A cross sectional study on refractive errors among adolescentsvisiting medical college, Jhansi, UttarPradesh.

A K Malhotra[1], Nitin Tiwari[2], Naveen Sirohi[3]

[1] Head and Professor Department ofCommunity Medicine, MLBMC, Jhansi, India
[2]Post Graduate, Department of Community Medicine, MLBMC, Jhansi, India
[3]Post Graduate, Department of Ophthalmology, MLBMC, Jhansi, India

Abstract: Blindness is one of the most significant social problems in India with uncorrected refractive errors as the second major cause of blindness and low vision. Refractive Error is an avoidable cause of visual impairment among adolescents. Its early diagnosis and treatment is the simple and most effective forms of eye care.
Aims & Objective: To assess the prevalence of uncorrected refractive errors, among adolescents visiting Eye OPD, Medical College Jhansi (U.P.) and to find out association between refractive errors and its determinants.
Material and Methods: A cross sectional study was conducted among 270 adolescents attending Eye OPD from 01 June to 31 July 2015 in medical college Jhansi (U.P.). A pre-tested questionnaire consisting of socio-demographic variables and determinants of refractive errors was administered on sampled population. Snellen's chart was used for screening and refractions of respondents. Data were collected and analyzed by using frequency tables and Epi-info software.
Results: The prevalence of uncorrected refractive errors was found to be 52.22%. Most of the respondents presented with myopia 75(53.19%) followed by astigmatism 41(29.08%) and hypermertropia 25(17.73%).The prevalence of Myopia, Hypermetropia and Astigmatism was 53.19%, 17.73% and 29.08% respectively. The refractive errors were more common in girls which was 72(59.50%) as compared to boys 69(46.30%). Gender and family history of refractive errors was found to be significantly associated with the Refractive Errors among study population.
Conclusion: The prevalence of uncorrected refractive error was higher among adolescents. Causes of higher prevalence and barriers to refractive error correction services should be identified and addressed.
Keywords: Refractive errors, Adolescent, Myopia, Hypermetropia, Astigmatism

I. Introduction

Community ophthalmology has developed as an important branch of community medicine since last few decades. It mainly emphasize on the prevention of ocular diseases and visual impairment, reduction of ocular disability and promotion of ocular health in peoples at community level.[1]

'Vision 2020': the Right for Sight has one of its aims to eliminate visual impairment (visual acuity less than 6/18) and blindness due to refractive errors or other causes of low vision. It is estimated that there are 35 million people in the world who require low vision care and 8 million (18%) are blind due to refractive errors [2]. Blindness is one of the most significant social problems in India with uncorrected refractive errors as the second major cause of blindness and low vision accounting about 19.7% of total.[3]

According to WHO Blindness refers as ''Visual acuity of less than 3/60 (Snellen) or its equivalent'' or ''Inability to count fingers in day light at distance of 3 meters''. In India adolescent comprises around 243 million which is about 23-25% of total population of the country [4]. In adolescents eye care is an alarming health issue to meet the challenges of the academic performances and competitions in future. Use of electronic gadgets like TV, Video games, mobiles, tablets and computers further worsen this situation. Most of them with uncorrected refractive errors are asymptomatic and hence screening helps in early detection and timely interventions to prevent permanent disability.[5]. Hence, there is a need to quantify the uncorrected refractive errors, among adolescents (10-19yrs) for early detection and proper and timely interventions. With these perspectives, we conducted the present study with the following objectives:

1.) To assess the prevalence of uncorrected refractive errors and its determinants taking into account.
2.) To find out association between refractive errors and its determinants.

II. Material And Methods

The study was conducted at M. L. B. Medical College, Jhansi (UP) during period of 01 June 2015-31 July 2015. The study population comprised of 270 adolescents, 10 -19 years age group visiting to Eye Out-patient department and screened for refractive errors. The minimum sample size calculated using formula n= $4pq/l^2$, where prevalence of uncorrected refractive errors as the second major cause of blindness and low vision

accounting about 19.7% of total was taken(5). Sample size was estimated to be 256, to give an allowance for refusal rate, 270 participants, on safer side studied by using simple random sampling.

