ANALYSIS OF OPTIC DISC AND PERIPAPILLARY AREA USING OPTICAL COHERENCE TOMOGRAPHY IN YOUNG ADULT INDIAN MYOPIC EYES AT AMBEDKAR MEDICAL COLLEGE

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ABSTRACT

INTRODUCTION
A specific objective of the study was to look for correlations between myopia and optic disc measurements obtained by Primus SD-OCT. Retinal nerve fibre layer thickness was measured by Primus SD-OCT in both normal and myopic eyes.

MATERIAL & METHODS
This is a cross-sectional case control study conducted over a period of 18 months from July, 2014 to December, 2015 at DR. B. R. Ambedkar Medical College and Hospital, Bangalore, India on analysis of optic disc and peripapillary area using Primus spectral domain OCT in young Indian adult myopic eyes. A total of 108 eyes were studied in which 40 were normal (emmetropia), 27 were mild myopia (≤3D) and 41 were moderate to severe myopia (>3D). Patients in all three groups were age matched. All patients were of young age between 20 to 40 years. All images were acquired by Primus SD-OCT. Measurements of the ONH parameters and the peripapillary RNFLT were noted by OCT. The data was then analysed after dividing the patients into three groups: the normal group and the myopic group. The myopic group was further sub-divided into mild myopia (≤3D) and moderate to severe myopia (>3D).

The mean disc area of eyes in the control (emmetrope) group was $2.3\pm0.4mm.^2$ The mean disc area in the mild myopia group was $2.07\pm0.32mm^2$ while that of the eyes in the moderate to severe myopia group was $1.8\pm0.4mm.^2$ The difference between the groups was statistically significant, suggesting that as myopia increases disc area decreases. The other parameters were analysed statistically in a similar fashion and the results were tabulated and explained.

Myopic patients review periodically for their refractive error correction. Myopic disc findings may mimic optic disc changes suggestive of optic neuropathy. The data and results obtained in the current study suggest that optic disc parameters vary in myopic eyes compared to emmetropic eyes by SD-OCT. Therefore, in myopic eyes, OCT parameters should be interpreted with caution before labelling them as glaucomatous or any other disease causing RNFL thinning and variation in ONH values. Clinical correlation along with OCT parameters are essential before formulating a definitive diagnosis.

CONCLUSION
OCT is a non-contact, non-invasive imaging modality that is used to take high resolution, in-vivo, and cross-sectional pictures of the optic nerve head. OCT, thus, helps to quantify the structural damage that an eye has suffered due to glaucoma.

While performing OCT studies in normal (emmetrope) and myopic eyes in the current investigation, it was found that there was thinning in the retinal nerve fibre layer in superior, inferior, nasal and average thickness values in myopic eyes which was more marked in moderate to high myopia than in mild myopia. The disc area was smaller in high myopes compared to the normal eyes. The cup volume was smaller in high myopes which correlated with the smaller disc area. There was no significant correlation between spherical equivalent and RNFLT.

Myopic patients review periodically for their refractive error correction. Myopic disc findings may mimic optic disc changes suggestive of optic neuropathy. The data obtained in the current investigation suggests that optic disc parameters vary in myopic eyes compared to emmetropic eyes by spectral domain OCT. therefore, in myopic eyes, OCT parameters should be interpreted with caution before labelling them as glaucomatous or any other disease causing RNFL thinning and variation in ONH values. Clinical correlation along with OCT parameters are essential before formulating a definitive diagnosis.

KEYWORDS
Optic Disc Peripapillary Area, Myopia, Optical Coherence Tomography, Retinal Nerve Fibre Layer, Glaucomatous.

INTRODUCTION:
AIM OF THE STUDY: To evaluate Optic Disc and Peripapillary area in young myopic adults by Primus Spectral Domain-optical coherence tomography at DR. B.R. Ambedkar Medical College.

SPECIFIC OBJECTIVES:
- To measure retinal nerve fibre layer (RNFL) thickness by spectral domain-optical coherence tomography in myopic and normal eyes.
- To measure various optic nerve head (ONH) parameters by Primus SD-OCT in myopic and normal eyes.

MATERIALS AND METHODS: A cross sectional, case-control study was conducted over a period of 18 months from July, 2014 to December 2015 at DR. B. R. Ambedkar Medical College and Hospital, Bangalore, Karnataka, India.

A total of 108 eyes were studied in which 40 were normal (emmetrope), 27 were mild myopia (less than or equal to 3D) and 41 were moderate to severe myopia (more than 3D). Informed consent was obtained from all the participants in the study. All patients were of young age between 20 to 40 years.

Patients were enrolled in the study if they satisfied the following criteria:

Inclusion Criteria:
1. Consent by the patient for the study.
2. Best corrected visual acuity of 6/6.
3. Normal IOP.
4. Normal visual field.
5. Open angle on gonioscopy.
6. C: D ratio not greater than 0.5D in myopia group and not more than 0.3 – 0.4 in the emmetropia group.
7. Age group of 20 to 40 years.

