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A study on prevalence of Myopia among the Medicos of Osmania Medical College, Hyderabad

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Abstract:
Introduction: *Refractive error may be defined as a state in which the optical system of the non-accommodating eye fails to bring parallel rays of light to focus on the retina. Especially myopia, which is not only inherited but also caused by excessive reading and other close work.*
Objective: *A systematic cross-sectional study was conducted in OSMANIA MEDICAL COLLEGE to establish refractive errors as a plebeian problem in young medical students.*
Aim: *The aim of the present study is to know the prevalence of myopia and factors which may be responsible for early onset of myopia among the students and to know the knowledge on healthy eye habits and eye care among the children.*
Methods and Materials: *The present cross-sectional study was conducted on 195 first year medical students of MBBS who joined during the year 2013-2014. A Pre-tested schedule and examination of eye by team of doctors was conducted.*
Results: *About 96% of students are in the age group of 17 to 20 years, 133 of them i.e. 68% are suffering from myopia and there is no sex difference. Acquired myopia, 72% of them developed by the age of 16 years. Children using computer education are more prone to develop myopia(statistically significant) than others who do not use. 90% of students are not aware of the knowledge about the minimum distance to be observed while using computer.*
Conclusion: *Our observation suggests that myopia is the predominant refractive error among medical students.*
Keywords*- Myopia, Medical students, Computer education.*

I. Introduction

In India, with increasing level of education and living standard, the prevalence and severity of myopia appear to be an upward trend. Refractive errors are becoming more of a problem in many societies with prevalence rates of myopia in many states of India reaching epidemic proportions [1]. Refractive error may be defined as a state in which the optical system of the non-accommodating eye fails to bring parallel rays of light to focus on the retina [1]. Nearsightedness or Myopia is a refractive error in which eye fails to see distant objects clearly.

Over one third of our children, although born with normal vision, become nearsighted during their school years [2]. Many have vision that has deteriorated to the point where they would be declared legally blind if they did not have the crutch of glasses to turn to. In some highly literate Asian Countries, the incidence of acquired myopia has been increasing in recent years to the point where over 90% of college students are nearsighted [2].

In India, the prevalence of myopia in the general population has been reported to be only 6.9%. For those with myopia, far away objects appear blurred and near objects clearly. Furthermore, racial differencesin myopia rates are well documented. Prevalence rates in Asian countries vary from 50% in

Chinese children to 84% in Taiwan and Hong Kong[3].With myopia, the eyeball is too long, or the cornea is too steep, so images are focused in the vitreous inside the eye rather than on the retina at the back of the eye.

The acquired myopia in children is affecting their learning at school and usually increasing steadily, starting in about their 5^{th} or 6^{th} grade of school [2]. Myopia is one of the fast growing eye problems among children and which is preventable. The excessive amount of reading and other close work that we do in our modern society is the REAL cause of acquired myopia and the glasses with minus power lenses that are normally prescribed by unauthorized persons make the vision get worse FAST.

The expense and nuisance of wearing glasses for a lifetime is the least of the problem. The more myopia you have, the more you are at risk for sight destroying diseases such as retinal detachment, macular degeneration, glaucoma and cataract. Research proved that the environmental cause of myopia in the USA during the past several decades that has provided sufficient evidence that the acquired myopia is not hereditary, but environmental [2].

As children spend more time on computers, watching television, or reading books, they become nearsighted according to Lan Morgan of the Australian National University in Canberra, who has quoted in the July 10, 2004 issue of New Scientist [4]. In addition, some reports, published in the end of last century created an alarming response to show that the academically active professionals are the major sufferer of this disease [5]. The increase in rates has beenremarkable in very young Asian children, too, suggesting that early lifestyle riskfactors may have a large impact on early myopia development and the overall population prevalence rate of myopia[6].

Woo et. al. reported that the prevalence rate of myopia in Asian countries have reached epidemic proportions [7]. Woo et al postulated that medical students are a select population with a high level of education as well as above-average intelligence, which perhaps might explain the high prevalence of myopia among the medical students [7].

