Section: Miscellaneous

Original Research Article

PREVALENCE AND DISTRIBUTION OF REFRACTORY ERRORS IN CHILDREN VISITING THE OUTPATIENT DEPARTMENT IN A TERTIARY CARE TEACHING HOSPITAL

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Received : 02/09/2022
Received in revised form : 05/10/2022
Accepted : 21/10/2022

Keywords:
Refractory Error, Myopia, Hypermetropia, Emetropia, Ametropia, Astigmatism.

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DOI: 10.47009/jamp.2023.5.2.130

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2023; 5 (2); 619-621

Abstract

Background: Refraction is required to know the status of refractive error. These occur when eye's shape prevents light from properly concentrating on retina (a light-sensitive layer of tissue in the back of the eye). The most frequent form of vision problem is a refractive error, although many people are unaware that they may not be seeing properly. In order to properly organize the delivery of pediatric eye care at the center, the goal of our study was to determine the distribution and patterns of visual defects in children. **Materials and Methods:** The present study was done in Dr. SS Tantia Medical College, hospital and research center on pediatric patients visiting OPDs in department of Pediatrics and Ophthalmology during the study period which ranged from February 2022 to August 2022. Data were collected, master chart prepared in Microsoft Excel, then analyzed with SPSS (Statistical Package for Social Sciences) and Microsoft Excel. **Result:** Overall altered vision was found in majority 60 % of the study participants. Excluding the ocular pathologies almost half of the study participants reported refractory errors. **Conclusion:** The study highlights the importance of screening of children for refractory errors at early stages of development and various risk factors that increase the development of refractory errors in children.

INTRODUCTION

Global productivity losses due to vision impairment are expected to cost US$411 billion annually, placing a huge financial burden on the whole world. Uncorrected refractive errors and cataracts are the main causes of reduced vision and blindness. The bulk of those who are blind or have visual problems are over 50, however vision loss can afflict anyone at any age. At least 2.2 billion individuals worldwide suffer from a near- or distant vision impairment. About half of these instances, or at least 1 billion, involved visual damage that either might have been avoided or is still unaddressed.[1]

Myopia, a disease that affects many people, causes near objects to seem distinct while far distant ones to appear fuzzy. It happens when light rays incorrectly bend (refract) due to the shape of the eye or specific portions of the eye. The retina is the area on the rear of the eye where light should be directed, however it is actually focused in front of the retina. Between the ages of 20 and 40, nearsightedness often becomes more stable after developing during infancy and adolescence. As a rule, myopia runs in families.[2]

When light from close objects is not nearly brought into focus in time to reach the retina, hypermetropia (far-sightedness) results. If the light could go so far, the point of focus would really be behind the retina. In a process known as accommodation, the lens makes a valiant effort to alter its thickness in an effort to concentrate the light on the retina.[3]

Astigmatism is produced by a cornea or lens that has a different shape than normal. Astigmatism is fairly prevalent. Physicians don't know why the shape of the cornea or lens differs from person to person. But scientists do know the risk of acquiring astigmatism is hereditary (passed down from parents).[4]

MATERIALS AND METHODS

A cross-sectional study was conducted on children in the age group of 5-18 years. The participants comprised of the patients visiting the outpatient department in the departments of Ophthalmology and pediatrics. The Snellen's chart was used to screen the

ISSN (O): 2687-5365; ISSN (P): 2753-6556

participants who could read, while the Landolt C chart was used to test people who could not read English or were illiterate. All the information required for further investigation was entered in a questionnaire that was created and was pretested. Gender, age, myopia, hypermetropia, astigmatism, glasses use in the family, when the child started wearing glasses, any prior history of eye disease, full-term/preterm birth, birthweight, visual acuity, refraction, and portable correction were among the information gathered. A child's distant vision was evaluated using Snellen's chart. The chart was used at a distance of 6 meters to screen the visual acuity. Any improvement in visual acuity by the pinhole was also documented. When youngsters were wearing glasses, visual acuity was also assessed. To acquire the greatest corrected visual acuity, subjective refraction was carried out first, then objective refraction using a retinoscope. Statistical analysis was performed using MS Excel and SPSS (Version 20.00 IBM). Chi squared test was used to test for association between the categorical variables.

