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# Prevalence of pediatric ocular morbidity in tertiary care hospital in Lucknow District

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***Abstract*---**Globally as of mid-2020, about 26% of the world's population was under 15 years old .[1] Ocular morbidity in children is a global problem being faced today that has a tremendous influence on the society. This was a cross sectional, observational study in a tertiary care hospital in Lucknow, UttarPradeshwhich was carried out for 12 months i.e. from September 2019 to august 2020 on1 to 15 years old patients . Maximum burden i.e. ≥90% of pediatric ocular disease is from refractory error, allergic conjunctivitis, computer vision syndrome, congenital NLD block, few infective diseases and ocular trauma so the managing these diseases only can help ≥90% pediatric ocular problems. For ≤ 10% diseases like ROP, retinal disease, cataract , glaucoma needs advanced diagnostic and therapeutic measures so for that after screening these patients in satellite centre these can be referred to tertiary care hospital.. focus on setting up peripheral eye care centre/ satellite eye care centre where a ophthalmology resident and paramedical staff can be appointed on rotatory basis will be helpful. Thus we can save few more precious eyes.

***Keywords*---**pediatric ocular, ocular morbidity, children, tertiary care hospital.

## Introduction

Globally as of mid-2020, about 26% of the world's population was under 15 years old .[1] Ocular morbidity in children is a global problem being faced today that has a tremendous influence on the society. It is estimated that there are 1.4 million blind children in the world. An additional 7 million suffer from low vision and a further 10 million children have a correctable refractive error causing visual impairment (refractive bilateral visual acuity of <6/18) Though no population-based nationwide survey has been undertaken on the prevalence of blindness in India, is estimated to be 0.8/1000 children in the age group of 0-15 years. Currently, there are an estimated 270,000 blind children in India [2]. Considering the fact that 30% of India's blind lose their eyesight before the age of 20 years and many of them are under five when they become blind, the importance of early detection and treatment of ocular disease and visual impairment among young children is obvious[3] .

However, blindness in childhood has far reaching implications for the affected child and family, and throughout life profoundly influences educational, employment, personal, and social prospects. Thus, the control of childhood blindness has been identified as a priority of the World Health Organisation's (WHO) global initiative for the elimination of avoidable blindness by the year 2020.[4] Moreover, Data on the prevalence and causes of blindness and severe visual impairment in children are needed for planning and evaluating preventive and curative services for children, including planning special education and low vision services.[5]

Though there are many studies done in past on prevalence of blindness in children but only few of them include all ocular diseases in children and none of them collected /presented data were from tertiary care hospital in Uttar Pradesh and in emerging trend of more computer/ mobile use and national programs for avoidable blindness this is the need of hour to address OR MODIFY current planning to tackle childhood ocular morbidity. Primary Objective of study was to get prevalence of different ocular diseases in pediatric population presenting to our tertiary care hospital.

## Method

This was a cross sectional, observational study in a tertiary care hospital in Lucknow, UttarPradeshwhich was carried out for 12 months i.e. from September 2019 to august 2020 on1 to 15 years old patients. All new and old patient (in ophthalmology OPD / referral from pediatric OPD of 1- 15 years age of either sex is included. Patient below age of 1 year and more than 15 years were excluded.Ocular morbidity was defined as ocular pathology requiring clinical intervention or follow-up[6].children with no ocular disease were excluded which were mainly patients referred to ophthalmology OPD for ruling out ophthalmic disorder/ signs like in case of headache of unknown origin, meningitis, Wilson disease, nutritional deficiency/ family history of ophthalmic disease in family like retinitis pigmentosa/ retinoblastoma/ ROP

Blindness was defined as the best corrected visual acuity less than 3/60 and visual field 10 degree or worse in the better eye (WHO). Moderate visual impairment was defined as presenting visual acuity less than 6/18 to 6/60 in the better eye (ICD-10) Severe visual impairment was defined as the presenting visual acuity less than 6/60 to 3/60 in the better eye (ICD-10) [7] In very few patients more than one visit was required to make confirmed diagnosis. Patient's attendant/parents were main informant for history, patient examined with the help of parents/guardians with informed consent. Though clinical diagnosis was required in most cases, in few cases there was requirement of advanced diagnostic test like CT SCAN AND MRI SCAN. Few patients were consulted with pediatric department for systemic association. Appropriate treatment is given to all patients subsequently and followed up according to protocol but that is beyond of this study's statistics.

