

A Study on Refractive Errors Among Medical Students Attending Ophthalmology Department.

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I. Introduction

Refractive error (RE) is a condition in which the optical system of the non-accommodating eye is unable to bring parallel rays of light to focus on the retina. Of all the human senses, the sense of sight is used the most, and as a result, is affected the most. Consequently, refractive errors are becoming more of a problem in our societies. Wearing spectacles was a province of adults over 40 years age till half century earlier. Now we find more children and adolescents wearing spectacles. Refractive errors are second most cause of blindness in developing countries such as India and also one of the commonest reason for patients to visit an ophthalmologist (Govt. of India, Annual Report, 2004). Worldwide a total of 153 million have uncorrected Refractive errors, with a prevalence of 2.67%. In India a total 39.31 million with prevalence of 4.07%, have uncorrected refractive errors. Uncorrected refractive errors create a significant impact on learning and academic success and in the long run leads to economic burden on family and in turn to the society. Considering presbyopia as a natural process of aging, most common type of refractive error is myopia. Woo et. al. reported that the prevalence rate of myopia in Asian countries have reached epidemic proportions. The study also postulated that medical students are a select population with a high level of education as well as above-average intelligence, which perhaps might explain the high prevalence of myopia among the medical students.

Myopia increases the risk of cataract, glaucoma, retinal detachment, macular degeneration, choroidal neovascularization, visual impairment and blindness. The clinical literature dealing with the potential etiology for myopia is massive but remarkable for its paucity of clear insights. However, it is now generally agreed that both heredity and environment have important roles to play in the formation as well as its progression of refractive errors of eye.

II. Aim

The present study aims at assessing the prevalence of refractive errors among medical students and to evaluate the hypotheses of its relation with increased near work and other risk determinants.

III. Materials And Methods

Study design: A cross-sectional descriptive study is done.

Study population: Medical students attending ophthalmology department (4th and 7th semester). Any previous history of ocular injury or surgery was set as exclusion criteria. A total of 361 medical students were included in the present study.

Methodology: All the students were explained about the present study and verbal consent was taken. Every student is asked to fill out a self-administered questionnaire which contained details of variables like age, sex, risk factors (amount of near work, visual stress, academic excellence and parental history), age at diagnosis, duration and change in prescription, mode of correction, and any difficulty they faced.

Questionnaire....

Age/sex:

1. Do you have refractive error – yes/ no

If yes... Year of diagnosing—

Incident that led to diagnosis ___ headache/ defective vision/ accidentally.

Change in prescription—before UG _____ times; in UG _____ times.

Present prescription --- right eye

Left eye

2. Mode of correction: spectacles/ contact lenses (constant wear/ not)

Both depending on situation.

3. Average hrs per day

Reading/studying _____

Mobile _____

Computer _____

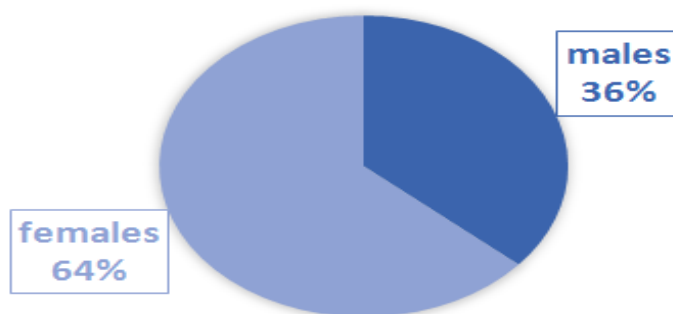
- TV _____ - distance between you and TV _____
 Sleep duration _____ ; sleep initiation- before 12 / after 12.
4. Preferred leisure time activity _____ avg hrs/day _____
 5. Did you undergo any surgery for refractive error correction: yes/ no. if yes, specify-
 6. Your last semester % _____
 7. Habit of studying in moving vehicles- yes/ no.
 8. Refractive error status in parents.
 MOTHER: myopic/ hypermetropic/ presbyopia/ none/ don't know.
 FATHER: myopic/ hypermetropic/ presbyopia/ none/ don't know.
 9. Do you know or practice any eye exercises-----
 10. Type of light used for studying ___ table lamp/ tube light/ LED.
 11. When do you review for your refractive error correction.
 Every 6mnths/ every 1year/ when there is defective vision or headache.
 12. Did you get your fundus examined- yes/ no ; Is there any rationale for fundus examination in myopes. Yes/ no . if yes , specify _____

