Research Paper **Medical Science**

Study of Refractive Errors on Medical Students

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ABSTRACT Refractive errors are becoming more of a problem in many societies, with prevalence rates of myopia in many Asian countries reaching epidemic proportions. To determine the prevalence of refractive errors among medical students of kadapa. The present cross-sectional descriptive study was conducted among medical students for a period of 6 months and 100 medical students were included. Those students having eyestrain and defective vision were subjected to auto refraction using Canon auto refractometer. Average of 3 readings were taken and confirmed by subjective verification. Chi-square test with continuity correction, Z-test for standard error of difference between 2 proportions and Fischer's exact probability test (done manually assisted by Epi-info package) were used. The prevalence of refractive errors was 32.24 %. Myopia (87.6%) was the most common refractive error with prevalence of 28.23 %.The occurrence of myopia was found high (28.23%) in medical students and the higher proportion were found among female students than male students

KEYWORDS : Refractive errors, myopia, medical students

Introduction

As per WHO report, Uncorrected refractive error remains the second commonest cause of global visual impairment next only to cataract. For students, uncorrected refractive errors pose a considerable impact on learning, academic achievement and by extension employability. Emmetropia is the absence of refractive error and ametropias are refractive defects in which refracted rays in the eye do not converge on the retina. These are classified as myopia, hyperopia and astigmatism. Hyperopia occurs when parallel light rays are brought to a focal point at a certain distance behind the retina, and is considered to be the most common refractive error and in fact constitutes one of the stages in normal development. Myopia is a condition in which parallel light rays come to a focal point in front of the retina. In astigmatism, the corneal surface is unevenly curved and light rays from different meridians cannot be focused on the same point on the retina.

The prevalence of ametropias in the literature is conflicting, mainly regarding myopia and hyperopia. According to Matsumura, myopia is the most common ocular disorder in Japan, affecting, at some ages, 65.6% of individuals. In Brazil, hyperopia is the most frequent refractive error in children, varying between 60 and 70%, demonstrated in studies at the Campo Grande University Hospital, between 1996 and 1998(4). Some authors, in a sample of medical students in Singapore, discovered that 82% were myopic. In Norway as well as in Greece, myopia has also been the most common refractive error.

Material and methods

Students were assessed for refractive errors at ophthalmology department in RIMS KADAPA total of 100 students in final MBBS students were examined for visual acuity.

This study was done over a period of 6 months. Refractive error was diagnosed if spherical equivalent was +0.50 or greater or asphere/cylinder of ±0.50 diopters spheres or greater. Those errors which required only cylindrical correction were considered as simple astigmatism which was in minus cylinder form. Compound myopic or mixed astigmatism was diagnosed if cylindrical errors were associated with minus or plus spherical errors respectively. Myopic errors less than – 5.00Dor less were considered as low myopia and those equal to – 6.00D or more were considered as high myopia. Prevalence of refractive errors was determined by finding the average of

students who had refractive errors against the total numbers of students in the class.

Astigmatism was considered with-the-rule (WTR) if the plus cylinder acts at 90º meridian orat 20º on its either side or against-the-rule (ATR) if the plus cylinder acts at 180º meridian or20º on its either side. Outside this range (20º to 70º and 100º to 160º), the astigmatism was considered oblique.

Results

Table 1.visual acuity

Visual acuity	Right eye frequency{%}	Left eye frequency{%}
≥6/18	79{95.2}	78{94}
<6/18-6/60	2{2.4}	2{2.4}
<6/60-3/60	1{1.2}	2{2.4}
<3/60- NPL	1{1.2}	1{1.2}
TOTAL	83{100}	83{100}

Table 2. Pattern of Refractive Errors

	Right eye{%}	Left eye{%}
Spheres[diopters]		
+1.25	16[19.3]	19[22.9]
<+0.25	0[0]	1[1.2]
Plano	12[14..5]	14[16.9]
<-0.25	1[1.2]	0[0]
-0.25 to <-1.25	33[39.8]	27[32.5]
-1.25 to <-2.25	12[14.5]	16[19.3]
-2.25 to <-3.25	5[6.0]	2[2.4]
-3.25 to <-4.25	2[2.4]	4[4.8]
-4.25 to <-5.25	1[1.2]	0[0]
-5.25 to <-6.25	1[1.2]	0[0]
Total	83[100]	83[100]
Cylinders[diopter cylinder]		
+1.00 to +0.25	2[2.8]	5[7.4]
<+0.25	0[0]	1[1.5]
None	3[4.2]	5[7.4]
<-0.25	8[11.1]	3[4.4]

