Journal of Cardiovascular Disease Research
ISSN: 0975-3583, 0976-2833 VOL15, ISSUE 10, 2024

A CROSS SECTIONAL STUDY OF THE PREVALENCE OF REFRACTIVE ERRORS AMONG FIRST YEAR MEDICAL STUDENTS

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Abstract:

Introduction: Refractive error (RE) is characterized by the inability of the non-accommodating eye's optical system to converge parallel light rays onto the retinal surface. The prevalence of refractive errors is increasing in medical students due to increase in near work hours, both due to studies and over exposure to gadgets. Identifying the group specific prevalence will help in creating awareness about refractive errors and initiation of corrective measures as uncorrected refractive errors result in impaired vision and blindness.

Materials and Methods: A cross sectional study was conducted among 230 first year medical students who were administered a questionnaire, following which the students underwent thorough ophthalmic examination to know the type and amount of refractive error. The results were tabulated and the prevalence of refractive error was noted among the students.

Results: The Prevalence of refractive errors was 40%, with prevalence more among male students in comparison to female students. Myopia was the most common type of refractive error and the prevalence was more among students with screen time more than 4 hours.

Conclusion: The high prevalence of refractive errors among medical students is a significant health concern. Prompt detection and treatment through regular check-ups are vital to prevent long-term ocular morbidity.

Keywords: Medical students, Myopia, Refractive error.

Introduction

Refractive error (RE) is characterized by the inability of the non-accommodating eye's optical system to converge parallel light rays onto the retinal surface. [1] The uncorrected refractive error is the second commonest cause of global visual impairment, next to cataract. Studies on refractive errors in different regions of India, have primarily focused on school going children. Very little is known about the prevalence of refractive errors in medical students.[2]Nowadays, the use of technology in everyday activities, spending long hours for reading, doing near work, intense academic stress, with less time for sports and physical activities has lead to increase in the prevalence of refractive errors.[3]Myopia is the most common type of refractive error that results due to both environmental and genetic factors. Even though numerous studies have been conducted to elucidate the aetiology of myopia, the exact aetiology is still unclear. However, research indicate high incidence and progression of myopia in individuals who spend long hours in near work activity. Studies suggest that myopia in children is associated with various environmental risk factors like higher educational attainment, higher socioeconomic status, and enhanced duration and frequency of near-work activities. [4]Refractive errors are on the rise among medical students due to the high academic pressure of long hours of reading and their dependency on technology like the gadgets. [5, 6]Evidence suggests that inadequate visual stimuli results in the improper development of the eyeball. In this case, normal refers to the environmental stimuli that the eyeball evolved for over hundreds of millions of years. In the modern lifestyle, most of the time is spent indoors, especially in dim or fluorescently lit rooms, thus the eyes do not get the appropriate stimuli to which they had evolved, contributing to the development of myopia. [4]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. [3]Uncorrected refractive errors have far-reaching consequences, causing increased morbidity, economic strain, and limitations in educational attainment and productivity that impact individuals and society. [5]

Methodology:

Ethical clearance was obtained from the institutional review board.Study group included 230 first year medical students who gave written consent for participation in the study.Participants having eye disorder, other than refractive error were excluded from the study group.The self-administered questionnaire was given to the participants to fill the form, and a clinical checklist involving the results of the eye test were used for data collection. The questionnaire included demographic information (age, gender), data regarding knowledge about presence or absence of refractive error, type and the amount of refractive error. Students who were using spectacle, contact lens or had a history of surgical intervention like LASIK, were taken as having refractive errors, while others were evaluated for refractive errors.It also included the data regarding risk factors like family history, the average number of hours spent for near work like reading, usage of mobile phones, iPad or laptop, playing video games, watching TV and any other gadgets. Information about sports and other outdoor activities were also noted. After completing the questionnaire, all participants underwent ocular examination which included Visual acuity testing using Snellen's chart and refraction to know the amount and type of refractive error by an Ophthalmologist.

