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Original Article

Prevalence of refractive error among school aged children attending the outpatient department of a tertiary eye care centre

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Abstract
Uncorrected refractive error is the leading cause of vision impairment globally and this in turn can have immediate and long-term consequences in children and adults. Our aims is to study prevalence of refractive error among school aged children attending the eye outpatient department.
This is a retrospective cross-sectional study involving children aged 6 to 15 years presented between June to December 2018 were retrieved. The data was entered in Microsoft Office Excel 2007 and analyzed.
Results: out of 561 children 185 children were having refractive error in atleast on eye. Refractive error was more prevalent in girls (52.97%) as compared to boys (47.03%) and common in 11 to 15 year age group. The most common refractive error was myopia.
Conclusion: The prevalence of refractive error was more common in 11 to 15 age group and with females preponderance. Myopia was the commonest type of refractive error followed by astigmatism and hypermetropia. The burden of undetected refractive error is high and needs to be addressed. Children and parents need to be educated.

Keywords: School age children, refractive error, myopia, hypermetropia, astigmatism, spectacle

Introduction
Uncorrected refractive error is the leading cause of vision impairment globally and it is the second leading cause of blindness in developing countries, including India [1, 2].
It is estimated that globally 153 million people over 5 years of age are visually impaired as a result of uncorrected refractive errors, of whom 8 million are blind. In the age group of 5 – 15 years, 12.8 million are visually impaired from uncorrected or inadequately corrected refractive errors, a global prevalence of 0.96%, with the highest prevalence reported in south-east Asia and in China [2].
Visual impairment from uncorrected refractive errors can have immediate and long-term consequences in children and adults, such as lost educational and employment opportunities, lost economic gain for individuals, families and societies, and impaired quality of life [2].
In India the treatable refractive error statistics account for about 33.3% preventable blindness according to a Dondana *et al*. study conducted in 2008, while the other causes of preventable blindess include amblyopia, and vitamin D deficiency and childhood cataract [1].
According to a systematic review conducted by Sheeladevi *et al*., the Prevalance of refractive errors in our country account for about 10.8% [3].
In a developing country like ours we need to aim to develop faster and more swifter than the other countries to improve the overall eye care and prevent ocular morbidity due to avoidable blindness of the children of our country.
Therefore it is imperative to continue to impart, educate and treat avoidable blindness especially among school aged children. Hence in our current study we aim to assess, analyze and evaluate the prevalence of refractive error among school aged children attending the outpatient department (OPD) of our institute.

Materials and Methods
The current was study is a retrospective cross-sectional study to estimate the prevalence of

refractive errors in school age children (6 to 15 years) attending ophthalmology out patient department in a tertiary care hospital. Clinical records of children aged 6 to 15 years who presented to the department of ophthalmology for various complaints between June 2018 to December 2018 were retrieved. These children were divided into two age groups one comprising children aged between 6 to 10 age and another 11 to 15years for comparison purpose.

Required information like gender, age, presenting complaints, past ocular history, visual acuity, refractive error if any – type, degree etc. were noted. Anterior segment and posterior segment examinations finding were noted. Children with history of ocular trauma, previous eye surgeries and children with trachoma, conjunctivitis, corneal ulcer, corneal opacity, cataract, pseudophakia, aphakia and gross retinal pathologies were excluded.

In this study we considered a spherical error of ≥ -0.50 diopters (D) as myopia, spherical error of ≥ +0.50 diopters (D) as hypermetropia and cylindrical error of ≥ 0.50 as astigmatism. Difference of 2 D or more between spherical equivalents of both eyes as anisometropia.

Myopia was further graded as low (-0.50D to -3.0D), Moderate (-3.25D to <-6.0D) and High (≥ -6.0D). Hyperopia was further gradedas Low (+0.50D to +3.0D), Moderate (+3.25D to +6D) and high ((≥ +6.0D).

Astigmatism was further classified as Simple Myopic Astigmatism, Simple Hypermetropic Astigmatism Compound Myopic Astigmatism, Compound Hypermetopic Astigmatism and mixed astigmatism.

