

# Prevalence of myopia among students of Melaka Manipal Medical College at Manipal in India

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## Abstract

Myopia is not only inherited but also caused by excessive reading and other close work. The objective of present study was to find out the various genetic and environmental factors contributing to the occurrence of myopia among students. The prevalence of myopia among the first year medical students of MMMC Manipal, India was assessed using a questionnaire. These Malaysian Medical students belonged to different ethnicity like Chinese, Malay and Indians. Our survey showed that the females had higher prevalence of myopia when compared to males of the same age group. A higher percentage of Chinese medical students were found to have myopia when compared to other Malaysian races. Although there was an association with the level of education, gender, ethnicity and origin with the prevalence of myopia, its occurrence may be reduced by suitable awareness programs and proper knowledge on development of myopia by environmental factors to a great extent.

**Keywords:** Myopia, Medical students, Chinese, Malay, Indian

## 1. Introduction

Myopia commonly called as near or short sightedness is a refractive error of the eye. In people with myopia, the anteroposterior diameter of the eyeball is slightly long, so image is focused in front of the retina rather than directly on the retina. When this happens, objects at a distance appear blurred and unclear (William, 2005). Generally, myopia first begins in school-age children, since the eye continues to grow during childhood it progresses until about age of 20 (Tay *et al.*, 1992 ; Saw, 2000). However myopia may also develop in adults due to visual stress during extensive close work activities such as studying, using computers and could be due to health conditions like diabetes (Douglas, 2002).

Myopia is said to be genetic in origin (William, 2005). However, from experiments, myopia can be produced by changing refraction during development. Past research that has been conducted on myopia has been done so on animals, particularly chicks, and has paved the way to myopia research with human subjects. The results of these studies suggest that the neuronal connectivity in the brain as it influences vision can be greatly affected by the environment (Wallman & Turkel, 1978).

The prevalence of myopia varies by country and by ethnic group, reaching as high as 70-90% in some Asian populations. Myopia is more common in Chinese, Japanese and Spanish than in blacks, Egyptians and Sudanese (Chow *et al.*, 1990; Wong *et al.*, 2000). In Japan it is estimated that more than one million people suffer from vision impairment associated with high myopia. According to epidemiological evidence the prevalence of myopia is increasing, especially in Asian populations (Takashima *et al.*, 2001). The objective of our present study was to determine the prevalence of myopia among medical students of Melaka Manipal Medical College, Manipal, India. We also aimed at finding out the various genetic and environmental factors contributing to the occurrence of myopia among these students.

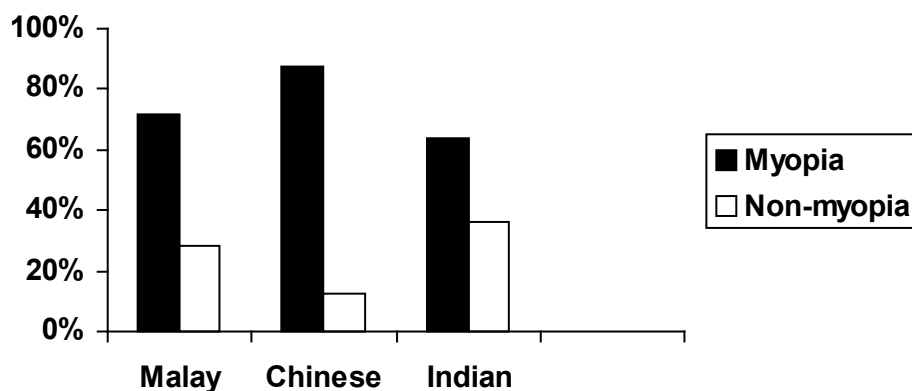
## 2. Methods

The prevalence of myopia among the first year medical students (115) of MMMC Manipal India was assessed using a questionnaire. These Malaysian Medical students belonged to different ethnicity. The age group of these first year medical students was between 19-24 years of which 51 were males and 64 were females. Among these students 34 were Chinese, 53 were Malay and 28 were Indians. A suitable questionnaire was prepared and administered to these groups of students. This questionnaire consisted of myopia related 12 items with subdivisions. All these students responded back and data was collected and statistically analyzed.