RESULTS

A total of 395 subjects were included in the study. 200 were males and 195 females. Age ranged from 5 to 18 years of age. 161 (40.76%) of the study participants were having a normal vision and no refractory errors were found though apart from them few other ocular pathologies were demonstrated in 42 (10.63%) of study participants. Hypermetropia was diagnosed in 72 (18.23 %) of the study participants while majority 85 (21.52 %) with poor vision where diagnosed to have myopia. Astigmatism was also found in around one tenth of the study participants. [Figure 1]

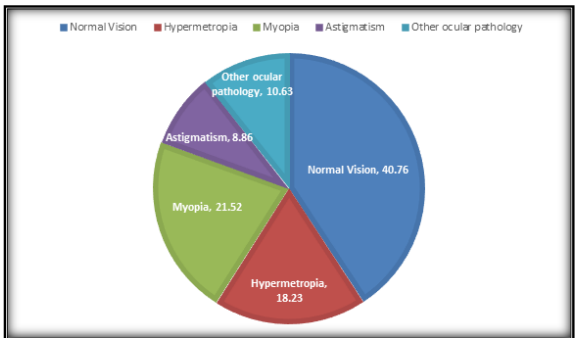

Figure 1: Distribution of study participants having refractory errors.

[Table 1] shows the distribution of refractory error in study participants with various factors that were studied in the present research. Age distribution showed more of the refractory error in older age groups i.e. 15-18 years, almost half of the study participants 47.39 % who had refractory error belonged to this age group. Males were more among the ones who had refractory errors (60.41 %). The association of birth weight was checked but the distribution being even resulted in negative results (p >0.05).

A significant association was established with family history of refractory error (p <0.05). Majority (73.43 %) of the participants belonged with refractory errors belonged to the group having family history. Association of refractory error with gestational age was also found to be statistically significant (p <0.05).

Table 1: Distribution and association of various factors with refractory error in study participants

		Normal Vision (N=161)	Refractory error (N=192)	Chi square	p value
Age group	5-10 years	37 (22.9 %)	37 (19.27 %)	7.728	0.02098
	10-15 years	71 (44.09 %)	64 (33.33 %)		
	15-18 years	53 (32.91 %)	91 (47.39 %)		
Gender	Male	85 (52.7 %)	116 (60.41 %)	2.0747	0.1497
	Female	76 (47.3 %)	76 (39.59 %)		
Birth weight	Normal	128 (79.50 %)	149 (77.6 %)	0.1869	0.665
	Low	33 (20.49 %)	43 (22.39 %)		
Family History of refractory error	Yes	32 (19.87 %)	141 (73.43 %)	100.5292	< .00001
	No	129 (80.12)	51 (26.56 %)		
Gestational Age	Full term	126 (78.2 %)	154 (80.20 %)	13.1262	.001411
	Pre term	21 (13.04 %)	36 (18.75 %)		
	Post term	14 (8.69 %)	2 (1.04 %)		

DISCUSSION

Most of the individuals throughout the world who reside in various locations have vision impairment. There are 285 million blind persons in the globe, according to estimates. 19 million of these people are youngsters under the age of 14. Refractive errors, which are the main source of visual impairment in children, account for about 43% of these visual impairments.[5]

By prescribing the correct glasses to concentrate the picture on the retina, sharp eyesight can be achieved. One of the most common and effective methods of eye care is this procedure. Uncorrected refractive defects can cause visual impairment in children, which can have short- and long-term effects including low academic performance and lost career chances. Moreover, this may lead to reduced quality of life and retarded economic progress for people, families, and society.[6]

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Primary care doctors and other medical professionals can aid in raising awareness of the importance of effective refractive error correction and hospital-based eye disease assessment. Regular eye examinations by qualified optometrists and ophthalmologists are a reliable method for identifying refractive problems early on.[7]

A hospital-based crossed-section study among 197 children conducted in Lucknow city of Uttar Pradesh reported that children, had an ametropia correction rate of 82.2%. the high prevalence of astigmatism (31%), hypermetropia (5%), and myopia (46%). The most serious refractive error occurs in 16 to 20-year-olds.[8]

In a systematic review there were 15 studies included from South India, 1 each from Western and Central India, and 1 research that comprised 15 states in total, shown the prevalence of myopia and hyperopia was 27.7% and 22.9%, respectively, whereas RE of at least 0.50 D of spherical equivalent ametropia was 53.1%. The prevalence of URE was 10.2%, although there was a significant amount of variation in these figures. Presbyopia prevalence was 33%.[9]

Estimates based on gender are crucial for assessing the scope of the problem and guaranteeing equal access to services. Past research has shown that women are more likely than men to get REs and other eye problems.[10]

This study has included few factors that play important role in defining the occurrence of refractory error in children. Many other factors could be assessed and on a larger scale for more accurate predictors of refractory error in order to provide scientific evidence to policy makers in combating health problems in India.

The limitation of the study was that the study had shown the prevalence of refractory errors in children on a higher side probably including patients from ophthalmology and pediatric OPDs. More accurate results might be obtained on inclusion of children from the community on a random basis.

CONCLUSION

The maximum number of cases of refractory error were found in the 15–18-year-old children followed by 10-15 with a major association by chi square test. Risk factors found to be associated significantly in the current study apart from the age group were gestational age and familial history.

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ISSN (O): 2687-5365; ISSN (P): 2753-6556