Ethical Clearance was obtained from the Institutional Ethics Committee and performed in accordance with the tenets of the declaration of Helsinki. The data was entered in Microsoft Office Excel 2007 and the same was analyzed using SPSS version 17. The data was expressed in frequencies and percentages.

Results

Total of 574 children aged 6 to 15 were seen in our OPD between June 2018 and Dec 2018. 561 Out of these 574 children were included in the study after considering exclusion criteria. Among these boys were 323 (57.58%). The mean age was 11.06 ((± 3.84) years.

The age and gender distribution of the patients is presented in Figure 1.

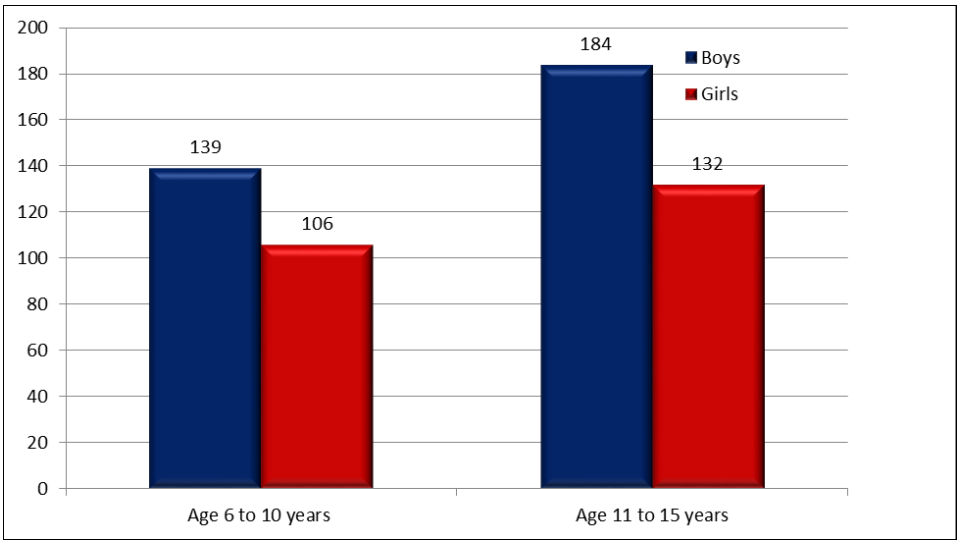

Fig 1: The age and gender distribution of the all the patients

Out of these 561 children, 185 (32.1%) children were noted to be having refractive error in at least on eye. Among these 185 children, 87 (47.03%) were boys and 98 (52.97%) were girls. The age and gender distribution of children with refractive errors is given in figure 2. Refractive error was more prevalent in girls (52.97%) as compared to boys (47.03%) and when considering age, refractive error was found to be common in 11 to 15 year age group (60%).