Then, visual acuity for distance using Snellen's test chart and near is checked using Roman test charts. Colour vision is tested, any abnormality if detected were excluded from the study. Those with snellen's visual acuity less than 6/6 in either eye were subjected to auto refractometry, cycloplegic refraction and subjective verification. Spherical equivalent value of >-0.5 in either eye is considered myopic. Further myopia is subdivided as low (power <3 Ds), moderate (power 3-6Ds), high (power >6 Ds). Also into simple and compound based on presence or absence of cylinder. Those with near visual acuity less than N6 were also subjected to auto refractometry, cycloplegic refraction and subjective verification. Spherical equivalent value of $>+0.5$ in either eye is considered hypermetropic. Those with only cylindrical power are categorized as having astigmatism. They were subclassified as myopic astigmatism and hypermetropic astigmatism.

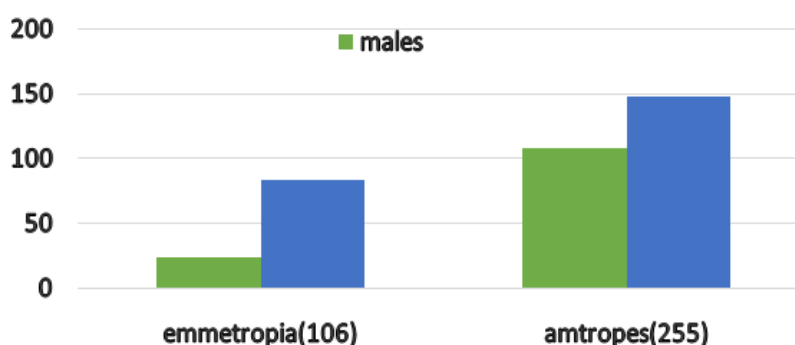
Ethical issues: Institutes ethics committee approval has been obtained.

Financial interest: none

Results: A total of 361 students were included in the present study, with a mean age of 20.3 years. Out of 361 students, 131 are males and 230 were females (male: female ratio—0.36).



106 out of 361 were emmetropes (29.3%), males 23 and females 83 (male: female ratio—0.27). The remaining 255 had refractive error (70.7%), males 108 and females 147 (male: female ratio—0.73).

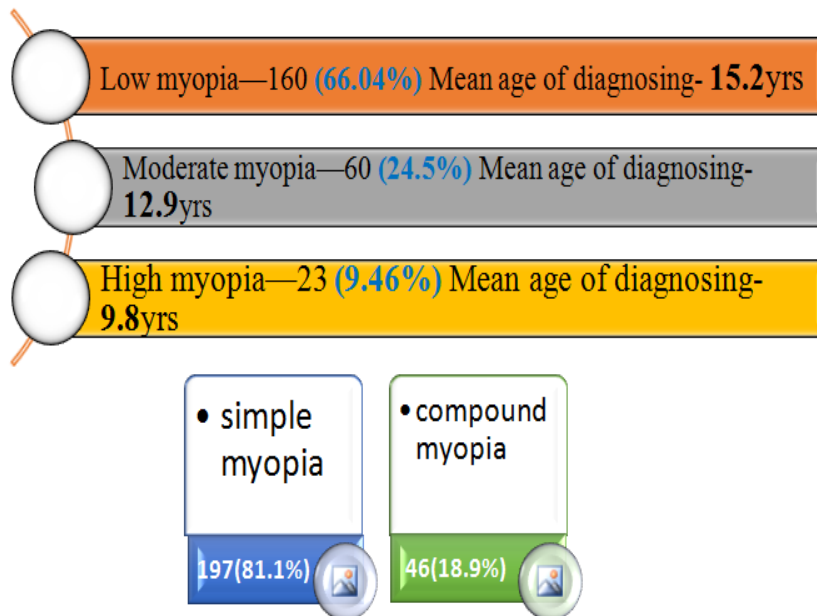


Among the 255,

- 243 were myopes (95.4%)
 - Low myopia—160 (66.04%) Mean age of diagnosing- 15.2yrs
 - Moderate myopia—60 (24.5%) Mean age of diagnosing-12.9yrs
 - High myopia—23 (9.46%) Mean age of diagnosing-9.8yrs
- Simple myopia—197 (81.1%)
- Compound myopia—46(18.9%)
- 7 were hypermetropes (2.74%)
- 5 were astigmatic (1.96%). All were myopic.
- Under corrected refractive error was noted in 8 students (3.1%).



