



Original Research Article

Prevalence of ocular morbidities in pediatric age group at a tertiary care hospital: A cross sectional study

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ABSTRACT

Background: Ocular morbidities affecting the children result in a serious health and economic burden and negatively impacts their developmental milestones. This study was performed to assess the prevalence and pattern of ocular diseases, and to know the common causes of childhood blindness amongst the children aged 0-15 years.

Materials and Methods: This was a single centre, cross-sectional observational study performed in the Department of Ophthalmology, Government Medical College and Hospital, Latur, Maharashtra, India and involved 380 children, aged 0-15 years, presenting with different ocular morbidities. The study was performed over a period of 18 months i.e., from January 2018 to June 2019. A detailed history and ophthalmic examination (consisting of visual acuity, color vision, refraction, cycloplegic refraction, anterior segment examination, fundus examination, and detection of squint) were performed to evaluate different ocular diseases.

Results: Majority of the cases were males (52.9%), and belonged to 11-15 years of age group (53.9%). Amongst all the presenting ocular complaints, diminution of vision (34.50%) followed by headache (9.20%), and itching in eyes (8.20%) were most prevalent. Majority of the cases had good visual acuity [(best-corrected visual acuity) >6/18, 65.50%]. While, severe visual impairment was observed in 2.90% cases. Refractive errors (31.60%) followed by allergic conjunctivitis (19.20%) were the most commonly observed ocular disorders. Moreover, myopia (43.33%) was the commonest refractive error. Similarly, amongst cases with ocular infection, most commonly observed condition was infective conjunctivitis (24.44%). Finally, congenital cataract (27.91%) and blunt ocular trauma (52.63%) were the most frequently observed congenital ocular disease and cause of ocular trauma respectively among children.

Conclusion: Findings of this study highlight that the majority of the pediatric ocular morbidities are both preventable and treatable. However, efforts should be directed towards health education and screening programs in children.

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1. Introduction

Childhood ocular morbidities comprise of a wide range of ocular diseases that have negative impact on child's mental development, education, and quality of life. According to the recent WHO estimates, globally, around 285 million individuals are affected by debilities of vision, of which 246 million have impaired vision, and remaining 39 million suffer from blindness.¹ Approximately one child becomes

blind every minute, this is equivalent to 500,000 children every year and after developing blindness, 60% of them do not survive for more than 1-2 years.² Notably, information pertaining to the prevalence of ocular morbidities in younger populations, especially in children, is rare. Recent studies have highlighted the fact that more than 30% of India's blind population lose their vision during childhood. Intriguingly, many of them belong to less than 5 years of age.³

Control and prevention of childhood blindness is the main priority of WHO's "VISION 2020: the Right to Sight" programme.⁴ The present global scenario reveals

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uncorrected refractive error (RE) as the most common cause of moderate to severe visual dysfunction. Recently, an African population-based survey reported that only 0.1% of the study sample was blind, while ocular morbidities such as conjunctival disorders and RE were found in 7.6% and 5.6% of the population, respectively.⁵ Similar study conducted in Pakistan reported 30.6% prevalence of ocular morbidity.⁴ Additionally, ocular injury is an imperative cause of eye ailment in children all over the world, which has a substantial impact on socioeconomic status as well.⁶ A recent study has revealed that childhood blindness was the area of main concern, because of the number of years of blindness that follows.⁷ Ocular injuries in children accounts for up to one-third of all ocular admissions, with significant economic allusions for the health care providers. Further, development of approaches for the treatment and prevention of ocular morbidity requires a better understanding of the epidemiology of these ocular disorders and their features.⁷ However, there are no consistent methodologies or techniques, globally, for the collection of cross-sectional data or information pertaining to pediatric ocular morbidity and the ability to undertake detailed epidemiological and health economic analyses. Previous studies have shown that the prevalence of ocular morbidity varies in different geographical locations.

Thus, the present study was undertaken to estimate the prevalence and pattern of ocular diseases, and to know the common causes of childhood blindness amongst the children aged 0-15 years.

