



Proportion of Refractive Errors Among Young Adults Attending Private Eye Clinic

KEYWORDS

Refractive errors, young adults, Hyperopia, myopia, astigmatism.

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ABSTRACT About 90% of the world's visually impaired people live in developing countries. Blindness is one of the most significant social problems in India with uncorrected refractive errors as the second major cause accounting for 19.7% of blindness and low vision. A retrospective study was done to find out proportion of refractive errors among young adults (21-40 years) attending the eye clinic during one year. Out of 3085 patients, 2162(70.1%) had refractive errors, out of which 50.6% were males and 49.4% were females. Most of the patients presented with myopia 1159(37.5%) followed by astigmatism 529(17.2%) and hyperopia 474(15.4%). Low to Moderate, Myopia and Hyperopia is more common in young adult females (21-30 years) as compared to males wherein the proportion is higher in (31-40) years of age group.

Introduction

Refractive errors (myopia, hyperopia and astigmatism) affect the whole spectrum of the population without regard to age, gender, race and ethnic group. Uncorrected or under corrected refractive errors can lead to visual impairment and ultimately, even blindness.^[14,18,19] Although they can usually be corrected by wearing glasses or contact lenses, and via surgery, these solutions pose public health challenges and/or economic burdens.^[2,7,15] In addition, refractive errors are risk factors for various ocular diseases. Myopia, especially high myopia is associated with open-angle glaucoma, retinal detachment, cataract, staphyloma and chorioretinal atrophy,^[8,10] whereas hyperopia is associated with angle-closure glaucoma,^[9] and acute ischemic optic neuropathy.^[10] Refractive error alone caused 153 million (8million blind, 145 million low vision) thus making refractive error the leading cause of low vision and the second leading cause of blindness following cataract. Most studies of the prevalence or proportion of refractive errors were related to particular groups, races, or countries. Young adults (21-40 age group) are backbone of the society. Now- a-days constant near work and use of computers is unavoidable which may be a cause for early onset of myopia.^[3,11,16] The aim of this study was to find out distribution of refractive errors among young adults (21-40 age group) attending Private Eye clinic.

Materials and Methods

A retrospective, cross-sectional, and record based study was done in private Eye Clinic. All the young adults (21-40 years of age) who attended the Clinic from 1st January 2013 to 31st December 2013 were included in the study. Young adults with ocular pathology, history of trauma or operation were excluded from the study. Auto refraction followed by Subjective refraction was performed by achieving best corrected visual acuity. Complete ocular examination was done to rule out any other cause for visual impairment. Because of the high correlation between eyes and similarity of results in left or right eyes, only the results of right eyes are reported. For this study, myopia (rays focused anterior to the retina) is defined as spherical power less than or equal to -0.50 D. Hyperopia (rays focused posterior to the retina) is defined as spherical power greater than or equal to +0.50 D. Emmetropia (rays focused on the retina) is defined as spherical power between -0.5 D and +0.5 D. Astigmatism (rays focused in various planes) is defined as cylindrical value of 0.25 D or more. Patients having only spherical power were considered for myopia and hyperopia. Myopic patients are divided into low (-0.5 to -1.75), moderate (-2.0

to -5.0) and high (< -5.0). Hyperopia also divided into low (+0.5 to +1.75), moderate (+2.0 to +5.0) and high (> +5.0). Proportions were compared using the chi-square test and P values of less than 0.05 were considered statistically significant.

Results

Table- 1: proportion of refractive errors among young adults attending private eye clinic.

Age group (Years)	Myopia		Hyperopia		Astigmatism		Emmetropia		Total n (%)
	Male n (%)	Female n (%)	Male n (%)	Female n (%)	Male n (%)	Female n (%)	Male n (%)	Female n (%)	
21-30	285 (9.2)	343 (11.1)	101 (3.3)	131 (4.2)	101 (3.3)	126 (4.1)	187 (6.1)	206 (6.7)	1480 (48.0)
31-40	310 (10.0)	221 (7.2)	144 (4.7)	98 (3.2)	154 (5.0)	148 (4.8)	254 (8.2)	276 (8.9)	1605 (52.0)
Total	595 (19.2)	564 (18.3)	245 (8.0)	229 (7.4)	255 (8.3)	274 (8.9)	441 (14.3)	482 (15.6)	
Grand Total	1159 (37.5)		474 (15.4)		529 (17.2)		923 (29.9)		3085 (100.0)
	2162 (70.1)						923 (29.9)		
Chi-square, df & p value	$\chi^2 = 19.459$, df = 1, p < 0.001*		$\chi^2 = 12.097$, df = 1, p < 0.001*		$\chi^2 = 2.193$, df = 1, p > 0.05 (NS)		$\chi^2 = 0.011$, df = 1, p < 0.05 (NS)		