Patients were not enrolled if they had even one of the following criteria:

Exclusion Criteria:
1. Had a best corrected visual acuity less than 6/6.
2. Those with peripapillary atrophy extending more than 1.7mm from the centre of the optic disc which interfered with the optic disc cube measurement.
3. History of previous trauma to eye.
4. Prior ocular or refractive surgery.
5. Suffered from any ocular or neurologic disease that causes thinning of RNFL.
6. No secondary glaucoma or angle closure glaucoma.
7. No h/o strabismus.
8. Congenital anomalies of optic disc.
9. Those optic nerve heads which have extensive peripapillary atrophy that comes into fixed scanning circle of OCT.

A detailed medical and surgical history was first elicited from all the patients. Following this all patients underwent automated refraction and measurement of best corrected visual acuity with glasses, IOP measurement by GAT,3 mirror gonioscopy, visual field testing by the Octopus visual field analyser, OCT measurement of the optic disc by Primus OCT System, axial length measurement by A-scan and optic disc photography by fundus camera.

RESULTS: This study on peripapillary disc measurement by Primus optical coherence tomography in young Indian myopic eyes was conducted at DR. B. R. Ambedkar Medical College and Hospital, Bangalore over a period of 18 months from July, 2014 to December, 2015. Patients enrolled in the study provided informed written consent prior to enrolment. This study was a cross sectional case-control study; 'cases' were eyes with mild myopia (27 eyes) and eyes with moderate or severe myopia (41 eyes) while 'controls' were emmetropic eyes (40 eyes). All cases were of younger age group between 20 and 40 years of age.

1. **Sample Size:** Prior to the start of the study, an attempt was made to calculate a suitable sample size based on the following requirements:
   - Margin of error 5%.
   - Confidence level 95%.
   - Population size 200.
   - Response distribution 80%.

   The sample size was calculated to be 136 in each arm of the study.

2. **PATIENT DEMOGRAPHIC DETAILS:**
2.1. **Age of patients:** The mean age in the control (emmetrope) group was 23.4±2.84 years (range 21-26), that in the mild myopia group was 23.5±4.54 years (range 21-27) and that in the moderate-severe myopia group was 23.3±3.3 (range 20-27 years) (table 1); these differences were not statistically significant (one way analysis of variance [ANOVA], Fisher 'F' value =0.027; P=0.973). Thus the patients included in the study could be considered to be age-matched. (Figure 1, Table 1).
2.2. **Gender of Patients:** Analysis of the gender details of the study population revealed that there were 6 males (30%) and 14 females in the control (emmetrope) group, 12 males (45%) and 15 female participants in the mild myopia group and 22 males (54%) and 19 female participants in the moderate-severe myopia group. (Table 1).

3. **CLINICAL PARAMETERS:**
3.1. **Spherical Equivalent (SE):** The mean spherical equivalent in the mild myopia group was -2.07±1.2D while that in the moderate-high myopia group was-4.97±1.2D. (Table 1).
3.2. **Axial Length:** The mean axial length of eyes in the control (emmetrope) group was 22.9±0.6 mm. the mean axial length of eyes in the mild myopia group was 24.27±0.88 mm while that of the eyes in the moderate –severe myopia group was 25.1±1.004mm (Table 1, fig. 2); these differences. <0.0001). Since one-way ANOVA detected significant differences between the three groups, Turkey's post-hoc test was applied to detect specific intergroup differences. The difference in mean axial length between the control (emmetrope) and mild myopia group was found to be statistically significant (Turkey test, 'q' value=10.7; P<0.01). The difference in mean axial length between the control

(emmetrope) and moderate–severe myopia group was found to be statistically significant (Turkey test, 'q'=16.8; P<0.001). The difference in mean axial length between mild and moderate-severe myopia groups was also found to be statistically significant (Turkey test, 'q'=6.1; P, 0.01). (Table 1).

4. OPTIC NERVE HEAD PARAMETERS:

4.1. Disc Area: The mean disc area of eyes in the control (emmetrope) group was 2.3 ± 0.4 mm.[2] The mean disc area in the mild myopia group was 2.07 ± 0.32mm^2 while that of the eyes in the moderate-severe myopia group was 1.8 ± 0.4mm.[2] (Table 1, Fig. 3); these differences were statistically significant (one-way ANOVA; 'F'=17.4; P, 0.0001). Since one-way ANOVA detected significant differences between the 3 groups, Turkey's post-hoc test was applied to detect specific intergroup differences. The difference in mean disc area between the control (emmetrope) and mild myopia group was found to be statistically significant. (Turkey test, 'q' value=3.9; P<0.05). The difference in mean disc area between the control (emmetrope) and moderate-severe myopia groups was found to be statistically significant (Turkey test, 'q'=8.4; P<0.01). The difference in mean disc area between the mild and moderate to severe myopia groups was found to be statistically significant. (Turkey test, 'q'=4.5; P<0.01) (Table 1).