2. Materials and Methods

This was a prospective, observational study conducted in the Department of Ophthalmology, Government Medical College and Hospital, Latur. The study was performed over a period of 18 months i.e., from January 2018 to June 2019 and involved 380 children of either-sex and aged 0-15 years, who came to the Eye OPD during the study period. Prior to beginning, the study protocol was approved by the Institutional Ethics Committee. After explaining the study procedures, an assent from the subjects and written informed consent from the parents or legal guardians was obtained.

2.1. Eligibility criteria

Children of either-sex and aged between 0-15 years were included in the study. While, children were excluded from the study, if either the children did not give assent or the parents or guardians refused to give informed consent.

2.2. Study procedure

Detailed history of the disease was taken and following ophthalmic examinations were performed in all the enrolled children: Gross examination of eyelids, adnexa, cornea,

conjunctiva, anterior chamber, iris, and pupil, lens using torch light; Examination of anterior segment with slit lamp; Measurement of visual acuity; Refraction; Retinoscopy and subjective refraction for all patients with refractive error; Colour vision using Ishihara Chart; Examination of the fundus with direct ophthalmoscope; Indirect ophthalmoscopy, if required; Detection of squint: extra-ocular movements, Hirschberg's test, and cover-uncover test; and Cycloplegic refraction, if required.

2.3. Procedure for visual acuity assessment

Depending on the age groups involved, different methods were used. For children aged 0-1, 1-5, and more than 5 years, methods used were flash light, Cardiff cards, and Snellen's chart, respectively. In flash light method, fixation pattern was correlated with visual acuity, as follows: visual acuity of 5/60, 6/60, 6/24-6/60, 6/9-6/18, and 6/6 were correlated with Gross eccentric fixation or affixation; Unsteady central fixation; Central steady fixation, but will not hold fixation when cover is removed; Central steady fixation will hold with deviating eye but prefers fixation with the other eye; and Alternates spontaneously, holds well with both eyes, cross-fixation, homonymous fixation, respectively. For Cardiff cards method, distance of 0.5 and 1 meter were converted to Snellen's equivalent.

2.4. Examination procedures

Child was subjected to routine anterior segment examination using flash light examination (LED torch light) and slit lamp, then pupil was dilated using Tropicamide (0.4%) eye drop. After half an hour, posterior segment was examined using indirect ophthalmoscope with 20D lens.

2.5. Instrumentation for ophthalmic examination

Anterior and posterior segments were examined with slit lamp microscope and indirect ophthalmoscope, respectively. Moreover, distant direct ophthalmoscopy was performed by direct ophthalmoscope. On examination, if treatable condition was observed, an appropriate treatment was prescribed, such as eye drops, free of cost, for minor complaints.

2.6. Statistical analysis

Data obtained was compiled using Microsoft Office Excel 2010. Categorical data is presented in terms of frequencies.

3. Results

A total of 537 children, of either sex, aged between 0-15 years, visited Ophthalmology OPD over a period of 18 months. Of these 537 children, 380 children were enrolled in the study.

Majority of the cases were males and belonged to the 11-15 years of age groups constituting 52.9% and 53.9% of the cases, respectively. Only 49 cases, constituting 12.9% of the total were aged less than 5 years. Moreover, sex-wise distribution revealed that a higher number of males belonged to the age group of 0-5 years (32vs17) and 6-10 years (67vs59), respectively. However, for 11-15 years age group, both males and females had nearly equal distribution (102 vs 103) (Table 1).

It was observed that amongst all the ocular complaints, diminution of vision (DOV, 34.50%) followed by headache (9.20%), and itching in eyes (8.20%) were most frequently reported by the cases. On the other hand, very few study subjects reported symptoms such as loss of vision (1.60%), foreign body sensation (2.90%), asthenia (4.70%), discharge (4.70%), and watering of eyes (5%) (Table 2).

