International Journal of Research in Medical Sciences
Sharma P et al. Int J Res Med Sci. 2023 Jan;11(1):261-265
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20223648

Original Research Article

Prevalence of refractive error in children- hospital based study in Lucknow

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Received: 16 November 2022
Accepted: 10 December 2022

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ABSTRACT

Background: Refractive error is defined as a status of refraction. They happen when the shape of your eye keeps light from focusing correctly on your retina (a light-sensitive layer of tissue in the back of your eye). Refractive errors are the most common type of vision problem but many don't know that they could be seeing well.
Methods: This study was a cross sectional hospital-based study of 197 children carried out in ophthalmology department of Era Medical College, Lucknow. The study of population comprised of all the children in 5-20 years' (78 male 119 female) age group in the rural area. In this study compressive examination prevalence of myopia and hypermetropia. The assess refractive error among study with 'hine retinoscopy'. Myopia considered grater or equal -0.50 and hyperopia is grater and equal +0.50.
Results: The crossed section hospital-based study 197 children examined 78 male and 119 female. The uncorrected ametropia in children was 82.2%. The highly prevalence of myopia 46%, hypermetropia 5%, astigmatism 31%. The most highly significant refractive error 16-20 year of age.
Conclusions: The prevalence of ametropia is fined among children in hospital visit. Need for regular routine cheek up proper ophthalmic assessment examination of eye and full proper diet and distance with digital gadget.

Keywords: Ametropia, Myopia, Hypermetropia, Astigmatism

INTRODUCTION

Eyes are one of the most important senses of organ. They contribute greatly to one's learning capacities right from childhood. Most of the ocular diseases have their origin in childhood and the morbidity might be unnoticed and cause severe drawbacks on child's performance in school and it may also lead to severe ocular problems in the later part of life. Poor vision impairs the performance of a child in school or at workplace and has a negative impact on the future of a child. Ametropia is defined as a status of refraction, when the parallel rays of light coming from infinity are focused in front or behind the sensory layer of eye (retina) when the accommodation is at rest.[1] It is very common ocular complaint where eye cannot clearly focus the images of the object the common type of refractive errors is Hyperopia, Myopia and Astigmatism. In myopia light is focused to a point anterior to the retina as a result of excessive refraction at the cornea or the lens, or, more commonly, an increased length of the eye ('axial myopia').[2] In hypermetropia, the reverse occurs with an image forming posterior to the retinal plane as a result of either in adequate refraction or a short axial lengt.[3] The World Health Organization estimates that 13 million children aged 5–15 years worldwide are visually impaired from uncorrected refractive error.[4] Global action plan 2014-2019 with an aim to reduce prevalence of avoidable visual impairment by 25% by 2019 compared to the baseline prevalence at 2010. In developing countries,

refractive error has a substantial impact, perhaps resulting in decreased economic production.[5] 80% of the global visual impairment burden is preventable and more than 90% of the visually impaired people live in developing countries.[6] To address the issue of visual impairment in children, the WHO recently launched a global initiative, "VISION 2020-the right to sight." So, in order to provide an early detection and initiate early treatment a professional based screening program for all school-aged children is recommended. Refractive error easily managed by spectacle at primary care level.[7] Childhood visual impairment due to refractive errors is one of the most common problems among school-age children, and is the second leading cause for treatable blindness.[8] The aim of this study was evaluating the refractive error in school going children in Lucknow.

METHODS

Present study was a cross sectional hospital-based study carried out in ophthalmology department of Era Medical College, Lucknow. The study of population comprised of all the children in 5-20 years' age group in the rural area. The distant vision of a child was screened with Snellen's chart. The visual acuity was screened with the chart at 6 meters. Any improvement of visual acuity with pinhole was noted. Visual acuity was also tested with glasses if children were using them. Objective refraction was performed with hine retinoscope which was followed by subjective refraction till the best corrected visual acuity was achieved.

Inclusion criteria

Age group 5-20 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 +0.50 spherical equivalent diopters in one or both eyes. Astigmatism was considered to be visually significant if ≥1.00. The visual acuity, types of refractive error and correction was noted down.

Statistical analyses were performed using statistical package for social sciences (SPSS) IBM Corp. released 2022. IBM SPSS Statistics for Windows, version 29.0. Armonk, NY: IBM Corp. analysis was tested with two-sided hypothesis testing and significance was considered at a p value <0.05. Normal distribution of the results was tested using the Kolmogorov–Smirov test and homogeneity of modification was examined using Levene's test categorical data was represented in Frequency form and continuous data was presented as the mean±SD or median (IQR).

Exclusion criteria

Age group more than 20 year and less than 5-year refractive error not considered when the measured refraction was less than −0.5 spherical equivalent diopters in eyes. Hypermetropia was not considered when the measured objective refraction was less than +0.75 spherical equivalent diopters in eyes. Astigmatism was not considered to be visually significant if <1.00. The visual acuity, types of refractive error and correction was noted down. More than age other ocular problems like cataract, conjunctivitis, sclerosis was not considered.

