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RESEARCH ARTICLE

PREVALENCE OF EYE DISEASES IN PRIMARY SCHOOL CHILDREN IN RURAL AREAS OF JAMMU CITY OF JAMMU & KASHMIR, INDIA

***,[1]Anjali Slathia and [2]Renu Hashia Dhar**

[1]Senior Resident, Department of Ophthalmology, ASCOMS & Hospital, Sidhra, Jammu, J&K
[2]Assoc. Professor, Department of Ophthalmology, ASCOMS & Hospital, Sidhra, Jammu, J&K

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ABSTRACT

Objective: To assess prevalence of eye diseases in primary school children in Jammu city, J&K
Settings and Design: Cross-sectional descriptive study
Material and Methods: All school going children of both genders aged 5-16 yrs under school screening programme underwent V.A assessment, ocular motility evaluation and cover-uncover test. Depending on type of eye disease, they were categorised. Children with defective vision were further examined employing objective refraction using autorefractometer followed by streak retinoscopy after instilling 1% cyclopentolate eye drops. Children with any kind of refractive errors were evaluated & categorized according to the type of refractive error on post mydriatic examination. Children with prior ocular surgery or any ocular disease contributing to diminished V.A, manifest strabismus & pathological myopia were excluded from the study.
Statistical Analysis: done by Chi square test
Results: Among children, the prevalence of refractive error in this study was found to be 11.6%.There was no significant difference in prevalence of refractive error between two sexes. The prevalence increases with age. The common refractive error was astigmatism followed by myopia and then hypermetropia
Conclusion: Refractive error is important cause of treatable blindness in School going children in the age group of 5-16 yrs. Hence, regular eye screening among school children is mandatory as is covered under NPCB.
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INTRODUCTION

Visual impairement in children is mostly detected during School screening programme in accordance with National programme for control of Blindness. Uncorrected refractive errors constitute a large number of children with treatable blindness (Alam, 2008).

- Poor vision in children can profoundly affect his/her participation and learning in the classroom. This can interfere with education, personality development & carrier oppurtunities in future in addition to causing an economic burden on society. However, this burden of economic loss may vary with type of visual impairement. Hence, knowledge of prevalence and pattern of visual impairement in school children can help us in planning public health strategy.

Corresponding author: **Anjali Slathia,**
[1]Senior Resident, Department of Ophthalmology, ASCOMS & Hospital, Sidhra, Jammu, J&K

- Approximately 12.8 million children in the age group5-16 years are visually impaired from uncorrected or inadequately corrected refractive errors, estimating a global prevalence of 0.96 % (Smith, 2009).
- Due to increasing realisation of visual requirements in children, Childhood blindness has been considered one of the priorities of VISION 2020-The Right To Sight—a global initiative launched by a coalition of non-government organizations and the WHO (Pararajasegaram, 1999).
- Uncorrected refractive errors are prevalent even in high income countries (Bourne, 2013)
- This study aims at evaluating pattern & prevalence of treatable eye diseases in School age children in rural area of Jammu which can help us in planning public health strategy

Subjects and methods

- Present study is a descriptive cross sectional study. Ethical clearance was taken from the institutional

review board. All primary school children who attended Eye OPD of ASCOMS & Hospital, Jammu in 2015, 2016 and till date in 2017 & those children who were screened during school eye screening camps in school premises itself, were included in this study under School screening programme.

- Detailed history was taken from all the students including family history, current problems, past problems & treatment taken
- The students then underwent a preliminary ocular examination. Snellen's chart was used at 6m distance for assessment of uncorrected, presenting & best corrected V.A
- Extraocular movements & cover test were performed using torch light, and convergence was tested using RAF (royal air force) rule.
- Children with defective vision were selected for detailed ocular examination including VA both for distance & near, objective refraction with autorefractometer followed by streak retinoscopy under 1%cyclopentolate eye drops, anterior segment & fundus examination
- Children with prior ocular surgery were excluded from the study

Statistical analysis

- Chi-square test was used to analyze differences in the refractive errors between males & females & among different age groups.
- P value<0.05 was considered significant

RESULTS

A total of 642 children between 5-16yrs of age were included in the study. 340(52.95%) out of these were male students and 302(47.04%) were female students giving a male:female ratio of 1.12(Table 1).

Table 1. Sex distribution of students

Sex	n%
Male students	340(52.95%)
Female students	302(47.04%)

Students were divided into 4 groups according to their age (Table 2).

