

# Frequency of Anisometropic Amblyopia in Anisometropes Among the Age Group of 5-35 Years

Nawaz Cheema, Saba Anwar, Erum Ehsan

## ABSTRACT

Amblyopia is the main cause of unilateral blindness in all over the world. Causes of amblyopia are strabismus, anisometropia and stimulus deprivation. Anisometropia is second most important cause of amblyopia. This study was designed to find the frequency of anisometropic amblyopia in anisometropes among the age group of 5-35 years. **Objective:** To find the frequency of amblyopia in anisometropic patients of age 5 to 35. **Study design:** Cross-sectional hospital based study. **Setting:** Eye outdoor patient department of Islam teaching hospital Sialkot. **Duration of study:** 6 months from 01/01/2016 to 30/06/2016. **Sample size:** The selected sample size is 100 patients. **Sampling technique:** Consecutive sampling. **Data collection procedure:** Visual acuity of all the patients was measured by using snellen chart and aided with Pinhole to check any improvement in visual acuity. Cycloplegic objective refraction was performed with the help of streak retinoscope in children and then was subjectively verified. Direct ophthalmoscope was used for the visualization of Bruckner reflex and fundus examination. With best corrected visual acuity if the difference between sound and lazy eyes of more than two lines of vision chart then included in amblyopia. **Results:** The results of our study showed that frequency of amblyopia is 8% in anisometropes. Gender distribution showed that females are more amblyopic than males (8.8% females, 7% males). Age distribution showed that 2.5% amblyopia is found in 5-15 age group, 11.6% in 15-25 and 11.8% in 25-35 age groups. **Conclusion:** Percentage of amblyopia was more in hyperopic astigmatic patients. The increase of anisometropic amblyopia in the older children indicates a development of amblyopia after the age of developing years in an untreated population.

**Keywords:** Binocular single vision (BSV), Visual acuity (V.A), Laser-assisted sub epithelial keratectomy (LASEK), Spherical equivalent refraction (SER)

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## INTRODUCTION

Anisometropia is the condition in which the two eyes have unequal refractive power, one eye may be markedly stronger than the other and it is significant cause of amblyopia<sup>1</sup>. Anisometropia is a relative difference in the refractive state of the two eyes and exists concurrently with strabismus in 24% of clinical population<sup>2</sup>. A difference in spherical equivalent refraction of 1 diopter or more (SER Difference  $\geq$  1.00 D) is usually used to define anisometropia. Anisometropia also refers to a difference in any meridian, of greater than 1.0 diopter<sup>3</sup>. Amblyopia is unilateral or bilateral decrease in best corrected visual acuity by formed vision deprivation and abnormal binocular interaction for which there is no pathology of eye and visual pathway<sup>4</sup>. Amblyopia is a developmental visual disorder characterized by abnormal form vision and binocular functions<sup>5</sup>.

Amblyopia is a condition of reduced visual function from abnormal visual experience caused by strabismus, anisometropia, or visual form deprivation during the critical period of visual development<sup>6</sup>.

The best-defined results of amblyopia are an increased risk of bilateral blindness, sometimes caused by traumatic eye injury in younger people and age-related macular degeneration in older people<sup>7</sup>. People who presents with amblyopia have reduced quality-of-life and career choices due to difficulties with distance and depth perception, visual disorientation, and fear of losing vision in the better seeing eye<sup>8</sup>. The most important factor in determining the depth of anisometropic amblyopia was thought to be the magnitude of anisometropia<sup>3</sup>. Amblyopia is associated with early childhood strabismus, anisometropia or both<sup>8</sup>.

## Objective

To find the frequency of amblyopia in anisometropic patients of age 5 to 35 years.

## METHODOLOGY

**Study design:** Cross-sectional study.

**Setting:** Eye outdoor patient department of Islam teaching hospital Sialkot.

**Duration of study:** 6 months from 01/01/2016 to 30/06/2016.

**Sample size:** Selected sample size is 100 patients.

**Sampling technique:** Consecutive sampling.

**Sample selection:**

**Inclusion criteria:**

- Patients with anisometropia having difference of  $\geq \pm 0.5$  diopters in both eyes.
- Refractive amblyopes
- Patients among the age group of 5 to 30 years.
- Both genders.
- Co-operative patients.

