



RESEARCH ARTICLE

PREVALENCE OF MYOPIA IN MEDICAL STUDENTS IN SOUTHERN RAJASTHAN

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ABSTRACT

Introduction: There has been a rise in the prevalence of myopia across the world. Although several hypotheses have been proposed, exact cause remains obscure.

Methods: The study has been conducted on first MBBS students. After detailed history, ophthalmic examination was done including visual acuity and cycloplegic refraction. Prevalence of myopia was calculated and statistically analyzed.

Results: Out of 150 (36 males) students myopia was found in (94) 62.66%. The number of myopic females was more than myopic males (61.7% vs, 38.29%, $p < 0.005$). Low myopia, moderate myopia and high myopia were found in 75%, 20.21% and 7.44% students respectively.

Conclusion: Myopia is highly prevalent among medical students. Near work can be the most important associated environmental risk factor.

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INTRODUCTION

Myopia is the state of refraction in which parallel rays of light from infinity are focused in front of the retina when the eye is at rest (Curtin 1985). Since myopia is a refractive error in which ability to see the distant objects is reduced, it results in profound limitation of day to day work leading to an immense physical disability on the individual. The amount of power of the concave lens required to focus the converging rays back on to the retina is a measure of the severity of myopia. (Curtin 1988; Angle and Wissmann 1980) The people having myopia will need either need to use a concave lens in the form of spectacles or contact lens or need to undergo refractive surgery but they involve huge expenses and are economic burden on the society. (Kempen *et al.*, 2004) Moreover, high myopia is a risk factor for rhegmatogenous retinal detachment or myopic maculopathy which can lead to blindness. (Hsu *et al.*, 2004) High prevalence of myopia in up to 80% have been reported in from some places in Asia like Japan (Burton 1990) Taiwan (Lin *et al.*, 1999; Tan *et al.*, 2000), Hong Kong (Lam and Goh 1991; Yap *et al.*, 1993b; Edwards 1999; Lam and Edwards 1999) and Singapore (Lin *et al.*, 1998; Wong *et al.*, 2000; Wu *et al.*, 2001). In rural south India its prevalence was found to be 30% (Raju *et al.*, 2004), while only 18.3% in Nigeria. (Ezelum *et al.*, 2011). The cause of concern is not only the high prevalence, but also the dramatic rise over the past decades. (Lin *et al.*, 1998; Zhao *et al.*, 2000; Lin *et al.*, 2005; Midelfart *et al.*, 2006; Midelfart *et al.*, 2007; Guggenheim *et al.*, 2007).

While the etiology of myopia remains obscure, several hypotheses for myopia have been forwarded involving genetic and environmental factors such as economic prosperity, and education but most prominent among which is increasing amount of near work. (Loman *et al.*, 2002; Chua *et al.*, 2006; Seet *et al.*, 2007) The prospective medical students in India are known to spend long hours in studies thereby have a prolonged near activity and hence having a strong propensity to develop myopia. Since the clinical data about the prevalence of myopia is scarce in India and nonexistent in southern Rajasthan (India), this study has been conducted. Also, by conducting the study on medical students, a category related with prolonged near work, the results will help us in further understanding the role of near work in development of myopia.

MATERIALS AND METHODS

The present study was done on first MBBS students of Geetanjali Medical College and Hospital, Udaipur, Rajasthan, India. The study was conducted on students admitted in the year 2013. Informed written consent was obtained from each student after explaining the details of the study. Past history of trauma and systemic disorders associated with myopia like Marfans syndrome or Stickler Syndrome was noted. Family history of myopia present in the first degree relatives was also noted. Then the ophthalmic examination was carried out. Distant visual acuity by Snellen's Chart was recorded without glasses, with glasses and with pin hole. Color vision was checked by Ishihara pseudo isochromatic color plates. Then the pupils were dilated by instilling a mydriatic eye drop (TM Plus,

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Pharmatak Inc, India) containing Tropicamide 0.5% and Phenylephrine 10%. The mydriatic drop was instilled three times at an interval of 10 minutes. Retinoscopy was done after 30 minutes. Post Mydriatic Test was done the next day to get the final spectacle power. Mild myopia was defined as a refractive error of -0.25 to -3.00 D, moderate myopia as -3.25 to -5.00 D, and high myopia as -5.25 D and above in at least one eye. Statistical analysis for significance was carried out by Chi square test.

RESULTS

A total of 150 medical students were examined out of which 94 were males (62.66%) and 56 females (37.33%).

Table 1.

No. of students examined	
Male	94 (62.66%)
Female	56 (37.33%)
Total	150

Table 2.