Table 2. Age wise distribution of student

Age (in years)	n%
5-7	77(11.98%)
8-10	167(26.01%)
11-13	205(31.93%)
14-16	193(30.06)

- Unaided V.A was normal (6/6) in 567(88.31%) students.
- Presenting V.A was normal (6/6) in 586(91.27%) students.
- Presenting V.A 6/9-6/12 was found in 45(7%) students
- Presenting V.A of 6/18-6/60 was observed in 17(2.64%) students
- V.A less than 6/60 was seen in 13(2.02%) students
- 26(12.7%) students were wearing glasses out of which 19 students had presenting V.A of 6/6
- After refractive correction, V.A improved to 6/6 in 636 (99.06%) students. 2 (0.31%)students whose BCVA was less than 6/12 were ambylopic.(Table-3)

Table 3. Distribution of uncorrected, presenting & best corrected V.A

	Unaided n(%)	Presenting n(%)	BCVA n(%)
6/6	567(88.31%)	586(91.27%)	636(99.06%)
6/9-6/12	45((7%)	42(6.54%)	4(0.62%)
6/18-6/60	17(2.64%)	10(1.55%)	2((0.31%)
<6/60	13(2.02%)	3((0.46%)	0

- A total of 75 children (11.6%) had refractive error. Refractive error was prevalent in 42(12.35%) males and 33(10.92%) females. There was no significant difference between the prevalence of refractive error between male and female sex (p>0.05).
- Prevalence of refractive error which was 3.8% in 5-7yrs age group increased to 17.6% in 14-16 years age group. This increase was statistically significant (p<0.01) (Table4).

Table 4. Prevalence of refractive error by Age and Sex

Age(years)	Refractive error absent	Refractive error present
5-7	74	3(3.8%)
8-10	155	12(7.2%)
11-13	179	26 (12.7%)
14-16	159	34 (17.6%)
Males	298	42 (12.35%)
Females	269	33(10.92%)
Total	567	75 (11.6%)

- Of the total 75 children with refractive error, myopia was present in 28(36.9%) cases; hypermetropia in 6(8.3%) and astigmatism in 41(54.8%) cases.(Table-5)

Table 5. Distribution of type of refractive errors among cases and the study group

Type of refractive error	No. of students	% among the cases	% in study group
Myopia	28	36.9%	4.36%
Hypermetropia	6	8.3%	0.93%
Astigmatism	41	54.8%	6.38%
Total	75	100	11.6%

The prevalence of myopia increased from 8.6% in 5-7yrs age group to 42.7% in 14-16 years age group. The prevalence of hypermetropia progressively decreased from 52.3% in 5-7yrs age group to 6.6% in 14-16yrs age group. The prevalence of astigmatism progressively decreased from 34.9% in 5-7yrs age group to 16.5% in 14-16yrs age group (Table 6).

Table 6. Association of age with the type of refractive error

Age (years)	Myopia n=28	Hypermetropia n=6	Astigmatism n=41	P Value
5-7	3(8.6%)	52.3%	34.9%	5
8-10	5(19.7%)	28.6%	26.6%	
11-13	8(29%)	12.5%	22%	
14-16	12(42.7%)	6.6%	16.5%	

The prevalence of myopia was 57.1% in males and 42.8% in females. The prevalence of hypermetropia was 66.6% in males and 33.3% in females. The prevalence of astigmatism was 43.9% in males and 56.09% in females (Table 7).

Table 7. Association of Sex with the type of refractive error

Sex	Myopia	Hypermetropia	Astigmatism	P value
	n=28	n=6	n=41	
Male	16 (57.1%)	4(66.6%)	18(43.9%)	P>0.05
Female	12 (42.8%)	2(33.3%)	23(56.09%)	

