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Dr. Vineet Choudhary
Department of Ophthalmology, Teerthanker Mahaveer Medical College and Research Centre, Moradabad, Uttar Pradesh, India

Dr. Ashish Chander
Head, Department of Ophthalmology, Teerthanker Mahaveer Medical College and Research Centre, Moradabad, Uttar Pradesh, India

Dr. Gopesh Mehrotra
Department of Ophthalmology, Teerthanker Mahaveer Medical College and Research Centre, Moradabad, Uttar Pradesh, India

Corresponding Author:
Dr. Ashish Chander
Head, Department of Ophthalmology, Teerthanker Mahaveer Medical College and Research Centre, Moradabad, Uttar Pradesh, India

To study the pattern of ocular morbidity in school going children in western Uttar Pradesh

Vineet Choudhary, Ashish Chander and Gopesh Mehrotra

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Abstract
Purpose: To estimate the pattern and frequency of ocular morbidity in the urban and Rural school going children aged 5-15 years.
Materials and Methods: It was cross sectional study conducted through various school camps including 1000 students in both rural and urban schools between age group 5-15 years.
Results: Ocular morbidity was found in 30.5% among all the students, 31.5% in the rural schools and 29.4% in the urban schools. Ocular morbidity was more in female students (33.5%), as compared to male (27.5%). Refractive errors was found to be the most common ocular morbidity 18.8%, followed by allergic conjunctivitis 2.2% and blepharitis 2.2%. Vitamin A deficiency was more in rural schools compared to urban schools.
Conclusion: Our study concluded that ocular morbidity was more in rural areas as compared to urban areas seen more among the females belonging to the age group of 11-15 years where Refractive error was seen as the most common cause.

Keywords: Ocular morbidity, refractive errors, conjunctivitis, vitamin a deficiency

Introduction

The child of today is the adult citizen of tomorrow and leader of the community and country as a whole in different spheres of life. It worries us more learning that in the world today a child goes blind every minute. Over 90% of blind children receive no schooling and will be unable to realize their full potential. Thus, blindness in children accounts for one third of the economic cost of blindness although it represents < 4% of the overall magnitude [1].

Childhood blindness is the second largest cause of blind person years, following cataract [2]. India has an estimated 320,000 blind children, more than any other country in the world [3]. An additional 7 million suffer from low vision, and another 10 million children have a correctable refractive error causing visual impairment (refractive bilateral visual acuity [VA] of < 6/18) [4]. Estimated National Prevalence of Childhood Blindness/Low Vision is 0.80/1000 in India [5].

Ocular morbidity is defined as the spectrum of eye diseases which includes both visually impairing and non-visual impairing conditions experienced by a population. The visually impairing ocular morbidity is a major public health problem [6].

Some common causes of ocular morbidity are –

Refractive error, Convergence insufficiency, Blepharitis, Vitamin A deficiency, Allergic conjunctivitis, Bacterial conjunctivitis, Squint, Amblyopia, Stye, Chalazion, Corneal/ Conjunctival foreign body, Ptosis, Pterygium, corneal opacity, cataract etc [7].

Most of the available studies demonstrate that corneal and lenticular conditions are the predominant causes of blindness, whereas among children outside blind schools, refractive errors are important causes of visual impairment and blindness [4].

The control of blindness in children is considered a high priority within the "WHO's Vision 2020- The Right to Sight Programme [8]." Many conditions associated with blindness lead to childhood mortality; hence, control of blindness in children is closely linked to child survival [8].

School eye health services is one of the important aspect of school health services in which children can be screened for diseases such as refractive error, squint, amblyopia, trachoma etc. Considering the fact that 30% of India's blind lose their sight before the age of 20 years, the importance of early detection and treatment of ocular morbidity and visual impairment in Young children is obvious [10].

Materials and Method

Present study was cross sectional, observational study. It was conducted by department of Ophthalmology, Moradabad district, through school screening camps in urban and rural areas of Western Uttar Pradesh. Study was conducted for a period of one year after approval from CRC & Ethics committee. 1000 students was enrolled in the study (500 urban area, 500 rural area) from 3 rural and urban school each which were randomly selected.