Distribution of cases on the basis of the best-corrected visual acuity (BCVA) revealed that most of the cases had good visual acuity (>6/18, 65.50%). While, only 2.90% cases had poor visual acuity (<6/60) (Table 3).

Refractive Errors (RE, 31.60%) was the most common ocular disorder observed. This was followed by allergic conjunctivitis (19.20%), and infectious eye diseases (11.80%). However, phthisis bulbi (0.50%) followed by retinal disorders (1.10%) were the least common causes (Table 4).

Amongst the RE, myopia (43.33%) followed by astigmatism (37.50%) were most commonly observed (Table 5). Similarly, amongst 45 cases with infection, most commonly observed conditions were infective conjunctivitis (24.44%) followed by infection of external hordeolum (20.00%), blepharitis (17.78%), and chronic dacryocystitis (13.33%) (Table 1). Moreover, out of the 43 cases with congenital eye diseases, congenital cataract (27.91%) was most frequently observed. This was followed by congenital nasolacrimal duct obstruction (CNLDO) (25.58%), and ocular colobomas (16.28%) (Table 2). Finally, amongst 38 cases presenting with ocular trauma, majority of the cases suffered blunt trauma (52.63%) followed by eyelid tear (15.79%), and corneal foreign body (13.16%) (Table 3).

Based on the age-wise distribution of ocular morbidity, it was noted that children aged between 6-10 years (6.8%) and 11-15 years (24.47%) accounted more for REs. On a positive note, none of the cases aged below 5 years reported squint and vitamin A deficiency (VAD). Similarly, none of the cases, aged between 6-10 years, had corneal opacity. On the other hand, infective eye diseases were equally observed amongst cases aged 6-10 years (5%) and 11-15 years (5%). Moreover, for cases aged below 5 years, there was equal distribution of REs (0.263%) and retinal disorders (0.263%). Finally, it was noted that allergic conjunctivitis was the most prevalent amongst children aged 11-15 years (19.2%) (Table 6).

Additionally, distribution of ocular morbidity according to sex revealed that allergic conjunctivitis (40 vs 33), congenital diseases of eye (30 vs 13), ocular trauma (23 vs 15), and chalazion (8 vs 4) were most prevalent amongst male. However, REs (65 vs 55) were more prevalent amongst female (Table 4).

4. Discussion

Ocular morbidity in childhood is considered as a principal reason for visit to an ophthalmologist. If neglected, it can lead to varying degrees of visual impairment. Various studies have highlighted the fact that prevention and treatment modalities of ocular disorders, if practiced appropriately, help in reducing the economic and social burden of ocular diseases.⁸⁻¹⁰ Information obtained from this study might be useful in improving the existing eye care facilities for pediatric population at tertiary care centers, thereby, reducing the prevalence of childhood blindness and severe visual impairment.

In the present study, there were 52.9% males and the sex ratio was 1.12:1. These findings are consistent with those reported by Sinha et al.,⁹ Qamruddin M,¹¹ and Mehta et al.¹² in which similar sex ratio was reported. However, in contrast to the findings of the present study, Mehari ZA,¹⁰ and Annamalai et al.¹³ reported that females formed majority of the cases i.e., 50.2%, and 54.98%, respectively.

In the present study, majority of the cases belonged to 11-15 years of age (53.90%). These findings are in line with studies conducted by Mehari ZA,¹⁰ Annamalai et al.,¹³ and Sushil et al.¹⁴ wherein most of the cases belonged to the age group of 11-15 years. On the contrary, a study conducted by Qamruddin M found children aged less than 5 years (39.23%) followed by 11-15 years (32.82%) to be the most common age group involved.¹¹

The findings of the present study demonstrate that for cases aged less than 10 years, males out-numbered the females. However, for cases aged 11-15 years, there was a comparable number of males (26.85%) and females (27.05%). This is consistent with the study performed by Mehari ZA¹⁰ where the number of females exceeded males in the most common age group i.e., 11-15 years. Moreover, Mehta et al.¹² reported greater number of males, than females, in the age groups 0-5 years and greater number females, than males, in the age group of 13-16 years.