Diagnosis is made following standard definitions and criteria. Diseases are divided into major groups. diagnostic criteria of some are following

1. refractory error: Myopia was defined as a spherical equivalent refractive error of more than −0.5 D & hyperopia of more than +2D[8]
2. Strabismus- Misalignment of the visual axis causing an outward, inward, upward, or downward deviation of either eye. [9]
3. Xerophthalmia Encompasses the clinical spectrum of ocular manifestations of vitamin A deficiency from milder stages of night blindness and Bitot's spots, to potentially blinding stages of corneal xerosis, ulceration and necrosis (keratomalacia)[6]
4. Bitot spots -Advanced dryness of the conjunctiva composed of desquamated keratinized epithelium, cheesy or foamy in appearance due to vitamin A deficiency[6]
5. Pediatric cataract- Lens opacity in one or both eyes, in children less than 15 years, due to any aetiology, dense enough to cause vision less than 6/9 was considered as a pediatric cataract. [6]
6. Anophthalmus refers to complete absence of the globe in the presence of ocular adnexa (eyelids, conjunctiva, and lacrimal apparatus).[6]
7. Microphthalmos is a developmental disorder of the eye in which one (unilateral microphthalmia) or both (bilateral microphthalmia) eyes are abnormally small and have anatomic malformations.[6]
8. Coloboma occurs due to the failure of closure of embryonic fissure. [10]
9. Retinal degenerations or dystrophies Inherited photoreceptor and/or retinal pigment epithelial dysfunction of obscure origin
10. Amblyopia is defined as the reduction of best-corrected visual acuity of one or both eyes that cannot be attributed exclusively to a structural abnormality of the eye.[9]
11. Congenital NLD block - watering from eye due to Nasolacrimal duct obstruction is a blockage of the lacrimal drainage system. In children the majority of nasolacrimal duct obstruction is congenital. [11]
12. acquired Dacryocystitis (acute or chronic)- is inflammation of the lacrimal sac which typically occurs secondarily to obstruction within the nasolacrimal duct and the resultant backup and stagnation of tears within the lacrimal sac.[12]

13. Retinopathy of prematurity- (ROP) is an eye disorder proliferative vitreoretinopathy affecting premature infants.[13]
14. Corneal blindness /scar- Corneal blindness encompasses a range of eye conditions that alter the transparency of the cornea, leading to corneal scarring and, eventually, blindness.[14]
15. *Corneal ulcer is an inflammatory or, more seriously, infective condition of the cornea involving disruption of its epithelial layer with involvement of the corneal stroma*[15]
16. Computer vision syndromecomplex of eye and vision problems related to the activities which stress the near vision and which are experienced in relation, or during, the use of the computer[16]
17. Allergic conjunctivitis/ VKCAllergic conjunctivitis is an inclusive term that encompasses seasonal allergic conjunctivitis (SAC), perennial allergic conjunctivitis (PAC), vernal keratoconjunctivitis (VKC), and atopic keratocongiuntivitis (AKC).[17]
18. Ocular Trauma with/without foreign body/chemical burn/ fire cracker burn - Based on the Birmingham Eye Trauma Terminology (BETT), ocular trauma refers to any injury of the eyes due to mechanic wound, chemical factors or radiation and they can be classified to open-globe and closed-globe injuries [18]
19. Uveitis- inflammation of the uvea.
20. Glaucoma:Childhood glaucoma is a heterogeneous group of diseases which all share the final, common pathway of ocular hypertension, and pressure-related damage to ocular structures[19]

**Statistical analysis**

Analysis of data done with SPSS Software Latest Version.

**Results**

Total number of patients in OPD was 11106 patient out of which 1058 were from paediatric age group(1 year to 15 years). 43 patient had no ocular diagnosis and they were excluded. Rest 1015 patients constituted as sample of the study and analysed with proper statistical tests. Only 19 patients required subsequent visit to make definite diagnosis(mainly refractory error) so average number of visit is 1.2. 15 Patients had 2 diagnostic category so they were put in both the groups. So the total add up of disease is 1030. In this study we found that patient presenting to us had mean age of 7.4 years ±1.2years. There were 553 male and 462 female patients with 1.2: 1 male : female ratio (p value ≤0.05 ). 716 patients were of urban background and only 299 patients were from rural background.