Before examination, permission and informed consent duly signed both in Hindi and English was taken from the principal of the school, and a date for screening was fixed. Examination was done in the respective school campuses in clean, quiet and well lit rooms. Only children present on the day of examination were screened. History taking was taken from the children as well as the teachers. VA was measured using the Snellen's VA chart at 6 m. Children with VA <6/9 underwent a pinhole vision examination to differentiate refractive errors from pathological conditions. Refractive error was diagnosed when a VA worse than 6/9 improves on pinhole test. Un dilated retinoscopy and subjective correction was done for these children.

Children requiring cycloplegic refraction and post mydriatic test was referred to hospital for further evaluation. Ocular movements and convergence insufficiency was evaluated. Anterior segment examination including lids, lacrimal sac, conjunctiva, cornea, anterior chamber, pupil, iris and lens was done using a torch light. Visual axis was checked using Heirschberg corneal reflex test and cover uncover test using distant and near targets. Un dilated fundus examination was done for every child using the small pupil aperture of a direct Ophthalmoscope. A proforma was used for documentation.

Results

Ocular morbidity was reported among 305 (30.5%) children out of total 1000 children examined. There were 505 (50.5%) males and 495 (49.5%) females. The study population included 447 (44.7%) children from 5-10 years and 553 (55.3%) subjects from 11-15 years age group. Among subjects from rural area, there were 50.9% males and 49.1% females belonging to 5-10 years age group and 52.5% males and 47.5% females belonging to 11-15 years age group. Among subjects from urban area, there were 48.9% males and 51.1% females belonging to 5-10 years age group and 49.5% males and 50.5% females belonging to 11-15 years age group. (Table 1)

The incidence of Ocular morbidity has been significantly more amongst females (33.5%) compared to males (27.5%) $p<0.05$ and it was also seen that ocular morbidity was more amongst 11-15 years age group (39.1%) compared to 5-10 years age group (19.9%). The incidence of Ocular morbidity has been significantly more in Rural (31.5%) compared to Urban (29.4%) $P=0.468$ (Table 2).

Among children from rural schools, the prevalence of ocular morbidity was significantly more among females (36.2%) compared to males (27.2%) and in urban schools incidence was significantly greater in females (31.0) compared to males (27.9%) but the difference was statistically insignificant. Among children from rural schools, the incidence of ocular morbidity was significantly more among 11-15 years age group (40.6%) compared to 5-10 years age group (20.6%) and among urban schools, the incidence was significantly more among 11-15 years age group (37.5%) compared to 5-10 years age group (19.2%). (Figure 1)

Refractive errors was found among 188 (18.8%), Convergence Insufficiency among 29 (2.9%), Allergic conjunctivitis among 22 (2.2%), Blepharitis among 22 (2.2%), Vitamin A deficiency among 18 (1.8%), Bacterial conjunctivitis among 9 (0.9%), Ambylopia among 4 (0.4%), Squint and Stye among 3 (0.3%) each, Chalazion, Congenital dacryocystitis, Corneal foreign body, Insect bite, Pseudophakia and Ptosis among 1 (0.1%) each. Blepharitis and Vitamin A deficiency was significantly more among subjects from rural schools compared to urban schools (Table 3).

Table 1: Distribution of population according to location, age and gender

Type of school	Gender	Age groups		Total
		5-10 years	11-15 years	
Rural	Male	116	145	261
		50.9%	52.5%	51.8%
	Female	112	131	243
		49.1%	47.5%	48.2%
	Total	228	276	504
		100.0%	100.0%	100.0%
Urban	Male	107	137	244
		48.9%	49.5%	49.2%
	Female	112	140	252
		51.1%	50.5%	50.8%
	Total	219	277	496
		100.0%	100.0%	100.0%

Table 2: Distribution of ocular morbidity among different gender, location and age group

	Ocular morbidity		Total
	Absent	Present	
Male	366	139	505
	72.5%	27.5%	100.0%
Female	329	166	495
	66.5%	33.5%	100.0%
Rural	345	159	504
	68.5%	31.5%	100.0%
Urban	350	146	496
	70.6%	29.4%	100.0%
5-10 years	358	89	447
	80.1%	19.9%	100.0%
11-15 years	337	216	553
	60.9%	39.1%	100.0%