-0.25 to <-1.25	33[45.8]	34[50.0]
-1.25 to <-2.25	16[22.2]	10 [14.7]
-2.25 to <-3.25	5[6.9]	5 [7.4]
-3.25 to <-4.25	3[4.2]	3[4.4]
-4.25 to <-5.25	1[1.4]	1[1.5]
-5.25 to <-6.25	72[100]	68[100]
Total		
Types of astigmatism		
With- the- rule[WTR]	18[25.0]	15[22.1]
Against –the –rule [ATR]	29[40.3]	28[41.2]
Oblique	25[34.7]	24[35.3]
Total	72[100]	68[100]

Discussion: Only 3.3% of the students developed RE during medical studies and the progression of RE was higher among myopics then those with astigmatism or myopia+astigmatism. As observed by some authors myopia is more prevalent among the better educated and more intelligent population. Medical students may have more stringent near work habits right from their school days, even before entering medical college, which may explain the findings of our study. Reports on prevalence of myopia in medical students in Asian countries showed higher rates of 82 and 9.8%Medical and law students are a group of young adults who spend prolonged periods on reading and close work. With their intensive study regimen that spans on the average 5 to 6 years, they have been reported to be at high risk for myopia The exact pathogenic mechanisms of the myopisation of ocular refractive apparatus by near-work are yet to be fully agreed upon. Prolonged near-work was thought to lead to progressive myopia through the direct physical effect of prolonged accommodation. But according to current theory prolonged near work leads to myopia via the blurred retinal image that occurs during near focus. This retinal blur initiates a biochemical process in the retina to stimulate biochemical and structural changes in the sclera and choroid that lead to axial elongation. Is myopia an occupational risk for professional students? This question arises from the observations made by several workers in different parts of the world that the prevalence of myopia is higher among university students' especially medical students. In addition to the genetic and racial traits, the intensive near work associated with the professional courses may play an important role as a causative factor for myopia. Myopia prevalence was more associated with longer near work, computer work, playing/texting with cell phones and TV watching. More reading hours were not associated with more progression of RE in contrast to finding of Seang-Mei Saw who found a positive correlation of progression of RE with reading hours. Extent of accommodation required for reading is more than the accommodation required for watching TV. However, playing/texting with cell phones that too in variable backgrounds with altering lights is more straining to eyes than simple reading. The extensive near work such as reading and writing involved in medical studies aswell as the long and intensive course in medical colleges may lead to the high prevalence of myopia among medical students. In our study genetic and familial factors have a stronger relation with RE as supported by some authors. We suppose that the new generation gadgets like computer and cell phones have replaced reading as the main near work activity among modern students. This may explain why in our study almost equal time spend in reading has not predisposed to RE. Thus prevalence of refractive errors among Indian medical students was slightly lower than other Asian population but higher than their Caucasian counterparts. Higher proportion of watching TV, computer or cell phone use, early age of onset of refractive error and presence of family history were strongly associated with RE presence and its progression. The maneuverable habits like computer/TV use, cell phone use, reading in very bright light might be taken care of especially in those with a family history in order to impede the onset of refractive errors as well as once detected then to diminish their progression. In spite of a slight female preponderance, statistical analysis of our data revealed no significant relationship between sex distribution and refractive errors. This is similar to previous studies among medical students and engineering students. ATR was the commonest astigmatism in our study. This is in consonance with several studies that the prevalence of ATR astigmatism significantly increases with age, and WTR astigmatism significantly decreases with age. As per WHO report, uncorrected refractive error remains the second commonest cause of global visual impairment next only to cataract

Conclusion:

Myopia was the predominant refractive error detected among medical students in our cohort, although multiple conceivable confounding variables such as ethnicity, culture, nutrition, socioeconomic status among others may have inadvertently influenced this outcome. Longitudinal studies among students involved in prolonged reading to confirm the late onset of myopia and its progression during the course of study as compared to other students are advocated. Prospective studies are required to be done among professional students to confirm the late onset of myopia and its progression during the course of study as compared to other students.

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