Statistical analysis: A cross sectional study was conducted to know the prevalence of refractive error. Data was collected using a self-administrated questionnaire. Results were tabulated and expressed in terms of frequencies and percentages.Chisquare test of significance was applied to determine the association and a p value of less than 0.05 was considered as significant for confidence interval of 95%.

Results

Table 1: Prevalence of refractive errors among medical students

Refractive error	Present	Absent	Total	
Males	50	68	118	Chi square test

Females	42	70	112	p value: 0.634 Non-significant
Total	92	138	230	

Total Prevalence is 40%; Males: 54.35% and Females: 45.65%

Table 2: Distribution of type refractive errors

Type of refractive error	**Males**	**Females**	**Total**	
Myopia	43 (86%)	38(90.48%)	81(88.04%)	Chi square test p value: 0.785 Non-significant
Hypermetropia	03 (06%)	02(4.76%)	05(5.43%)	
Astigmatism	04 (08%)	02(4.76%)	06(6.52%)	
Total	50	42	92	

The prevalence of myopia was 81%, hypermetropia was 5% and astigmatism was 6%.

Table 3: Prevalence of refractive error with respect to screen time usage

Prevalence of refractive error	**Screen time <4hours/day**	**Screen time >4 hours/day**	**Total**	
Males	22	28	50	Chi square test p value: 0.567 Non-significant
Females	16	26	42	
Total	38	54	92	

Prevalence of refractive error was more in students with screen time of more than 4 hrs/ day.

Discussion:

Refractive errors are among the leading causes of vision loss worldwide. [3]Researchers worldwide have sought to elucidate the prevalence patterns and risk factors associated with this condition across various populations. Our study targets medical students, who are particularly susceptible to develop refractive errors due to extensive near work. In the present

study the prevalence of refractive error was 40%.The prevalence of refractive error was 37.6% in a study conducted in North Karnataka, [1] while among medical students in two different medical colleges, in the same city in North Karnataka the prevalence was found to be 54% and 65%. [6] In a medical college in South India the prevalence of refractive error was relatively high (70.7%) when compared with normal population(36.5%).[7] Research suggests that medical students are more prone to refractive errors due to factors inherent to their academic pursuits. Specifically, their prolonged near-work, rigorous study regimens, and high educational aspirations, increase their susceptibility to refractive errors. [2]In the present study the prevalence of refractive errors in males was 54.35% and in females it was 45.65%.Similar, higher prevalence of refractive errors in male students in comparison to female students were found in studies done in different medical colleges across India. [2,8] On the contrary, higher prevalence of refractive errors in females as compared to males was found in a medical college in Haryana, India. [4]The variation in prevalence rates among medical students across different regions and countries may be attributable to ethnic variations, different genetic predispositions, differences in lifestyle, socioeconomic status, and environmental factors. [5,6] In the present study the prevalence of myopia was 81%, hypermetropia was 5% and astigmatism was 6% which was not statistically significant. Various studies have also reported the highest prevalence of myopia compared to other refractive errors. [1, 2, 6,8]Research suggests that medical students' high susceptibility to myopia stems from their demanding academic requirements and extended periods of near-sighted focus. This prolonged visual strain leads to blurred retinal images, instigating a series of biochemical and structural adaptations in the sclera and choroid, ultimately resulting in axial elongation and the onset of myopia. [1, 3]In the present study the prevalence of refractive error was more in students with screen time of more than 4 hours per day. Similar results were obtained wherein the students involving in outdoor activities and spending less time indoors had a low prevalence of refractive errors in comparison with students who spent more time indoors doing near work activities.A significant association between the prevalence of refractive errors and the amount of near work was also found. [3, 4]

Conclusion:

Medical students due to their excessive and prolonged academic hours are more vulnerable to refractive errors especially myopia. Uncorrected refractive errors are the main cause of irreversible ocular damage and blindness. Awareness about preventive measures, early

detection, and prompt treatment of refractive errors along with promotion of eye care are very important to prevent further ocular morbidity.

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