4.2. Rim Area: Group was 1.3 ± 0.3 mm^2. The mean rim area in the mild myopia group was 1.32 ± 0.37mm^2 while that of eyes in the moderate-severe myopia group was 1.32 ± 0.37mm^2 while that of eyes in the moderate-severe myopia group was 1.29 ± 0.23mm^2 (Table 1). These differences in mean optic nerve head rim area values between the groups was statistically insignificant (one-way ANOVA; 'F'=0.08; P=0.92). (Table 1).

4.3. Cup Volume: The mean optic nerve head cup volume in the control (emmetrope) group was 0.37 ± 0.3mm.[3] The mean optic nerve head cup volume of eyes in the mild myopia group was 0.25 ± 0.19mm^3 while that of the eyes in the moderate–severe myopia group was 0.22 ± 0.18mm^3 (Table 1, Fig.4); these differences were statistically significant (0ne-way ANOVA; 'F'=4.5; P=0.013). Since one-way ANOVA detected significant differences between the three groups, Turkey's post-hoc test was applied to detect specific intergroup differences. The difference in mean cup volume between the control (emmetrope) and mild myopia groups was found to be statistically significant (Turkey test, 'q'=3.27; P≈0.05). The difference in mean cup volume between the control (emmetrope) and moderate-severe myopia group was found to be statistically significant (Turkey test, 'q'=4.1 P <0.05). The difference in mean cup volume between the mild and moderate-severe myopia groups was found to be statistically insignificant (Turkey test, 'q'=0.81; P=0.7).

4.4. Average CD Ratio: The average CD ratio of eyes in the normal group was 0.5 ± 0.2. The average CD ratio in the mild myopia group was 0.5 ± 0.2 while that of in the moderate-severe myopia group was 0.5 ± 0.2 (Table 1). These differences were not statistically significant. (Table 1).

5. RETINAL NERVE FIBRE LAYER THICKNESS:

5.1. Average Retinal Nerve Fibre Layer Thickness (RNFLT): The mean average RNFLT of eyes in the control (emmetrope) group was $100.1\pm9.5\mu$. the mean average RNFLT in the mild myopia group was $89.78\pm6,04\mu$ while that of eyes in the moderate-severe myopia group was $88.17\pm8.2\mu$ (Table 2, Fig. 5); these differences were statistically significant (one-way ANOVA; 'F'=23.9;P,0.0001). Since one-way ANOVA detected significant differences between the three groups, Turkey's post-hoc test was applied to detect specific intergroup differences. The difference in mean average RNFLT between the control (emmetrope) and mild myopia group was found to be statistically significant. (Turkey test, 'q' value=8.0; P<0.001). The difference in mean average RNFLT between the control (emmetrope) and moderate to severe myopia groups was found to be statistically significant (Turkey test, 'q'=9.3; P<0.001). However, the difference in mean average RNFLT between the mild and moderate-severe myopia groups was not found to be statistically significant. (Turkey test, 'q'=1.3; P>0.05) (Table).

5.2. Superior Quadrant RNFLT: The mean superior quadrant RNFLT of eyes in the control (emmetrope) group was $126.1\pm18.08\mu$. The mean superior quadrant RNFLT in the mild myopia group was $116.4\pm10.16\mu$ while that of eyes in the moderate-severe group was $113.37\pm11.1\mu$ (Table 2, Fig. 5); these differences were statistically significant (one-way ANOVA; 'F'=8.9; P<0.0001). Since one-way ANOVA detected significant differences between the 3 groups, Turkey's post-hoc test was applied to detect specific intergroup differences. The difference in mean superior quadrant RNFLT between the control (emmetrope) group and mild myopia group was found to be statistically significant. (Turkey test, 'q' value=4.4; P<0.01). The difference in mean superior quadrant RNFLT between the control (emmetrope) and moderate-severe groups was found to be statistically significant. (Turkey test, 'q'=5.8; P<0.01). However, difference in mean superior quadrant RNFLT between the mild and moderate to severe myopia groups was not found to be statistically significant (Turkey test, 'q'=1.4; P>0.05) (Table 2)

5.3. Nasal Quadrant RNFLT: The mean nasal quadrant RNFLT of eyes in the control (emmetrope) group was $77.93\pm11.54\mu$. The mean nasal quadrant RNFLT of eyes in the mild myopia group was 66.7 ± 10.9 μ while that of eyes in the moderate-severe group was 65.12 ± 11.46 μ (Table 2, Fig. 5). These differences were statistically significant.

5.4. Inferior Quadrant RNFLT: The mean inferior quadrant RNFLT of eyes in the control (emmetrope) group was 132.1±18.1μ. The mean inferior quadrant RNFLT of eyes in the mild myopia group was 118±9.64μ while that of eyes in the moderate-severe myopia group 107.15±15.7μ (Table 2, Fig. 5). These differences were statistically significant.

5.5. Temporal Quadrant RNFLT: The mean temporal quadrant RNFLT of eyes in the control (emmetrope) group was 64.1±8.8 μ. The mean temporal quadrant RNFLT of eyes in the mild myopia group was 55.33±11.66 μ while that of eyes in the moderate-severe myopia group was 60.56±12.28μ (Table 2, Fig. 5). These differences were statistically significant (0ne-way ANOVA; 'F'=5.2; P=0.007).