Maximum 343 PATIENT 33.33% was for refractory error, next in prevalence was allergic conjunctitvitis/VKC 246 PATIENTS 23.883% , patient presented with computer vision syndrome was 113 PATIENTS , 10.97% which shows hazardous effect of excessive screen time (table 1).1002( 98.7%) patients had avoidable/preventable blindness , only 13 patients patient had unavoidable blindness like patient of coloboma, Retinal disease like retinitis pigmentosa/optic atrophy,Whole globe anamoly like microphtalmos/ anophthalmos, retinoblastoma.Best corrected visual acuity at the time of presentation was

categorised according to WHO criteria of vision loss grading to know the impact of didease on patients (table 2)

Table 1

| s. no. | Disease | Total | Percentage |
|---|---|---|---|
| 1. | Refractory error | 343 | 33.30 |
| 2. | Allergic conjunctivitis/ VKC | 246 | 23.883 |
| 3. | Computer vision syndrome | 113 | 10.970 |
| 4. | Xerophthalmia/ Bitots spot | 86 | 8.349 |
| 5. | Ocular Trauma with/without foreign body/chemical burn/ fire cracker burn | 61 | 5.922 |
| 6. | Chalazion/stye/ blephritis | 48 | 4.660 |
| 7. | Amblyopia | 41 | 3.980 |
| 8. | Strabismus | 17 | 1.650 |
| 9. | Infective conjunctivitis | 17 | 1.650 |
| 10. | congenital NLD block | 15 | 1.450 |
| 11. | Pediatric cataract | 8 | 0.776 |
| 12. | Retinal disease like retinitis pigmentosa/optic atrophy | 6 | 0.582 |
| 13. | Corneal blindness | 6 | 0.582 |
| 14. | acquired Dacryocystitis | 5 | 0.485 |
| 15. | Glaucoma | 3 | 0.291 |
| 16. | Whole globe anamoly like microphtalmos/ anophthalmos | 3 | 0.291 |
| 17. | Corneal ulcer | 3 | 0.291 |
| 18. | Orbital disease/ abscess/ cellulitis | 3 | 0.291 |
| 19. | Uveitis | 2 | 0.194 |
| 20. | Systemic syndrome associated disease like marfans | 2 | 0.194 |
| 21. | Retinoblastoma | 1 | 0.097 |
| 22. | Congenital anamoly like coloboma | 1 | 0.097 |

Table 2- vision at presentation

| s. no. | Disease | Severe vision loss/ blindness <6/60 to PL negative | Moderate vision loss <6/18 to >6/60 | Mild/ No vision loss 6/6-6-18 | Non verbal patients AND / OR Could not be assesed | Total |
|---|---|---|---|---|---|---|
| 1. | Refractory error | 7 | 90 | 246 | 0 | 343 |
| 2. | Allergic conjunctivitis/ VKC | 0 | 2 | 155 | 89 | 246 |
| 3. | Computer vision syndrome | 0 | 0 | 97 | 16 | 113 |
| 4. | Xerophthalmia/ Bitots spot | 4 | 8 | 58 | 16 | 86 |
| 5. | Ocular Trauma with/without foreign | 13 | 3 | 0 | 45 | 61 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | body/chemical burn/ fire cracker burn | | | | | |
| 6. | Chalazion/stye/blephritis | 0 | 2 | 46 | 0 | 48 |
| 7. | Amblyopia | 19 | 7 | 15 | 0 | 41 |
| 8. | Strabismus | 1 | 5 | 9 | 2 | 17 |
| 9. | Infective conjunctivitis | 0 | 0 | 16 | 1 | 17 |
| 10. | NLD block congenital | 0 | 0 | 0 | 15 | 15 |
| 11. | Pediatric cataract | 5 | 0 | 0 | 3 | 8 |
| 12. | Retinal disease like retinitis pigmentosa/optic atrophy | 3 | 1 | 0 | 2 | 6 |
| 13. | Corneal blindness | 4 | 0 | 0 | 2 | 6 |
| 14. | acquired Dacryocystitis | 0 | 0 | 5 | 0 | 5 |
| 15. | Glaucoma | 2 | 0 | 0 | 1 | 3 |
| 16. | Whole globe anamoly like microphtalmos/ anophthalmos | 3 | 0 | 0 | 0 | 3 |
| 17. | Corneal ulcer | 3 | 0 | 0 | 0 | 3 |
| 18. | Orbital disease/ abscess/ cellulitis | 0 | 0 | 3 | 0 | 3 |
| 19. | Uveitis | 0 | 2 | 0 | 0 | 2 |
| 20. | Systemic syndrome associated disease like marfans | 2 | 0 | 0 | 0 | 2 |
| 21. | Retinoblastoma | 0 | 0 | 0 | 1 | 1 |
| 22. | Congenital anamoly like coloboma | 1 | 0 | 0 | 0 | 1 |
| | Total | 67 | 120 | 650 | 193 | 1030 |