No. of students with myopia	
Male	36
Female	58
Total (%)	94(62.66%)

(P value <0.005, Chi square Test)

Out of total 150 students, myopia was found in 94(62.66%) . Out of 94 students who were found to be myopic, 36 (38.29%) were males while 58 (61.7%) were females.

Table 3.

Distribution of myopia among males and females	
Male (%)	36(38.29%)
Female (%)	58 (61.7%)

(p value<0.005, Chi square Test)

Low myopia, moderate myopia and high myopia was found in 68 (75%), 19 (20.21%) and 7 (7.44%) students respectively. Amongst the 36 male students who were found to be myopic, low myopia, moderate myopia and high myopia was present in 27 (39.7%), 7 (36.84%) and 2 (28.57%) students respectively. Out of a total of 58 female myopic students, low myopia, moderate myopia and high myopia was found in 41 (60.29%), 12 ((63.15%) and 5 (71.42%) students respectively.

Table 4. Frequency of myopic students according to No. of Diopters

No. of Dioptres of myopia (-D)	Male	Female	Total (%)
0.25-3.00(%)	27	41	68 (78.24%)
3.25-5.00	7	12	19(20.21%)
>5.00	2	5	7(7.44%)
Total	36	58	94

Table 5. Frequency of myopic students among males

No. of Dioptres of myopia (-D)	Male (%)
0.25-3.00	27(75%)
3.25-5.00	7(19.44%)
>5.00	2(5.55%)
Total	36

Table 6. Frequency of myopic students among females

No. of Dioptres of myopia (-D)	Female (%)
0.25-3.00	41(70.68%)
3.25-5.00	12(20.68%)
>5.00	5(8.62%)
Total	58

Low myopia was found in 68 students of which 27(39.7%) were males and 41 (60.29%) females. Moderate myopia was found in 19 students of which 7(36.84%) were males and 12 (63.15%) were females. High myopia was found in 7 students of which 2(28.57%) were males and 5 (71.42%) were females.

Frequency of Myopia according to power (-D) among males and females

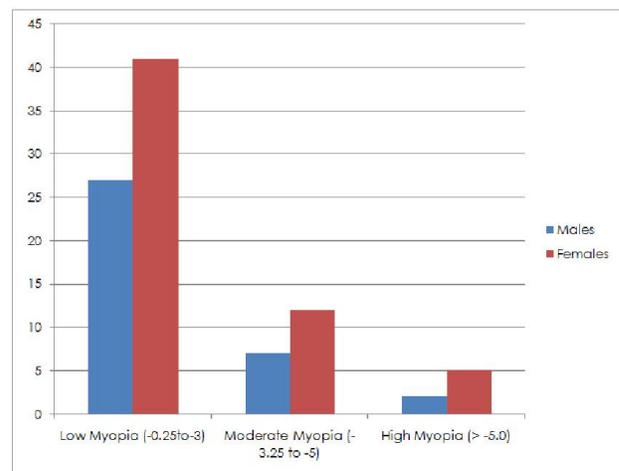


Fig.1.

Conclusion

The Myopia has been prevalent all over the world in variable proportions but the increasing rate of prevalence of myopia is becoming a cause of concern. While the etiology of myopia has been elusive the most prominent risk factors to be blamed has been the near-work. Our study was conducted on the medical students of first year MBBS of which 62.66% were found to be myopic. Similar studies on medical students that have been conducted in different parts of the world have reported huge variations in their prevalence rates. Among medical students, myopia has been found in 82% in Singapore (Woo *et al.*, 2004) and 87.5% in Hong Kong (Goh and Lam 1994) Taiwan reported more than 92.8% which further increased to 95.8% over a five year period. (Lin *et al.*, 1996) In contrast, similar studies on medical students in Lahore showed 57.6% (Razia Chaudhry *et al.*, 2011). A study on Norway also showed relatively low prevalence rates of 50.3% but also noted that the number of myopic students who received their first spectacles at the age of 20 years was 43.3% (Ojaimi *et al.*, 2007) In sharp contrast to the high prevalence rates of among medical students, myopia in school children has been reported to be quite low. A study among school children from Punjab (India) has reported the prevalence to be 6.97% (Refractive errors –a review from Punjab—NPCB 2007), While in Srinagar (India)

it was found to be only 4.74% (Ishfaq Ahmed *et al.*, 2008). In a study of refractive errors in Hong Kong, it was found that the prevalence of myopia increased from 30% at ages 6-7 years, to 70% at ages 16-17 years (Lam and Goh 1991). Similarly in Finland prevalence increased from <10% in early 20th century to 30% in late 20th century. (Pärssinen 2012) Notwithstanding the above figures, a study in school children in western Rajasthan (India), reported the prevalence to be 56.9%. (Chanchal Shrivastav *et al.*, 2013) Although such large variations in prevalence rates of myopia can be attributed to varied cultural, ethnic and socio- economic background and methods of sampling but one of the noteworthy factor is the lack of similarity in criteria of its definition ,classification and method of refraction, i.e., with or without using cycloplegia. An earlier study of Greek high school students reported that the prevalence rate of myopia was higher in female students as compared to their male Counterparts ($p < 0.001$) (Sotiris Plaini *et al.*, 2009).