Recent research indicates that when accommodation is maintained for long periods of time (as and when reading or doing any other kind of close work), a chronic spasm of the ciliarymuscle can occur so that lens will no longer fully relax. Then when a distant object is looked at, the parallel rays are bent too much and come to focus in front of the retina. The resulting blurred vision is the first symptom of myopia. If this spasm is permitted to exist for too long a period of time, a pressure increase occurs in the vitreous chamber, causing the coats of the eye to stretch, this results in an overall enlargement of the vitreous chamber as additional fluid moves into the vitreous chamber to fill the increased volume. It is believed that the greater the amount of accommodation and convergence (the turning-in-movement of the eyes) exerted, the greater the pressure [2].

II. Objectives

1. To know the prevalence of acquired myopia among medical students
2. To identify the risk factors for myopia
3. To suggest control and preventive measures

III. Methods And Materials

The study population were the First year MBBS students (195) of the Osmania Medical College, Hyderabad who were admitted during the academic year 2013-2014. They were in the age group of 17 to 20 years. Pre-tested schedule was used to know the back ground of their school education, family size, no of attempts made to get seat and habits of studying and knowledge of computer education and other healthy habits of eye care during watching T.V& playing video games. All Medical students were routinely examined as a part of premedical examination conducted at the time of admission into the college by the team of doctors.

The present study was focused on prevalence of myopia among the students of first year MBBS. Two groups were identified. One group of students, who wereexposed tocomputer education during their school studies (risk factor of computer education) and others who do not have computer education in their school studies (school studies- 5^{th} class to 10^{th} class). Children born after 1985, all of them were exposed to television right from their childhood. All of them have struggled and worked hard to get through the entrance examination and got admitted in to the course.

IV. Observation And Discussion

The age and sex wise distribution of medicos in table no 1 shows that nearly 96 percent of them are in the age group of 17 to 19 years. The percentage of boys and girls are 57% and 43% respectively

Table1: Age and sex wise distribution of medical students

Age (in years)	Male	Female	Total	%
17	24	21	45	23.1
18	61	34	95	48.7
19	22	25	45	24.1
20+	5	3	8	4.1
Total	112	83	195	100

Graph 1: Age and sex wise distribution of medical students

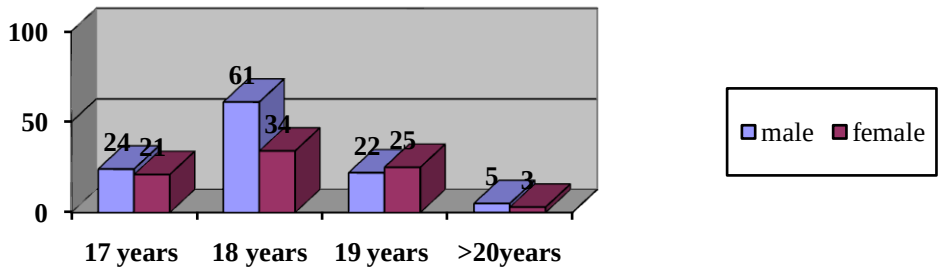


Table 2 shows that only five students acquired myopia before they attained the age of 10 years. It may be due to either malnutrition or hereditary. Myopia is rapidly increases with the age up to 18 years after that it is not rapidly increasing. It is observed that Myopia increases as age is increasing (10 to 16 years) and it is corresponding with their studying of 5th to 10th class. About 94% of them acquired myopia by age of 17 years.

Table2: Age of onset of Acquired Myopia of medical students

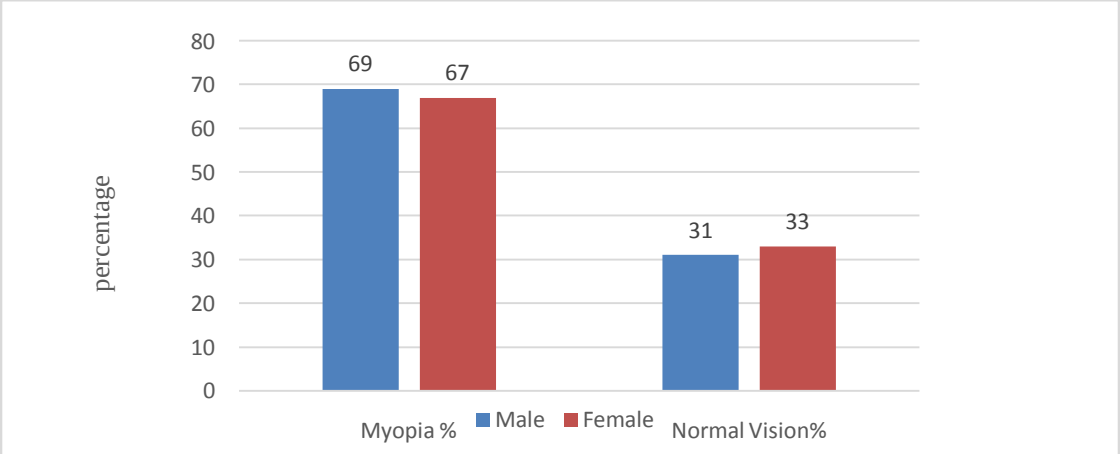
Age of Onset (years)	Male	Female	Total	%
>10 years	4	1	5	4
10 to14	10	16	26	19
15	11	9	20	15
16	28	17	45	34
17	19	10	29	22
18to 20	5	3	8	6
Total	77 (58%)	56 (42 %)	133	100