6. Correlation between Various Clinical Parameters and Optic Nerve Head Measurements: Using Pearson's correlation coefficient, correlations were sought between various parameters within the normal (emmetrope) group and the case (myopia) groups. (Tables 3, 4).

6.1. Control (emmetrope) Group:

6.1.1 Age and RNFLT: In the control (emmetrope) group, age was found to have a weak negative correlation with the average RNFL thickness (r=-0.292, P=0.06), superior RNFLT (R=-0.255, P=0.11) and inferior RNFLT value (r=-0.274, P=0.08); that is, increasing age was accompanied by reduction in RNFLT thickness at these sites. However, no correlations were observed between age and nasal RNFLT (r=0.005, P=98) and temporal RNFLT (r=-o.188, P=0.24) values (Table 3).

6.1.2 Axial Length and RNFLT: In the control (emmetrope) group, a weak (positive) correlation (not statistically significant) was observed between axial length and nasal RNFLT (r=-0.24, p=0.13) (Table 3). However, no correlations emerged between axial length and average RNFL thickness (r=-0.031, p=0.85), superior RNFLT (r=-0.001, p =0.99), inferior RNFLT (r=0.026, p=0.87) or temporal RNFLT (r=0.158, p=33) values (Table 3).

6.1.3 Disc Area and RNFLT: In the control (emmetrope) group, weak positive correlations (not statistically significant) were observed between optic disc area and average RNFL thickness (r=0.24, p=0.13) and disc area and inferior RNFLT (r=0.29, P=0.07) values (Table 3). However, no correlations emerged between disc area and superior RNFLT (r=0.06, p=0.68), nasal RNFLT (r=0.11, p=0.52) and temporal RNFLT (r=- 0.171, p=0.29) values (Table 3).

6.2. Case (myopia) Groups:

6.2.1 Age and RNFLT: In case (myopia) groups, significant correlations were observed between age and average RNFLT (r=-0.39, p <0.005), superior RNFLT (r=-0.345, p <0.05), nasal RNFLT (r=0.26, p<0.05) and temporal RNFLT (r=0.43, p<0.005) values, although the strength of these correlations ranged from weak to moderately strong. No significant correlation emerged between age and inferior RMFLT (r=-0.07, p=0.58). (Table 4).

6.2.2 Axial Length and RNFLT: In the case (myopia) groups, significant (although weak) negative correlations were observed between axial length and the average RNFLT (r=-0.28, p<0.05), superior RNFLT (R=-0.24, P<0.05) and inferior RNFLT (r= 0.29, p<0.05) values; a weak negative correlation (not statistically significant) was observed between axial length and nasal RNFLT (R=-0.2, p=0.06), but no correlation emerged between axial length and temporal RNFLT (r=0.09, p=0.49). (Table 4).

6.2.3 Disc Area and RNFLT: In the case (myopia) group, no correlations emerged between disc area and average RNFLT (r==0.07, p=0.59), superior RNFLT (r=-0.04, p=0.76), inferior RNFLT (r=-0.09, p=0.43), nasal RNFLT (r=-0.08, p=0.52) and temporal RNFLT (r=0.014, p=0.92) values (Table 4).

6.2.4 Spherical Equivalent and RNFLT: In the case (myopia) group, weak (not statistically significant) correlations were observed between spherical equivalent and average RNFLT (r=0.28, p=0.52) and spherical equivalent and inferior RNFLT (r=-0.21, p = 0.63), no correlations emerged between spherical equivalent and superior RNFLT (r=0.02, p=0.79), nasal RNFLT (r=-0.09, p=0.98) and temporal RNFLT (r=0.06, p=0.72) values (Table 4).

Parameters	Normal (Emmetrope) A	Mild myopia (less than or equal to 3D) B	Moderate-severe myopia (more than 3D) C	Statistical Analysis by one-way analysis of variance Fisher 'F' value; P value)
Age (years)	23.4±2.84	23.5±4.54	23.3± 3.3	F=0.027; P=0.973
IOP (mmHg)	17.1±1.94	17.1±2.49	16.9±2.49	F=0.096 P=0.908
Disc Area (mm²)	2.3±0.4	2.07±0.32	1.8±0.4	F=17.4 P<0.0001
Rim Area (mm²)	1.3±0.3	1.32±0.37	1.29±0.23	F=0.084 p=0.92
Mean Cup-Disc Ratio	0.5±0.2	0.5±0.3	0.5±0.2	No. difference in values
Table 1: Demographic details of patients and clinical parameters of eyes enrolled in the study				

Parameters (µm)	Normal (Emmetropes) A	Mild Myopia (≤ 3D) B	Moderate to severe Myopia (> 3D) C	Statistical Analysis by one-way analysis of variance (F Value & P Value) D
Avg. RNFL	100.1±9.5	89.78±6.04	88.17±8.2	F=23.9, P<0.0001
Inferior	132.1±18.1	118±9.64	107.15±15.7	F=26.6, P<0.0001
Superior	126.1±18.08	116.4±10.6	113.37±11.1	F=8.9, P<0.0001
Nasal	77.93±11.54	66.7±10.9	65.12±11.46	F=14.7, P<0.0001
Temporal	64.1±8.8	65.33	60.56±12.28	F=5.2, P=0.007