The verbal consent to conduct this study was obtained from the concerned departments and respondents. Those not giving consent and presenting with organic defects in eye such as corneal opacity, opacity of the lens, choroid and retinal disorders were excluded from the study.

Respondents were examined by ophthalmologist present in the OPD. The screening was done from a six meters distance, on Snellen's chart. Those with visual acuity less than 6/9 were subjected for refraction test. Objective refraction was performed with retinoscopy which was followed by subjective refraction performed by achieving best corrected visual acuity (BCVA), while cycloplegic refraction was advised when best corrected visual acuity could not be achieved.

Myopia was considered when the measured refraction was more than or equal to −0.5 spherical equivalent diopters in one or both eyes. Hypermetropia was considered when the measured objective refraction was greater than or equal to +1.00 spherical equivalent diopters in one or both eyes. Astigmatism was considered to be visually significant if ≥1.00 D.

After diagnosed with refractive errors, respondents were interviewed by using a pre-designed, pre-tested questionnaire consisting of socio-demographic variables and determinants of refractive errors.

III.   Results And Discussion

The study population comprised of 270 adolescents, 10 -19 years age group visiting to Eye out-patient department, Medical College, Jhansi (UP). Out of total 270 adolescents examined 149 (55.18%) were boys and rest 121(44.82%) girls. The mean age of the study group was found 14.5 years. 141 adolescents diagnosed with refractive errors in which 72(51.06%) were girls and 69(48.94%) were boys(Fig.1).

The prevalence of uncorrected refractive errors was found to be 52.22%. Most of the respondents presented with myopia 75(53.19%) followed by astigmatism 41(29.08%) and hypermertropia 25(17.73%)(Fig.2). Both myopia 40(53.33%) and hypermetropia 15(60.00%) was found more in girls as compared to boys while astigmatism was more common in boys 24(58.52%) (Table1).

Table 2 shows that 77(52.02%) respondents with refractive errors were found in age group 15-19 years and more than age group 10-14years. It was found that refractive errors were more common in girls which was 72(59.50%) as compared to boys 69(46.30%). 74(49.34%) respondents with refractive errors were residing in urban area in compared to 67(55.83%) of rural area. Family history of refractive errors was present in 65(46.43%) while 76(58.46%) respondents with refractive errors had no family history. Gender and family history of refractive errors was found to be significantly associated with the Refractive Errors among study population.(Table.2).

In our study the prevalence of refractive errors was quite high at 52.22%. The overall incidence in India has been reported to vary between 21% and 25% in patients attending eye outpatient departments [6]. Almost Similar prevalence of 54.62% has been seen in adolescents of 12-18 years in Kashmir study and Ahmedabad study [7, 8]. A prevalence of refractive errors seen in children of age group 3-18years in a study of south India was 32%.[9]. The overall prevalence of refractive errors according to Mattha et al study was found to be 12.5% [10]. Datta et al report low prevalence of refractive errors of 2% from Eastern India among primary school children 5-13 years, which could not be explained. The prevalence of refractive error in Pavithra et al. study was 7.03% similar to the prevalence observed by Murthy et al. in New Delhi and Kumar et al. in Lucknow [12, 14, 15]. High rate of refractive errors in our study population can be attributed to racial or ethnic variations or different lifestyles or living conditions like watching TV for long hours, or using computers and mobiles as most of our adolescents are confined to indoors.

A prevalence of Myopia, Hypermetropia and Astigmatism in our study was found in 53.19%, 29.08% and 17.73% while Matta et al.study showed that myopia in 55.6%, hypermetropia in 16.9% and astigmatism in 27.4 % with refractive errors.[10]. Pavithra et al. study also showed that myopia was the most common type which constitutes 62.9% of the refractive errors while hypermetropia and astigmatism was seen in 14.4% and 22.7% respectively.[12]. Padhye et al study showed different findings that prevalence of myopia, hypermetropia and astigmatism in urban children was 3.16%, 1.06% and 0.16% respectively.[13]