The cases, in the present study, presented most commonly with DOV (34.50%) followed by headache (9.20%). DOV is the most frequently observed presenting complaint as it an alarming symptoms for both the child and the parents. These findings are similar to those reported by Sahoo et al.¹⁵ in which blurring of vision (29%) followed by headache (7.80%) were the most common presenting complaints. However, Rai et al.¹⁶ reported watering from the eyes (24.2%) followed by DOV (21.9%) and redness (18.9%) as the most frequently observed

Table 1: Age- and sex-wise distribution of the study subjects

Age (years)	Number of children, n (%)		Total n (%)
	Males	Females	
0-5 years	32 (8.42)	17 (4.48)	49 (12.90)
6-10 years	67 (17.63)	59 (15.57)	126 (33.20)
11-15 years	102 (26.85)	103 (27.05)	205 (53.90)
Total (n)	201 (52.90)	179 (47.10)	380 (100)

Table 2: Distribution of cases according to main presenting complaints

Presenting Complaint	No. of Patients	Percentage (%)
Asthenia	18	4.70%
Discharge	18	4.70%
Diminution of vision(DOV)	131	34.50%
Foreign body sensation	11	2.90%
Headache	35	9.20%
Itching	31	8.20%
Loss of Vision	06	1.60%
Pain of eyes	24	6.30%
Photophobia	22	5.80%
Redness	26	6.80%
Swelling	23	6.10%
Traumatic injury	16	4.20%
Watering	19	5.00%
Total	380	100%

Table 3: Distribution of cases according to best corrected visual acuity (BCVA) in better eye

BCVA	No. of Patients	Percentage (%)
> 6/18 (Good)	249	65.50%
≤ 6/18 (Fair)	120	31.60%
< 6/60 (Poor)	11	2.90%
Total	380	100%

Table 4: Distribution of cases according to ocular morbidity

Ocular Morbidity	No. of Patients	Percentage (%)
Allergic Conjunctivitis	73	19.20%
Amblyopia	11	2.90%
Chalazion	12	3.20%
Congenital Eye Diseases	43	11.30%
Corneal Opacity	4	1.10%
Infections of the eye andadnexa	45	11.80%
Ocular Trauma	38	10.00%
Phthisis bulbi	2	0.50%
Refractive Errors	120	31.60%
Disorders of the Retina	4	1.10%
Strabismus/Squint	11	2.90%
Vitamin A Deficiency(VAD)	8	2.10%
Others*	9	2.40%
Total	380	100%

(*Others: include aphakia, pseudophakia, subluxated lens, staphyloma, limbal dermoid, optic atrophy, and tumours of eye and orbit.)

Table 5: Distribution of cases according to refractive errors

Refractive error	No. of Patients	Percentage (%)
Myopia	52	43.33%
Hypermetropia	23	19.17%
Astigmatism	45	37.50%
Total	120	100%

Table 6: Age-wise distribution of cases with ocular morbidity

Ocular Morbidity	Age group						Percentage (%)	
	0-5 years		6-10 years		11-15 years		Total	
	N	%	N	%	N	%	N	%
Allergic Conjunctivitis	2	0.53	23	6.05	48	12.63	73	19.21
Amblyopia	0	0.00	1	0.26	10	2.63	11	2.89
Chalazion	0	0.00	7	1.84	5	1.32	12	3.16
Congenital Eye Diseases	26	6.84	9	2.37	8	2.11	43	11.32
Corneal Opacity	3	0.79	0	0.00	1	0.26	4	1.05
Infections of the eye	7	1.84	19	5.00	19	5.00	45	11.84
Ocular Trauma	8	2.11	18	4.74	12	3.16	38	10.00
Others	1	0.26	7	1.84	1	0.26	9	2.37
Phthisis bulbi	0	0.00	2	0.53	0	0.00	2	0.53
Refractive Errors	1	0.26	26	6.84	93	24.47	120	31.58
Retina	1	0.26	2	0.53	1	0.26	4	1.05
Squint	0	0.00	7	1.84	4	1.05	11	2.89
Vitamin A Deficiency(VAD)	0	0.00	5	1.32	3	0.79	8	2.11
Total	49	12.89	126	33.16	205	53.95	380	100%

presenting complaints.