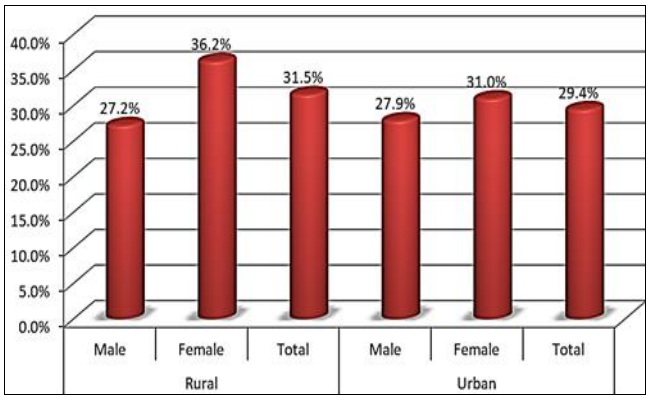

Fig 1: Distribution of ocular morbidity according to location and gender

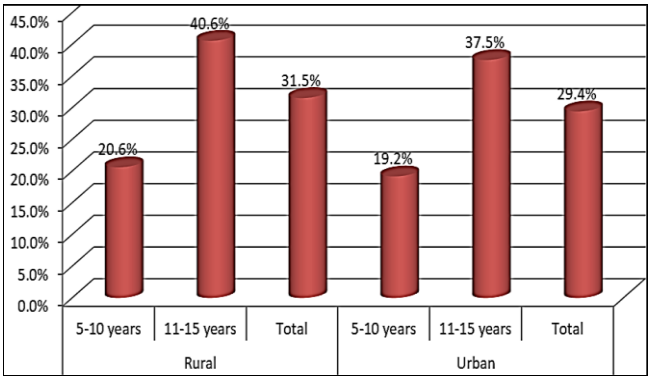

Fig 2: Distribution of ocular morbidity according to location and age groups

Table 3: Distribution of various types of ocular morbidity according to location

	Location		Total	*p*-value
	Rural	Urban		
Refractive errors	92	96	188	0.656
	18.3%	19.4%	18.8%	
Convergence insufficiency	15	14	29	0.885
	3.0%	2.8%	2.9%	
Allergic conjunctivitis	11	11	22	1.000
	2.2%	2.2%	2.2%	
Blepharitis	13	9	22	0.048*
	2.6%	1.8%	2.2%	
Vitamin A deficiency	12	6	18	0.001
	2.4%	1.2%	1.8%	
Bacterial conjunctivitis	5	4	9	0.720
	1.0%	0.8%	0.9%	
Ambylopia	2	2	4	1.000
	0.4%	0.4%	0.4%	
Squint	2	1	3	0.573
	0.4%	0.2%	0.3%	
Stye	2	1	3	0.573
	0.4%	0.2%	0.3%	
Chalazion	0	1	1	0.314
	0.0%	0.2%	0.1%	
Congenital dacryocystitis	1	0	1	0.321
	0.2%	0.0%	0.1%	
Conjunctival foreign body	1	0	1	0.321
	0.2%	0.0%	0.1%	
Corneal foreign body	1	0	1	0.321
	0.2%	0.0%	0.1%	
Insect bite	1	0	1	0.321
	0.2%	0.0%	0.1%	
Pseudophakia	0	1	1	0.314
	0.0%	0.2%	0.1%	
Ptosis	1	0	1	0.321
	0.2%	0.0%	0.1%	

Discussion

The sources resulting in ocular morbidity as well as blindness differ across the countries due to difference in environmental variables followed by socioeconomic and geographic as well as ethnic backgrounds. It might as well get affected due to the child's personal biological factors as well as their entire wellbeing. The study population in the present study consisted of 504 rural and 496 urban school children.

There were 53.2% males and 46.8% females in the current study which co-incited with the study by Adhikari *et al.* [11] However, this was different from to the Singh *et al.* [7] study where males 47.9% were lesser than females 52.9%. The ocular morbidity was present among 30.5% school children in the current study that has been quite same to Singh *et al.* [7] the incidence of ocular morbidity was 29.35% with 29.33% among males and 29.37% amongst females. These outcomes have been similar with the research work by Gupta *et al.* [12] stated a comparable 31.6% occurrence in population of Shimla.

Similar to the present study, Singh *et al.* [7] showed that there has been an increase in the occurrence of ocular morbidity followed by growing age, which has been seen similar to the study of Kumar *et al.* [13]. This may be because of increasing awareness amongst the children with growing age that enabled them to speak regarding their difficulties and problems way more frankly with doctors, leading to increased number of reported ocular problems in the older children.