In our study refractive errors were more common in girls than boys and this difference was statistically significant (p=0.03) which is similar to south India study and Singapore study.[9, 11]. Pavithra et al. study showed refractive errors was more prevalent in the female children compared to male children and this difference was statistically significant while not found significant in Kashmir study and Ahmedabad study [7,8,12]. Refractive errors were more common among males as compared to females in Mattha et al study [10]. In these studies the differences were related to the possible differences in the rate of growth between girls and boys.In our study refractive errors were more in age group 15-19 years than 10-14years which is similar to Matta et al. study and Sethi study finding that refractive errors increased with increasing age while in Kashmir study 17-18 year age group presented with more refractive errors.[7,8,10]. The Pavithra et al. study showed that

the prevalence of refractive errors were found more in the 13- 15 year age group compared to 7-9 years age group which was similar to the results of a study conducted in Ahmedabad city where the prevalence of refractive errors was highest in 17 years old students compared to 11 year old children.[8,12].

In our study, refractive errors were more in urban 49.34% than rural respondents similar to Pavithra et al. study and VivekTrivedi et al. study.[12,16] which is similar to Khan et al. study and Padhye et al study which reported higher prevalence among the children in the urban area as compared to rural India.[13,17]

Family history of parents or siblings wearing spectacles and refractive errors were significant (p=0.04) in the study which is similar to the Pavithra et al. study that showed the association was highly significant.[12] In our study refractive errors were more in adolescents with improper posture which is similar to the finding of Matta et al. study in which posture of 61.2% adolescents was found to be incorrect.[10].
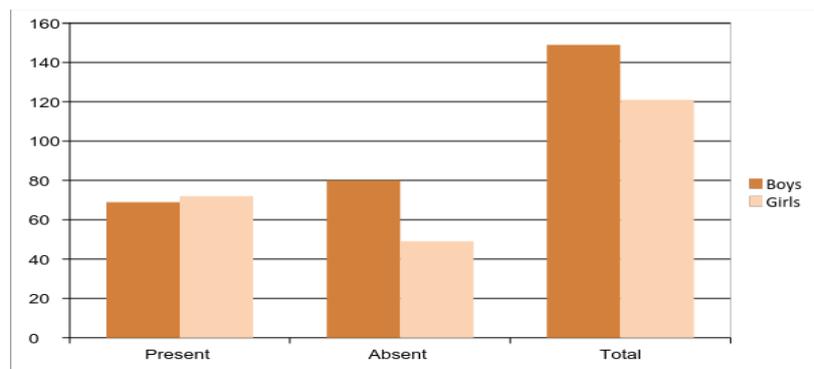
IV.   Figures And Tables

Figure 1: Gender-wise distribution of refractive errors in studied population
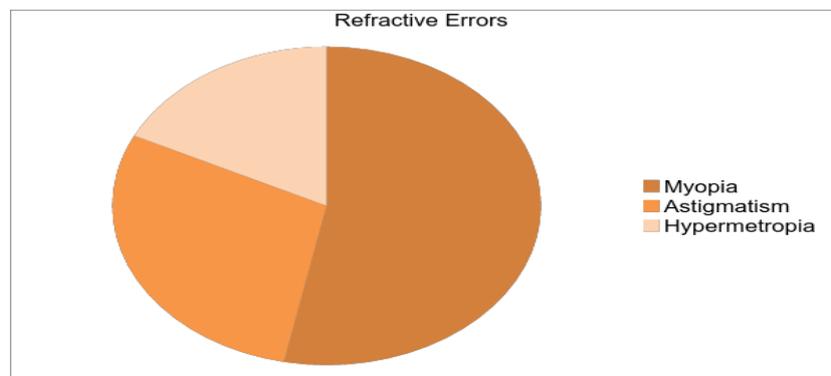

Figure 2: Prevalence of type of refractive errors among studied population

Table 1: Type of refractive errors and their gender-wise distribution among studied population

Type of Errors	No, of adolescent with refractive errors (N=141)	%	Boys	Girls
Myopia	75	53.19	35(46.67)	40(53.33)
Hypermetropia	25	17.73	10(40.00)	15(60.00)
Astigmatism	41	29.08	24(58.54)	17(41.44)

Table2. Association of socio-demographic variables with refractive errors among study population