### 3. Results

From our questionnaire study we obtained the following results. From the 64 female medical students 80.82% (52) were found to be myopic. Among the 51 males 66.67% (34) were found to be myopic. According to the races (Fig.1) 71% of Malay students, 86% of Chinese students and 61% of Indian students were found to have myopia. Our survey on myopic family showed that the students with myopia had increasing percentage of family members with myopia in comparison to myopic family members of non myopic students (table 1a, 1b). Among the myopic students 87.36% of them had acquired myopia over the years where as 12.64% of the students had acquired it congenitally. Among the myopic students who had acquired myopia over the years our survey showed that 42.53% had acquired myopia in primary school, 35.63% in secondary school and 20.69% had acquired the defect in college. Only 1.15% of the students said to have had myopia in pre-school (Fig. 2). Medical students (79.31%) also felt that wearing spectacles or contact lenses did not worsen near sightedness.

**Fig.1.** Percentage of MMMC students with myopia according to races

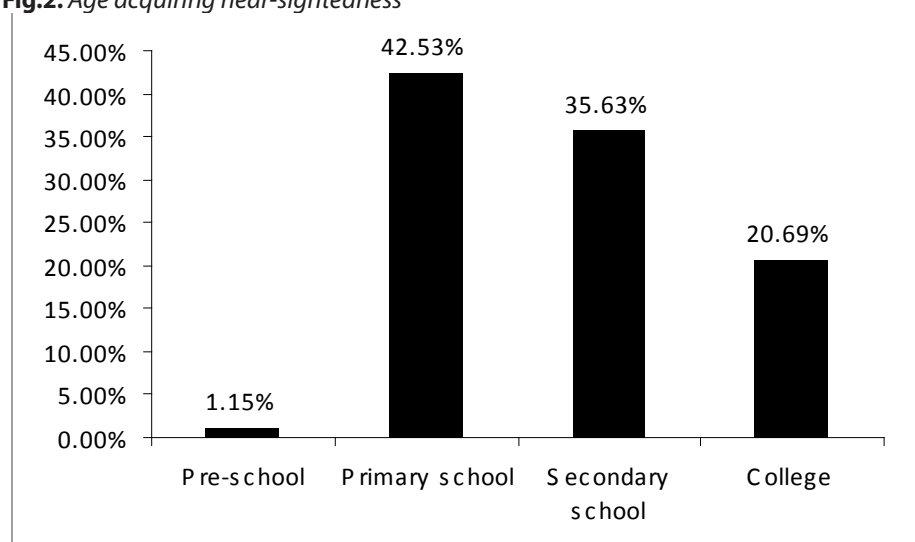


**Table 1a.** Family Members of the Students with Myopia

		Myopia
Grandfather	Father's side	16.09%
	Mother's side	14.94%
Grandmother	Father's side	14.94%
	Mother's side	10.34%
Father		48.28%
Mother		36.78%
Brother		44.83%
Sister		48.28%

**Table 1b.** Family Members of the Students who are Non-myopia

		Myopia
Grandfather	Father's side	14.86%
	Mother's side	10.71%
Grandmother	Father's side	14.29%
	Mother's side	10.71%
Father		14.29%
Mother		21.43%
Brother		17.86%
Sister		32.14%

**Fig.2. Age acquiring near-sightedness**

#### 4. Discussion

Our survey showed that the females had higher prevalence of myopia when compared to males of the same age group this supports several previous studies conducted on myopia in females (Saw, *et al.*, 1996). A higher percentage of Chinese medical students were found to have myopia when compared to other Malaysian races; the Chinese students were followed by Malay students and lastly Indian students in developing myopia. Hence according to our survey, among the races the Chinese race or medical students belonging to Chinese origin have a higher prevalence of myopia. This strongly agrees with several studies which have been conducted among the Chinese race across the globe (Wong *et al.*, 2000; Rasmussen *et al.*, 1936; Lin *et al.*, 1988)