In the present study, refractive error (31.60%), allergic conjunctivitis (19.2%), infections of the eye and adnexa (11.8%), congenital ocular diseases (11.3%), and ocular trauma (10%), in the decreasing order, were the most frequently observed ocular morbidities. These observations are in accordance with the studies conducted by Sinha et al.,⁹ Qamruddin M,¹¹ and Sahoo et al.¹⁵ On the contrary, studies conducted by Sushil et al.¹⁴ and Gupta et al.¹⁷ reported allergic conjunctivitis and diseases of the conjunctiva, respectively, as the most common ocular morbidities. In the present study, a positive finding is the lower prevalence of VAD (2.10%), which might be due to good nutritional status of the children and good coverage of National Prophylaxis Program against Nutritional Blindness due to VAD in our area.

Amongst the REs, in the present study, myopia (43.33%) was most common followed by astigmatism (37.50%), and hypermetropia (19.17%). These findings are supported by Sinha et al.,⁹ where myopia (41.29%), astigmatism (38.71%), and hypermetropia (20.00%), in the decreasing order, were the REs reported. Contrarily, Mehari ZA¹⁰ reported astigmatism (53.60%), myopia (40.50%), and hypermetropia (5.90%), in the decreasing order, as the observed REs.

Infections of the eye and adnexa accounted for 11.8% of the total ocular morbidity. Moreover, infective conjunctivitis (24.44%) was the most common infection of the eye.

Similarly, Biswas et al.¹⁸ reported infective conjunctivitis (21.30%) as the most common infections of the eye and adnexa. Amongst various causes of ocular trauma, in the present study, blunt trauma (52.63%) was the most common cause. Similarly, blunt trauma (48.18%) was reported as the most common cause of ocular trauma by Gupta et al.¹⁷ Most childhood ocular trauma occurred during unsupervised play and domestic activities and males are more commonly affected. This may be because, in rural India, health of male child is given priority and cases are frequently reported to the healthcare centers.

In the present study, congenital ocular disorders (11.30%) were the fourth most common ocular morbidity. This is similar to findings observed by Biswas et al.,¹⁸ where, congenital eye diseases (13.59%) were the fourth most common ocular morbidity. Moreover, amongst congenital ocular disorders, congenital cataract (27.91%) followed by CNLDO (25.58%) were most commonly observed. Similarly, Rogers et al.¹⁹ reported congenital cataract as the leading cause of surgically correctable blindness in most developing countries. Additionally, Kashyap et al.²⁰ reported CNLDO as the second most common cause of congenital ocular disorder. Maurya et al reported commonest cause of ocular morbidity, refractive errors (39.78%) followed by infective disorders like conjunctivitis (30.64%) and blepharitis (16.85%) among the university.²¹

Most of the cases had good visual acuity (65.50%) with BCVA of > 6/18 in the better eye. While, only 2.90% cases were found to have visual impairment. These findings are consistent with those reported by Sahoo et al.¹⁵ and Rai et al.¹⁶

5. Conclusion

The present study concludes that refractive errors are the most frequently observed ocular morbidity amongst children aged < 15 years. Consequently, Diminution of vision (DOV) was the most common presenting complaint. However, majority of the children still had good visual acuity, thus, highlighting the need for early identification and management of childhood ocular diseases. The majority of the observed morbidities are preventable and easily treatable, if care is taken at an early stage. Parent education plays a pivotal role in the prevention as well as early identification and management of ocular diseases in children. Moreover, we suggest setting-up the special care units for addressing pediatric ocular ailments. Screening programs and promoting health education are the two crucial steps in reducing the prevalence of ocular morbidities. There by, reducing the national burden of childhood blindness.

6. Source of Funding

None.

7. Conflict of Interest

None.

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