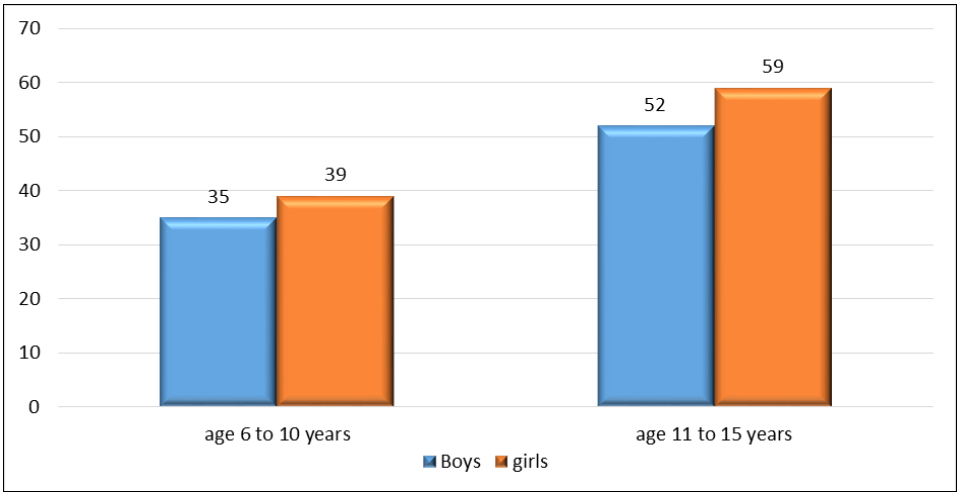

Fig 2: The age and gender distribution of children with refractive errors

In children found to be having refractive error, history of previous spectacle use was present only in 33 (17.84%) whereas rest had uncorrected refractive error.

The most common refractive error was myopia which was found in 232 (62.70%) eyes**,** followed by astigmatism which was seen seen in 76 eyes (20.54%). Hypermetropia was seen in 62 eyes (16.76%). Frequency and distribution of refractive error is given in figure 3.

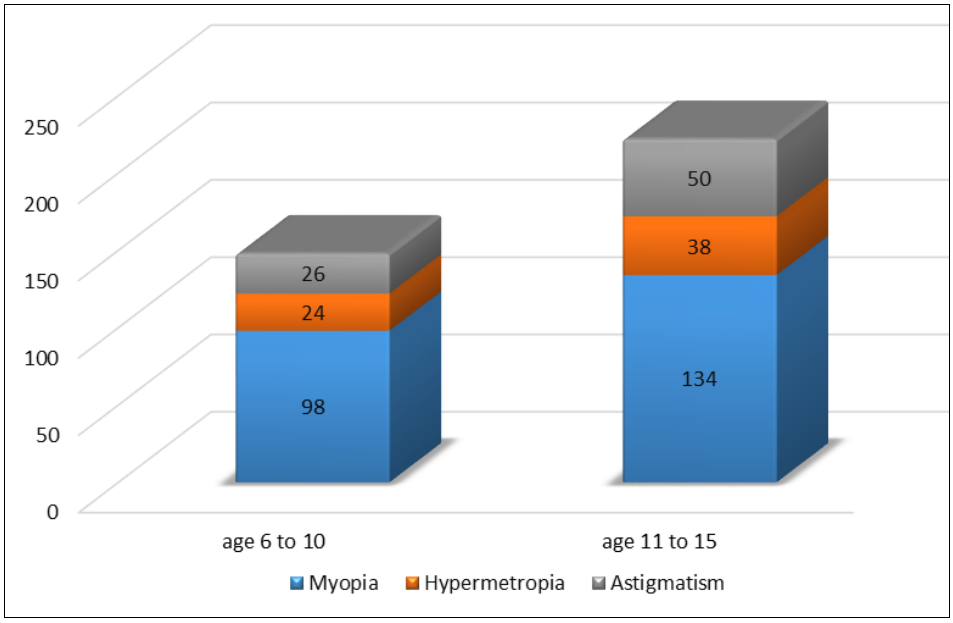

Fig 1: Distribution of various types of refractive errors

Among 232 myopic eyes in our study low grade myopia was the most common and seen in 163 (70.26) eyes. Low grade myopia was slightly more common in 6 to 10 age group.

Moderate grade myopia was slightly more prevalent in 11 to 15 year age groups. The frequency and distribution of degrees of myopia is given in table 1.

Table 1: Frequency and distribution of degrees of myopia

Degree of myopia	6 to 10 age group	11 to 15	Total
Low	87	76	163 (70.26)
Mod	20	42	62(26.72)
Severe	2	5	7(3.02)
Total	98	134	232

In Sixty two eyes with hypermetropia low grade was more common seen in 30 (48.39%) eyes. Severe hypermetropia was least common. The frequency and distribution of grades of hypermetropia is given in table 2.