**Exclusion criteria:**

- Anisometropes having difference of  $< 0.5$  diopters in both eyes.
- Patients with strabismus.
- Simple refractive errors.
- Patients having any anterior segment or posterior segment ocular pathology.
- Mentally handicapped patients.
- Traumatic patients.
- Patients with ocular surgery (congenital cataract / traumatic).

**Method of data collection:**

Data was collected on specially designed proforma.

**Informed consent:**

Informed consent was given to the patients & in case of children to their parents, that their ocular examination will not cause any harm to them and there are no ethical issues regarding it. **Data**

**collection tools:**

- Visual acuity chart (snellen chart)
- Pen torch
- Retinoscope
- Autorefractometer
- Trial box and trial frame
- Direct ophthalmoscope
- Lensmeter
- 0.5 % cyclopentolate

**Procedure:**

Visual acuity of all the patients was measured by using snellen chart and aided with Pinhole to check any improvement in visual acuity. Extra ocular muscles motility will also be assessed. Cycloplegic objective refraction was performed with the help of streak retinoscope in children and then will be

subjectively verified. Autorefractometer was also used for objective refraction. Direct ophthalmoscope was used for the visualization of Bruckner reflex and fundus examination. After fundus examination, if there is no pathology and patient with anisometropia then included in the amblyopia. Subjective refraction was done in young patients. With best corrected visual acuity if the difference between sound and lazy eyes of more than two lines of vision chart then included in amblyopia.

**Data analysis procedure:**

By the softwares, which are as follow:

- Cross tabulation
- Standard deviation, Mean, Median and Mode
- SPSSversion 13 software

**Data Analysis**

Statistical analysis was carried out using the Microsoft excel 2007. Categorical data was represented by frequency, percentage and cross tabulation.

## RESULTS

Total 100 patients were studied all were anisometropes, and frequency of amblyopia in anisometropes was found 8%. Age distribution of patients showed that 2.5% amblyopia was found in 5-15 age group,11.6% in 15-25 age group and 11.8% in 25-35 age group.[table 1]

Gender distribution showed that 43% were males and 57% were females. In 43% males frequency Of amblyopia is 7% and in females amblyopia was found 8.8%. In age distribution of males 5.9% amblyopia was found in age group of 5-15 yeears,10.0 in 25-35age group while in age distribution of females 12.5%amblyopia was found in 15-25 age group and 20% in 25-35 age group.[table 2,3]

Out of total 8% amblyopia, 7% was unilateral and 1% bilateral amblyopia. [table 4]

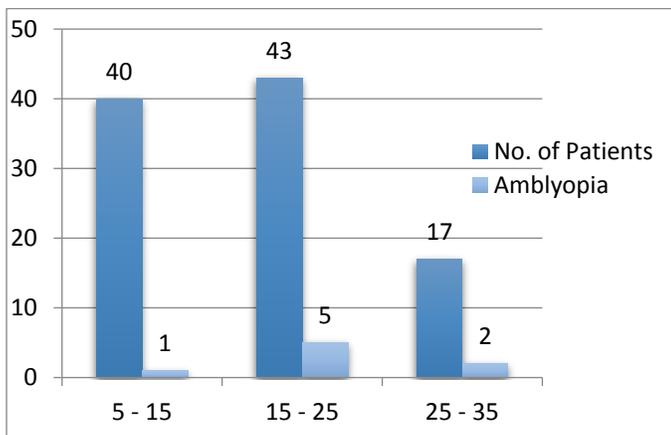
Among 100 anisometropes 61 were astigmatic had amblyopia 8.2%, 24 were myopes had amblyopia 8.0% and 14 were hyperopes amblyopia 7.1%. [table 5]

**Table 1: Age distribution of patients**

Sr. #	Groups (Years)	No. of Patients	Amblyopia	Percentage
1	5 – 15	40	1	2.5
2	16 – 25	43	5	11.6
3	26 – 35	17	2	11.8
<b>Total</b>		<b>100</b>	<b>8</b>	<b>8.0</b>

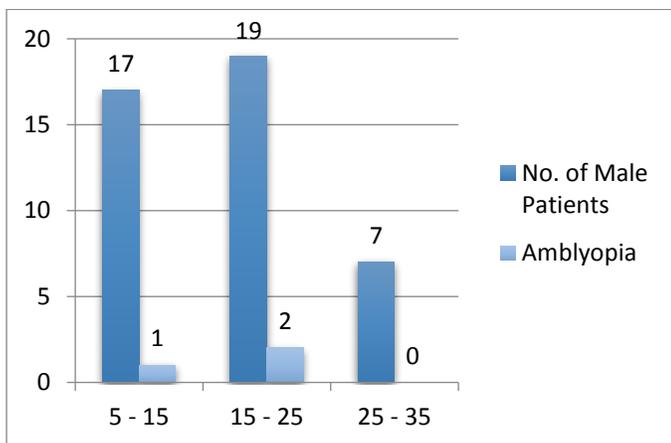
**Table 2: Age distribution of male patients**

