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Original Article

Refractive Errors Among Medical Students

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ABSTRACT

Introduction: Refractive errors are becoming a problem in many societies, with prevalence rates of myopia in many Asian urban countries reaching epidemic proportions. This study aims to determine the prevalence rates of various refractive errors among medical students of Kist Medical College Teaching Hospital, Nepal.

Materials and Methods: Medical students were included in the study. Demographic data was obtained via questionnaires filled in by the students after taking informed verbal consent. Refractive error measurements were determined by dry retinoscopy and additional cycloplegic refraction as and when needed.

Results: The prevalence rate of simple myopia was 64.81% and 3.7% had high myopia. Hyperopia (Hypermetropia) was present in 1.8% of the participants while overall astigmatism prevalence rate was 29.6% among medical students. Conclusion: Prevalence rates of myopia in medical students are found to be quite high.

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Keywords: Astigmatism; Hyperopia; Myopia; Refractive errors

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INTRODUCTION

The refractive status of the eye is an expression used to denote the relationship between the refractive mechanism (dioptrics) of the eye and the spatial location of the sensory layer of the eye (retina). This is broadly classified into two groups; emmetropia and ametropia. The latter term is employed to describe the clinical condition in which there is a variation from a perfect coincidence of the posterior principal focus of an eye's refractive media and the retina, while the former denotes the clinical condition in which the perfect coincidence exists. A further classification of the latter condition is made based upon the location of this posterior principal focus thus formed relative to the position of the retina. Myopia is the word used to refer to the condition in which the posterior principal focus thus formed lies in front of the retina, while hyperopia defines a reverse situation in which this focus lies hypothetically behind the retina. However, a third condition exists in which the posterior principal focus fails to form a point focus and this is denoted as astigmatism.

The prevalence rates of myopia in many Asian countries have reached epidemic proportions. While refractive errors may be corrected using spectacles and contact lenses, refractive errors present a reasonably large economic burden. Prevalence of

Table 1: Prevalence of refractive errors according to gender

	Males	Females	Total
Without Refractive Errors	119 (59.8%)	80 (40.2%)	199 (78.6%)
With Refractive Errors	26 (48.1%)	28 (51.9%)	54 (21.4%)
Total	145 (57.35%)	108 (42.7%)	253 (100%)

Table 2: Prevalence rates of different types of refractive errors

Refractive Errors Type	Prevalence
Simple myopia	35 (64.81%)
High myopia	2 (3.7%)
Simple hypermetropia	1 (1.8%)
Astigmatism	16 (29.6%)

myopia among medical students varies in different countries. In some countries incidence of myopia is quite high[2,3] whereas other areas low prevalence rate of myopia was identified.[4,5]

This cross sectional study was designed to determine the prevalence rates of refractive errors among Nepalese medical (MBBS) students of first three batches of Kist Medical College.

MATERIALS AND METHODS

Two hundred and sixty medical (MBBS) students from first three batches of KISTMCTH, aged 18-24 years, were included in this study. The study proposal was approved by the research committee and institutional review boards of KISTMCTH. The medical students were examined over a one month period in August 2013. Seven students were excluded from the study as they already had pre-existing ocular causes of decreased visual acuity and so were not eligible for the study. Informed verbal consent was obtained from every participant, explaining the purpose of the study, procedures, risks, benefits, and the assurance of confidentiality of the results. Demographic data such as age, gender and parental history of refractive errors (asking whether the parents had refractive errors in past) were obtained from a self-administered questionnaire. Asthenopic symptoms were specifically mentioned in the questionnaire and the subjects complaining of headache were also reviewed by the physician.

Distant visual acuity (VA) was checked with Snellen distant vision chart, separately for each eye by an experienced ophthalmic assistant. Whenever VA was <6/6, it was rechecked using a pinhole for any improvement. Dry retinoscopy was then performed for those who had decreased vision (here referred as VA<6/6).