In current study, 31.7% urban school children and 29.8% rural school children had ocular morbidity. This co-incited with the research study by Singh *et al.*, 28.65% children in urban schools and 30.05% of the children in rural schools had ocular morbidity with no statistical difference [7].

In the present study, refractive error has been seen as the commonest cause responsible for ocular morbidities with a prevalence of 18.8% which is similar to the study of "Singh *et al.* (17.36%) [7], Gupta *et al.*" [14] Who as well founded refractive errors to be the commonest morbidity, with a prevalence of 22%. Das *et al.* [15], in Kolkata and Desai *et al.* [16] in Jodhpur as well stated a comparable incidence of 25.11% and 20.8%, respectively. Vitamin A deficiency was reported among 1.8% children which coincided with the study of Singh *et al.*, "Vitamin A deficiency" in the form of "conjunctival xerosis and bitot's spots" were seen amongst 2.09% children. Gupta *et al.* [17] reported bitot's spots in 0.90% children. Kumar *et al.* [13] reported xerophthalmia in 4.1% children. Gupta *et al.* [14] and Desai *et al.* [16]. Found Vitamin A deficiency prevalence of 1.8% and 5.39% in their respective studies. Jyoti *et al.* performed a nation-wide analysis in the blind schools, conveying that "corneal blindness" because of "Vitamin A deficiency" has been an important causative factor responsible for blindness in children [18].

Our study revealed allergic conjunctivitis to be prevalent in 2.2% children. A study performed by Lu *et al.* [19] in China displayed a somewhat comparable prevalence of 0.65%. Ntim-Amponsah and Ofosu-Amaah [20] reported a lower prevalence of 2 out of 997 children screened in their study. This difference could be due to difference in race, region and weather conditions or due to a smaller sample size in their study.

Bacterial conjunctivitis was found in 0.9% children, similar to the study performed in Shimla by Gupta *et al.* [14] which reported a prevalence of 0.8%. Delhi based study conducted by Kumar *et al.* [13] and Jodhpur based study performed by Desai *et al.* [16] concluded a higher prevalence of 4.6% and 5%, respectively. This might be because of overcrowding followed by unhygienic living conditions as well as practices of slum dwelling children in Delhi.

In our study, the incidence of strabismus (squint) has been 0.3%. Similar as well as comparable incidence has been documented by Desai *et al.* [16] (0.21%), Ntim-Amponsah and Ofosu-Amaah [20] (0.2%) and Nepal *et al.* [21] (1.63%). A higher incidence of strabismus has been reported in the study by Lu *et al.* [19] (2.49%), Yekta *et al.* [22] (2.02%), Gupta *et al.* [14] (2.5%).

The prevalence of Amblyopia was 0.4% in our study. Similar reports were submitted by Agrawal *et al.* [23], (0.4%) Ntim-Amponsah and Ofosu-Amaah [20] (0.2%), Lu *et al.* [19] (1.02%). In our study, stye was present in 0.3% children. This has been similar to the incidence reported in Singh *et al.* [7], (0.31%) and Desai *et al.* [16] (0.21%) studies, but contrasting to the findings of 1.3% by Kumar *et al.* [13].

Chalazion was seen among 0.1% of the children in our study that was comparable to 0.25% prevalence reported by *Desai et al.* [16] in their Jodhpur based study and 0.27% reported by Singh *et al.* [7]. The prevalence of ptosis in current study was 0.1% which was much lesser than the study by Hashemi *et al.* [24], the prevalence of ptosis was found to be 1.41%.

The prevalence of foreign body was found to be 0.1%. Higher prevalence of foreign bodies in eye was found in the study by Annamalai (8.1%) [25] and Biswas J *et al.* [26]. Annamalai [25] found that foreign body was seen commonly in the age group 6-10 years and it's seen more in females.

The results of other ocular disorders including pterygium, corneal opacity, cataract, nystagmus, insect bite, retinal detachment, optic atrophy, dacryocystitis, coloboma, pseudophakia, retinitis pigmentosa, phthisis bulbi were comparable with other studies.

Conclusion

In our study we founded that ocular morbidity was more in rural areas as compared to urban areas which showed the importance of conducting school health programme regularly in the rural areas, so as to timely detect and manage ocular morbidities. We also concluded that ocular morbidity was seen more among the females belonging to the age group of 11-15 years where Refractive error was seen as the most common causes. This shows us the extreme importance of early detection and timely management of ocular morbidity in school going children so that they can be prevented from further frustration in future.

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