Socio-demographic variables		Refractive errors		Chi-square value	df	P value
		Present	Absent			
Age	Early(10-14yrs)	64(52.45%)	58(47.55%)	0.005	1	0.94
	Late(15-19yrs)	77(52.02%)	71(47.98%)			
Gender	Boys	69(46.30%)	80(53.70%)	4.66	1	0.03*
	Girls	72(59.50%)	49(40.50%)			
Locality	Urban	74(49.34%)	76(50.66%)	1.129	1	0.28
	Rural	67(55.83%)	53(44.16%)			
Family History	Present	65(46.43%)	75(53.57%)	3.912	1	0.04*
	Absent	76(58.46%)	54(41.54%)			

Posture	Proper	61(46.92%)	69(53.08%)	2.822	1	0.09
	Improper	80(56.40%)	60(43.60%)			

* P value <0.05 i.e. statistical significant

V.   Conclusion

The study reveals that the adolescent age group has high prevalence of refractive errors thereby needs eye care including early diagnosis and timely interventions to prevent permanent disabilities and promotion of ocular health at community level. The Provision of affordable corrective services should follow screening of this age group (10-19 yrs.). More studies to determine the extent of the problem, manpower and resources are needed to solve the problem ofrefractive errors and to achieve the goal of Vision 2020.

Acknowledgement

References

[1].   A.K. Khurana, comprehensive ophthalmology 6th edition (New Delhi, Jaypee Brothers Medical Publisher, 2015).
[2].   Strategic plan for Vision 2020, The Right to Sight, WHO Report, SEA-Opthal, 177, 2000.
[3].   K. Park, park's textbook of preventive and social medicine 23rd edition,(Jabalpur, M/s BanarsidasBhanot, 2015).
[4].   World Health Organization. global initiative for the elimination of avoidable blindness. programme for the prevention of blindness and deafness, Geneva, WHO, 1997
[5].   L.L.K. Un, F. Shih, CK Hsiao, CJ Chen. Prevalence of myopia in Taiwanese school children, 1983 to 2000. Ann Acad Med.2004,33,3-33.
[6].   Govt. of India, National survey on Blindness,1999-2001, Report 2002.
[7].   J. Rohul, A. Maqbool, SA Hussain et al., Prevalance of refractive errors in adolescents in out-patient attendees of preventive ophthalmology clinic S K I M S Kashmir, NUJHS,3(1), 2013, 17-20.
[8].   S. Sethi, GP Kartha, Prevalence of refractive errors among school children (12-17years) of Ahmedabad city, Ind Journal of Com Med. (25), 2000, 181-83.
[9].   V. Kalikivayi, T.J. Naduvilath, A.K. Bansal, L. Dandona, Visual impairment in school children in Southern India, Indian J Opthalmol, 45, 1997, 129-134.
[10].   S. Matta, P. Matta, V. Gupta et al., Refractive errors among adolescents attending Ophthalmic OPD, IndJounComm Medicine, 31(2), 2005-06
[11].   M.T. Tay, K.G.A. Eong, C.Y. Ng, M.K. Lim, Myopic & educational attainment in 421116 young Singaporean males. Ann Acad Med, Singapore, 21, 1992, 785-91.
[12].   M.B. Pavithra, R. Maheshwaran, M.A. Rani Sujatha, The prevelance or refractive errors among school chidren of 7-15years, in the field practice areas of Medical College, Bangalore International J Medical Science and Public Health, 2, 2013, 641-645.
[13].   AS Padhye, R. Khandekar S. Dharmadhikari et al., Prevalence of uncorrected refractive error and other eye problems among urban and rural school children. Middle East Afr J Ophthalmol 2009.
[14].   G.V. Murthy, S.K. Gupta, L.B. Ellwein et al., Refractive error in children in an urban population in New Delhi, Invest Ophthalmol Vis Sci, 43, 2002, 623–631.
[15].   J.V. Kumar, P.C. Singh, J. Ahuja et al., Ocular morbidity among school children in Sarojini Nagar Lucknow, Indian J Community Med, 17, 1992, 109-113.
[16].   T. Vivek, Z. Sandip, V. Janardhan, P. Tapasi, Prevalence of refractive errors in children aged 7-15 years in Gujarat, India.
[17].   A.A. Khan, A.R. Nasti, M.A. Dar, S.A. Lone. Prevalence of refractive error in school children. JK-Practitioner, 12(3), 2005, 156-159.