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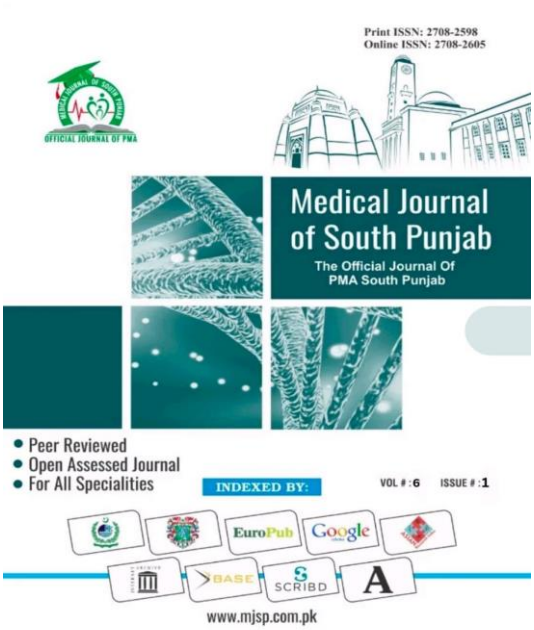

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Original Article

Assessment of types of Phorias in Myopic Patients before and after Refractive Correction

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ABSTRACT

Objective: The purpose of this study is to assess the types of phorias in myopic patients before and after refractive correction.

Methods: This was cross-sectional studies in which 61 patients age between 40 to 85 years included. Types of phorias in myopic patients were assessed before and after refractive correction at Department Of Ophthalmology, Fatima Memorial Hospital. Phorias in myopic patients were investigated with the help of cover uncover test and alternat cover uncover test.

Results: Out of 61 patients, who were involved in this study, there were 28(45.9%) males and 33(54.1%) females. Degree of myopia was recorded mild myopia in 20 subjects, moderate myopia in 26 subjects and severe myopia in 15 subjects. It was investigated that before the correction of myopia 47(22males, 25females) subjects were with exophoria, 9(3males, 6females) subjects were with esophoria and 5(3males, 2females) subjects were orthophoric. After the correction of myopia, it was observed that the only 6 subjects were exophoric (2males, 4females), 2subjects left esophoric (0males, 2females) and 53 subjects turned orthophoria (26males, 27females).

Conclusion: Before refractive correction exophoric pattern has significant frequency. After the refractive correction orthophoria was significantly high.

Keywords: heterophoria, myopia, refractive correction.

1. INTRODUCTION

Myopia is the significant type of refractive error.[1] Myopia is the term used to describe blurry vision in the distant.[2] When accommodation is relaxed, light rays or collateral beams from infinities fall in front of the retina rather than on it. Another name for the condition known as near-sightedness.[3] General prevalence of myopia in Asian people is about 24.19%. Prevalence of myopia in males is 28.81% and in females is 20%.[4,5]

Strabismus is condition in which an eye deviates from the point of fixation.[6,7,8]In squint the visual axis of each eye do not intersect from the point of view. So, fusion of both images is replaced either by diplopia or suppression of one image which can cause loss of binocular single vision.[9,10] When fusion breaks then deviation of eye can lead to a latent form of squint. Latent strabismus is also known as heterophoria which is caused by deficient symmetry in the eye moving muscles and is associated with the deviation of one eye.[11,12,13] The Uncorrected high myopia, accommodation vergence abnormalities and anatomical factors, as well as increased demand to close work can lead to phoria.[14,15] In 2017 research was conducted at Services Hospital Lahore on the topic "Prevalence of latent squint with its clinical features". 75 Students of a public sector medical college were participated in research. A latent squint was identified in 40% of the students. 76.6% Students with heterophoria mainly presented with the complaints of sleepiness during study, 53.3% had sensitivity to light, 43.3% had headache and eyestrain, 33.3% with difficulty in accommodation. 26.6% students presented with the symptoms of double vision and 16% with blurring of vision.[16]

The aim of this study was to investigate the changes in the degree of the heterophoria in myopic patients before and after myopic correction. Heterophorias seen in majority of myopic individuals leads to complains of asthenopic symptoms effecting their daily routine work. If myopia is left untreated, heterophoria can convert into heterotropia raising visual and cosmetic concerns. So, myopic correction is significant to avoid asthenopic symptoms and hence to prevent the conversion of heterophoria to the heterotropia. screening are crucial and that full focus should be paid to effective management as well as meticulous screening to prevent amblyopia and strabismus.

2. METHODOLOGY

It was an observational cross-sectional study which included 61 patients. This present study was conducted in the "Department of Ophthalmology" of Fatima Memorial Hospital and College of Medicine and Dentistry, Shadman Lahore. The duration of study was from September 2023 to December 2023, after approval of synopsis from IRB. Non-probability consecutive sampling technique was used. The study included Myopic patients of 8 – 25 years, Myopic patients with 1D≤ sphere, and Astigmatism of ≥1 Diopter. The study excluded Patients having hypermetropia, pathological myopia, allergic conditions, and manifest strabismus. Informed consent was taken and the demographic data by using a self-designed Performa was also recorded. The tests and examinations were included history and symptoms, Visual Acuity (Snellen's chart) without correction, subjective and objective refraction (static retinoscopy). Then cover, uncover and alternate cover test was performed to detect which type of phoria was present, either exophoria or esophoria.

All the myopic patients were assessed before and after refractive correction. The data was entered and analyzed using software IBM-SPSS-23 v-25. The categorical variables were expressed as frequency and percentages, whereas continuous variables in the form of Mean ± SD. Bar charts were used to display categorical data. Chi-square test was used to find any association between categorical variables. A P-value <0.05 was considered as statistically significant. As it was

observational study so there was no ethical issue or any religious barrier in this study.

