopia

Using Pearson's Co-relational Coefficient, R value-0.2077, showed positive co-relational coefficient, however the p value-0.564, not found to be statistically significant at a significance level of 0.05. (Table 5)

S.No.	Type of Strabismus	Degree of Deviation	Visual Acuity	Log MAR
1	Esotropia	15	20/63	0.5
2	Esotropia	30	20/200	1
3	Esotropia	45	20/63	0.5
4	Esotropia	30	20/125	0.8
5	Esotropia	30	20/125	0.8
6	Exotropia	30	20/125	0.8
7	Esotropia	30	20/125	0.8
8	Exotropia	15	20/80	0.6
9	Esotropia	45	20/200	0.3

Table 6: Strabismic Amblyopia.

Using Pearson's Co-relational Coefficient, the R value-0.2448, showed a weak negative co-relation. The p value -0.496 was found not to be statistically significant at a significance level of 0.05. (Table 6)

S.No.	Etiology of Stimulus Deprivation	Grade	Corrective Surgery Done -Yes/No
1	Ptosis	Moderate	Yes
2	Ptosis	Moderate	No
3	Congenital Cataract	Total cataract	Yes

Table 7: Stimulus Deprivation

	Number of patients	Percentage
Unilateral	22	88
Bilateral	3	12
Total	25	100

Table 8: Laterality of Amblyopia

Bilateral Amblyopia : The causes were Isoametropic (2) and Strabismic.

Visual Impairment	Number of patients	Percentage
Mild VI (20/32-20/63)	4	16
Moderate VI (20/80-20/160)	11	44
Severe VI (20/200-20/400)	7	28
Profound VI (20/500-20/1000)	3	12
Total	25	100

Table 9: Visual Impairment at time of presentation

## Discussion

The prevalence of amblyopia varies among different races, cultures, regions due to differences in the socioeconomic background.

In India, the prevalence of amblyopia was 1.1% according to a study conducted by Ganeka S<sup>9</sup> et al, 1.1% by V Kalikivayi<sup>10</sup> et al, 8.6% by Manisha Gupta<sup>11</sup> et al

In the international scenario

Region	Study	Prevalence
China	Fu J <sup>12</sup> et al	2.5%
Nepal	K Sapkota <sup>13</sup> et al	0.70%
Malaysia	Chew FLM <sup>14</sup> et al	7.53%

In our study the percentage of amblyopia was 3.47%, the variations in the prevalence as compared to other studies is due to the short period of our study and a larger sample size in the various studies mentioned above.

In our study, the percentage of amblyopia was higher in the age group of 10-15 years was greater in contrast to the age group of 5-10 years ( p value-1, hence not significant) and was comparable to a study conducted by Menon<sup>15</sup> et al where the average age of presentation was above 8 years. Considering the critical time period till 8 years where the child has potential for developing binocular single vision.<sup>16</sup> This is due to lack of awareness for the need of timely which leads to a delay in onset of treatment. Periodic screening programs in schools, anganwadis can enable timely intervention for effective management of amblyopia.

In this present study males (60%) were affected more than females (40%) pvalue-0.42 hence not statistically significant, this was consistent with the study conducted by K Sapkota<sup>13</sup> et al in which 56 % of affected were males.

In our study the proportion of unilateral amblyopia (88%) was higher as compared to bilateral amblyopia (12%) which is on par to a study conducted by K Sapkota<sup>13</sup> et al (71%). Similar findings were noted in a study conducted by Karki JD<sup>17</sup> where monocular was 40%, this was due to the high incidence of anisometropic amblyopia in this study.

In the present study the most common type of amblyopia was anisometropic followed by strabismic. Similar results were found in a study conducted by Dr. K. Anjaneyulu<sup>18</sup> et al .However contrasting results were seen in a study conducted by Vimla Menon<sup>15</sup> et al where strabismic was the most common subtype.

In the current study, co-relation between the dioptric power of anisometropia and Visual acuity was carried out and a weak positive co-relation (R-0.2077) was detected in comparison to a study conducted by Dr Abdul Waris et al<sup>19</sup> which showed a strong positive co-relation R-0.85. This could be due to the larger sample size of 62 subjects in contrast to our study.

Correlation between degree of strabismus and visual acuity showed a weak negative correlation. However this relationship is affected by many factors the time of detection and presentation, can also be affected by future interventions during which compliance and patience during the course of treatment play an important role.

In the current study, the maximum visual impairment was moderate (44%), followed by severe visual impairment (28%). In a study conducted by V Kalikivayi<sup>10</sup> et al amblyopia was one of the major cause of visual impairment in children.