Table 2: Comparison of mean values of retinal nerve fibre layer thickness in control (emmetrope) eyes and eyes with Myopia

RNFL (µm)	Age (years)	Axial length (mm2)	Disc Area (mm3)
Average	-0.29	-0.03	0.24
Superior	-0.25	-0.00	-0.04
Inferior	-0.27	0.03	-0.09
Nasal	0.005	-0.24	-0.08
Temporal	-0.19	0.16	0.01

Table 3: Correlations between retinal nerve fibre layer thickness and other parameters in control (emmetrope) group

No parameters are significant.

Correlations expressed as 'r' values (derived from testing with Pearson's correlation coefficient).

RNFL (µm)	Age (years)	Axial length (mm)	Disc Area (mm2)	Spherical Equivalent (D)
Average	-0.39**	-0.28*	-0.06	0.28
Superior	-0.34*	-0.24*	-0.03	0.02
Inferior	-0.06	-0.29*	-0.09	-0.21
Nasal	-0.25*	-0.2	-0.08	-0.09
Temporal	-0.42**	0.09	0.01	0.06

Table 4: Correlations between retinal nerve fibre layer thickness and other parameters in case (myopia) groups

*p significant <0.005, **p significant <0.05.

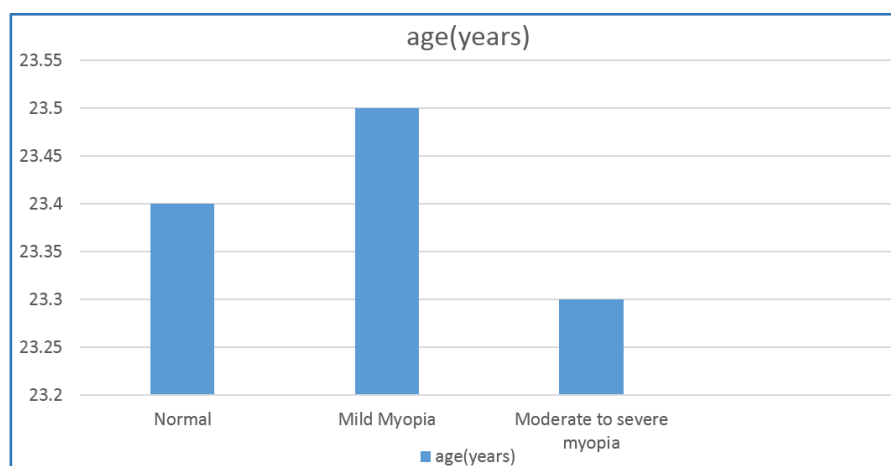Correlations expressed as 'r' values (derived from testing with Pearson's correlation coefficient).
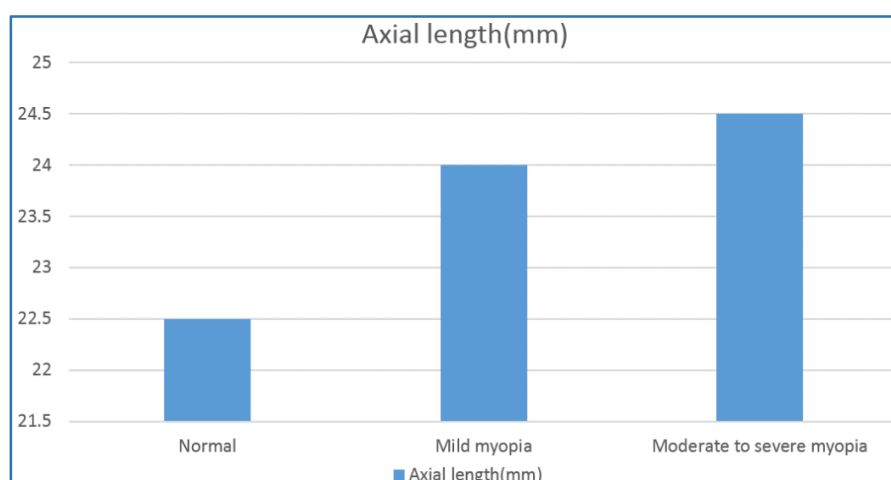