Out of total 112 male students 77 (68.75%) of them developed acquired myopia whereas out of 83 females students 56 (67%) of them developed myopia. It shows that there is no gender difference.

Table 3: Sex wise distribution of students with myopia and normal vision

Sex	Myopia	Normal Vision	Total
Male	77 (69%)	35 (31%)	112 (100%)
Female	56 (67%)	27 (33%)	83 (100%)
Total	133 (68%)	62 (32%)	195 (100%)

Graph 2: Percentage of Myopia & Normal vision



Nearly 90 percent of the student's background education is from Private educational Institutions. All students (195) have been divided into two groups. The exposure to computer education in their school education **(risk factor present)** and non exposure to computer education (**risk factor absent)** applied chi -squire test and its significance.

Table 4: Acquired Myopia Vs Normal Vision

Exposure to Computer Education	Acquired Myopia	Normal Vision	Total
Present	73 (79%)	19 (21%)	92 (100%)
Absent	60 (58%)	43 (42%)	103 (100%)
Total	133 (68%)	62 (32%)	195 (100%)

Chi-square test value = 8.36($p < 0.001$)

Exposure to computer education in their school age has strong association for development of acquired myopia in the study group and Children who are engaged with computer education, video games are more prone for early onset of myopia which is a statistically significant. Experts argue that focusing on images on computer screen causes eye fatigue than reading normal print in a book of magazine.

V. Results

About 96% of students are in the age group of 17 to 20 years, 133 of them i.e., 68% are suffering from myopia and there is no sex difference. Acquired myopia, 72% of them developed by the age of 16 years. Children using the computer education are more prone to develop myopia(statistically significant)than others who do not use. 90% of students are not aware of the knowledge about the minimum distance to be observed while using computer or watching television.

VI. Discussion

It is already an established fact that the correctable refractive errors of eye are creating a specific burden on the human resource as well as economy,worldwide. This acute eye problem is very much emphasized in some recent studies from Eastern Asian countries. India is also not exempted from this very problem. Since, most of the time young agegroup who are especially engaged in near work are found to be vulnerable to this crisis, the predicament need to be paid attention at all the stages of socio-academic-health-economic point of development. Thus the present study of refractive errors in medical students itself implies its own importance to be taken up.

The prevalence of ametropias in the literature is conflicting, mainly regarding myopia and hyperopia. According to Matsumura and Hirai, myopia is the most common ocular disorder in Japan, affecting at some ages 65.6% of individuals [8].Woo et. al. reportedthat the prevalence rate of myopia in Asian countries have reached epidemicproportions [7]. Woo et al postulated that medical students are a select populationwith a high level of education as well as above-average intelligence, which perhaps might explain the high prevalence of myopia among the medical students [7]. Some authors, in a sample of medical students in Singapore, discovered that 82%were myopic [9,10]. It is estimated that 49.3 million of those aged>15 years may have refractive errors [11] and under corrected refractive error is the most common cause of reversible blindness in India.Kalikivayi et al found that the prevalence of myopia is significantly higher in children more than 10 years of age [12]. Researchers point to a recent trend of high level of curricular near work indulged by medical students, probably predisposing them to development of myopia and considering it to be a risk factor [13]. As it is an alarming situation, therefore it is necessary to create awareness in the community to prevent development of myopia. Tikashi Sato of Yokohama, who spent almost his entire professional life attempting to determine why myopia suddenly became widespread throughout Japan after world War I, believed that it was due to close work stress associated with the attempt to wipe out illiteracy in Japan.Dr. Young conducted an interesting study on Eskimos in barrow, Alaska in which he substantiated the work of previous investigators who are found that primitive people who did not read or engage in substantial close work have virtually no myopia [14].