Sr. #	Groups	No. of Male Patients	Amblyopia	Percentage
1	5 - 15	17	1	5.9
2	15 - 25	19	2	10.5
3	25 - 35	7	0	0.0
<b>Total</b>		<b>43</b>	<b>3</b>	<b>7.0</b>



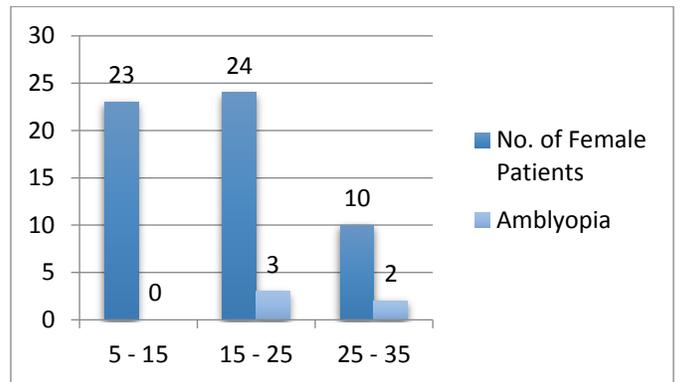
**Figure 1: Age distribution of patients**

Table and graph showed 40% patient fall in the category of 5-15 age group, 43% were 15-25 and 17% were 25-35 age group and 2.5% amblyopia is found in 5 to 15 age group, 11.6% in 15 to 25 age group and 11.8% in 25 to 35 age group.



**Table 3: Age distribution of female patients**

Sr. #	Groups	No. of Patients	Amblyopia	Percentage
1	5 - 15	23	0	0.0
2	15 - 25	24	3	12.5
3	25 - 35	10	2	20.0
<b>Total</b>		<b>57</b>	<b>5</b>	<b>8.8</b>

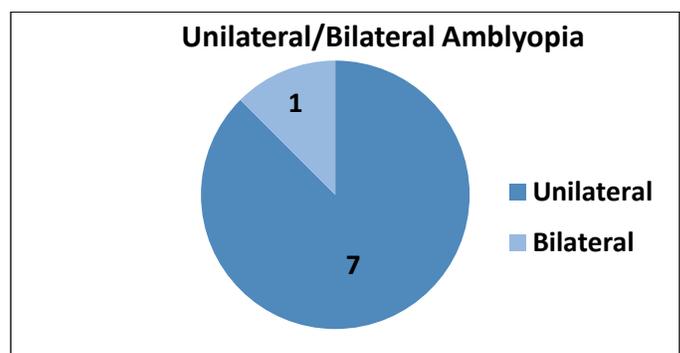


**Figure 3: Age distribution of female patients**

Age distribution of female patients showed that 23 female patients fall in 5 to 15 age group, 24 were in 15 to 25 age group and 10 in 25 to 35 age group. 20% amblyopia found in 25 to 35 age group while 12.5% amblyopia was found in 15 to 35 age group.

**Table 4: Type of amblyopia**

Sr. #	Type of Amblyopia	Amblyopia
1	Unilateral	7
2	Bilateral	1
<b>Total</b>		<b>8</b>

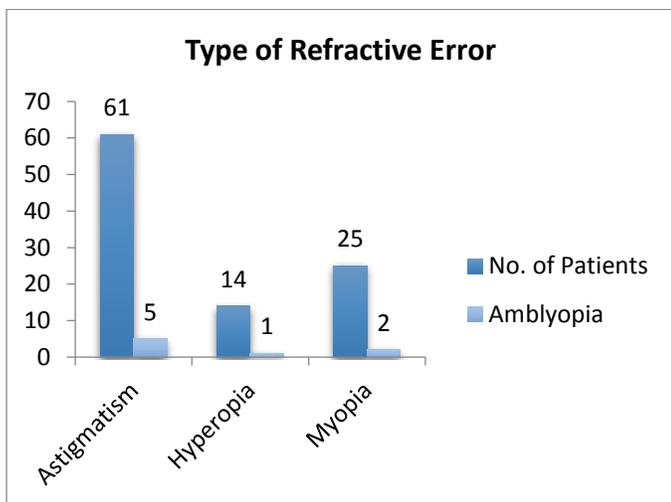


**Figure 4: Type of amblyopia**

From total 8% amblyopia, 7% amblyopia unilateral and only 1% amblyopia is bilateral.