RESULTS

The study population comprised 197 children, hospital-based studies were screened from in Lucknow. Prevalence of refractive error children emmetropia 10 (5.1%) and ametropia 162 (82.2%), and ocular pathology 25 (12.7%) (Table 1).

Table 1: Prevalence of refractive error.

Dignosis	Frequency	Percent
Emmetropia	10	5.1
Ametropia	162	82.2
Ocular pathology	25	12.7
Total	197	100.0

This study among 162 children hospital-based studies ware female 119 (60.4%) and male 78 (39.6%) in refractive error (Figure 1).

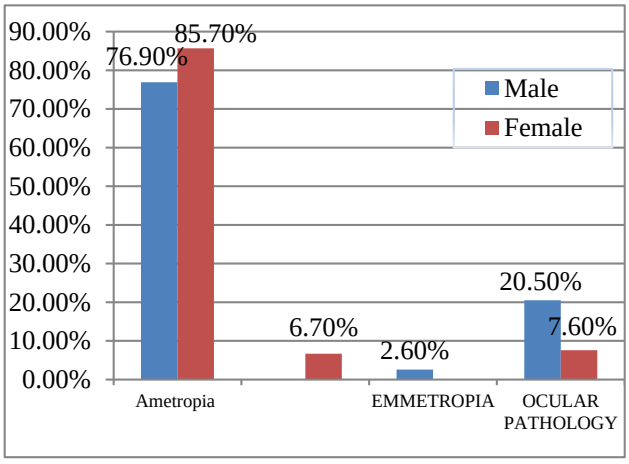

Figure 1: Gender according refractive error, emmetropia and ocular pathology.

Emmetropia more male 18 (23.1%) than female 17 (14.3%) refractive error was more common female 102 (85.7%) than male 60 (76.92%). Myopia was more common in female 55 (46.2%) than male 35 (44.9%). Hypermetropia was more common female 8 (6.7%) than 2 (2.6%) astigmatism was common more female 39 (32.8%) than male 23 (29.5%) (Figure 2).

Highly prevalent in the age group of 16–20 years with 86.6% (n=71) among 82 children, followed by 79.3% (n=69) in the age group 11–15 years in a total of 87 children. However, the age group between 5-10 years had

comparatively less prevalent refractive errors with 78.6% (n=22) among 28 students (Table 2).

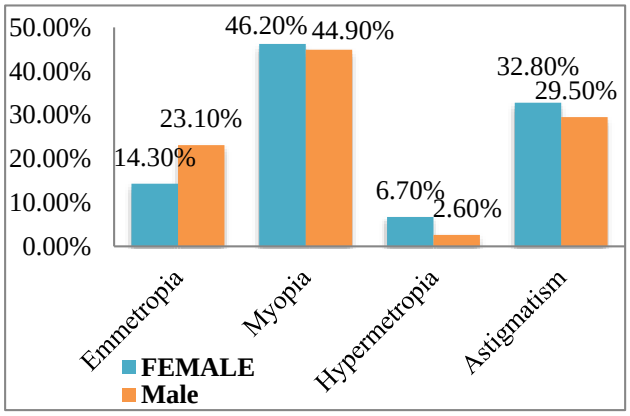

Figure 2: Gender distribution of refractive error.

We also observed that increasing age was associated with an increased risk. From a total of 197 children community-based study were screened from in rural Lucknow, the prevalence of refractive errors was 82.2% (n=162) among which myopia was the most common types of refractive error with 45.7% (n=90), followed by 31.5% of astigmatism (n=62), and the remaining 5.1% (n=10) with hyperopia, and emmetropia 17.8% (n=35) (Figure 3).

Children with other ocular problems (14%) were referred to department of ophthalmology in Era Medical College Lucknow (Figure 5).

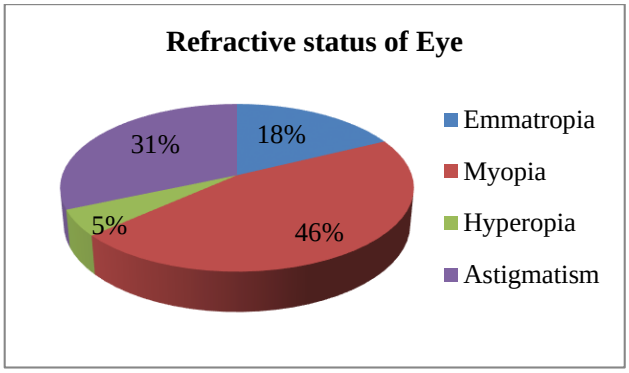

Figure 3: Refractive status of eye.