**Discussion**

In our study maximum children presented with refractory error which was 28.44 % and it is very similar to data of refractory error presented by OT BODUNDE ET AL[20]. Which show it 24.61% [20], Abdulrahman Darraj et al[21] show it 26.5%. earlier there has been taboo on using glasses especially by female child but now this taboo has diminished. Almost 99 % of patients were compliant to glasses of said power on subsequent visit. Vernal and allergic conjunctivitis was next prevalent cause of visit to eye opd and in few patients was associated with other diseases like refractory error, lid disease (stye, blephritis and chalazion) data by veer sing et el [22]show allergic conjunctivitis (1.92%) and 17. 2% in study by Pratap et al[23]. as there is more pollution/ smoke in todays world our data shows a increased risk of todays children with allergy as previously noted. These patient were told to identify allergen and avoid them if possible in addition to eye drops to control inflammation and allergy.

Computer vision syndromeprevalence is 10.9%in our study which was conducted in pre-covid era when the use of digital device is comparatively less than covid and post covid era. in previous studies of covid eraprevalence ranges from 50 %[24]

to about 92%[25] which shows hazardous effect of excessive screen time. Awareness about prevention and treatment is necessary for this upcoming pandemic. As xerophthalmia is a disease which is mainly prevalent in patients from low socio-economic statusand rural background and our hospital was having many patients from rural and poor economic background we did had a good number of cases of xerophthalmia that was 8.34%. correlate with data of Sandeep Sachdeva et al[26] but it was high in comparison to other study of Uttar pradesh[27]which shows inadequate diet and poverty causing bad health of children. Recent meta-analyses confirm inclusion of vitamin A to children aged between 6 months and 5 years with measles vaccine in India immunization scheduleconfers a significant mortality benefit and ocular benefit. We must start few more drives so health workers remain vigilant for VAD in nutritionally vulnerable populations.

Objective of study was to get overall prevalence of eye disease with their percentage of different eye conditions in paediatric age group . As national programme to control blindness was working in all districts of india and right to vision 2020 is also contributing to this. so Nutrition related diseases are in decreasing trend in comparision to previous years. Refractory error and computer vision syndrome are main area of focus to be included in new programme for this part of community. Maximum of these diseases were requiring only basic setup like refraction facility, slit lamp examination for diagnosis and follow up both. So satellite centre of tertiary care hospital will be a good option to tackle the situation. Resident Opthalmologist / optometrist can be utilized for the same as there is scarcity of trained ophthalmologist in the country(india). School based screening programme and awareness programme for it will be helpful. Treatment needs glasses and basic medications mainly in the form of eye drops which are easily commercially available and also in government supply free of cost. For prevention adequate awareness programmes and counselling which can be done by paramedical staff is usually sufficient.

Limitation of study is small no. of patient studied. As this is hospital based study it gives the idea of different ocular disease which are commonly present in paeditric age group but large scale study may be required to generalize these findings for the community. As we studied the patient in tertiary eye care. we might not get accurate percentage of disease as many patient has not access to eye care due to multiple barriers i.e. non-availability of ophthalmologist/ lack of transport/ loss of wages of parents during hospital visit/ un-awareness of disease seriousness especially in case of amblyopia

**Conclusion**

Maximum burden i.e. ≥90% of pediatric ocular disease is from refractory error, allergic conjunctivitis, computer vision syndrome, congenital NLD block, few infective diseases and ocular trauma so the managing these diseases only can help ≥90% pediatric ocular problems. For ≤ 10% diseases like ROP, retinal disease, cataract , glaucoma needs advanced diagnostic and therapeutic measures so for that after screening these patients in satellite centre these can be referred to tertiary care hospital.. focus on setting up peripheral eye care centre/ satellite eye care centre where a ophthalmology resident and paramedical staff

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