

Prevalence of Refractive Errors among Medical Students in Tertiary Care Medical Centre Mathuranthakam

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Abstract: ***Introduction:** Refractive errors are apparently more prevalent among the medical students and the incidence is increasing. **Materials and Methods:** The study was conducted Karpaga Vinayaga Institute Of Medical Science and included 100 medical students. Refractive error was assessed using Snellen's visual acuity chart and streak retinoscopy. The students were categorized according to their refractive error and the prevalence was calculated. **Results:** Of 100 students 36% had refractive error. Of these 88% had myopia, 6% had hypermetropia and 6% had astigmatism. Myopes were further divided into mild moderate & severe. It was found that 78% had mild, 18% had moderate and 3% had severe myopia. **Conclusion:** The commonest refractive error among medical students is myopia of varying grades.*

Keywords: Medical students, Myopia, Refractive error

1. Introduction

Emmetropia is defined as a state of refraction wherein the parallel rays of light coming from infinity are focused at the sensitive layer of retina with accommodation being at rest. Ametropia is defined as a state of refraction wherein the parallel rays of light coming from infinity are focused either in front or behind the sensitive layer of retina. The major types of refractive errors include myopia, hypermetropia and astigmatism. Myopia or short sightedness is a type of refractive error in which parallel rays of light coming from infinity are focused in front of the retina when accommodation is at rest. Hypermetropia or long - sightedness is a type of refractive error in which parallel rays of light coming from infinity are focused in behind the retina when accommodation is at rest. Astigmatism is a type of refractive error wherein the refraction varies in different meridian. Consequently the rays of light entering the eye cannot converge to a point focus but form focal lines. Broadly there are two types of astigmatism: regular and irregular. Regular astigmatism is when the refractive power changes uniformly from one meridian to another (there are two principle meridian).irregular astigmatism is characterized by an irregular change of refractive power in different meridian. Refractive errors are estimated to be the second most common cause of blindness worldwide in2010 and one of the most familiar reasons for patients to visit an ophthalmologist.

Academically active professionals, like medical students, are the primary sufferers of visual impedence. It may be because they contact technology the most in their everyday activities, spend long hours reading and doing near work, not finding enough time for sports and physical activities, and acute academic stress to pass and compete. Poor vision in students negatively influences their future life as it affects their productive performance in education and affects their professional competence and performance in the long-term.

A high prevalence of refractive errors has been reported in medical students, the most common of which is myopia. About a quarter of the world's educated population has the

refractive error. Refractive error is associated with near work activities such as reading, writing, computer use, and mobile phones. Excessive curriculum in medical universities has led to an excessive student near activities, leading to the development of myopia. This study aimed to assess the incidence of refractive errors among medical students at Karpaga Vinayaga Institute of medical science.

2. Materials and Methods

A cross sectional institution based study was conducted by random selection. The study group included 100 students of Karpaga Vinayaga Institute of Medical Science. The students were explained regarding the nature of the study and assured confidentiality of their information and thereafter their written consent was taken for enrollment in the study. For the assessment of refractive errors, visual acuity was checked using Snellen's chart. The students were instructed to sit at a distance of 6 meters from the Snellen's chart and were asked to read the letters from the top of the chart to the bottom line. Each eye was tested separately with glasses as well as without glasses. Fundus examination was done in needed students. Refractive error was diagnosed if spherical equivalent was $+0.50D$ or greater or a sphere/cylinder of ± 0.50 diopters or greater. Those errors which required only cylindrical correction were considered as simple astigmatism. Myopic errors less than $-3.00D$ were considered as low myopia, those between -3.00 to $-6.00D$ as moderate and more than -6 were considered as high myopia. The average of students who had refractive error against the total numbers of students in the class was taken to determine the prevalence of refractive error.

Statistical analysis:

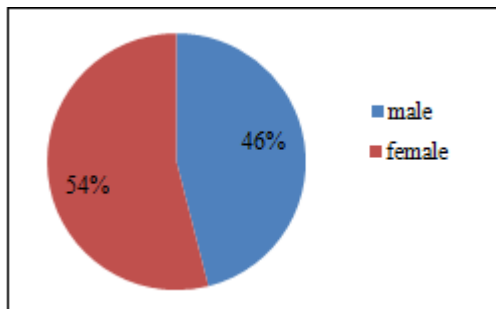
The details were enrolled in excel sheet and they were analyzed using bar chats

3. Results

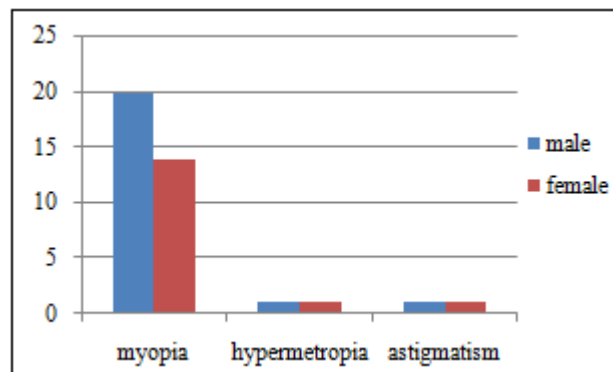
100 students of Karpaga Vinayaga Institute of Medical Science are assessed for refractive error. The average age

