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A CROSS-SECTIONAL STUDY TO CHECK THE PREVALANCE OF REFRACTIVE ERRORS AMONG MEDICAL STUDENTS OF SBKS MEDICAL COLLEGE

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ABSTRACT

Purpose: To check the prevalence of refractive errors among the medical students studying in SBKS medical college, Dhiraj hospital, Vadodara. To assess the most common type of refractive error among medical students studying in different academic years in SBKS medical college,Dhiraj hospital, Vadodara.

Methods: This is a cross-sectional study conducted at SBKS medical college, Dhiraj hospital, Vadodara over a period of 3 months. The study comprises 500 medical studentsincluding males and females studying in different academic years(1st year, 2nd year, 3rd year, 4th year).The study population was better explained the objectives of the study. The written consent was also taken from the students explaining the purpose, risks and benefits of the study. All the students were undergone for assessment of refractive error with the help

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of Auto-refractometer(NIDEK AR-310A). Both the eyes of each student were examined by the Auto-refractometer. Refractive errors were further divided on the basis of their diopteric power.

Results: There were total 234 students out of 500 were having Myopia.Out of these 234 students, 134 (57.2%) students were males and 100 (42.7%) students were females. There were 67 (43.7%) students out of 153 in 1st year were having refractive error.73 (48.6%) students out of 150 studying in 2nd year were having refractive error. There were 78(52%)students out of 150 in 3rd year were and 16(34%) students out of 47 in 4th year were having refractive error. The study revealed that myopia is more prevalent among the students. Males were more prevalent in to myopia than females. Myopia was also further categorized according to severity into mild, moderate or severe by the value of spherical equivalent. Most common type of myopia seen was mild type followed by moderate followed by severe type in our study.

Conclusion: High degree of unawareness was found among medical students in relation to their status of having refractive error. Myopia was found to be the most common type of refractive error among the young adults. Males are more affected from myopia than females. A regular check-up for refractive error is needed to correct the refractive error and prevent blindness from the refractive error.

Key words: prevalence, refractive error, myopia, medical students, SBKS medical college, unawareness, diopteric power, auto-refractometer.

INTRODUCTION:

Refractive error is a defect in the optical system of eye which prevents the light from being brought to a single point of focus into retina. This leads to reduced clarity of the vision forming the blurred image on the retina. Refractive error is the second most common cause of global blindness after cataract[(1)]. Uncorrected refractive errors cause significant impact on students in view of their learning and academic success. Poor vision due to refractive error is the major cause of understudies in various areas of the world.

Refractive errors are divided in 3 types:

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1. Myopia- it is the difficulty in seeing the distant objects clearly.
2. Hyperopia- it is the difficulty in seeing the near objects clearly.
3. Astigmatism- decreased vision is due to irregular curvature of the cornea.

Prevalence of myopia has been increasing among the developed parts of the Asia in past few decades. One study reported that the high prevalence of myopia was noted among children aged more than 10 years compared to those aged less than 10 years of age. This suggests the progressive nature of the disease [(2)].

High degree of unawareness regarding refractive errors is present among the medical students. There have been many studies done on school going children regarding prevalence of refractive error. Little is known regarding prevalence of refractive error among medical students. Refractive error is the most easily cured cause of poor vision among the young people[(3)].

Woo et al reported that high prevalence of myopia have been seen among the medical students because of high level of education and high level of intelligence[(4)]. A large number of population especially young adults are unaware of the problem and this leads to progressive visual impairment and their subnormal growth. This applies to all young adults who are studying in schools, colleges and universities. Plenty of investigations have been suggested the significant connection between intelligence level with the school participation and seriousness of refractive error knowledge[(5)].Bourne RR et al.[(6)]also reported that the uncorrected refractive error is one the most cause of visual disability worldwide and it affects the nations' economy especially the developing ones.

So our study was conducted to check the prevalence of refractive errors in medical students studying in the SBKS medical college, Dhiraj hospital, Vadodara. It also checks the type of the refractive error causing visual impairment among the medical students. Results obtained from this study increases awareness of refractive error and various modalities of treatments among medical students.

Aims and objectives:

- To find prevalence of refractive error among the study population.
- To analyze the commonest type of refractive error in the study population.
- To analyze the severity of myopia among the medical students.

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Materials and methods:

This is a type of cross sectional study. The students studying in different academic years (1st year, 2nd year, 3rd year, 4th year) in the SBKS medical college, Dhiraj hospital, Vadodara were included as the study population. The study was conducted in the ophthalmology department, dhiraj hospital, Vadodara. Total 500 students were selected for the study.

Inclusion criteria:

- Participants of either gender, in the age group of 18-25 years.
- All those who are ready to participate and give their informed consent.
- Participants belonging to medical profession.

Exclusion criteria:

- Uncooperative and unwilling to fill the informed consent.

Written consent was taken from each student. This consent form included the things like aims and objectives of the study, advantages and disadvantages of the study. This written consent also assured the confidentiality regarding the results of the students.

Among these students 153 students were studying in 1st year, 150 students were studying in 2nd year, 150 students were studying in 3rd year and 47 students were studying in 4th year. The students were examined in period of 3 months.

All the students were undergone refractive error assessment with the help of Auto-refractometer(NIDEK AR-310A). It is the type of non-cycloplegic assessment of refractive error check-up. Both the right and left eyes were thoroughly assessed with Auto-refractometer. An average of three readings from Auto-refractometer were taken.
The students were further categorised according to the type of the refractive errors into myopia, hyperopia, astigmatism and emmetropia. Percentage of myopia was calculated between males and females present in this study.

