Original Article

Study on Incidence and Progression of Refractive Errors in Medical Students

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Abstract

Purpose: To study the incidence and progression of refractive errors in medical students.
Methods: This is a retrospective study including 200 medical students of our college during the period of July 2015 to June 2018. Examination included visual acuity testing using Snellens chart, slit lamp biomicroscopy, fundus examination with direct ophthalmoscope, indirect ophthalmoscope and refraction. Students were examined for refractive errors and findings compared with pre-admission data. Changes in spherical, cylindrical power analysed.
Results: Prevalence of Myopia increased from 40% to 48%. Incidence of new refractive errors in emmetropes was 8%. Myopic change found was -0.75D to -1.0D.
Conclusion: Students in medical colleges have high prevalence of myopia, high incidence of adult onset myopia and statistically significant progression. Parental history, prolonged eye strain, excessive use of electronic gadgets, decreased outdoor activity and urban background had significant association with prevalence of myopia.

Key words: Myopia; incidence; prevalence; near work

Introduction

Today in India, with increasing level of education & living standards, the prevalence and severity of myopia appear to be an upward trend. Myopia is a common cause of visual impairment in developing countries

Materials and methods

This is a retrospective study conducted on 200 medical students of our college, during the period of July 2015 to June 2018. Informed oral consent was obtained from each student after explaining the nature of study. Students were given a questionnaire that included age, sex, parental history of refractive errors, age of appearance of refractive error, reading hours and scores in common entrance, hours of computer using, television watching and playing videogames. Examination included visual acuity testing using Snellens chart, slit lamp biomicroscopy, fundus examination with direct ophthalmoscope, indirect ophthalmoscope and refraction. Students were examined for refractive errors and findings compared with pre-admission data. Changes in spherical, cylindrical power analysed.

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Results

In our study of 200 students, 104 had emmetropia, out of which 44(53.65%) were males and 60(50.84%) were females, 79 had myopia, out of which 31(37.80%) were males and 48(40.67%) were females.17 had astigmatism, out of which 7(8.53%) were males and 10(8.47%) were females.

In our study, myopic progression was more in the age group of 18-20 years. Total number of new cases were 16 at the end of our study, out of which 12 were in the age group of 18-20 years and 4 were in the age group of 21-23 years.

Table 1: Prevalence of myopia

	Pre-admission	**New cases**	**End of study**
Prevalence	79(40%)	16(8%)	95(48%)

Table 2: Refractive status according to sex

Sex	**Male**	**Female**
Emmetropia	44(53.65%)	60(50.84%)
Myopia	31(37.80%)	48(40.67%)
Astigmatism	7(8.53%)	10(8.47%)
Total	**82**	**118**

Table 3: Myopic students according to the number of dioptres

Dioptres	**Male**	**Female**
<3D	26(83.87%)	37(77.08%)
3-6D	4(12.9%)	10(20.83%)
>6D	1(3.22%)	1(2.08%)
Total	**31**	**48**

Table 4: Questionnaire

	Emmetropia	**Myopia**	**Astigmatism**
Parental history			
Yes	11	32	3
No	93	47	14
Reading			
10hrs/week	54	31	8
11-20hrs/week	50	46	8
>20hrs/week	0	2	1
Too much stooping the head downwards to read			
Yes	5	46	10
No	99	33	7
Reading in dim light			
Yes	3	51	11
No	101	28	6

Tabel 4 cont ...

Gadgets usage			
7hrs/week	62	10	5
8-14hrs/week	41	21	9
>14hrs/week	1	48	3
Watching screens in the dark / dim room			
Yes	46	53	8
No	58	26	9
Too much brightness of screen			
Yes	4	47	8
No	100	32	9
Reading small fonts			
Yes	6	58	11
No	98	21	6
Staring screen for long time			
Yes	2	45	10
No	102	34	7
Outdoor Sports			
Yes	66	25	6
No	38	54	11

Table 5: Myopic progression according to age group

Age	Pre-admission	New cases
18-20 years	63	12
21-23 years	16	4
Total	**79**	**16**

Discussion

The result of present study are consistent with other studies in showing that prevalence of myopia increases among groups exposed to high educational demands during their student period. (Parekh Paras.2013, Jenny M, Seang-Mei Saw.2008, Mitchell P, Hourihan F, Sandbach J, Wang JJ.1999).Various research studies also shows that, the kind of near work like reading influenced the development of myopia (Goldschmidt E.2003, Kinge B and Midelfart A.1999) During near work eyeball is in accommodation. Accommodation raises intraocular pressure causing elongation of eyeball that leads to myopia. (Pan CW, Rammurthy D, Saw SM.2012).There exists a hypothesis that reading scientific literature is more intensive and takes longer period of near focus than when reading magazines and newspaper. The prevalence of myopia continuously progressed with the level of education. Most medical students find themselves to be under great stress as they go through a highly competitive environment, spending on average more than 25 hours per week reading and studying. Such longer periods of near work maybe a contributing factor to the

statistically significant prevalence of myopia amongst the medical students.

Conclusion

Students in medical colleges have high prevalence of myopia, high incidence of adult onset myopia and statistically significant progression. Myopia is the predominant refractive errors among the medical students. In this regard, the importance of rigorous academic hard work in the previous years to qualify the admission test related to medical study is one of the risk factors. Parental history, prolonged eye strain, bad reading habits and posture adopted while reading such as too much bending or stooping the head downwards to read, reading in dim light, excessive use of electronic gadgets, watching screens in the dark / dim room, too much brightness of screen, reading small fonts, staring screen for long time, decreased outdoor activity and urban background had significant association with prevalence of myopia.(Guggeheim JA, Hill C, Yam TF.2007).

By adopting proper postures and reading habits, avoiding excessive use of electronic gadgets and by increasing the time spent outdoors myopic progression is avoidable.

The prevalence of myopia increased with hours of work on computer, playing videogames & watching television.

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