

Pattern of Refractive Errors in Teenage School Students Visiting A Tertiary Care Hospital In Manipur

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Abstract: Myopia is the commonest refractive error followed by hypermetropia. Many conservative and surgical modalities are available for correcting the refractive errors, each with varying efficacy and safety. This study was planned to find out the pattern of refractive errors and the extent of correction possible with conservative methods. A hospital based cross sectional study was done in the months of March, April and May 2018, among teenage patients attending the Out-Patient Department (OPD) of tertiary hospital in Imphal, Manipur, India. A total of 980 teenage patients attending the Ophthalmology OPD who were having refractive error were included in the study. Around 42.85% of the participants complained of decreased vision while 35.71% had recurrent bouts of headache as the presenting problem. Most of the patients had an uncorrected far vision between 6/6 and 6/12. Around 98.97% of the participants had a corrected visual acuity of 6/6 in both eyes, and around 1.02% had a corrected acuity between 6/6 and 6/12 in both eyes. In our study, sub-optimal correction of visual acuity has been reported only in less than 1% of the participants, and therefore the probability of progression of the problem is minimised in a vast majority of the patients.

Key words: Myopia, hypermetropia, refraction, visual acuity, refractive errors.

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I. Introduction

A refractive error may be defined as a state in which the optical system of the nonaccommodating eye fails to bring parallel rays of light to focus on the retina.[1] Especially, myopia has become a very common problem. Several studies described an increasing prevalence of myopia in the last two decades [2,3,4,5] whereas other studies concluded that the frequency of myopia had been nearly static for a century.[6,7,8] Furthermore, racial differences in myopia rates are well documented. Prevalence of myopia has been shown to be as low as 2% to 5% in Australian Aborigines [9] and Salomon Islanders.[10] Prevalence rates in Asian countries vary from 50% in Chinese children [11] to 84% in Taiwan and Hong Kong [12,13]. In Europe, the prevalence of myopia seems to be lower than in Asian countries. The prevalence rates vary from 30.3% in middle-aged adults and 35.0% in young adults in Norway [14] to 53% in Norwegian medical students.[15] Guggenheim and colleagues (2003) reported a prevalence of myopia of 64% among British students between 18–40 years.[16] Although this prevalence is supposed to be typical of university students,[17] the study was likely to have been affected by response bias, with more myopes choosing to participate than non-myopes. A study by Mavracanas and colleagues (2000) have shown a prevalence of myopia of 36.8% among Greek students (aged 15–18 years).[18] In children, the prevalence of myopia varies from 9.2% among American children aged 5–17 years [19] to 6% among 6-year-olds.[20] Villareal and colleagues (2000) found a prevalence of 49.7% in Swedish school children aged 12–13 years.[21] The prevalence of hyperopia is not clear. The Eye Diseases Prevalence Research Group (2004) investigated persons older than 40 years and reported hyperopia rates of 9.9% in America, 11.6% in Western Europe and 5.8% in Australia.[22] Kleinstein and colleagues (2003) have shown a prevalence of hyperopia of 12.8% in American children aged 5–17 years.[23] Midelfart and colleagues (2002) showed a prevalence of 13.2% among 20–25 year-olds and 17.4% among 40–45 year-olds.[24] Wensor and colleagues (1999) have shown that more than every third person older than 40 years in Australia is hyperopic.[25] King and colleagues (1998) reported a prevalence of hyperopia of 47% among Norwegian adults.[26] The aim of this study was to determine the pattern of refractive error in teenagers in Manipur and the extent of correction with conservative methods.

II. Material and Methods

A hospital based cross sectional study was done in the month of March, April and May 2018, among teenage patients attending the Ophthalmology Out Patient Department (OPD) of tertiary hospital Manipur, India. A total of 980 teenage patients attending the ophthalmology OPD were included in the study, after obtaining written informed consent. All the participants who were included in the study had refractive errors and were candidates for correction using conservative methods. All the patients with history of Radial Keratotomy, Photorefractive Keratectomy or Laser-Assisted in Situ Keratomileusis (LASIK) were excluded from the study. Refractive error was assessed, with or without cycloplegia, in both eyes of all participants by objective and subjective refraction. Various qualitative variables were tallied, marked and tabulated.

