

Spectrum and Frequency of Ocular Diseases contributing to morbidity in children aged 5 to 15 years: a Descriptive Cross-Sectional Study**Mamta Meena¹, Savita Shekhawat², Lipika Maru³**¹Assistant Professor, Department of Ophthalmology, GBH American International Institute of Medical Sciences & Research centre, Udaipur, Rajasthan (India)²Associate Professor, Department of Paediatrics, Pacific Medical College & Hospital, Udaipur, Rajasthan (India)³Assistant Professor, Department of Paediatrics, GBH American International Institute of Medical Sciences & Research centre, Udaipur, Rajasthan (India)

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Conflict of interest: Nil

Abstract:**Background:** Decreased vision, whether congenital or acquired can negatively affect the learning of a child. It not only leads to bad quality of life but also has detrimental effects on the person's self-esteem.**Aims:** To determine the frequency of different ocular conditions leading to ocular morbidity in a multi-centric tertiary care hospital.**Study Design:** Descriptive cross-sectional study.**Place and Duration of Study:** Study was done in multi-centric tertiary care hospitals at Udaipur, Rajasthan from February 2024 to January 2025.**Methodology:** A total of 556 patients presenting in the eye out-patient department were included. Patients with unaided visual acuity of 6/6 in both eye and no other ocular abnormalities were excluded from the study. Children with congenital syndromes like Down's syndrome, etc. leading to eye diseases were also excluded. All children underwent complete ocular examination. Data was analyzed by using SPSS version 22. Frequency and percentages were computed for gender and different ocular diseases e.g., myopia, hypermetropia, strabismus, Vernal Keratoconjunctivitis, astigmatism, red eye, subconjunctival haemorrhage etc. Post-stratification chi-square test was applied with p-value ≤ 0.05 .**Results:** Out of 556 participants of the study, there were 308 (55.4%) males and 248 (44.6%) females. Average age of the patients was 11.15 ± 3.44 years. Myopia and red eyes were the major causes of paediatric ocular morbidity i.e. 33.81% and 26.6% respectively. Comparison between two age groups showed that Myopia was higher in children with 11 to 15 years. Myopia and astigmatism were more common in females while sub-conjunctival haemorrhage was more in males.**Conclusion:** Refractive errors are the commonest cause of childhood visual impairment in our setup. Correcting these preventable diseases can have a positive impact on the performance of children at school.**Keywords:** Visual acuity, Paediatric, Myopia, Hypermetropia, Kerato-conjunctivitis.

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Introduction

Decreased vision, whether congenital or acquired can negatively affect the learning of a child. It not only leads to bad quality of life but also has detrimental effects on the person's self-esteem caused by lack of employment opportunities and other social stigmatization. [1] According to WHO, about 5 percent of the global blind population comprises of children (approximately 1.5 billion). The burden of blindness in the third world countries of Africa and Asia is three to four folds as compared to developed countries, contributing to 80- 90% of the number of blind children worldwide.[2] Every year, 5,000,000 children become blind and it is found that the majority of cases are caused by

preventable ailments. [3] The most common cause of visual impairment, all over the world, is refractive error.[4] According to the Farrukh et al, the ratio of blindness among children was 1 per 10,000 children, which accumulated the total to 60,000 blind children. A possible contributing factor of congenital visual impairment is consanguineous marriages and maternal infections.[5] The visual acuity is also impaired among the people as per Jadoon et al. That is 66.7% are caused by cataracts.[6] The range of ocular morbidity shows regional disparity, at a national level and sub-national level, often with respect to racial and genetic make-up. In the United States, squint,

amblyopia and refractive error were the most common causes of visual disability in school going children.[7] While in Nigeria, refractive error accounts for 25.7%, allergic conjunctivitis makes up to 25.3%, ocular trauma about 13.3% and corneal infections 12.5%.[8] Although in Ethiopia, the most frequent reason of ocular diseases among kids was trachoma (33.7%), while refractive errors came out to be 6.3% and non-trachomatous conjunctivitis was about 5.9%.[9] In India, about 30% of the visually impaired people acquire this disability before 20 years of age.[10] Ocular morbidities, in order of their prevalence included refractive error (23.6%), vernal conjunctivitis (17.32%) and infection of eye (15.13%).[11] The rationale of this study was to find out the causes of vision impairment in multi-centric tertiary care Hospitals in Udaipur Rajasthan so that preventable diseases of paediatric age group could be tackled in time to avoid blindness.

Aims & objectives: To determine the frequency of different ocular conditions leading to ocular morbidity in a multi-centric tertiary care hospital.

Study Design: Descriptive cross-sectional study.

Place and Duration of Study: Study was done in multi-centric tertiary care hospitals at Udaipur, Rajasthan from February 2024 to January 2025.

Methodology: The sample size was calculated by Open epi-calculator with margin of error as 5% and 95% confidence interval; the sample size came out to be 556. All patients of 5 to 15 years of age were included in this study. Patients belonging to either

gender, presenting in the OPD for eye related problems were included. All patients, who had unaided visual acuity of 6/6 in both eye and no ocular abnormality detected on detailed examination were excluded from the study. Children with congenital syndromes like Down's syndrome, etc. leading to eye diseases were also excluded. After written informed consent from the parents of the children, all children underwent auto refractometry by a trained optometrist. Visual acuity was checked with Snellen chart. Cycloplegic refraction (by using Cyclopentolate hydrochloride 1.0% drops) was done in patients with visual acuity of less than 6/9 in the worse eye. Detailed examination of anterior segment and fundus of the eye was done with Slit lamp Bio-microscope and +90 Diopter by an ophthalmologist. The information collected from the patients was entered in a pre-designed Performa. Data was analyzed by using SPSS version 22. Mean with standard Deviation was calculated for age. Frequency and percentages were computed for gender, ocular morbidity e.g., myopia, hypermetropia, strabismus, Vernal Keratoconjunctivitis, astigmatism, red eye, subconjunctival hemorrhage etc. Effect modifiers like age and gender were addressed through stratification. Post-stratification chi-square test was applied with p-value ≤ 0.05 .