#### Limitations of the study:

A low sample size of 25 is a limitation in this study.

#### Conclusion

Amblyopia is one of the most important causes of avoidable childhood blindness. Amblyopia not only causes visual morbidity but also has psychological and social impact in adulthood as most individuals are deprived of career opportunities that require binocular vision.

Early interventions at the critical period visual development are of prime importance in curtailing the disease burden. Visual screening by teachers, pediatricians and educating parents about amblyopia will help in timely detection and early intervention

Authors declare no conflicts of interest

#### References

- 1) World Health Organization. Global initiative for the elimination of avoidable blindness. Programme for the Prevention of Blindness and Deafness. Geneva: WHO, 1997 (WHO/PBL/97.61).
- 2) World Health Organization. Preventing blindness in children: report of WHO/IAPB scientific meeting. Programme for the Prevention of Blindness and Deafness, and International Agency for Prevention of Blindness. Geneva: WHO, 2000 (WHO/PBL/00.77).
- 3) Rahi JS, Sripathi S, Gilbert CE, Foster A. Childhood blindness in India: Causes in 1318 blind school students in nine states. *Eye (Lond)*. 1995;9(Pt 5):545-50.
- 4) Gary RD, Raza M. Amblyopia. Yanoff M, Duker JS. (Eds.). *Ophthalmology*. 4th Edition, Philadelphia : Saunders Elsevier Inc. 2014; pg 1238
- 5) Von Noorden GK, Campos EC. *Binocular Vision and Ocular Motility*. 6th Edition, Mussourie: Mosby Inc. 2002; pg 257
- 6) Von Noorden GK. Amblyopia: A multidisciplinary approach (Proctor Lecture). *Invest Ophthalmol Vis Sci*. 1985;26(12):1704-16.
- 7) Von Noorden GK. New clinical aspects of stimulus deprivation amblyopia. *Am J Ophthalmol*. 1981; 92(3):416-21.
- 8) Bowling B. *Kanski's Ophthalmology*. 8th edition, Philadelphia: Elsevier Inc. 2016; pg 737- 8.
- 9) Ganekal S, Jhanji V, Liang Y, Dorairaj S. Prevalence and etiology of amblyopia in Southern India: results from screening of school children aged 5-15 years. *Ophthalmic Epidemiol*. 2013;20(4):228-31.
- 10) Kalikivayi V, Naduvilath TJ, Bansal AK, Dandona L. Visual impairment in school children in Southern India. *Indian J Ophthalmol*. 1997;45(2): 129-34.
- 11) Manish G, Sudhir KR, Sanjiv KM, Sinha RNP. Profile of Amblyopia in School going (5-15 years) Children at State Level Referral Hospital in Uttarakhand. *J Clin Diagn Res*. 2016;10(11): SC09-SC11.
- 12) Fu J, Li SM, Liu LR, Li JL, Li SY, Zhu BD, et al. Prevalence of amblyopia and strabismus in a population of 7th-grade junior high school students in Central China: the Anyang Childhood Eye Study (ACES). *Anyang Childhood Eye Study Group. Ophthalmic Epidemiol*. 2014;21(3):197-203.
- 13) Sapkota K, Pirouzian A, Matta NS. Prevalence of amblyopia and patterns of refractive error in the amblyopic children of a tertiary eye care center of Nepal. *J Clin Diagn Res*. 2016;10(11): SC09-SC11.
- 14) Chew FLM, Thavaratnam LK, Shukor INC, Ramasamy S, Rahmat J. Visual impairment and amblyopia in Malaysian pre-school children - The SEGPAEDS study. *Med J Malaysia*; 2018;73(1). 2510- 29.
- 15) Vimla M, Zia C, Rohit S, Kulwant G, Sachdev MM. Profile of amblyopia in a hospital referral practice. *Indian J Ophthalmol*. 2005;53(4):227-34.
- 16) Keech RV, Kutschke PJ. Upper age limit for the development of amblyopia. *J Pediatr Ophthalmol Strab*. 1995;32:89-93.
- 17) Karki KJ. Prevalence of amblyopia in ametropias in a clinical set-up. *Kathmandu Univ Med J*. 2006;4(4):470-3.
- 18) Anjaneyulu K, Narendranath R. Prevalence of Amblyopia in Children Aged from 5-15 Years in Rural Population Kurnool District Andhra Pradesh, India. *Int J Sci Res*. 2015;4(2):99-100.
- 19) Abdul W, Amitava AK. Amount of Anisometropia and degree of Amblyopia, A Correlation. *UJO*. 2013;8(1).28.