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Research Article

**ASSESSMENT OF CORRELATION BETWEEN INTRA  
OCULAR PRESSURE AND MYOPIA AT TERTIARY CARE  
HOSPITAL**<sup>1</sup>Dr. Muhammad Younis Tahir, <sup>2</sup>Dr. Muhammad Khalid, <sup>3</sup>Dr. Manzoor Hussain Malik<sup>1</sup>Associate Professor, Department of Ophthalmology, Quaid-e-Azam Medical College,  
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Bahawalpur<sup>3</sup>Consultant Ophthalmologist, Al-Shifa Hospital, Bahawalpur**Article Received:** November 2019 **Accepted:** December 2019 **Published:** January 2020**Abstract:****Objective:** To detect correlation between intra ocular pressure and myopia at tertiary care hospital.**Material and methods:** This cross sectional study was conducted at Department of Ophthalmology, Bahawal Victoria Hospital, Bahawalpur from March 2018 to September 2018 over the period of 6 months. Total 500 patients with myopia having age 7-35 years either male or female attending ophthalmology outpatient department were included in this study and correlation between intra ocular pressure and degree of myopia was assessed.**Results:** Total 500 patients with myopia were selected for this study. Out of 500 myopic patients, 224 (44.8%) patients were male and 276 (55.2%) patients were female. Total 21 (4.2%) patients belonged to age group 7-10 years followed by 47 (9.4%) patients to age group 11-15 years, 143 (28.6%) patients to age group 16-20 years, 137 (27.4%) patients to age group 21-25 years, 122 (24.4%) patients to age group to 26-30 years and 30 (6%) patients to age group 31-35 years. Mean intra ocular pressure was 15mmhg, mean radius of corneal curvature was 44.12D, mean anterior chamber depth was 3.55mm, mean lens thickness was 3.56mm.**Conclusion:** Results of present study showed that most of the patients with myopia were between 16-20 years. Females were more victim of myopia as compared to males. Correlation between degree of myopia and intra ocular pressure was not detected. But anterior chamber depth, lens thickness, vitreous chamber depth and axial length were statistically very significant with amount of myopia.**Keywords:** Myopia, IOP, corneal curvature, glaucoma**Corresponding author:****Dr. Muhammad Younis Tahir,**Associate Professor, Department of Ophthalmology,  
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**INTRODUCTION:**

Myopia (short sightedness) optics was first explained by Johannes Kepler, the founder of dioptric's during the 17th century. In his initial clarification of ophthalmic dioptrics, he correctly assumed that in myopia the incident light was brought to focus in front of the retina.<sup>1</sup> Myopia was the most common refractive error in the world.<sup>2</sup> Its worldwide prevalence is about 30% and up to 80% in certain Asian population.<sup>3</sup> High grade myopia can increase the risk for glaucoma, retinal detachment, and chorioretinal degeneration.<sup>4</sup> Etiologically myopia can be classified as axial myopia (due to increase in antero posterior length of eyeball), curvatural myopia (due to increase in curvature of cornea, lens or both), positional myopia (due to anterior placement of the lens) and Index myopia (due to increase in refractive index of lens in nuclear sclerosis).<sup>5</sup> Pathological or degenerative myopia is a rapidly progressive refractive error which starts in childhood at the age of 5-10 years and results in high myopia (power >6D) during early adult life which is usually associated with degenerative changes of retina, choroid and vitreous. Genetic factors play a role in the etiology of pathological myopia.<sup>6</sup> An association between intraocular pressure (IOP) and refractive error has been reported in children, young adults and presbyopic adults.<sup>2-4</sup> Most population based studies in adults have found significant relation between intraocular pressure and myopia, although disputed by a few clinical based studies.<sup>7</sup> Intra Ocular Pressure (IOP) is measured by Schiotz tonometer, applanation tonometer, Perkins hand held tonometer, and non contact tonometer. Goldmans applanation tonometer is the gold standard method for measuring IOP. Intra ocular pressure in normal individual is 10-21mmHg. Raised intra ocular pressure leads into Glaucoma which is due to blockage in the trabecular meshwork out flow pathway or excessive secretion of aqueous humour.<sup>8</sup>

Incidence of primary open angle glaucoma (POAG) was slightly higher in myopes.<sup>9</sup> Axial length or antero posterior diameter of eye ball in normal individual is 22-24mm. Axial length is measured by A scan Biometry. About 1mm shortening of antero posterior diameter of the eye results in 3 dioptres of myopia.<sup>10</sup>

**MATERIAL AND METHODS:**

This cross sectional study was conducted at Department of Ophthalmology, Bahawal Victoria Hospital, Bahawalpur from March 2018 to September 2018 over the period of 6 months. Total 500 patients with myopia having age 7-35 years either male or female attending ophthalmology outpatient department were included in this study.

Patients with family history of Glaucoma, history of trauma or surgery in the eye, patients on any topical medications and those with corneal dystrophy and myopic macular degeneration were excluded from the study.

Study was approved by ethical committee and written informed consent was taken from every patient.