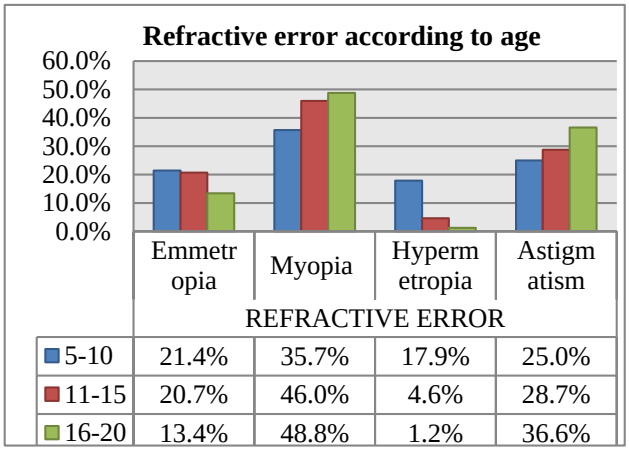

Figure 4: Refractive status with age.

Table 2: Age distribution with ammetropia.

Age	Emmetropia (%)	Ammetropia (%)	Total (%)	P value
5-10	6 (21.4)	22 (78.6)	28 (100.0)	0.425
11-15	18 (20.7)	69 (79.3)	87 (100.0)	
16-20	11 (13.4)	71 (86.6)	82 (100.0)	
Total	35 (17.8)	162 (82.2)	197 (100.0)	

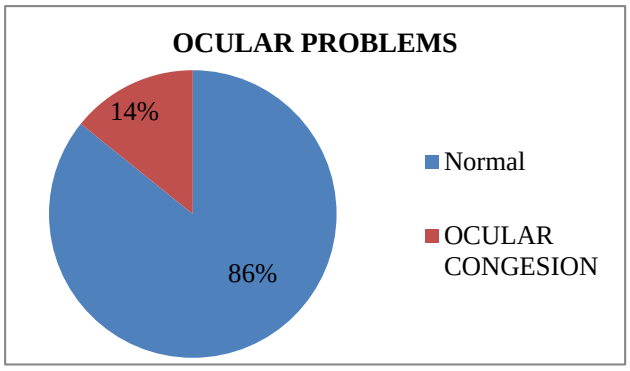

Figure 5: Ocular problems.

DISCUSSION

Primary care physicians and health workers can help in spreading awareness about the need for proper correction of refractive errors and evaluation of eye ailments in the hospital based. Even eye evaluation by trained optometrist and ophthalmologist and is also an effective way for early detection of refractive errors.[9]

As the standard of living is increasing, people are becoming more aware of the health concerns in their day to day living still for many reasons patients would suffer in silence with uncorrected refractive errors fearing 'social stigma' of wearing glasses or enmeshed in 'unfounded belief' that eyeglasses damage eyes as reported across societies.[10,11] Most of the studies done so far to analyze the pattern of ammetropia in children in this study we discovered that was responsible for 162 (82.23%) among 197 children. The number of female patients with refractive error is more than males across different studies. In our study also similar trend found most common eye condition investigation this accounted for 45.7% myopia cases. The proportion of hyperopia in our study was 5.1%.

It increased till 10 year and then decreased with increasing age. Similar trend has been found in some population-based studies.[12-14] The proportion of astigmatism in our study was 31.5%, which is lower than other studies. ATR astigmatism was the most common type followed by oblique and WTR astigmatisms. It is many population-based studies, against-the-rule (ATR) astigmatism has been found to be the most common type of astigmatism.[15,16]

Some other ocular cases like ocular pathology, were also diagnosed by the ophthalmologist (n=25) 12.7% available data. We also observed that the children 16-20 year of children had highly refractive errors.

Communicating visual prognosis by primary health care practitioners would help to increase knowledge and compliance among patients because needless to say, health promotion and communication is a key public health strategy.[17-20] These findings emphasize the crucial role of ophthalmologists and optometrists in bringing the general ocular health information to the public attention. After the questions being asked participants were happy to know about the new knowledge regarding the health care. Getting participants informed about available services could enhance positive attitude to such services.[21] Strategies such as vision screening and eye health promotion programmers need to be implemented, the quality of refractive services should be monitored and the cost of spectacles be regulated if the substantial burden of visual impairment due to refractive error in this is to be reduced.

CONCLUSION

A high prevalence of ametropia is fined among children in hospital visit. Myopia was the most common types of ametropia with increasing age and excessive use of electronic digital gadget like smart phone, laptop, close watching television and increasing duration of age period was found accuracy of ametropia associated with family history.

ACKNOWLEDGEMENTS

Authors would like to thank entire optometry department of Era University. They would also like to thank the students and patients for their support and co-operation.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Sharma P, Ali J, Kumari R, Akhtar R, Gupta S, Sharma A. Prevalence of refractive error in children- hospital based study in Lucknow. Int J Res Med Sci 2023;11:261-5.