Fig. 1: Mean ages of patients in the three groups

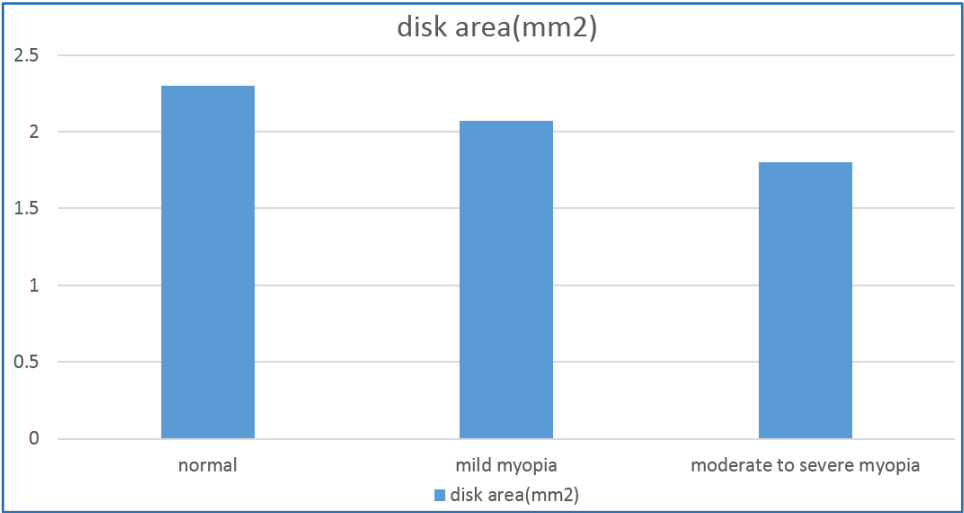*Fig. 2: Mean axial length of patients in the three groups*

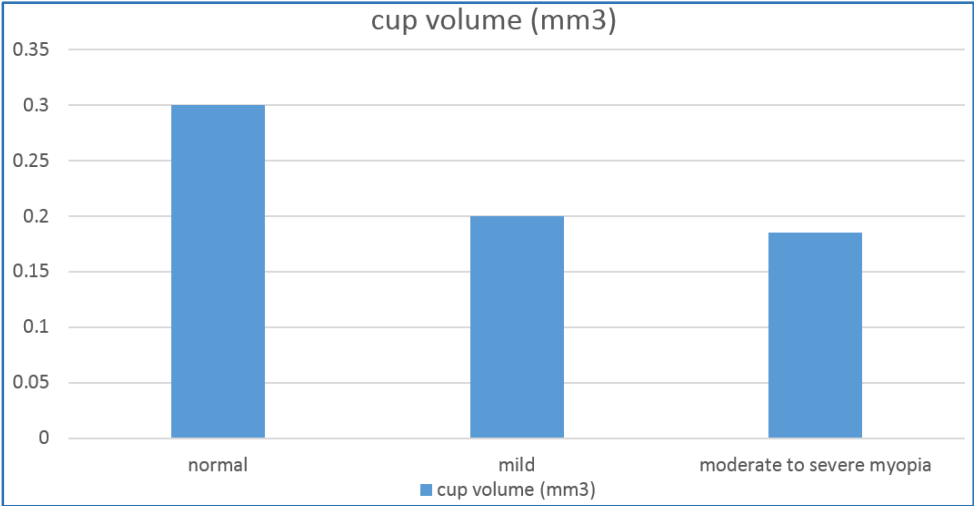**Fig. 3: Mean disc area of the patients in the three groups**

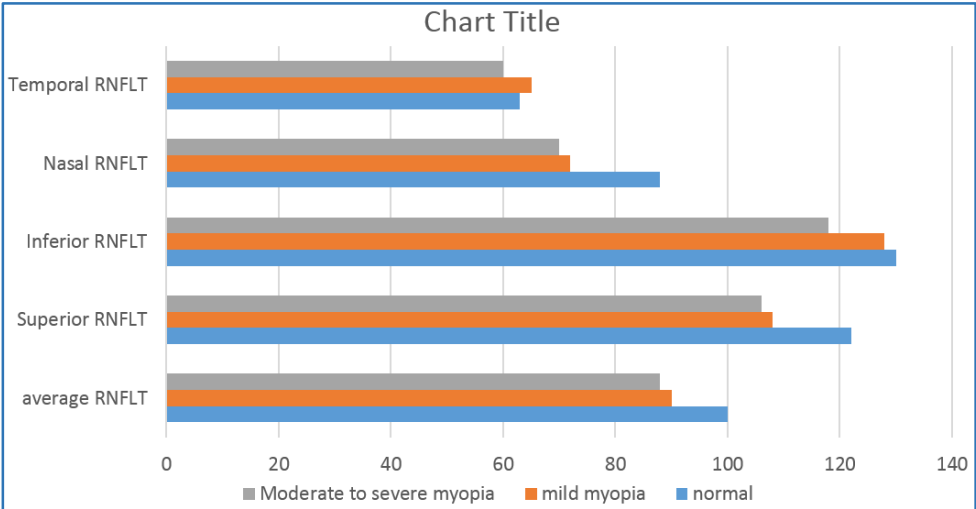**Fig. 4: Mean cup volume of the patients in the three groups**