Our survey on myopic family yielded significant result as the number of myopic family had an increasing incidence of myopic children or myopic siblings. This strongly supports the claim by several physiologists that myopia is genetically inherited (William, 2005). Several studies have been done regarding the genetic involvement in myopia and even the genes and chromosomes have been studied (Young *et al.*, 1998; Young *et al.*, 1998). Among our students we got lesser percentage of myopic students who had congenitally acquired myopia in comparison to students who acquired myopia by environmental factors. This supports the claim by studies that myopia can be both congenital as well as environmentally acquired (Saw, *et al.*, 1996). Studies conducted on infants with ambient light at night that developed myopia and near work studies in children and students who develop myopia supports the environmental factors which can result in myopia (Quinn *et al.*, 1999). Hence in our survey, among the age group in which the medical students who developed myopia because of environmental factors, we found higher percentage at the school going age that is primary school as depicted in the results. Most of the medical students wear spectacles probably due to convenience, while those who wore contact lens said that they were going for a better appearance. Our survey showed that some students chose to ignore the defect (mild myopia) as they were worried of wrong prescription of spectacles which would lead to worsening of their eyesight. This shows that few of the medical students are hesitant of getting their eye tested as well as their appropriate treatment. Perhaps more awareness about myopia and its effects is required among the medical students. In conclusion, the survey of myopia indicated the prevalence of myopia among several of our medical students. It also showed the different hereditary and environmental factors which could have lead to the development of myopia in these students. Since our students work close to computers and several near work activities there is every chance of non myopic student developing myopia. In addition to this the presence of Chinese origin among our students is an increasing risk factor. Perhaps the congenital defects to be corrected may require further research. However, suitable awareness program and proper knowledge on development of myopia and its risk factors may reduce its occurrence by environmental factors to a great extent.

## 5. References

- 1• William F. Ganong (2005); Review of Medical Physiology, 22<sup>nd</sup> Edition, 156
- 2• Tay MT, Au Eong KG, Ng CY Lim MK (1992). Myopia and educational attainment in 421, 116 young Singaporean males. *Ann Acad Ed Singapore* 21, 785-791.
- 3• Saw S, Neito FJ, Katz J, Schein OD, Levy B, Chew S. (2000) Factors related to the progression of myopia in Singaporean Children. *Optom Vis Sci*, 77, 549-554.
- 4• Douglas R Fredrick. (2002) Clinical review myopia. *BMJ* 324, 1195-1199
- 5• Wallman J, Turkel J. (1978) Extreme myopia produced by modest change in early visual experience. *Science* 201, 1249-1251.
- 6• Chow YC, Dhillon B, Chew PT, Chew SJ (1990). Refractive errors in Singapore medical students. *Singapore Med J* 31, 472-473.
- 7• Wong TY, Foster PJ, Hee J, Ng TP, Tielsch JM, Chew SJ, et al. (2000) Prevalence and risk factors for refractive errors in an adult Chinese population in Singapore. *Invest Ophthalmol Vis Sci* 41, S324.
- 8• Takashima T, Yokoyama T, Futagami S, Ohno-Matsui K, Tanaka H, Tokoro T, et al. (2001) The quality of life in patients with pathologic myopia. *Jpn J Ophthalmol* 45, 84-92
- 9• Saw SM, Katz J, Schein OD, Chew SJ, Chan TK (1996). Epidemiology of myopia. *Epidemiol Rev* 18, 175-187
- 10• Rasmussen OD. Incidence of myopia in China. *Br J Ophthalmol* (1936) 20, 350-360.
- 11• Lin LL, Chen CJ, Hung PT, et al. (1988) Nation wide survey of myopia among school children in Taiwan, 1986. *Acta Ophthalmol suppl* 185, 29-33.
- 12• Young TL, Ronan SM, Drahozal LA, Wildenberg SC, Alvear AB, Oetting WS, et al. (1998) Evidence that a locus for familial high myopia maps to chromosome 18p. *Am J Hum Genet* 63, 109-119
- 13• Young TL, Ronan SM, Alvear AB, Wildenberg SC, Oetting WS, Attwood LD, et al. (1998) A second locus for familial high myopia maps to chromosome 12q. *Am J Hum Genet* 63, 1419-1424
- 14• Quinn GE, Shin CH, Maguine MG, Stone RA (1999). Myopia and ambient lightning at night. *Nature* 399(6732), 113-114