Among 243 myopes



	Without refractive error	With refractive error
¶Close work in avg hrs/day	9.6hrs	9.9hrs
Sleep duration and onset	9.5hrs 64.2% slept before 12	8.4hrs 59% slept before 12
Preferred leisure time activity	¥Distance work in 61%	Distance work in 56%
Academic excellence (in % scored)	73.41%	75.45%
Parental history of refractive error	+ve in both parents (9.6%)	+ve in both parents

	In either parent (9.6%) Total of 19.2%	(6.8%) In either parent (25.4%) Total of 32.2%
Practice of Eye exercises	13% followed	11% followed

¶ close work includes reading/studying, playing/ texting with mobile, computer etc..

¥ distance work includes outdoor games, dancing, swimming, outing etc..

There was a marginal increase in the amount of near work activity and visual stress routine in the group with refractive error when compared to those without refractive error. **32%** students with refractive error had a positive family history when compared to 19% of students without refractive error had a positive parenteral history (statistically significant). Among those with refractive error, only 57% had regular annual ophthalmic checkups. Others went for a review only when they were symptomatic (headache, defective vision). Only 35% got their fundus checked with indirect ophthalmoscopy (to rule out presence of any degenerative changes). About 39% had a habit of reading in moving vehicles.

IV. Discussion

Prevalence of refractive error was relatively high (70.7%) when compared with normal population (36.5%). Mean age of diagnosis is of importance, as has been observed in the present study. High refractive errors occurred early in the age (9.8 yrs) and progressed so. Whereas low myopia has a mean age of diagnosis of 15.2 yrs

Prevalence of myopia in medical students: national data

place	Study author	prevalence
South India	Suneetha C et al	51.3%
East India	Sood R S et al	45%
kerala	Shiny G et al	52.5%
Maharashtra	Wokade N S et al	54.9%

Prevalence of myopia in medical students: comparison with global data

Country	Study authors [Reference]	Prevalence (%)
Taiwan	Lin LL, et al	93
Singapore	Woo WW, et al	90
Singapore	Chow YC, et al	82
China	Wu Y, et al	71
India	Present study	70.7
Pakistan	Chuaday R, et al	58
Norway	Midelfart A, et al	58
Denmark	Fledelius HC	50
Turkey	Onal S et al	33
Poland	Mozolewska-Piotrowska K, et al	32

This differences found globally maybe attributed to various ethnicities, environmental factors. This study and other various studies observed that myopia is more prevalent among more intelligent population. The present study and many previous studies supported the observations that “Myopia is multifactorial with genetic and environmental factors and interaction between them,” as well as “parental history of myopia is an important risk factor for its development” such as Chalasani et al., Kathrotia et al., Wakode et al., Chaudhry et al., Wu et al., Gopalakrishnan et al., Mavracanus et al., and Onal et al. reported a positive parental history of myopia. However, Woo et al. 14 study did not demonstrate any statistically significant correlations between myopia and the number of parents with myopia. The present study has also observed a marginal increase in the amount of near work done by those with refractive errors which was in correlation with the findings observed by Woo et al. The present study observed lesser visual stress routine in those without refractive error compared to those with refractive error.

V. Conclusions

Prevalence of refractive error was relatively high when compared to the normal population. There was association found with the amount of close work (reading/studying, computer use, and playing/texting with a cell phone) and with the amount of visual stress (lesser sleep duration, later onset of sleep, reading in moving vehicles, light conditions etc.) in those with refractive error. There was significant positive parental history in group having refractive error. Though the study population was in medical profession, there was 3% students who were under corrected for their refractive error and 65% have not undergone fundus examination. This highlights the need for increasing the awareness on refractive errors and dangers they may pose. The study also

stresses for initiating and strengthening of the strategies to prevent the further rise in the prevalence of refractive errors.

Limitations: Lack of comparative group. Institution based group.

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