

REFRACTIVE ERRORS IN SINGAPORE MEDICAL STUDENTS

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ABSTRACT

The refraction of 128 third-year medical students aged 20-22 was studied using a Topcon autorefractometer. The population was predominantly Chinese and comprised 44% females and 56% males. The mean refractive error was -3.75 D for males and -4.76D for females. In all, 82% of the students were myopic. 72% were found to have astigmatism. This study confirms clinical impressions that Singapore students have one of the highest prevalence rates of myopia and astigmatism in the world.

Keywords: Myopia, astigmatism, Chinese

SINGAPORE MED J 1990; Vol 31: 472 - 473

INTRODUCTION

It has been observed that both the incidence and degree of myopia and astigmatism have increased in the Singapore population. Refractive errors also appear more prevalent among the higher educated⁽¹⁾. For this reason, University undergraduates were selected for further evaluation to determine the type and severity of refractive errors. Medical students were chosen as they were considered typical of young adults who have spent prolonged periods of time in reading and close-work.

METHODS

One hundred and twenty-eight medical students (72 males, 56 females, all Chinese) in the 3rd year of their studies (one class) were examined. Autorefraction using a Topcon RM-A2000 auto-refractometer (with automatic fogging) was performed on all students without the use of cycloplegia.

RESULTS

The frequency distribution of myopia is shown in Fig 1.

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The mean spherical equivalent for males was -3.78D, and that for females was -4.76D. Myopia (defined as a spherical error of equal to or greater than -0.5 D) was found in 83% of the students, 78% of males and 89% of females.

Myopia of greater than -6.00 D, frequently defined as "high myopia", was found in 41% of all students, 19% of males and 21% of females. The percentage of myopic females was higher than the males.

Astigmatism (defined as a cylinder of equal to or greater than -0.50 D) was found in 72% of males and 71% of females. The frequency distribution is shown in Fig 2. Keratoconus was not found in this population.

DISCUSSION

This study shows that refractive error in young Singapore medical students were similar to findings in Taiwan, where the degree of myopia is the highest in the world; 99% of Taiwan medical students being myopic.

A similar study of young Caucasian optometry students in the United States shows a similar pattern of myopia, with 75% of the survey population of 447 being myopes with a mean refractive error of -2.21 D⁽²⁾. Myopia was also found to be commoner in females, though the reason for this remains unclear.

Certainly the sample of medical students chosen in no way represents the general population of Singapore. However, they do typify the group at highest risk for the development of myopia. A previous study in Singaporean men of the same age group⁽¹⁾ found the prevalence of myopia to correspond closely with the degree of educational attainment; approximately 10% of men without formal education were myopic, in contrast to 60% of those with A-level education and above. Thus, the fact that 83% of medical students are myopic underscores this association.

High myopia is also more prevalent among the higher educated. Less than 1% of young men without formal education have myopia in excess of -7.00 D in contrast to 4% of A-level students⁽¹⁾ and, as this study shows, 14% in medical students. This group would be at particular risk for the development of retinal breaks, retinal

Fig 1
Frequency Distribution of Refraction 128 Third Year Medical Students

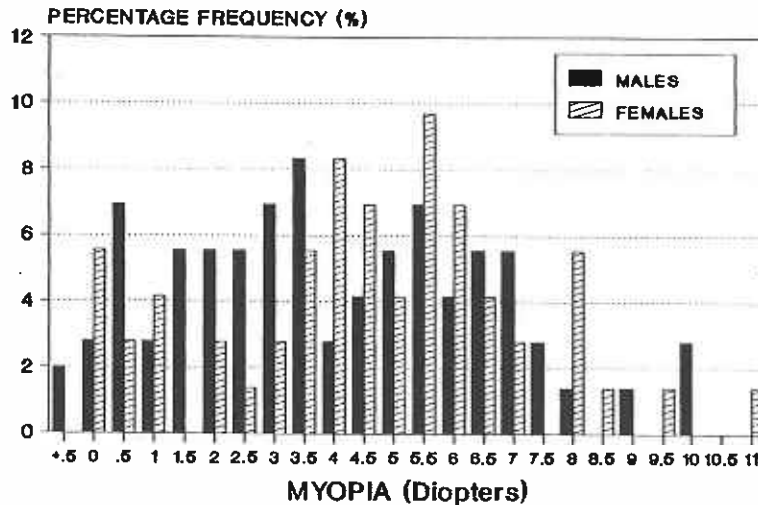
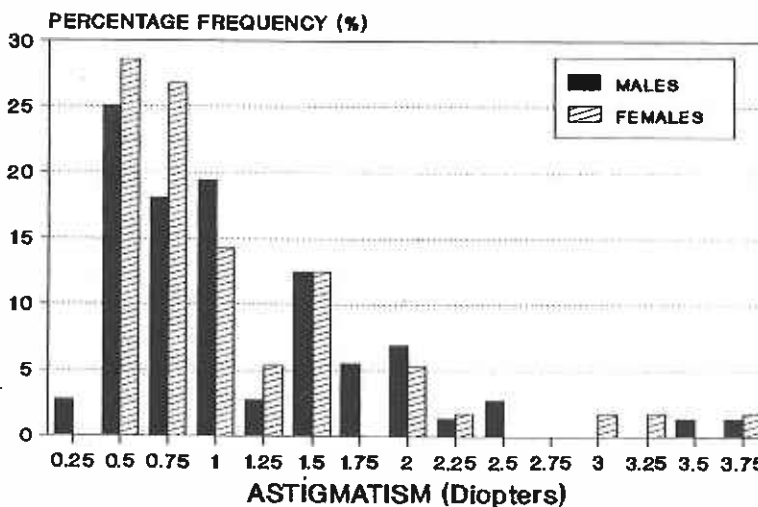


Fig 2
Frequency Distribution of Astigmatism 128 Third Year Medical Students



detachment, glaucoma, cataract, posterior staphyloma and macular degeneration, with irreversible visual loss⁽³⁾.

The aetiology of myopia remains obscure⁽⁴⁾. It is now generally agreed that both heredity and the environment^(5,6) have important roles to play. That Chinese have a predisposition to the development of myopia appears to support the genetic theory of myopia. Nearwork has also been closely associated with myopization, thereby supporting the alternate theory that myopia can be acquired. The clear correlation of educational attainment with myopia, as our study illustrates, unfortunately does not shed light on these hypotheses - it may be the result of higher intelligence (genetically determined) or the product of intense and diligent reading (nearwork).

We are conducting further comparative studies between different ethnic and geographical populations in order to determine the main aetiological factors causing the myopia epidemic observed world-wide.

ACKNOWLEDGEMENT

The authors wish to thank Dr Arthur Lim for his support and Dr Luke Lin and Mrs Sylvia N. Rachlin of the Myopia International Research Foundation for their help and advice. We are grateful to the Singapore Eye Foundation for the myopia study grant and to Topcon Singapore for the use of the autorefractometer.

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