III. Statistical Analysis

The data was digitised and analysed using SPSS 21. The quantitative variables were categorized and tabulated using descriptive statistics.

IV. Results

A total of 980 participants, aged 13 to 19 years, were included in the study. There were more females in the study group than males as seen in TABLE 1. Around 42.85% of the participants complained of decreased vision while 35.71% had recurrent bouts of headache. Sizeable proportion of people came with a Snellen's reading of 6/6 which indicated the presence of additional refractive issues as mentioned in the correction estimates. Most of the patients had an uncorrected far vision between 6/6 and 6/12 (TABLE-2). Both spherical and cylindrical deformities were corrected conservatively. In spherical deformity corrections, -0.5 to -3.0D were most commonly used, followed by more than +0.5 to +2.0D. In cylindrical deformity corrections, 0.25 to 0.50D were used most commonly, as observed in TABLE-3. The visual acuity achieved post correction was satisfactory in the case of most participants. Around 98.97% of the participants had a corrected visual acuity of 6/6 in both eyes, and around 1% had a corrected acuity between 6/6 and 6/12 in both eyes as seen in TABLE-4.

Table-1: Baseline demographic and clinical characteristics

Variable	Frequency	Percentage
Gender		
Male	321	32.76
Female	659	67.24
Symptoms		
Blurring of vision	420	42.85
Headache	350	35.71
Eyeache	150	15.34
Giddiness	34	3.5
Watering	26	2.6

Table-2: Far vision among the participants

Visual acuity	Right eye	Left eye
≤6/6	710(72.46%)	710 (72.46%)
≤6/12	150(15.30%)	150(15.30%)
≤6/24	70(7.14%)	70(7.14%)
≤6/60	50(5.10%)	50(5.10%)

Table-3: Spherical and cylindrical correction required by the participants

Correction (Spherical)	Right eye (%)	Left eye (%)
-0.5 to -3.0 D	294 (30.01%)	294 (30.01%)
-3.0 to -6.0D	60 (6.12%)	60(6.12%)
<-6.0D	7(0.71%)	7(0.71%)
+0.5 to +2.0D	252 (25.71%)	252(25.71%)
+2.0 to +5.0D	1(0.10%)	1(0.10%)
>+5.0D	-	-
Correction (Cylindrical)		
0.25 to 0.50 D	316 (32.22%)	316 (32.22%)
0.75 to 1.0 D	30 (3.08%)	30 (3.08%)
1.0 to 4.0 D	20 (2.04%)	20 (2.04%)
>4.0 D	-	-

Table-4:Far vision among participants, after correction

Visual acuity	Right(%)	Left(%)
≤6/6	970(98.97%)	970(98.97%)
≤6/12	10(1.02%)	10(1.02%)
≤6/24	-	-
≤6/60	-	-

V. Conclusion

Our study presents the pattern of refractive error for the age groups 13–19 years in Manipur. A group of teenager (aged 13 to 19 years), were studied in order to examine the frequency of refractive errors in the teenagers in Manipur. The average prevalence approximately of myopia in this study was found to be 37% and that of hypermetropia was 26%. Most of the participants had a visual acuity of less than 6/12 on presentation to the hospital, and over 98% of them achieved a vision 6/6 only with conservative measures. Refractive errors in children may often pass undiagnosed for a long time, especially hyperopia. Thus, the prevalence of myopia and hyperopia is possibly underestimated in the present study. Although the prevalence rates found in this study maybe underestimated, and a comparison between all studies concerning the prevalence rates of myopia is not easy due to the variability in definition and selection of subjects, the prevalence rates found in this study are comparable with those found in other European studies. There are very few comparable studies concerning the prevalence rates of hyperopia. Thus, this study concludes that refractive error is quite common and correction of refractive error is possible by conservative methods alone. It is also important to have screening programmes in school to detect refractive errors in early stages.

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