More recently Mavracanaset al reported that the prevalence rate of myopia was higher in female students as compared to their male counterparts among the Greek high school studentsfrom the present study, there has been no gender bias of myopia prevalence [15].

The present study further revealed that 90% of them secured MBBS seats in 1st and 2nd attempt. 90% of them studied the qualifying examination in private schools and only 79% of them have their medium of instruction in English. The families who are having 1 to 3 children (small family size) secured maximum seats 81%.Probably almost all of them were born during the year 1986 to 1987, have been watching Television since their childhood and only about 10% of them know about the knowledge, regarding the distance to be maintained while watching the TV and or computer.

In the present study,about 96% of students are in the age group of 17 to 20 years, 133 of them i.e., 68% are suffering from myopia and there is no sex difference. Acquired myopia, 72% of them developed by the age of 16 years. Children using the computer education are more prone to develop myopia(statistically significant)than others who do not use. 90% of students are not aware of the knowledge about the minimum distance to be observed while using computer or watching television

Control And Prevention:

We should not sit too close to the computer monitor. Maintainat least 50 cm distance from your eye to the monitor.

1) We must take a short break after every 30 to 40 minutes of computer work.
2) We should sit straight while working with the computer.
3) While watching television and playing video games a distance of six times the size of the screen.
4) International Myopia prevention Association (IMPA 2005) strongly discourages the use of concave lenses to correct myopia vision, while the real cause of the problem is left untouched.
5) Success in preventing myopia depends,a great deal on how parents make sure their children follow the doctor's instructions.
6) The eye may be more susceptible to myopia development at night. Children should sleep early, (with the lights off) and wake up early to study.
7) Daily outdoor activities provide better visual stimulation for the eyes and may be beneficial.

Reduce the stress of close work:

Methods are all directed towards reducing the stress to accommodation of convergence in order to prevent a spasm from occurring, without requiring for the patient to wear preventive aids [16].

1) Reading Distance:-

Hold the book or other material as far from the eyes as is comfortable possible. The distance from the elbow to the knuckles of the hand has been suggested as the minimum working distance. Look up and into the distance momentarily at the end of each page to relax the eyes. Ideally, the chair should be placed to enable looking out a window or across the room when looking up [16].

2) Posture:-

Reading should not be permitted while lying on the floor or lying in bed. This usually places the eye too close to the reading material. The elbows should not be rested on the desk or table when reading or writing, since this creates a posture which usually causes the head to bend forward too close to the work [16].

3) **Lighting**:-

Good lighting is extremely important in myopia prevention. Use as much light as possible when reading,as long as it does not cause glare ordiscomfort. Most people tend to use far too little light for their close work.Maintain proper illumination on all close work, most people tend to use too little illumination indoors. It is rare to find indoor illumination that comes anywhere near approaching the intensity of natural sunlight. In addition to eliminating the need to hold the book close, increased lighting causes the pupil of the eye to become smaller so that the outer portion or periphery of the lens is not used. This reduces the amount of accommodation required. The Indiscriminate use of sun glasses particularly for close work indoor, should also be avoided for the same reason [16].

4) Illness

When confined to bed, it is common for the sick person to be provided with books,games, etc., to relieve the boredom of confinement. In-addition illumination in the sick room is often poor. The environment can contribute to a rapid development of myopia. This is one time when watching television might be encouraged in preference to reading [16].

Finally strategy WHO for vision 2020: "Right to Sight" the main object to the district blindness control society (DBCS) is to achieve the maximum reduction avoidable blindness in the districts through optimal utilization of available resource in the district [2]

VII. Conclusion

Our observation suggests that myopia is the predominant refractive error among medical students. Most of them developed by the age of 16. This indicates thatthere is a failure of school authorities towards prevention of myopia in respect of school children. The people who monitor the education of our children, from the local school boards to the state and federal bureaucracies, are failing in their duty. While they enforce compulsory education, they show no much interest in the harm which is compromising the children's vision. Excessive reading and now the increasing use of computer monitors are extremely harmful unless proper protective measures are taken. Further studies may be useful to understand the association of stress and strain with respect to myopia among school children.

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