3. RESULTS

This study included 61 subjects. The mean age was 12.49 (SD=4.784) years with the range of 8 to 25 years. The frequency of male and female subjects analyzed by SPSS is shown in the following table-1.

Table-1:Frequency distribution of subjects by gender

	Frequency	Percentage
Female	33	54.1
Male	28	45.9
Total	61	100.0

All of these subjects were grouped into 3 myopic groups. The criteria of these groups were as follows. (1) Mild myopia from 0.25 to 2D; (2) moderate myopia from 2D to 6D;(3) severe myopia>6D. Table-2

Table-2: Frequency distribution of subjects according to Degree of Myopia

Characteristics	Frequency	Percent
Mild Myopia	20	32.8
Moderate Myopia	26	42.6
Severe Myopia	15	24.6
Total	61	100.0

Before the correction of myopia, out of 61 subjects 9 participant were seen with esophoria, 47 had exophoria and 5 subjects were orthophoric. Following tables 4.3 and 4.4 shown the frequencies of the type of phoria in myopic patients before refractive correction. Table-3.

Table-3: Frequency distribution of types of phoria in myopic patient before refractive correction

Characteristcs	Frequency	Percent
Esophoria	9	14.8
Exophoria	47	77
Orthophoria	5	8.2
Total	61	100.0

Table-4: Frequency of types of phoria in males and females before myopic correction

Gender	Orthophoria	Exophoria	Esophoria	P
Male	**3**	**22**	**3**	**0.32**
Female	**2**	**25**	**6**	**33**

When subjects were given myopic correction reaching to the 6/6 visual acuity than 2 patients had left esophoria less than 5 degree, 6participant left exophoria up to 5 degree and 53 participants were orthophoric after the refractive correction.

Table below show the frequencies and percentages of the phoria types after the refractive correction.

Table-5: Frequency distribution of types of phoria in myopic patient after refractive correction

Characteristcs	Frequency	Percent
Esophoria	2	3.3
Exophoria	6	9.8
Orthophoria	53	86.9
Total	61	100.0

Table-6: Frequency of types of phoria in males and females after myopic correction

Gender	Types of phoria			
	Orthophoria	Exophoria	Esophoria	p
Males	26	2	0	0.143
Females	27	4	2	
Total	53	6	2	

Cover uncover test in degrees was performed to detect the type of phoria in myopic patients. Following table shown the mean degrees of type of phoria before and after myopic correction.

Table-7: Mean degrees of type of phoria before and after myopic correction

Variable	N	Mean (Degrees)	Std. Deviation
Cover-uncover test before myopic correction	61	16.70	7.136
Cover-uncover test after myopic correction	61	0.66	1.702

Types of phoria is assessed with the help of cover uncover test in all subjects and is categorized into 3 groups. Group 1 represent the orthophoria in myopic patients before their myopic correction, group 2 represent exophoria in myopic patients before their myopic correction and the group 3 represent the esophoria in myopic patients before their myopic correction.

4. DISCUSSION

In this study 61 myopic individuals were included. The range of age was 8-25 years. The frequency of male and female was 45.9% and 54.1% respectively. Myopic individuals were categorized into mild 20(32.8%), moderate 26(42.6%) and severe 15(24.6%) myopia. According to the data exophoria was present in 47 individuals (25 females and 22 males), esophoria was present in 9 individuals (6 females and 3 males) and 3 males and 2 female individuals, 5 individuals were orthophoric ($p<0.05$). A similar study was conducted by Ying Li Yang in 2019 on investigation about horizontal heterophoria among newly diagnosed myopia juveniles of 150 cases. 73 male and 77 female with 12 to 16 years ranges were included. 7.3% accounted for orthophoria, 13.33% esophoria and 79.33% exophoria.[6]

Statistical results indicated that exophoria was present in higher proportion as compared to that of esophoria. 47 individuals were having exophoric state with mild myopia (6 subjects), 22 individuals with moderate myopia and 09 individuals with severe myopia. While there was a single esophoric individual in mild myopia, in moderate myopia there were 2 esophoric and in severe myopia there were 9 individuals with esophoria.

Study conducted in 2021 by Javeria Maqbool on the types of phorias in different degrees of myopic patients before and after refractive correction. 100 individuals were included in which 42% of individuals had mild myopia, 42% had moderate myopia, and 16% had severe myopia. Prior to myopia treatment, esophoria was detected in 21% of individuals, exophoria in 54%, and orthophoria in 25% of individuals. Following refractive correction, 13% of the individuals still had esophoria, 28% exophoria, and 59% became orthophoric He concluded that the exophoria was more common than esophoria, which is comparable to this study.

These all 61 myopic individuals were given myopic correction. Before the correction of myopia there were 5 cases of orthophoria which had neither exophoria nor esophoria. After the correction of myopia 53 individuals (87%) become orthophoric. While 6 individuals (9.8%) left exophoric and 2 subjects (3.3%) left esophoric even with myopic correction.

Considering the result of this study exophoria was more common type of phoria in myopic individuals. Although esophoria was also present in some of myopic individuals.[15]

5. CONCLUSION

Heterophorias seen in majority of myopic individuals leads to complains of asthenopic symptoms effecting their daily routine work. If myopia is left untreated, heterophoria can convert into heterotropia raising visual and cosmetic concerns. So, myopic correction is significant to avoid asthenopic symptoms and hence to prevent the conversion of heterophoria to the heterotropia.

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