**Table 5: Type of Refractive Error**

Sr. #	Type of Refractive Error	No. of Patients	Amblyopia	Amblyopia Percentage
1	Astigmatism	61	5	8.2
2	Hyperopia	14	1	7.1
3	Myopia	25	2	8.0
<b>Total</b>		<b>100</b>	<b>8</b>	<b>8.0</b>



**Figure 5: Type of refractive error**

Results showed that from total 100 patients 61% were astigmatics having 8.2% amblyopia, 14 % were hyperopic having 7.1% amblyopia and 25 were myopic having 8.0% amblyopia. (Table 5)

## DISCUSSION

The prevalence of anisometropia in population-based studies varies widely, ranging from 1% to 8.1% in toddlers and young children to as high as 25% in newborns or infants.<sup>9,10</sup> Certainly much of this variation can be attributed to different definitions of anisometropia as well as the different ages and types of populations studied (e.g, a hospital population versus a school population). Nevertheless, regardless of the true prevalence of anisometropia (which clearly does vary among groups studied), it remains a significant factor in the development of amblyopia and a significant public health concern.<sup>11</sup>

Amblyopia is unilateral or bilateral decrease in best corrected visual acuity by visual deprivation and is caused by abnormal binocular interaction for which there is no pathology of eye and visual pathway. During this study period at eye OPD of Islam

teaching hospital, 400 patients were examined. From 400 patients 100 were anisometropes and from these 100 patients 8 were diagnosed as amblyopic. Age distribution of patients showed that 40% patients fall in 5 to 15 age group, 43% in 15 to 25 age group and 17% in 25 to 35 age group. Frequency of amblyopia is 2.5% in 5-15 years, 11.6% in 15-25 years and 11.8% in 25-35 years.

Abrahamson and associates in a cohort of patients followed for up to 9 years, have reported that while the overall prevalence of anisometropia is relatively stable, individual patients develop, lose, or have changes in the magnitude of their anisometropia when followed longitudinally<sup>9,12</sup>. A number of other studies have supported this general rule of a relatively consistent overall prevalence of anisometropia with considerable variability among individuals<sup>9,13</sup>. Other investigators have disputed this, arguing for a more consistent natural history of anisometropia over time<sup>10</sup>. DeVrie reported relative consistency in anisometropia over time with two thirds of patients unchanged over 2 to 8 years (mean, 4 years). Hardman and colleagues likewise noted little change in anisometropia over a 3-year period. Hirsch noted 8 of 9 patients with anisometropia at age 5 to 7 to still have it 12 years later.<sup>14</sup> However, in young patients whose anisometropia persists or increases, the case for an increased risk for the development of amblyopia is convincing<sup>9</sup>.

Gender distribution showed that 43 were males and 57 were females and in this study females were more amblyopic than males (8.8% females, 7% males). From 43% males, 17 were in 5 to 15 age group, 19 were in 15 to 25 age group and 7 were in 25 to 35 age group and amblyopia is more common in 15 to 35 age group that was 10.5%.

Total females were 57%, age distribution of female showed that 23 females were in 5 to 15 age group, 24 in 15 to 25 age group and 10 in 25 to 35 age group. Amblyopia was more common in 25 to 35 age group that was 25%. From total 100 patients 61% were astigmatic were 14% hyperopic and 25% were myopic and from all these refractive errors the most common cause of amblyopia was astigmatism. Amblyopia was diagnosed 8% from total sample, from which 5% amblyopia was due to astigmatism. The amblyopic patients who were diagnosed in 5 to 15 age group further advised spectacle correction, patching or penalization and frequent follow up visits.

## CONCLUSION

Prevalence of amblyopia is related to magnitude of anisometropia. Frequency of amblyopia was found

out to be 8%. Females were found to be more amblyopic than males (females 8.8%, males 7%). Frequency of amblyopia is high in hyperopic astigmatism that is 15.8% as compared to myopic astigmatism 2.7%. Older children had an increased risk of amblyopia compared with younger children for moderate levels of anisometropia. Low magnitude anisometropia in young children may not predispose to amblyopia

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