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Original research article

Study of Epidemiology of Refractive Errors in Children of Age group 7-15years Attending Ophthalmology OPD at a Tertiary Institute, Kalaburagi

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Abstract

Background: Refractive Error is a treatable and avoidable cause of visual impairment seen in all age groups. Children of age group 7-14 or less are in growing age have more propensity to develop refractive errors due varied reasons. Our motto in this study is to counsel mothers, early detection of refractive errors and prompt management.

Aims &Objective: To determine prevalence and pattern of refractive errors in children of age group of 7-15 years, at tertiary care hospital i.e. ESIC Medical college and Hospital, Kalaburagi.

Materials and methods: The study was undertaken in ophthalmology OPD at ESIC Medical college and Hospital, Kalaburagi during the period of June 2019 to June 2021. Out of 628 children attended OPD during study period, 530 students were selected based on exclusion and inclusion criteria.

Results: In our study we found 84.3% of children attended OPD during study period having refractive error. We had 59.6% were from urban children of urban and 40.3% were from rural back ground. We found refractive errors more in females compared to males with male to female ratio 1.48. In our study we found mixed myopic astigmatism (68.49%) as most common refractive error

Conclusion: The prevalence of uncorrected refractive error, especially myopic Astigmatism, was more in older children and Hypermetropia is more common in younger age group. Eye Screening for refractive errors should be made mandatory for all children at school entry level. Negligence by parents should be addressed with prompt education and counselling especially in hereditary cases.

Key words: Refractive Error; Myopia; Hypermetropia; Astigmatism; School Children.

Introduction

Defective vision due to any cause will definitely have a negative effect on the normal development and growth as well as life style of a particular child for rest of his social and educational life.

WHO defines Blindness as visual acuity less than 3/60 with best possible correction in the better eye on Snellen visual acuity chart. Visual impairment can also be defined as a best corrected visual acuity less than 6/18 in better eye
Prevalence of childhood blindness varies from developing countries to developed nations[1], approximate ratio being 1.5:0.3. Refractive errors remained most important cause of visual impairment in childhood worldwide, and contributes for about 19% of total blindness in the world.[2]

Around 12.8 million peoples in the age group of 5-15 years are suffering from visual impairment due to uncorrected refractive error. Prevalence of uncorrected refractive errors is 0.96% worldwide, with highest prevalence reported south-east Asia and China[3].
In study by Dandona et al in rural areas of Andhra Pradesh, prevalence of visual impairment was 2.7% and 61% of those were suffering from refractive error. Myopia is commonest refractive error in childhood. Patients having myopia need to be corrected as early as possible, due to its greater impact on overall development child as well as eye. However, hypermetropic eyes need also attention as these children will have more asthenopic symptoms especially while reading.

Difference in amount of refractive errors between two eyes in a patient is defined as Anisometropia. It is more dangerous of all types of refractive errors as if neglected can lead permanent loss of vision due to amblyopia or dull eye. All types refractive errors can be easily diagnosed with advanced optometry machines like streak retinoscopy, auto refractometer. Our prospective study aims at early detection of refractive errors at school entry level i.e. 7yrs and effective management can improve quality of life and prevention of blindness. Ours being tertiary care center especially ophthalmology OPD well equipped with proper equipment and manpower, all types of refractive errors can be diagnosed precisely. Data collected can be utilized to study the pattern of refractive errors in our region.

Materials and methods

In our prospective cross sectional study, all children of age group of 7 to 15years, attending Ophthalmology OPD at ESIC Medical college and Hospital, Kalaburagi from June 2019 to June 2021 have been included in this study.
Patients were divided in three age groups 7 -9 years,10-12 and 13-15 years. All variables were calculated in all the three groups and studied. Children presenting with defective vision due causes other than refractive error like cataract, glaucoma, corneal opacity and retinoblastoma, were excluded from the study.

