Prevalence of ametropia in children with sociodemographic status and parental ametropia

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Abstract

Aim: To study prevalence of refractive error with parental ametropia and sociodemographic status.

Introduction: Refractive error is leading cause of visual impairment, which affects children' routine schoolwork and day-to-day activities. Children's proper vision is essential for successful learning in school.

Method: It is a prospective observational study was conducted in 322 patients, who were presented with refractive error in tertiary care centre for period of 18 months. They were included after taking consent from parents. Detail family history is taken to know the sociodemographic status and ametropic history of parents. Auto-refractometry and retinoscopy was performed to know refractive status of eye.

Result: Mean age of presentation was 11.78±2.77 years with 140 (43.5%) of patients belonging between 13 to 16 years of age. The sociodemographic character show that most participant belong to upper- middle socioeconomic status (39.1%) followed by upper (24.2), lower middle (23.9%) and lower socioeconomic status (12.7%) (p-0.0475). It's also stated that prevalence of refractive error in both ametropic parent is 49% followed by single parent 32.6%. (p-0.00001).

Conclusion: The awareness among school teachers and parents should also be done as they play important role in identifying the ocular problems and referring them for timely management. Causes of higher prevalence and barriers to correction services and compliance should be identified

Keyword: ametropia, refractive error, socioeconomic status, parents

Introduction

Ametropia is state of refraction wherein the parallel ray of light coming from infinity are focused either in front or behind the sensitive layer of retina in one or both the meridian [1]. Developing countries accounts to three-fourth of total 1.4 million blind children across globe [2]. Global estimate states that 153 million people over 5 years of age are visually impaired primarily due to uncorrected refractive errors and 8 million amongst are blind [3]. Orinda Longitudinal Study of Myopia (OLSM) showed an association between parental myopia and a child's refractive error and axial length before the onset

of juvenile myopia. Highest prevalence reported in urban and highly developed urban areas in Southeast Asia and in China [4] from this perspective, to evaluate the genetic influence and environmental factor like socioeconomic status and lifestyle on refractive error. It is a great deal of interest whether children with ametropic parents will or will not be ametropic. Thus, we evaluated the prevalence of children ametropia with parental ametropia and sociodemographic Status.

Material and methods

It is a prospective observational study was conducted in 322 patients, who were presented with refractive error in tertiary centre from a period of January 2018 to June 2019 in central India. They were included after fulfilling inclusion criteria and after taking consent from parents. Detail family history (like family income, education of both parents, occupation of parents, housing, water supply) is taken to know the sociodemographic status and ametropic history of parents is asked and autorefractometry of parents is done. To rule out anterior segment pathology, slit lamp examination was carried out and best corrected visual acuity is recorded with help of Snellen chart. Auto-refractometry and retinoscopy was performed under cycloplegic drugs (cyclopentolate/ Tropicamide plus) and along with this fundus examination was done by Direct and Indirect Ophthalmoscope to rule out any posterior segment pathology. Then, post mydriatic test (PMT) was performed and best corrected spectacles were provided. All procedures and investigation were done by the same surgeon.

Statistical analysis

Data was entered into MS excel 2007, analysis was done with the help of SPSS software. Frequency and percentage were calculated & statistical test (Chi Square)

was applied wherever applicable; $P<0.05$ was taken as statically significant.

Result

A total of 322 children of age 5-15 year were included in this study. Mean age of presentation was 11.78 ± 2.77 years with 140 (43.5%) of patients belonging between 13 to 16 years of age. Maximum patients in present study were males 189(58.7%) and rest 133 (41.3%) were females. In 5-8 yrs. age group maximum hypermetropic (60%) patient were observed, in 9-12 yrs. age group max myopic patient (51.5%) were observed. and in 13-16 yrs. age group astigmatic children (51.4%) were observed maximally (p- 0.00001). The sociodemographic character (table-2) which show that most participant belong to upper- middle socioeconomic status (39.1%) followed by upper (24.2), lower middle (23.9%) and lower socioeconomic status (12.7%) (p-0.0475). Among the children from families with both ametropic parents and single parent show myopic children followed by astigmatic and hypermetropic children while children with no family history show hypermetropic followed by myopic then astigmatic. It's also stated that prevalence of refractive error in both ametropic parent is 49% followed by single parent 32.6%. (p-0.00001). This result state that ametropic parents tend to have ametropic children.