Table 1 shows that Out of 3085 patients, 2162 (70.1%) had refractive errors, 1095 (50.6%) males and 1067 (49.4%) females. Most of the patients (37.5%) had Myopia, followed by Astigmatism (17.2%) and Hyperopia (15.4%). This is evident from the table that proportion of myopic females (11.1%) and hyperopic females (4.2%) is higher in age group of 21 – 30 years as compared to males (myopia 9.2% & hyperopia 3.3%). While in age group of 31 – 40 years it is vice-versa. This is statistically highly significant (p < 0.001). Astigmatism is slightly more common in females, but it is not statistically significant.

Table- 2: Myopia-age, gender and grade distribution (n=1159)

Age group (Years)	MYOPIA						Total n (%)
	Low (-0.5 To -1.75)		Moderate (-2.0 To -5.0)		High (< -5.0)		
	Male n (%)	Female n (%)	Male n (%)	Female n (%)	Male n (%)	Female n (%)	
21-30	239 (20.6)	260 (22.4)	35 (3.0)	58 (5.0)	11 (1.0)	25 (2.2)	628 (54.2)
31-40	160 (13.8)	125 (10.8)	134 (11.6)	83 (7.2)	16 (1.3)	13 (1.1)	531 (45.8)
Total	399 (34.4)	385 (35.2)	169 (14.6)	141 (12.2)	27 (2.3)	38 (3.3)	1159 (100.0)
Grand Total	784 (69.6)		310 (26.8)		65 (5.6)		
Chi-square, df & p value	X ² = 4.609, df = 1, p < 0.05*		X ² = 14.313, df = 1, p < 0.01**		X ² = 3.058, df = 1, p > 0.05 (NS)		

Table 2 shows that out of the total (1159) myopia cases, maximum cases are of Low Myopia 784 (69.6%), followed by Moderate Myopia 310(26.8%) and High Myopia 65(5.6%).

Table- 3: Hyperopia - age, Gender and grade distribution (n=474)

Age group (Years)	HYPEROPIA						Total n (%)
	Low (+0.5 To +1.75)		Moderate (+2.0 To +5.0)		High (> +5.0)		
	Male n (%)	Female n (%)	Male n (%)	Female n (%)	Male n (%)	Female n (%)	
21-30	87 (18.4)	107 (22.6)	8 (1.7)	14 (3.0)	6 (1.3)	10 (2.1)	232 (48.9)
31-40	123 (25.9)	79 (16.7)	14 (3.0)	10 (2.1)	7 (1.5)	9 (1.9)	242 (51.1)
Total	210 (44.3)	186 (39.2)	22 (4.6)	24 (5.1)	13 (2.7)	19 (4.0)	474 (100.0)
Grand Total	396 (83.5)		46 (9.7)		32 (6.7)		
Chi-square, df & p value	X ² = 9.595, df = 1, p < 0.01**		X ² = 1.427, df = 1, p < 0.01*		X ² = 0.000, df = 1, p > 0.05 (NS)		

Table 3 shows that out of the total (474) hyperopia cases, maximum cases are of Low hyperopia 396 (83.5%), followed by Moderate hyperopia 46(9.7%) and High hyperopia 32(6.7%). From table 2 and 3 it is evident that low to moderate grade myopia and hyperopia is more common in females of 21-30 age group than males, but in 31-40 age group it is exactly opposite, which is highly significant (p < 0.01).

Discussion

There is increasing trend of refractive errors in India.^[1,4] In this study we found 70.1% of patients with refractive errors. Proportion of Myopia is higher (37.5%), followed by Astigmatism (17.2%) and Hyperopia (15.4%), which is similar to the findings reported in other studies.^[5,12,13,17] Higher prevalence of myopia was reported worldwide, which was in between 20-48%.^[5,12,13,17] Gender wise, there is no statistically significant difference in having refractive errors, but when controlled for age, (21-30 age group) refractive errors are more common in females (19.4%) than males (15.8%) and in 31-40 age group it is vice-versa. Myopia and hyperopia of low to moderate grade and also astigmatism is more common in females of 21-30 age group than males, but in 31-40 age group it is exactly opposite. Constant near work and use of computers is unavoidable, particularly in (21-30 age group) young adults, which may be a cause for early onset of myopia.^[3,11,16] In high myopia and high hyperopia there is no significant relation either age wise or gender wise (p > 0.05).