A thorough history was taken regarding duration, laterality and asthenopic symptoms. Past history of ocular disease including history of spectacle, drugs, ocular surgeries were noted. Family history of refractive errors if any was recorded.
In our study, all children included in the study underwent through visual acuity level testing, systematic eye examination with the help of lit lamp bio microscope and dilated fundus examination. Children having vision 6/9 or less with no pin hole improvement and those with asthenopic symptoms advised for Cycloplegics refraction, so that even the smallest refractive errors not missed.

All children with refractive errors were corrected. and prescribed spectacles.
Inclusion and Exclusion Criteria: All children aged between 7 to 15 yrs. were included except those having diminution of vision due to causes other than refractive errors like corneal dystrophies cataract, ptosis were excluded from the study

Results

In our prospective cross sectional study, out of 628 children of age group of 7 to 15years, attended Ophthalmology OPD at ESIC Medical college and Hospital, Kalaburagi from June 2019 to June 2021,530 children had complaints due to refractive errors [Table :1]. We found mixed myopic astigmatism (68.49%) as most common refractive error followed by myopia (15.09%) and hyperopic astigmatism (10.18%) and Hypermetropia (4.15%) [Table:2].
In our study most common presenting symptom was diminution of vision seen in all cases followed by headache and asthenopic symptoms[Table:3]. In our study in 18.49% of children had family history of refractive errors. [Table:4].
In our study we had most of the children in the age group of 10-15 years. [Table:5]. The mean age of the study group was 11.5 years. We had more female children compared to male. [Table:6]. Amblyopia was seen in 8 children. Out of 8 children,6 children showed improvement 2 could not improve their visual status due negligence and underdiagnoses. We had 59.6% were from urban children of urban and 40.3% were from rural back ground. [Table:7].

Table 1: Table showing prevalence of refractive error in children attending OPD during study period

Total number of patients attended during study period	9165
Total number of children attended OPD during study period	628
Total number of children suffering from refractive error	530(84.3%)
Total number of children attended OPD due to other causes	98(15.70%)

Table 2: Table showing distribution of refractive errors in children included in our study

Type of refractive error	No.of children
Myopic astigmatism	363(68.49%)
Hyperopic astigmatism	54(10.18%)
Mixed astigmatism	3(0.36%)
Myopia	80(15.09%)
Hypermetropia	22(4.15%)
Astigmatism	8(1.50%)
Total	530

Table 3: Table showing presenting complaints in children included in our study

Type of complaint	No of children
Headache	525
Diminished vision	530
Congestion in eyes	120
Pain in eyes	20
Double vision	312
Watering in eye	25
Deviated eye	95

Table 4: Table showing family history of refractive errors in children included in our study

Family history of refractive errors	No.of children
Present	98(18.49%)
Absent	432(81.59%)

Table 5: Table showing distribution of refractive error according to different age group

	Type Of Refractive Error			
Age	Myopia	Hypermetropia	Astigmatism	
7-9 yrs	22(6.66%)	54(71.05%)	17(14.16%)	93(17.5%)
10-12 yrs	87(26.12%)	16(21.05%)	33(27.50%)	136(25.6%)
13-15yrs	224(67.26%)	6(7.8%)	71(59.16%)	301(56.7%)

Table 6: Table showing gender wise distribution of refractive error

	Type of Refractive Error			
Gender	Myopia	Hypermetropia	Astigmatism	
Male	153(45.9%)	00(0%)	60(49.58%)	213(40.1%)
Female	180(54.05%)	76(100%)	61(50.41%)	317(59.8%)
Total	333	76	121	

Table 7: Table showing distribution of refractive error according to different region

	Type of Refractive Error			
Region	Myopia	Hypermetropia	Astigmatism	
Urban	207(62.16%)	49(64.4%)	66(54.54%)	316(59.6%)
Rural	126(37.83%)	27(35.52%)	49(40.49%)	214(40.37%)
Total	333	76	121	530