Discussion

Diagnosis and treatment of refractive error is simplest and it is one of the easiest ways to reduce burden of visual impairment**.** Our study aimed to observed prevalence of refractive error with parental ametropia and sociodemographic status. This study includes 322 children of 5–15-year age group. Mean age of presentation was 11.78 ± 2.77 years with 140 (43.5%) of patients belonging between 13 to 16 years of age. However, Bhutia etal study show that school children

within the age group of 14–17 years were found to be the highest (9.2%) with refractive error and are comparable with many studies indicating that with increasing age, the disease increases [5]. Maximum patients in present study were males 189(58.7%) and rest 133 (41.3%) were females. In our study 5-8 yrs. age group show maximum hypermetropic (60%) patients, in 9-12 yrs. age group maximum myopic patient (51.5%) were observed. and in 13-16 yrs. age group astigmatic children (51.4%) were observed maximally (p- 0.00001) while Czepita D etal study show positive correlation was found between the prevalence of myopia and age (p < 0.001) and a negative correlation between prevalence of hyperopia and age (p < 0.001) [6].   In Mojsa A etal study show a positive correlation was found between the prevalence of myopia and age (p <0.001) as well as a negative correlation between prevalence of hyperopia and age (p < 0.001). An association between the prevalence of astigmatism and age was not observed. Our study shows that most participant belong to upper- middle socioeconomic status (39.1%) followed by upper (24.2), lower middle (23.9%) and lower socioeconomic status (12.7%) (p-0.0475) [7]. In a study conducted by Dandona et al, it was observed that children in urban areas had 2.5 times higher risk of developing refractive error as compared to children in rural areas [8]. Nisha Dulani etal study show number of children from lower middle socioeconomic status (40.90%) and with a positive family history of refractive errors (59.59%) was higher [9]. Our study state that among the children from families with both ametropic parents and single parent show myopic children followed by astigmatic and hypermetropic children while children with no family history show hypermetropic followed by myopic then astigmatic. Landmann A etal study show that the prevalence of myopia in children with 2 ametropic parents was 54%, decreasing to 35% in pupils with 1 and to 13% in children with no ametropic parents [10].

Conclusion

The study provides useful and baseline data about the refractive errors in children. Many ocular morbidity and diseases have their origin in childhood which may go unnoticed which lead to severe ocular disability in the later part of life. therefore, high prevalence of undetected refractive error in every young child and the importance of early detection and treatment with corrective spectacles which halts the further progression of refractive error is highlighted. The awareness among school teachers and parents should also be done as they play important role in identifying the ocular problems and referring them for timely management. Parents insist that their children should have as many outdoor activities and reduce near work as possible. Causes of higher prevalence and barriers to refractive error correction services and compliance should be identified and addressed. Eye screening of every child is recommended

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Legend Tables

Table 1: Age-wise Distribution of cases of ametropia in paediatric age groups (n=322).

	Myopia	Hypermetropia	Astigmatism	Row Totals
5-8	12 (19.25) [2.73]	30 (10.87) [33.67]	8 (19.88) [7.10]	50
9-12	68 (50.83) [5.80]	16 (28.70) [5.62]	48 (52.47) [0.38]	132
13-16	44 (53.91) [1.82]	24 (30.43) [1.36]	72 (55.65) [4.80]	140
Column Totals	124	70	128	322 (Grand Total)
P value- 0.00001				

Table 2: Distribution of refractive error according to Socio demographic pattern (Modified Kuppuswamy scale) (n= 322).

	Myopia	Hypermetropia	Astigmatism	Row Totals
Upper	32 (36.82) [0.63]	18 (18.89) [0.04]	28 (22.29) [1.47]	78
Upper middle	70 (59.48) [1.86]	34 (30.52) [0.40]	22 (36.00) [5.44]	126
Lower middle	33 (36.35) [0.31]	17 (18.65) [0.15]	27 (22.00) [1.14]	77
Lower	17 (19.35) [0.29]	9 (9.93) [0.09]	15 (11.71) [0.92]	41
Column Totals	152	78	92	322 (Grand Total)
	P value-.047582			

Table 3: Distribution of cases according to Family history (n=322).

	Myopia	Hypermetropia	Astigmatism	Row Totals
Single parent	55 (55.43) [0.00]	18 (22.83) [1.02]	32 (26.74) [1.04]	105
Both parent	94 (83.42) [1.34]	22 (34.35) [4.44]	42 (40.24) [0.08]	158
Absent	21 (31.15) [3.31]	30 (12.83) [23.00]	8 (15.02) [3.28]	59
Column Totals	170	70	82	322 (Grand Total)
	P value- 0.00001			