All of them underwent a complete ocular examination including slit lamp examination, dilated fundus examination, retinoscopy and refraction. BCVA (Best corrected visual acuity) was assessed using Snellen's visual acuity chart. Intraocular pressure was measured by Goldmann applanation tonometer by the same investigator in all cases. Patients with astigmatism >1Dioptre (D) and hyperopia >+0.50 DS (Dioptre Sphere).

All the data was entered in pre-designed performa along with demographic profile of the patients. SPSS version 18 was used to analyzed the collected. Mean and SD was calculated for numerical data. Frequencies were calculated for categorical data.

**RESULTS:**

Total 500 patients with myopia were selected for this study. Selected patients were divided into 5 age groups i.e. age group 7-10 years, age group 11-15 years, age group 16-20 years, age group 21-25 years, age group 26-30 years and age group 31-35 years. Total 21 (4.2%) patients belonged to age group 7-10 years followed by 47 (9.4%) patients to age group 11-15 years, 143 (28.6%) patients to age group 16-20 years, 137 (27.4%) patients to age group 21-25 years, 122 (24.4%) patients to age group to 26-30 years and 30 (6%) patients to age group 31-35 years. (Table 1) Out of 500 myopic patients, 224 (44.8%) patients were male and 276 (55.2%) patients were female. (Fig. 1) Total 88 (17.6%) patients having amount of myopia between 0 to -2 followed by 223 (44.6%) patients between -2.25 to -4, 108 (21.6%) patients were between -4.25 to -6, 59 (11.8%) patients were between -6.25 to -8, 14 (2.8%) patients were between -8.25 to -10 and 8 (1.6%) patients were having myopic power more than 10 Diopter (Table 3). Around 223 patients (44.6%) were having 16 mmHg intra ocular pressure (IOP). The 14 patients were having IOP 14mmHg and 8 patients were having 20mmHg IOP (Table 4). Around 223 patients were having 43.75D radius of corneal curvature value, 147 patients were having corneal curvature value 43.25D and 122 patients were having 45D corneal curvature value (Table 5). The minimum value of anterior chamber depth obtained in this study was 3.04mm and the maximum value obtained was 3.96mm. Majority of the patients

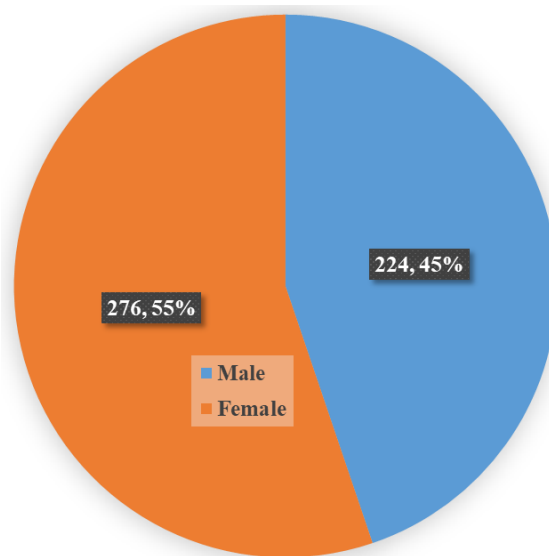
anterior chamber depth was 3.36mm (Table 6). Maximum lens thickness value obtained in this study was 3.74mm and the minimum value obtained in this study was 3.43mm. The mean value of lens thickness for all eye was 3.56mm (Table 7). The minimum value of vitreous chamber depth obtained in this study was 16.66mm and maximum value was 19.72mm. The mean value for the whole range in

vitreous chamber depth value was 18.40mm (Table 8). Around 8 patients were having high 19.72mm vitreous chamber depth value. The minimum value of axial length obtained in this study was 21.74mm and the maximum value was 26.74mm. The mean value of axial length for all the eyes were 24.60mm (Table 9).

**Table 1: Age distribution.**

Age	No. of patients
7 -10 yrs	21 (4.2%)
11-15yrs	47 (9.4%)
16-20 yrs	143 (28.6%)
21-25yrs	137 (27.4%)
26-30 yrs	122 (24.4%)
31-35 yrs	30 (6%)

**Figure 1: Gender distribution.**



**Table 2: Percentage of patients.**

Amount of myopia (Diopters)	No. of patients
0-2	88 (17.6%)
2.25-4	223 (44.6%)
4.25-6	108 (21.6%)
6.25-8	59 (11.8%)
8.25-10	14 (2.8%)
>10	8 (1.6%)

**Table 3: Variations of intra ocular pressure (IOP) and amount of myopia**

Amount of myopia (Diopters)	No. of patients	IOP mmHg
0-2	88	18
2.25-4	223	16
4.25-6	108	12
6.25-8	59	14
8.25-10	14	10
>10	8	20
P-value	P > 0.05	
Significance	Not significant	

**Table 4: Variations of radius of corneal curvature (k reading) and amount of myopia.**

Amount of myopia	No. of patients	K reading
0-2	88	43.25
2.25-4	223	43.75
4.25-6	108	45
6.25-8	59	43.25
8.25-10	14	45
>10	8	44.50
P-value	P > 0.05	
Significance	Not significant	