Results:

Out of 556 participants of the study, there were 308 (55.4%) males and 248 (44.6%) females. Average age of the patients was 11.15 ± 3.44 years.

Table 1: Most Common Ocular Morbidity in Childhood (No.= 556)

S. No.	Cause of vision impairment	Number of patients	Percentage (%)
01.	Myopia	188	33.81%
02.	Red eye	148	26.60%
03.	Astigmatism	072	12.95%
04.	Hypermetropia	036	06.47%
05.	Vernal Keratoconjunctivitis	034	06.12%
06.	Sub-conjunctival hemorrhage	026	04.68%
07.	Strabismus	008	01.44%

As per table no.1 myopia and red eyes were the major causes of paediatric ocular morbidity i.e. 33.81% and 26.6% respectively.

Table 2: Ocular Morbidity with Respect to Paediatric Age Groups (No.=556)

S No.	Ocular Morbidity	Age group in years		P-Value
		5-10 yrs (No.=210)	11-15 yrs (No.=346)	
01.	Decrease Vision	112 (53.3%)	222 (64.2%)	0.074
02.	Myopia	42 (20%)	146 (42.2%)	0.0005*
03.	Hypermetropia	18 (8.6%)	18 (5.2%)	0.268
04.	Strabismus	6 (2.9%)	2 (0.6%)	0.122
05.	Vernal Keratoconjunctivitis	18 (8.6%)	16 (4.6%)	0.183
06.	Astigmatism	36 (17.1%)	36 (10.4%)	0.105
07.	Red Eye	64 (30.5%)	84 (24.3%)	0.257
08.	Sub-conjunctival hemorrhage	12 (5.7%)	14 (4%)	0.523

Comparison between two age groups is shown in Table no.2. Myopia was higher in age group with 11

to 15 years. All the other ocular diseases were similarly common in both age groups.

Table 3: Ocular morbidity with respect to gender (No.= 556)				
S No.	Ocular Morbidity	Gender		P-Value
		Male (No.=308)	Female (No.=248)	
01.	Decrease Vision	162 (52.6%)	172 (64.2%)	0.005*
02.	Myopia	86 (27.9%)	102 (42.2%)	0.021*
03.	Hypermetropia	26 (8.4%)	10 (5.2%)	0.138
04.	Strabismus	4 (1.3%)	4 (1.6%)	0.827
05.	Vernal Keratoconjunctivitis	20 (6.5%)	14 (5.6%)	0.769
06.	Astigmatism	28 (9.1%)	44 (10.4%)	0.033*
07.	Red Eye	102 (33.1%)	46 (18.5%)	0.06
08.	Sub-conjunctival hemorrhage	22 (7.1%)	4 (1.6%)	0.030*

Gender difference indicated that rate of decrease Vision, myopia, astigmatism and sub-conjunctival haemorrhage were also statistically significantly different between male and female as shown in table 3.

Discussion

Visual disabilities of children affect their ability to learn, their wisdom, studying power and behaviour. Statistics on diagnosis of ocular diseases in kids is the key for to carry out preventive and curative facilities. In the present study, the average age of the patients was 11.15 ± 3.44 years. In a study by Mehari et al, the mean (SD) age of the study population was about 9.37 (4.95) years. [12] Biswas et al had 714 patients including 416 (58.26%) males and 298 (41.74%) females. All the patients were divided into three broad groups, that is, 0–4, 5–9, and 10–14 years. Majority, that is, 70.73% of the study subjects were in the 10–14 years of age group. [11] Different studies had been done which concluded the burden of ocular morbidity among paediatric population. One of the study from Nigeria found that refractive error was the most common (25.7%) while the vernal conjunctivitis was second commonest cause of visual morbidity.[13] In another study in Tikrit, Iraq, allergic conjunctivitis (27%) came out to be most prevalent and the second most common was refractive errors (14.6%) followed by ocular trauma (13.8%), infection (12.7%), squint (12.1%) and nasolacrimal duct obstruction (NLDO, 5.2%).[14] Active trachoma (51.6%) was the most common in central Ethiopia in children under 10 years of age.[15] In another study, refractive error was the commonest cause of decrease vision in children.[16] This was consistent with our results. Different studies show variability in the prevalence of refractive error from 12% to 31%. [17,18] Higher prevalence of refractive errors is seen among older age group of children which also endorse the results of our study. This could be because of lack of awareness among caretakers to recognize visual problem at an earlier stage. The prevalence of refractive errors ranges between 21% and 25% in India.[19] Similar prevalence of refractive errors has

been observed among different studies in Shimla, Kolkata and also in Ahmedabad.[20] Data on prevalence of different causes of ocular morbidity from a particular region is a pre-requisite for planning preventive and curative services. There are insufficient data regarding hospital-based studies on childhood ocular morbidity. To combat this, school eye screening programs should be strengthened so that visual impairment due to refractive errors could be reduced. Majority of the causes of ocular morbidity are preventable.

Conclusion

Refractive errors are the commonest cause of childhood visual impairment, which can be easily handled. Early detection and management can have a positive impact on the performance of children at school. The problem can be solved by simple spectacle correction. Ongoing repeated inspection platforms should be implemented to trim down the prevalence of ocular diseases in children.

Ethical Approval: The study was approved by the Institutional review board/Ethical review board.

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