Fig. 5: Comparison of mean values of retinal nerve fibre layer thickness in control (emmetrope) eyes and eyes with myopia seen at the study institute
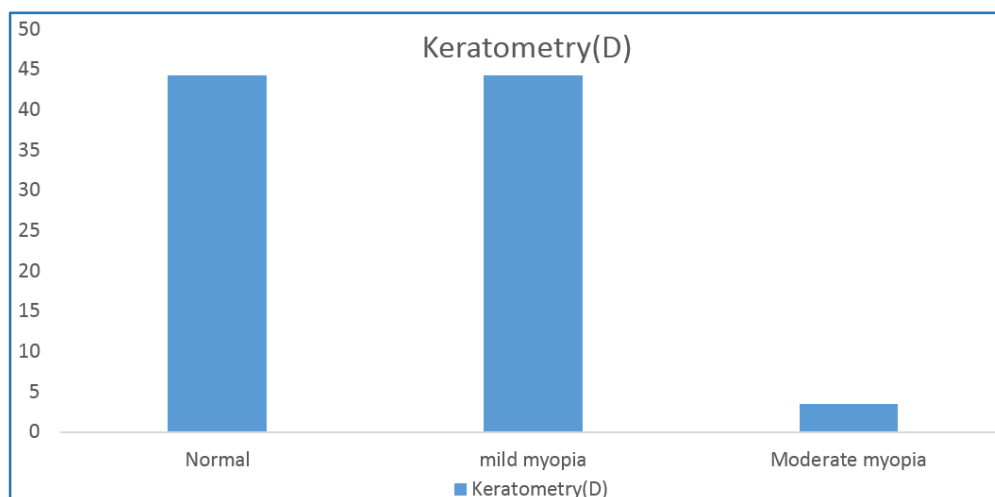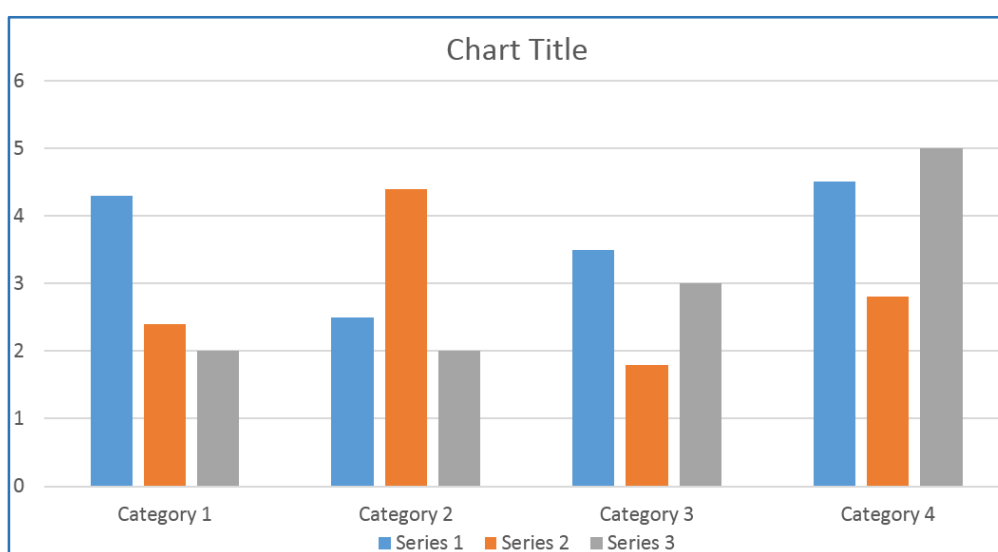
Fig. 6: Mean keratometry in the three groups

Fig. 7: Mean Central Corneal Thickness in the three groups

DISCUSSION: Glaucoma is an optic neuropathy wherein there is loss of retinal ganglion cells and RNFL thinning manifesting as increased vertical cupping of the ONH and thinning of the neuroretinal rim with focal RNFL defects. Appearance of the ONH varies among normal population.

OCT has a resolution of 8 to 10µ and, thus, can detect early RNFL defects in glaucoma. However, the measurement of RNFL thickness in myopic eyes by OCT is debatable. The current study is on measurement of peripapillary RNFL thickness in myopic eyes by Primus SD-OCT.

In the current study, the mean age of the patients in the control group was 23.4±2.84 years; in the mild myopia group was 23.5±4.54 years and in the moderate to severe myopia group was 23.3±3.3 years.

There is loss of RNFL with increasing age, at the rate of approximately 2500 axons per year before the age of 50 and 7500 axons per year after 50 years of age. In two important studies, Funaki et al.[1] found no correlation between age and RNFLT (as measured by scanning laser polarimetry) while Ramakrishna et al.[2] too found no correlation between age and RNFLT as measured by Stratus OCT. in the current study, there was no statistically significant correlation between RNFLT and age in the control group while in the myopia groups, significant correlations between age and superior, nasal, temporal and average RNFL values were noted (table 3, 4) since the study was a cross sectional study, the effect of aging over RNFL can't be assessed.