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Calculation of spherical equivalent(SE) was done as the sphere plus half negative cylinder. The severity and degree of the myopia was defined with the help of spherical equivalent(SE). Myopia was divided in three categories by the value of spherical equivalent(SE) that is in mild, moderate and severe. Mild myopia was defined by the spherical equivalent(SE) between -0.75 and -2.99D. moderate myopia was defined by the spherical equivalent(SE) between -3.00 and -5.99D. Moderate myopia was defined by spherical equivalent(SE) equal or more than -6.00D.Calculation of prevalence rate was done by subjects affected by the refractive error per hundred students.

Statistical method was performed using Statistical Package for Social Science (SPSS).

Results:

A total of 500 students from the SBKS medical college, dhiraj hospital, Vadodara were included in the study. Out of them 300 students were males (60%) and 200 students were females (40%). We have taken students studying in all the four academic year in this study. The numbers of the students taken from different academic years are as below:

Table 1:

Academic year	Number
First year	153
Second year	150
Third year	150
Fourth year	47

In this study, various types of the refractive errors were found. The frequency of refractive errors was recorded in following table:

Table 2:

Refractive error	Frequency	Percentage (%)
Myopia	234	46.8
Hyperopia	52	10.4
Astigmatism	20	4
Emmetropia	194	38.8
Total	500	

The most common type of refractive error found amongst the students was myopia which was found in 234 (46.8%) students out of 500. These 234 students were further divided by sex of the students. Out of these 234 students the distribution of myopia was done in students studying in different academic years. There were total 67 (43.7%) students out of 153 studying in the 1st year having myopia. A total of 73 (48.6%) students out of 150

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students studying in 2nd year were having myopia. There were total 78 (52%) students out of 150 students studying in the 3rd year having myopia. A total of 16 (34%) students out of 47 students studying in 4th year were having myopia.

Following table shows the sex distribution of students having myopia studying in different academic years.

Table 3:

Myopia	1st year	2nd year	3rd year	4th year	total
Males	27	43	54	10	134
Females	40	30	24	6	100
total	67	73	78	16	234

These myopic students were further divided into three different categories according to the degree of myopia. Degree of myopia was decided with the help of spherical equivalent (SE). Spherical equivalent (SE) was calculated as the sphere plus half cylinder. In our study most common degree of myopia found was mild type (SE between -0.75 and -2.99D) which was found in 154 (65.8%) students out of 234 students. The next common degree of myopia found was moderate type (SE between -3.00 and -5.99D) which was found in 59 (25.2%) students out of 234 students. The last degree of myopia of severe type (SE equal or more than -6.00D) was found in 21 (8.9%) students out of 234 students.
Following table shows the degree of myopia among the medical students:

Table 4:

Degree of myopia	frequency	Percentage (%)
Mild(SE between -0.75 and -2.99D)	154	65.8
Moderate(SE between -3.00 and -5.99D)	59	25.2
Severe(SE equal or more than -6.00D)	21	8.9
total	234	

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Discussion:

Errors of the refraction are the second most common curable blindness after cataract all over the world.

There are two methods by which we can measure the refractive errors. First, patients who come for check up to ophthalmic centres. In most of the developed countries this method is most utilised. Second, by vision screening method allowed to move voluntarily. In underprivileged countries vision screening programs are of utmost necessity all around the world. Usually screening for the vision is done in school children to early detect the treatable cause of blindness and to prevent the amblyopia in children.

One reported study by Ghaderiet al.[7] mentioned that in younger adult population there is increasing in incidence of errors of refraction. All over the world myopia has become the most common type of refractive errors in this age group and it is still increasing. So that uncorrected refractive error has become the economic and social burden all over the world[8].

The prevalence of refractive error in SBKS medical college was 61% in our study. Many studies have been done to check the prevalence rate in different medical universities. The prevalence rate of refractive error in one study done in Singapore university was found 89.8%[9]. This much high prevalence rate was also reported in one study done in Taiwan (92.8%)[10]. The reason behind these variations may be due to different genetic predisposition and ethnicity.

One meta-analytic study was performed by Pan et al. recently on Asian population regarding prevalence of myopia age-specific. The study showed significant increase in prevalence of myopia with increase in age[11].

Our study was conducted on 500 students studying in SBKS medical college, Vadodara. The data obtained from our study showed that the myopia is most prevalent among all types of refractive errors. The results of our study is also fully supported by one other study conducted on students of the Malaysia university which also showed that myopia was the most prevalent cause of refractive errors.

Many studies have reported that severity of myopia is highly related to the level of the educational status[12]. One study done in Israel reported that there was significant relation

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with the myopia with the level of education. This study was also reported strong association of degree of myopia with the level of school attendance. Myopia was more prevalent in highly educated groups and highly intelligent groups[13]. One study in Denmark was done on the males recruited for the military services showed that the level of education and intelligence being the most important triggering factors for the onset of the myopia. Higher intelligence score was noted in myopes than the non-myopes[14]. So the students of the medical colleges are the selected population with higher level of intelligence and higher level of education. The other factors responsible for myopia in medical students were being long study hours and excessive near work. Medical students are the group of young adults who have excess close work. This long hour study schedule in medical colleges has been continued for five to six years. This is important risk factors for developing myopia.

Near work has become the most important pathogenic mechanism leading to myopia in medical students. Recent theory behind the development of myopia explains the excessive near work. Excessive near work leads to retinal blurring of the images which leads to myopia. Myopia is caused by elongation of eyeball which is the result of stretching of the choroid and sclera. Excessive near work causes the structural and biochemical changes in choroid and sclera which leads to development of myopia [15].

Conclusion:

The errors of the refraction are the most common correctable cause of blindness worldwide. High degree of awareness was found among medical students. Myopia was the most common type of the refractive error found in medical students in our study. Males were more affected from the myopia than the females. A regular check-up for errors of refraction is needed for early detection and correct the vision.

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