**Table 5: Variations of anterior chamber depth (ACD) and amount of myopia.**

Amount of myopia	No. of patients	ACD
0-2	88	3.04
2.25-4	223	3.36
4.25-6	108	3.57
6.25-8	59	3.65
8.25-10	14	3.73
>10	8	3.96
P-value	P < 0.05	
Significance	Significant	

**Table 6: Variations of lens thickness (LT) and amount of myopia**

Amount of myopia	No. of patients	LT
0-2	88	3.56
2.25-4	226	3.43
4.25-6	108	3.58
6.25-8	59	3.74
8.25-10	14	3.63
>10	8	3.46
P-value	P < 0.05	
Significance	significant	

**Table 7: Variations of vitreous chamber depth (VCD) and amount of myopia.**

Amount of myopia	No. of patients	VCD
0-2	88	16.66
2.25-4	223	17.34
4.25-6	108	18.56
6.25-8	59	18.82
8.25-10	14	19.34
>10	8	19.72
P-value	P <0.001	
Significance	Highly significant	

**Table 8: Variations of axial length and amount of myopia.**

Amount of myopia	No. of patients	Axial length
0-2	88	23.74
2.25-4	223	23.91
4.25-6	108	24.36
6.25-8	59	25.90
8.25-10	14	26.51
>10	8	26.91
P-value	P <0.001	
Significance	Highly significant	

**DISCUSSION:**

The purpose of this study was to assess the **correlation between myopia and intraocular pressure**. Total 21 (4.2%) patients belonged to age group 7-10 years followed by 47 (9.4%) patients to age group 11-15 years, 143 (28.6%) patients to age group 16-20 years, 137 (27.4%) patients to age group 21-25 years, 122 (24.4%) patients to age group to 26-30 years and 30 (6%) patients to age group 31-35 years. (Table 1) Out of 500 myopic patients, 224 (44.8%) patients were male and 276 (55.2%) patients were female.

The prevalence of the pathological myopia may involve 1.7 to 2.1% of Caucasian population.<sup>11</sup>

In this study 419 patients (83.8%) were having simple myopia (power <6D) and 81 patients (16.2%) were having pathological myopia (power >6D). The overall mean intraocular pressure (IOP) in myopia was 15mmHg in this study. The mean IOP in myopic eye was similar to that of the present study in most of the previous studies. Becker et al, in their study reported that mean IOP was 15.35mmHg. In this study the mean IOP increases with the age.<sup>12-13</sup> The study conducted by Abdulla MI and Hamdi M, also agreed that intra ocular pressure increases in older myopes.<sup>13</sup> In this study, the mean IOP was found high (15.33mmHg) in simple myopia than pathological myopia (14.66mmHg). But there was no correlation between degree of myopia and intra ocular pressure in this study. Abdulla MI and Hamdi M, had similar observation in their studies.<sup>13</sup> Brien Mc and Millodot M, found that the values of both

horizontal and vertical corneal radius of curvature between myopes and emmetropes were identical.<sup>14</sup> Normally radius of corneal curvature was 43.25 D in emmetropes but in this study mean radius of corneal curvature was 44.12D.

Tien yin Wong et al, concluded that there was no significant variation in corneal curvature between emmetropia and refractive error.<sup>15</sup> Calmettes L et al, suggested that depth of anterior chamber increases regularly up to 20 yrs of age and reaches its maximum of 3.76mm between 20 and 30 years and decreased afterwards slowly with age to attain the maximum of 3.23mm.<sup>16</sup> He found that mean value of anterior chamber depth was 3.62mm in myopic eyes compared to 3.58mm of anterior chamber depth in emmetropes.

Erickson pointed the effect of change in anterior chamber depth and refractive error depends on the causative structure. If 0.1mm in anterior chamber depth results from the growth of cornea away from the lens, then 0.14D of myopia results.<sup>17</sup> But if increase was due to lens shifting posteriorly then 0.13D of hypermetropia occurs. The mean anterior chamber depth was 3.55mm for all myopes in this study. Deeper anterior chamber was seen in myopia in the range of 8-9D in this study.

A statistically significant thinner lens was seen in higher degrees of myopia in this study.

Tien Yin Wong *et al*, found that myopes had longer axial length, deep anterior chamber depth and long vitreous chamber depth than hypermetropes.<sup>15</sup>

Bai-Chuan-Jiang and WM Woessner, found a high correlation between refractive error and axial length. The axial elongation is a consequence of change in vitreous chamber depth.<sup>18-19</sup> The mean value of axial length for all the eyes were 24.60mm in this study. Mc Brien and Adams DW, concluded that the only difference in ocular component dimension changes for myopic eye was elongation of vitreous chamber depth.<sup>19</sup> Goss DA *et al*, concluded in their study that vitreous depth was greater in myopes than in emmetropes.<sup>20</sup>

### CONCLUSION:

Results of present study showed that most of the patients with myopia were between 16-20 years. Females were more victim of myopia as compared to males. Correlation between degree of myopia and intra ocular pressure was not detected. But anterior chamber depth, lens thickness, vitreous chamber depth and axial length were statistically very significant with amount of myopia.

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