Conclusions

Myopia is the most common refractive error followed by astigmatism and hyperopia. Myopia and hyperopia of low to moderate grade is more common in females of 21-30 age group than males, but in 31-40 age group it is exactly opposite. Excessive near work may be a cause for early appearance of myopia in young generation. Graduate, post graduate college students and young adults in business or service should be examined regularly for vision and refractive errors.

REFERENCE

[1] Arlappa N. (Dr) Epidemiological Overview of Preventable Blindness in India. Vision 2020 India. | [2] Choo V (2003) A look at slowing progression of myopia. Lancet 361:1622-1623. doi:10.1016/S0140-6736(03)13315-6. PubMed: 12747886. | [3] Ip JM, Saw SM, Rose KA, et al. Role of near work in myopia: findings in a sample of Australian school children. Invest Ophthalmol Vis Sci. 2008;49(7):2903-2910. | [4] Kulkarni S.(2013), Prevalence of Avoidable blindness. IJAR : vol. 3,issue 5:487-488. | [5] Krishnaiah S, Srinivas M, Khanna R, Rao G, (2009), Prevalence and risk factors for refractive errors in the South Indian adult population: The Andhra Pradesh Eye disease study, Clin Ophthalmol, 3:17-27. | [6] Katz B, Spencer WH (1993) Hyperopia as a risk factor for nonarteritic anterior ischemic optic neuropathy. Am J Ophthalmol 116: 754-758. PubMed: 8250080. | [7] Lim MC, Gazzard G, Sim EL, Tong L, Saw SM (2009) Direct costs of myopia in Singapore. Eye (Lond) 23: 1086-1089. doi:10.1038/eye. 2008.225. PubMed: 18670466. | [8] Leske MC, Chylack LT Jr, Wu S-Y (1991) The lens opacities casecontrol | study: risk factors for cataract. Arch Ophthalmol 109: 244-251. PubMed: 1993036. | [9] Lee DA, Brubaker RF, Ilstrup DM (1984) Anterior chamber dimensions in patients with narrow angles and angle-closure glaucoma. Arch Ophthalmol 102: 46-50. | [10] Morgan IG, Ohno-Matsui K, Saw SM (2012) Myopia. Lancet 379:1739-1748. doi:10.1016/S0140-6736(12)60272-4. PubMed: 22559900. | [11] Mutti DO, Mitchell GL, Parental myopia, near work, school achievement, and children's refractive error. Invest Ophthalmol Vis Sci. 2002;43(12):3633-3640. | [12] Midelfart A, Kinge B; prevalence of refractive errors in Norway, Acta Ophthalmol. Scand. 2002; 80: 501-505. | [13] Marwaha K., Sing K., Kaur B., Refractive Errors among Collegiate Students. Indian Journal of Bioinformatics and Biotechnology, Vol. 2, issue. 5, May 2013: 82-87. | [14] Pan CW, Ramamurthy D, Saw SM (2012) Worldwide prevalence and risk factors for myopia. Ophthal Physiol Opt 32: 3-16. PubMed: 221505 | [15] Saw SM, Katz J, Schein OD, Chew SJ, Chan TK (1996) Epidemiology of myopia. Epidemiol Rev 18: 175-187. doi:10.1093/oxfordjournals.epirev.a017924. PubMed: 9021311. | [16] Saw SM, Chua WH, Hong CY, et al. Nearwork in early-onset myopia. Invest Ophthalmol Vis Sci. 2002;43(2):332-339. | [17] Saw S., Gus G., David K., Mohamad F., Refractive error in Indonesia, IOVS, Oct 2002, vol. 43, no. 10:3174-80. | [18] Smith, A. and Smith, J. (1996): The economic burden of global blindness: A price | Too high! Br.J.Ophthalmol, 80(4):276-7. | [19] WHO press release. Sight test and glasses could dramatically improve the lives of 150 | Million people with poor vision. Geneva. October11,2006. |