Cycloplegic refraction was performed whenever there was inconsistent findings with dry retinoscopy with eye drop cyclopentolate 0.75% and the subject was called for post-mydriatic test and final diagnosis of type of error was then recorded in the case sheet after complete ocular examination: i.e. ocular alignment and motility, pupillary examination and detailed slit lamp examination followed by fundus evaluation.

Myopia was defined as spherical error (SE) of at least -0.50 dioptres (D). High myopia was defined as SE of at least -6.00D. Hyperopia was defined as SE of at least +0.50D. Astigmatism was defined as cylinder of at least 0.50D.

Table 3: Different types of refractive errors according to gender

Refractive errors type	Males	Females	Total
Simple myopia	15 (27.7%)	20 (37.0%)	35 (64.8)
High myopia	1 (1.8%)	1 (1.8%)	2 (3.6%)
Simple hypermetropia	0	1 (1.8%)	1 (1.8%)
Astigmatism	10 (18.5%)	6 (11.1%0	16 (29.6%)
Total	**26 (48.1%)**	**28 (51.9%)**	**54 (100%)**

Statistical analysis was carried out with chi square test with Statistical Package for Social Sciences (SPSS) version 20.0 to find out the specific prevalence rates of different types of refractive errors according to gender.

RESULTS

A total of 253 among the total of 260 students (97.3%) were examined. The median age was 20 (18-24) years. Among the study population, 145 (57.3%) were males and 108 (42.7%) were females. One hundred ninety-nine (78.6%) of the participants did not have any types of refractive errors (119 males and 80 females). Among the remaining students having refractive errors, 26 were males and 28 were females. (Table1) The overall prevalence rate of simple myopia was 64.81% and 3.7% for high myopia. The prevalence rate of hyperopia was 1.8% and that of simple astigmatism was 29.6%. Details are given below in table 2 and the various types of refractive errors according to gender are shown in table 3.

DISCUSSION

The overall prevalence rate of simple myopia in medical students of first three batches of KISTMC was found to be 64.81% and that of high myopia was 3.7 percent. The prevalence rate of hyperopia was found to be 1.8% while that of astigmatism was 29.6 percent. A study of 128 third year medical students in Singapore had reported a rate of 83 percent.[2] Another study done in second year medical students in Singapore, 89.6% students had myopia.[6] The results obtained from our study was also not so similar to the study of medical students in Taiwan in 1996, where 92.8% of medical students were reported to be myopic.[3] However, there are limitations in comparing these studies, as participation rates were different and criteria for entry into medical school may have changed.

It is reported that myopia rates in Asia are higher as compared to those in Europe. A Danish study of 147 medical students (median age 26 years) in 2000 reported figures of 50%[4] while the Norwegian study on 140 medical students (median age 24.9 years) in 1992 reported a prevalence rate of 50.3 percent.[5] In Nigeria, a study was conducted which involved fifth year medical college students. The prevalence rate of myopia among those students were 63.6 percent.[7]

In this study, the overall prevalence rate of hyperopia among medical students was 1.8 percent. A Norwegian study on 224

engineering students had reported a higher figure of hyperopia (30%).[8] However, the non-participation rate in the Norwegian study differed from this study and it may be inappropriate to draw comparisons.

The overall prevalence rate of astigmatism in this study was 29.6 percent. Chow et al reported overall astigmatism rates of 72% in Singapore medical students using the same definition.[2] Another study on astigmatism among 1738 Greek students (aged 15-18 years) reported prevalence rates of 10.2 percent.[9]

This study benefited from the fact that there was a high participation rate (97.3%) although the overall sample size was relatively small. All first three batch medical students from the medical college were invited to participate in this study. An intensively trained ophthalmic assistant performed the refraction readings thus reducing variability in the measurements obtained.

CONCLUSIONS

The prevalence rate of simple myopia in medical students of first three batches of Kist Medical College Teaching Hospital was 64.81%, rate of high myopia was 3.7%, hyperopia was 1.8%, and rate of astigmatism was 29.6 percent.

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