Table 2: Frequency and distribution of degrees of hypermetropia

Degree of hypermetropia	6to 10	11 to 15	Total
Low	12	18	30 (48.39)
moderate	10	18	28(45.16)
Severe	4	2	4(6.45)
Total	24	38	62

In 76 eyes which had astigmatism compound myopic astigmatism was most commonly occurring 42(55.27) eyes. Mixed astigmatism was found to be least commonly seen in our study. The frequency and distribution of types of astigmatism is given in table 3.

Table 3: Distribution of Astigmatism

Type of astigmatism	6 to 10	11 to 15	Total
Simple myopic	8	10	18 (23.68)
Simple hypermetropic	2	6	8(10.53)
compound myopic	14	28	42(55.27)
Compound hypermetropic	2	4	6(7.89)
mixed	0	2	2 (2.63)
Total	26	50	76 (100)

Discussion

Our study was conducted in hospital OPD set up unlike community based or school screening studies. The overall prevalence of refractive in 6 to 15 age group was found to be 32.1% in our study. In 6 to 10 age group it was 30.20% and slightly higher in 11 to 15 age group (35.20%.). This is comparatively higher than other similar studies. In a study by singh *et al*. the prevalence of refractive error was only 17.36% [4] whereas in another study done on school children the prevalence of refractive error was 23.5% [5].

Higher prevalence refractive error in our study can be attributed to the fact that ours was a hospital based study and children presenting to hospital with ocular morbidity are more likely to have higher rate refractive errors compared to the school screening or population based studies.

The prevalence of refractive error in male eyes was less (26.93%) as compared to in female eyes (41.18%). These findings are similar to population based studies done by

Pavithra MB *et al*. in and Dulani N *et al*. which showed females preponderance [6, 7]. Whereas one hospital based study done in Nepal **(**Rai S *et al*. in Nepal,) reported that males are more affected by refractive errors than females
Whereas one hospital based study done in Nepal reported that males are more affected by refractive errors than females [8].
In 6 to 10 age group the prevalence of refractive error was more in females (52.7%) as compared to males (47.3%) and similar trend is seen in 11 to 15 years age group also where prevalence of RE in males is (46.8%) less than in females (53.2%).
History of previous spectacle use was present only in 33 (17.84%) whereas rest had uncorrected refractive error. In another study 12.7% of the cases were using spectacle [10]. The rate of wearing spectacle in other studies conducted in India were slightly higher 29.5% and 21.70% [11]. The high rate of uncorrected refractive error and low spectacle wear rate can be attributed to lack of awareness about refractive errors and can also be due to shyness related to practice of wearing spectacles.
The most common refractive error found in our study subjects was myopia which was found in 232 (62.70%) eyes**,** followed by astigmatism which was seen in 76 eyes (20.54%). Hypermetropia was least common and seen in 62 eyes (16.76%).
In few other studies also myopia was the commonest refractive error [12, 13].
Whereas in few studies the commonest refractive error found was astigmatism followed by myopia and hypermetropia [11, 14, 15].
In one study the on frequency of refractive error it was found that astigmatism was most common followed by hypermetropia and myopia [16].
These variation can be due to different geographic locations, socioeconomic and other factors like race, ethnicity etc.
In myopic eyes low degree of myopia (upto -3D) was seen the most common seen in 70.26% of total myopic eyes. It was followed by moderate degree of myopia 26.72% and severe degree 3.02%. These results are comparable to other studies [17, 18].
Among hypermetropic eyes low grade hypermetropia was again more common (48.39%) similar to trends in myopia, this was followed by moderate degree of hypermetropia in 45.16 and severe degree of hypermetropia was rare seen only in 6.45% of total hypermetropic eyes.
Among astigmatic eyes, compound myopic astigmatism was most common (55.27%) followed by simple myopic (23.68%.), simple hypermetropic (10.53%), compound hypermetropic (7.89%) and mixed astigmatism was the least common type seen in only 2.63% of astigmatic eyes. In some other studies also compound myopic astigmatism was seen to be the most common type of astigmatism [8, 19].
Since ours is a hospital based study more community based studies on school aged children are needed to discover the actual burden of refractive error in that population.