DISCUSSION

- In India as in other developing countries, the School health services provided are quite insufficient contrary to services provided in Developed countries. India being a developing country, there is shortage of infrastructure and resources.
- In order to implement VISION 2020 in India, childhood blindness has to be targetted & for that School eye screening programme is a must there.
- Data on prevalence & causes of blindness in children is needed for planning & evaluating preventive & curative services for children
- Among various eye disorders in school children, prevalence of refractive error in this study was 11.6% which was slightly lesser to prevalence observed by Shakeel *et al* in Dehradun (13%) (Shakeel, 2016) and Seema *et al* (2009), in Haryana (13.65%). However, due to differences in demographic factors, socioeconomic factors, different race etc, prevalence in this study is higher when compared to that by GVS Murthy *et al* (Murthy, 2002), in New Delhi (6.4%) and Kumar *et al* (Kumar, 1992), in Lucknow (7.4%). Variations in prevalence data were observed from different parts of the world also like 8.2% in Baltimore, USA (Proslan, 1996); 12.8% in Shunyi district in China (Zhao, 2000); 2.9% in Nepal (Pokharel, 2000) and 15.8% in Chile (Maul, 2000).
- There was an increase in overall prevalence of refractive errors with advancing age as shown in Table-4.Our results were comparable with the study conducted by Shakeel *et al*. Dehradun (Shakeel, 2016), which showed prevalence of refractive error more in 14-16years age group(16.1%) as compared to 9.1% in 5-7years age group. Pavithra *et al* (Pavithra, 2013) in Bangalore showed the prevalence of refractive error higher in 13-15years age group (7.5%) as compared to 6.6% in 7-9years age group. Matta *et al* (Matta, 2006), also found that refractive error increased with increasing age especially in the age group of 10-14years.
- There was no significant difference in the prevalence of refractive error between males and females in our study($p>0.05$) as shown in Table-4.This was similar to the results shown by Ande *et al* in Andhra Pradesh (Ande, 2015) and Krishnan VM *et al* in Villupuram and Puducherry (Krisnan, 2015), where no sex predilection of refractive error was seen. However, some studies showed evidence of increased prevalence in female students (Sharma, 2009; Prema, 2011), which can be due to earlier puberty in girls with respect to boys. This was in contrast to Sriram *et al* (Kumar, 1992) in Tamil Nadu which showed refractive errors to be more prevalent in male children (21.5%) than female children (17%).
- In our study, the single most common refractive error was astigmatism followed by myopia. Hypermetropia was least common of all as shown in table-5.Our results were comparable with the study conducted by Shakeel *et al* in Dehradun (Shakeel, 2016), where also the commonest refractive error among school children was astigmatism (54.3%), followed by myopia (38.1%) and then hypermetropia(7.6%). Rai *et al*. in Rupendehi district, Nepal (Rai, 2015), have also shown similar results. Pavithra *et al*. in Bangalore (Pavithra, 2013), Sethi *et al* Ahmedabad (Sethi, 2000) and Matta *et al* (Matta, 2006) concluded that myopia was the most common refractive error among school children followed by astigmatism and hypermetropia. Medi *et al* in Kampala district showed that commonest refractive error was astigmatism (52%) followed by hypermetropia (37%) and myopia (11%) (Medi, 2002).
- In the present study, myopia showed an increasing trend with advancing age whereas hypermetropia and astigmatism showed a decreasing trend with advancing age which was statistically significant ($p<0.05$) as shown in Table-6.Similar pattern was shown in many previous studies conducted in Dehradun (Shakeel, 2016), New Delhi (Murthy, 2002), Bangalore (Pavithra, 2013), Andhra Pradesh (Ande, 2015) and Kolkata (Chatterje, 2014). There was no significant difference in the prevalence of myopia, hypermetropia and astigmatism between males and females in our study ($p>0.05$) Table 7.Similar results were shown in a study conducted in Villupuram and Puducherry (Krisnan, 2015). Hypermetropia was shown to be associated with female sex in some of the previous studies (Murthy, 2002; Pavithra, 2013; Kalikivayi, 1997). In a study conducted by Pune (Kumar, 2014), myopia was found to be more prevalent in females (57.35%) as compared to males (42.65%). Hypermetropia was equally prevalent in both sexes (50%), astigmatism was found only in females (100%) and myopia was shown to be associated with female gender (65%) in a study conducted in Kolkata (Chatterje, 2014). Myopia was shown to have no sex predilection in few other studies (Pavithra, 2013 and Ande, 2015). Study conducted by Shakeel *et al* (Shakeel, 2016), has also shown that myopia has increasing trend with age whereas hypermetropia and astigmatism have decreasing trend with age.
- The presenting V.A was 6/6 in 91.27% students while after refractive correction 99.06% students could attain a V.A of 6/6.These results raise the need for School-based program that provides prescription of glasses to the deserving students at no cost, through government and non-governmental collaborative fund. Due to shortage of resources and insufficient facilities in India, School health services are hardly more than a token service (Park, 2017).
- 2(0.31%) students in our study suffered from ambylopia. Ambylopia treatment is most effective when done early in the child's life, usually before 7years of age (Khurana, 2006). School screening is the best way to detect ambylopia in school children. Since detailed evaluation was done only in children with V.A less than 6/12, some refractive errors like latent hypermetropia might have been missed. Moreover, students with manifest strabismus and pathological myopia were excluded from this study which might distort the demographic data marginally. Another limitation of our study was that only school going children were included in the study though some proportion of

children in Rural India and other developing countries do not go to school. Hence, a more complete assessment of visual impairement in children would be possible with population based studies not restricted only to school going children.

- Different studies conducted in India and world over suggest early screening, spectacle compliance and spreading awareness among parents to motivate students to use spectacles (Gogate, 2013).

Conclusion

Refractive error is a common cause of visual impairement among school children in developing countries. Uncorrected refractive errors can cause immediate and long term consequences in children and adults such as lost educational and employment oppurtunities, reduced economic gain for individuals, families and societies with impaired quality of life. Various factors are responsible for refractive errors remaining uncorrected in children like lack of awareness and recognition of the problem at personal and family level, as well as at community and public health level; non-availability of and/or inability to afford refractive services for testing; insufficient provision of affordable corrective lenses and cultural disincentives to compliance. School eye screening programme need to be implemented on a large scale to detect children suffering from blindness due to refractive error.

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