This trend was also observed in Finland medical students (Yosefa Bar Dayan *et al.*, 2005) as well as in Taiwan (Guo *et al.*, 2012) and Kashmir (India). (Ishfaq Ahmed *et al.*, 2008) In our study also, number of female medical students found to be myopic were more than the males (61.7% vs.38.29%, $p < 0.005$). It could be due to more hours spent on studies by the girls and reduced outdoor activities as compared to boys. We have noted that while the prevalence rates of myopia at young age is quite low as evident in the various studies in school children, it was astonishingly high in college students. This suggests that some environmental factor apart from genetic factor is at play due to which myopia increases with age. Also, environmental factors such as educational level, occupation and individual income have been shown to associate with the prevalence of myopia. High prevalence of myopia found in our study could be due to very high competitive education system in India. Due to tough competition at entrance examination for admission to medical colleges, the students have to spend long hours on studies. Prolonged study hours lead to constant accommodation of lens which in turn leads to myopia. It suggests that prolonged near-work is a risk factor in the development of myopia. The limitation of the study in calculating the prevalence and implicating the near-work as a risk factor for myopia is that it was conducted in only one medical college. It is suggested that further studies be conducted among different professions related with near-work besides medical students across the globe to get the exact trend in prevalence of myopia.

REFERENCES

- Angle J, Wissmann DA. The epidemiology of myopia. *Am J Epidemiol* 1980; 111:220-8.
- Burton TC. The influence of refractive errors and lattice degeneration on the incidence of RD. *Trans Am Ophthalmol Soc.* 1990:143-55.
- Chanchal Shrivastav, Suman Sharma, Suman Jain *et al.* Prevalence of refractive errors among school children in western rajasthan, *International Journal of Current Research*, Vol. 5, Issue, 10, pp.2907-2908, October, 2013.
- Chua WH, Saw SM, Wu HM, *et al.* Refractive errors in schoolchildren: the Singapore Myopia Cohort Study. In: Thorn F, Troilo D, Gwiazda J, editors. Proceedings of the VIII International Conference on Myopia; 2006 July 7 – 9; Boston, United States. United States: Conference on Myopia, 2006: 11.
- Curtin B J. The myopias: basic science and clinical management. Philadelphia, PA: Harper and Row, 1985.
- Curtin B. Topics to be considered when establishing standards for clinical myopia studies. *Acta Ophthalmol Supp* 11988;185:61-2.
- Edwards MH. The development of myopia in Hong Kong children between the ages of 7 and 12 years: A five-year longitudinal study. *Ophthalm Physiol Opt.* 1999;19:286-94.
- Ezelum C, Razavi H, Sivasubramaniam S, *et al.* Refractive error in Nigerian adults: prevalence, type, and spectacle coverage. *Invest Ophthalmol Vis Sci.* 2011 Jul 3;52(8):5449-56.
- Goh and Lam (Goh, W.S. and Lam, C.S., "Changes in refractive trends and optical components of Hong Kong Chinese aged 19-39 years," *Ophthalm. Physiol. Opt.*, 14:378-382, 1994)
- Guggenheim JA, Hill C, Yam TF. Myopia, genetics, and ambient lighting at night in a UK sample. *Br J Ophthalmol*, 2007; 87: 580-2.
- Hsu WM, Cheng CY, Liu JH, *et al.* Prevalence and causes of visual impairment in an elderly Chinese population in Taiwan: the Shihpai Eye Study. *Ophthalmology* 2004; 111(1): 62-69.
- Ishfaq Ahmed, Seema Mian, Syed Mudasar, *et al.* Prevalence of myopia in students of srinagar city of Kashmir, India. *Int J Health Sci (Qassim)*. Jan 2008; 2(1): 77-81.
- Kempen JH, Mitchell P, Lee KE, *et al.* The prevalence of refractive errors among adults in the United States, Western Europe, and Australia. *Arch Ophthalmol* 2004; 122(4): 495-505.
- Lam CSY, Edwards MH. Myopia: Prevalence and risk factors. *Optician.* 1999;217:28-31
- Lam CSY, Goh WSH. The incidence of refractive errors among school children in Hong Kong and its relationship with the optical components. *Clin Exp Optom.* 1991; 74:97-103.
- Lam, C.S. and Goh, W.S. The incidence of refractive errors among schoolchildren in Hong Kong in relationship with the optical components", *Clin. Exp. Optom.*, 74:97-103, 1991)
- Lin *et al.* (Lin, L.K., Shih, Y.F., Lee, Y.C., Hung, P.T., and Hou, P.K., "Changes in ocular refraction and its components among medical students - a 5-year longitudinal study", *optom. Vis. Sci.*, 73:495-498, 1996)
- Lin LK, Shih YF, Tsai CB, *et al.* Epidemiologic study of ocular refraction among school children in Taiwan in 1995. *Optom Vis Sci.* 1999;76:275-81.
- Lin LLK, Shih YF, Hsiao CK, *et al.* Prevalence of myopia in Taiwanese schoolchildren: 1993 to 2005. *Ann Acad Med Singapore*, 2005; 33: 27-33.
- Lin LLK, Tsai CB, Lieu JC, *et al.* Correlation between ocular refractions with longitudinal study among schoolchildren in Taiwan. In: Tokoro T, editor. Myopia Updates: Proceedings of the 6th International Conference on Myopia. Springer-Verlag; Tokyo: 1998. pp. 53-7.