Conclusion
In our study, the prevalence of refractive error was more common in 11 to 15 age group and with females preponderance. Myopia was the commonest type of refractive error in school aged children followed by astigmatism and hypermetropia. Compound myopic astigmatism was the more common type of astigmatism. Low grade errors are more prevalent. The burden of undetected refractive error is high and needs to be addressed. All the children coming to the hospital with any complaint must be evaluated thoroughly for refractive errors. Children and parents need to be educated and awareness should be created about refractive errors and practice of spectacle use.

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References
1. Dandona R, Dandona L. Refractive error blindness Bull World Health Organ. 2001;79:237-43.
2. Resnikoff S, Pascolini D, Mariotti SP, Pokharel GP. Global magnitude of visual impairment caused by uncorrected refractive errors in 2004 Bull World Health Organ. 2008;86:63-70.
3. Sheeladevi S, Seelam B, Nukella PB, Modi A, Ali R, Keay L. Prevalence of refractive errors in children in India: a systematic review. Clinical and Experimental Optometry 2018;101(4):495-503.
4. Singh V, Malik KP, Malik VK, Jain K. Prevalence of ocular morbidity in school going children in West Uttar Pradesh. Indian journal of ophthalmology 2017;65(6):500.
5. Kabindra Deva Sarma, MousumiKrishnatreya. A study on refractive errors among the school children of Guwahati city. International Journal of Contemporary Medical Research 2016;3(8):2258-2260.
6. Pavithra MB, Maheshwaran R, Rani Sujatha MA. A study on the prevalence of refractive errors among school children of 7-15 years age group in the field practice areas of a medical college in Bangalore. Int J Med Sci Public Health 2013;2(3):641-5.
7. Dulani N, Dulani H. Prevalence of refractive errors among school children in Jaipur, Rajasthan. Int J Sci Study 2014;2(5):52-5.
8. Rai S, Thapa HB, Sharma MK, Dhakhwa K, Karki R. The distribution of refractive errors among children attending Lumbini eye institute, Nepal. Nepal J Ophthalmol 2012;4(1):90-5.
9. Hashia R, Slathia A. Pattern of Refractive Errors in Primary School Children in Rural Areas of Jammu City of Jammu and Kashmir, India. Int J Sci Stud 2017;5(6):115-9.
10. Gogate P, Mukhopadhyaya D, Mahadik A, Naduvilath TJ, Sane S, Shinde A, *et al*. Spectacle compliance amongst rural secondary school children in Pune district, India. Indian journal of ophthalmology 2013;61(1):8.
11. Mittal S, Maitreya A, Dhasmana R. Clinical profile of refractive errors in children in a tertiary care hospital of Northern India. Int J Community Med Public Health 2016;3(5):1189-94.
12. Tuladhar S, Dhakal S. Refractive Error Profile in a tertiary Centre in Western Nepal. Int J Infect Microbiol 2013;292:59-63.
13. Opubiri I, Adio A, Emmanuel M. Refractive error pattern of children in South- South Nigeria: A tertiary hospital study. Sky Journal of Medicine and Medical Sciences 2013;1(3):10-4.

14. Mittal J, Rizvi Y, Jain R. Clinical profile of Refractive Errors in School - going Children of Bareilly, Uttar Pradesh, India. International Journal of Advanced and Integrated Medical Sciences 2017;2(4):169-72.
15. Mehari ZA. Pattern of childhood ocular morbidity in rural eye hospital, Central Ethiopia. BMC Ophthalmol 2014;14(1):50.
16. Karki KGD. Karki M. Refractive error profile- a clinical study. Kathmandu Univ Med J 2003;2(7):208-12.
17. Yared AW, Belaynew WT, Destaye S, Ayanaw T, Zelalem E. Prevalence of refractive errors among school children in Gondar town, northwest Ethiopia. Middle East African Journal of Ophthalmology 2012;19(4):372.
18. Muthu Krishnan V *et al*. Sch. J App. Med. Sci 2015;3(7B):2568-2573.