In the Andhra Pradesh Eye Study, an investigation on Indian eyes, the mean optic disc area was reported to be 3.37±0.68mm[2] by planimetric optic disc measurement by Zeiss telocentric fundus camera (30[0] view). In the current study, the mean area of the optic disc (as measured in 40 emmetropic eyes) was found to be 2.3±0.4mm.[2]

According to Verma et al.[3] larger discs have a greater NRR area. Quigley et al. found that there was linear increase in nerve fibre as the disc size increases in monkey eyes. This association was subsequently confirmed by Jonas et el.[4] In humans. These investigators showed that in humans, more nerve fibers are found in larger discs than in smaller discs. However, conflicting data was reported by Mikelberg et al. in a study of 16 individuals. These workers found that there was no correlation between the optic disc size and the optic nerve fiber count in humans. Balazsi et al.[5] didn't detect a significant correlation between the optic nerve fiber count

and the area of the optic disc and NRR, as measured by post-mortemly gross pathologic examination in 16 optic nerves.

In the current investigation, when emmetropic and myopic participants were studied by SD-OCT, no significant correlations between the disc area and the mean and quadrant RNFLT measurements were noted. (Tables 3, 4). These findings were consistent with those of Mansoori et al.[6] who observed that peripapillary RNFLT, as measured by SD-OCT, didn't show correlations with optic size disc. These findings may indirectly suggest that the number and distribution of optic nerve fibers within the RNFL is somewhat independent of optic disc size.

In the current study, there was a statistically significant increase in axial length proportionate to an increase in the degree of myopia suggestive of axial myopia (table 1, 2). Jonas et al.[7] found that a greater axial length was associated with a larger optic disc. This may have been due to uncorrected refractive error magnification of optic disc size by Stratus OCT. Saviniu et al.[8] after correcting for refractive error independent of axial length, found that the longer the eye, the smaller were the values of optic disc area, rim area and RNFLT; these investigators also found that in short hypermetropic eyes, there were greater values of optic disc size and RNFLT. However, in another study by Budenz et al,[9,10] no significant correlation was observed between the axial length and the disc area. In the current study too, no significant correlation was observed between the axial length and the disc area (table 3, 4).

According to Hoffman et al,[11] the larger the optic disc size, the larger is the cup size. In the current study too, a significantly larger mean cup volume was observed in emmetrope eyes of Compared to myopia group eyes (table 1, fig. 4). This also confirms that the control group of eyes had a larger mean disc size compared to the groups of eyes in myopia. Thus, myopic patients have a shallow cup with a smaller disc, a phenomenon that is more marked in moderate to high myopia.

The effect of myopia on RNFLT profile is controversial. Budenz et al.[9,10] found that for every 1mm increase in axial length, the mean RNFLT reduced by approximately 2.2µ. Leung et al.[12] found that for every 1mm increase in axial length, the mean RNFLT reduced by approximately 2.75µ. Rauscher et al.[13] found a significant decrease of about 7 µ/mm with longer axial length. Hoh et al.[14] found no correlation between axial length or spherical equivalent with RNFLT. Leung et al.[12] found that there was decrease in the superior an inferior RNFLT with increasing axial length. Mohammed salih[15] also found that mean RNFL thickness values were lower in moderate to severe myopia when compared with mild myopia; significant positive correlations were found between spherical equivalent and RNFL thickness values in the superior, inferior and nasal quadrants of RNFL and also in the average RNFLT value. Thus, patients with high myopia would have thinner RNFL. Kang et al.[16] found RNFLT to be decreased with decrement in spherical equivalent and increase in axial length.

In the current study, there was thinning in the RNFLT in myopic eyes when compared to the normal emmetropic eyes; this was more marked in the moderate to severe myopic group than mild myopic group.

Another interesting finding in the current study is that temporal quadrant RNFLT values in the moderate to severe, myopic eyes were not significantly lower than temporal quadrant RNFLT values in normal control emmetropic eyes. Thus, due to longer eyes, the disc looks small, the scanning circle becomes larger and there may be false thinning in the RNFLT due to placing of the scanning circle farther away from the ONH, thereby, underestimating the thickness of the retinal nerve fiber layer. Also, the peripapillary atrophy surrounding the optic disc may influence the retinal nerve fiber layer thickness.

CONCLUSION: OCT is a non-contact, non-invasive imaging modality that is used to take high resolution, in-vivo, and cross-sectional pictures of the optic nerve head. OCT, thus, helps to quantify the structural damage that an eye has suffered due to glaucoma.

While performing OCT studies in normal (emmetrope) and myopic eyes in the current investigation, it was found that there was thinning in the retinal nerve fiber layer in superior, inferior, nasal and average thickness values in myopic eyes which was more marked in moderate to high myopia than in mild myopia. The disc area was smaller in high myopes compared to the normal eyes. The cup volume was smaller in high myopes which correlated with the smaller disc area. There was no significant correlation between spherical equivalent and RNFLT.

Myopic patients review periodically for their refractive error correction. Myopic disc findings may mimic optic disc changes suggestive of optic neuropathy. The data obtained in the current investigation suggests that optic disc parameters vary in myopic eyes compared to emmetropic eyes by spectral domain OCT. therefore, in myopic eyes, OCT parameters should be interpreted with caution before labelling them as glaucomatous or any other disease causing RNFL thinning and variation in ONH values. Clinical correlation along with OCT parameters are essential before formulating a definitive diagnosis.

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