- Loman J, Quinn GE, Kamoun L, *et al.* 2002. Darkness and near work. Myopia and its progression in third – year law students. *Ophthalmol*, 2009; 109:1032–8.
- Midelfart A, Aamo B, Sjøhaug KA, *et al.* Myopia among medical students in Norway. *Acta Ophthalmol Scand*, 2007; 70: 317–22.
- Midelfart A, Kinge B, Midelfart S, *et al.* Prevalence of refractive errors in young and middle-aged adults in Norway. *Acta Ophthalmol Scand*, 2006; 80: 501–5.
- Ojaimi E, Rose KA, Morgan IG, *et al.* Distribution of ocular biometric parameters and refraction in a population – based study of Australian children. *Invest Ophthalmol Vis Sci* 2007; 46: 2748–2754.
- Pärssinen O. The increased prevalence of myopia in Finland. *Acta phthalmol*. 2012 Sep; 90(6):497-502
- Raju P, Ramesh SV, Arvind H, *et al.* Prevalence of refractive errors in a rural South Indian population. *Invest ophthalmol vis sci* 2004 Dec; 45(12):4268-72.
- Razia Chaudhry, Hassan Ali And Naheed H. Sheikh .Frequency and underlying factors of myopia among medical students. *Biomedica* Vol.27, Jul. – Dec. 2011\ Bio-14. Doc P. 154 – 160.
- Refractive errors –a review from Punjab—NPCB India vol. 1 no.4 Oct-dec-2007.
- Seet B, Wong TY, Tan DT, *et al.* Myopia in Singapore: taking a public health approach. *Br J Ophthalmol* 2007; 85: 521-6.
- Sotiris Plaini, Joanna Moschandreas, Panagoula Nikolitsa *et al.* Myopia and visual acuity impairment: A comparative study of Greek and Bulgarian school children. *Ophthalm. Physiol. Opt.* 2009 29: 312–320.
- Tan NWH, Saw SM, Lam DSC, *et al.* Temporal variations in myopia progression in Singaporean children within an academic year. *Optom Vis Sci.* 2000; 77:465–72.
- Woo W W, K A Lim, H Yang *et al.* Refractive errors in medical students in Singapore. *Singapore Med J* 2004 Vol 45(10) : 470-474.
- Wong TY, Foster PJ, Hee J, *et al.* Prevalence and risk factors for refractive errors in adult Chinese in Singapore. *Invest Ophthalmol Vis Sci.* 2000;41:2486–94.
- Wu HM, Seet B, Yap EPH, *et al.* Does education explain ethnic differences in myopia prevalence? A population-based study of young adult males in Singapore. *Optom Vis Sci.* 2001;78(4):234–9.
- Yap M, Wu M, Wang SH, *et al.* Environmental factors and refractive error in Chinese schoolchildren. *Clin Exp Optom.* 1993b;77:8–14.
- Y-H Guo, H-Y Lin, L L K Lin *et al.* Self-reported myopia in Taiwan: 2005 Taiwan National Health Interview Survey. *Eye* (2012) 26, 684–689.
- Yosefa Bar Dayan, Avi Levin, *et al.* The Changing Prevalence of Myopia in Young Adults: A 13-Year Series of Population-Based Prevalence Surveys Investigative Ophthalmology & Visual Science, August 2005, Vol. 46, No. 8.
- Zhao JL, Pan XJ, Sui RF, *et al.* Refractive error study in children: Results from Shunyi district, China. *Am J Ophthalmol.* 2000;129:427–35.