group was 23.3 of the 100 students 46 were male students 54 were female students

Sex	No
Male	46
Female	54

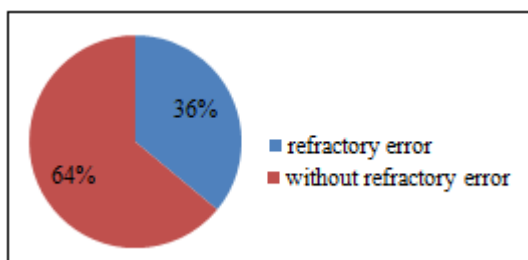


	Myopia	Hypermetropia	Astigmatism
Male	19	1	1
Female	13	1	1



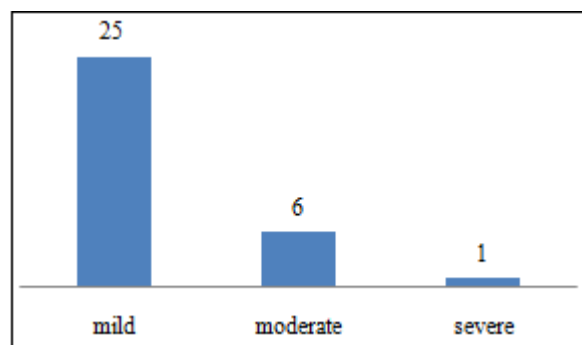
Of the 100 students 36 (36%) had refractory errors including myopia, hypermetropia and astigmatism. Were as 64 students were without refractory error.

Total	100
Refractory Error	36
Without Refractory Error	64



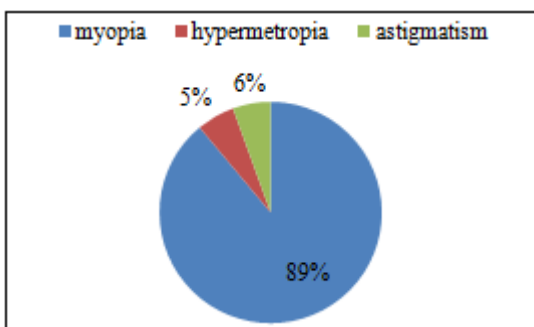
Among the 32 students with myopia, 25 (78%) students had mild myopia, 6 (18%) had moderate myopia and 1(3%) had severe myopia

Mild	25
Moderate	6
Severe	1



Of the 36 students with refractory errors 34(88%) of the students had myopia.2 had hypermetropia (6%) and 2 had astigmatism (6%)

Total	36	
Myopia	32	88%
Hypermetropia	2	5.50%
Astigmatism	2	5.50%



Among the 32 students with myopia 19 (58%) were male students and 13 (42%) were female students. Among the 2 students with hypermetropia 1 (50%) were male student and 1 (50%) were female student. Among the 2 students with astigmatism 1 (50%) were male student and 1 (50%) were female student

4. Discussion

Among medical students, the prevalence of refractive error was found to be 34% which is supported by the study conducted by Rajdeep et al and Emmanuel Olu Megbelayin et al in which it was 54% and 79.5% respectively. Majority of students with refractive error had myopia (88%) These results are quite similar to a study conducted at Northern Border University, KSA which shows that 67.1% participants had refractive error with same order of prevalence of various refractive errors. The commonest error of refraction was observed to be myopia which was found in 53.9% subjects while hypermetropia was found in 6.6% and Astigmatism in 6.6% study participants. In another study conducted at Western Region of Saudi Arabia researchers found that commonest error of refraction was myopia (40.7%) followed by hyperopia (13%) and astigmatism (3.5%).Of the myopes 78% had mild (0-3D), 18% had moderate (3-6D) and 3% had severe myopia (>6D) which was comparable to study by Onalet al reported slightly higher prevalence rates such that 81% of all the myopes had mild, 17.6% had moderate, 1.4% had severe myopia with overall more prevalence of mild myopia. The reason for high prevalence of myopia could be increased reading and close up work and excess screen time. However, despite several decades of research, the etiology of myopia is unknown.

Our study revealed low prevalence of hypermetropia (6%) and astigmatism (6%) as compared to myopia which was in agreement with Matta S, et al., 2005 [1] and SD Jessica et al.

The long and extensive study regimen of a medical college involves extensive near-work such as reading and writing. Increased amount of near-work could cause an early defective vision and its progression in adulthood. The possible association between near work activity and the prevalence of refractive error can be explained on the basis that increasing the amount of near-work done can consequently increase accommodation, which in turn could potentially cause defective vision, particularly myopia. However, evidence from experimental animal studies has shown that accommodation is not an influencing factor. Multiple studies have demonstrated an association of near-work with the prevalence of refractive errors. Another study implied that for each additional 1 hour of writing/reading or computer work, myopia's odds increased by 24% and 16%, respectively. Since there is no universal definition for near-work, and hence quantification of near-work may vary, and so might the results.

The era of smart phones and high technical gadgets youth frequently using them has impacted the prevalence rates and increased the cases of the worsening of already present refractive error. Therefore, prevention of refractive error may almost be impossible, but the knowledge of these refractive errors, factors affecting them and contributing to these factors as well as methods of decreasing the prevalence of refractive errors maybe of help. The application of the appropriate correction methods along with preventive measures and ample knowledge regarding the same must be our long-term goal in the society in order to curb its rise in prevalence.

The limitations of our study were that no controls were taken. The environmental, racial and genetic factors for predilection of refractive error were not assessed. The results of this study showed that two-third of participants had normal vision. Only one-third of students who had visual impairment or refractive errors were using glasses; This result is in accordance with those of Dey et al. (2014), in which 31.25% of students used glasses to correct their refractive errors.

5. Conclusion

Refractive error is prevalent among students of Karpaga Vinayaga institute of medical science, and the most prevalent type was myopia. There is no significant difference in the prevalence of refractive errors between male and female students. Majority of students had mild to moderate degree of myopia with only a few having severe grade of myopia.

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