Discussion

In our study we have observed that out of 628 children in total 9165 OPD patients attended ophthalmology OPD during study period 530 children (5.78%) had refractive errors on methodical thorough examination. It's been observed in studies that there is difference in prevalence rate in different parts of the world which might be due to varied operational definitions and demographic factors as recorded by different studies.in the following studies prevalence rate varies

In a study GVS Murthy et al in New Delhi[5] and Kumar et al in Lucknow[6] prevalence rate is 6.4%.and 7.4%. But Sharma S et al in Haryana[7] observed more prevalence rate of 13.65% compared to our study. Studies from different parts of the world showed a prevalence rate of 8.2% in Baltimore (USA)[8], 12.8% in Shunyi district in China[9], 2.9% in Nepal[10] and 15.8% in Chile [11].

In our study most common presenting symptom was diminution of vision seen in all cases followed by headache and asthenopic symptoms similar results were found in studies by Kumar JV[6] ,Sharma.S[7].

In our study we found mixed myopic astigmatism (68.49%) as most common refractive error followed by myopia (15.09%) and hyperopic astigmatism (10.18%) and Hypermetropia (4.15%). When the study was observed for relative association of refractive errors with type and age. It's found in our study that prevalence of myopia and astigmatism increased

significantly with age. Wherein Hypermetropia is more significantly seen in younger female children. Similar trend in relative shift of refractive errors from Hypermetropia to myopia with growing age was observed by study by GVS Murthy et al [5].

In our study, 40.1% were male and 59.8% were female. This difference was statistically significant (p=0.0061). The refractive error was more in female compared to male. This may be explained by the higher growth rate in girls and earlier pubertal age of females compared to boys. Similar results were observed by Seema et al[4]and Pavithra et al[12] with slightly higher pre-valence of refractive error in female (23.7%), males (12.2%)[4].and female children 9% male children 5.3% respectively. Tay MT et al[13] also found similar results

In our study most common age group affected was 13-15 yrs. i.e. 56.7% followed by 10-12 yrs. age group.i.e.25.6% .and least was seen in in the age group of 7-9 yrs. i.e.17.5%[8,9, 10]. We found that refractive errors increased with age especially from 10 yrs. to 14 yrs. may because of growing age, and excessive near work by school age children. S Matta et al[14] and Sonam Sethi et al[15] also observed same results in children attending OPD in New Delhi and Ahmedabad

GV Murthy et al[5], Kalkivayi V et al in Andhra Pradesh[16] and in a study conducted in Mechi, Nepal by Gopal P et al[17] also reported relative shift of refractive errors and strong association of Hypermetropia with female gender and younger age group. Similar results were also seen in India is by Prema et al and others [16-21]

We found in 18.4% of children significant association with parents or siblings having refractive errors. Ayub Ali et al[21] and Saw et al[21] observed strong relationship between refractive errors and their progression and family history.

We had more children from urban background compared to rural, i.e. 59.6% in children from urban area 40.37% in rural area. Similar results were seen in studies by Vivek Trivedi et al in Gujarat,[23] Dandona et al in Andhra Pradesh.[24] Afroz A khan in Srinagar.[25] and Amrutha S Padhye et al[26] in India.

Conclusion

In India, though school health Programme is a part of our national programme, we come across many children suffering from diminution vision and asthenopic symptoms. Most of the schools don't follow the rules laid by the government that any child entering school should have tested for vision and treated for refractive errors if found. Due to which children will have problem in social interaction and lag in their studies. Children especially in the age group of 7-15 yrs. are considered independent for their routine and school work even if they complain about their problems its noticed in many incidences that they are mistaken, scolded and given punishment for nonperformance by parents, guardians and teachers as well. This will delay the diagnosis and thereby treatment.so it everybody s duty to look in to the issue seriously and make some action. this can only happen if all are aware of routine vision testing and compliance to the treatment.

Thus early screening at school entry definitely helps in assessment and management of children with refractive errors thereby preventing further deterioration of vision and irreversible changes in the visual system.

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