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A Hospital-based Survey on the Pattern of Ocular Diseases in Western Uttar Pradesh, India

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Abstract

Aims and Objectives: Ocular morbidities involve a spectrum of eye diseases that affect one's quality of life. Therefore, in view of the importance of visual impairment and lack of precise information, the study was conducted to determine the prevalence of various ocular morbidities in patients attending an eye hospital in relation to demographic factors. **Methods**: A hospital-based cross-sectional study was conducted in Gandhi Eye Hospital, Aligarh, from April 2018 to June 2019. The information regarding name, gender, residential address, marriage, and diagnosis were recorded. Chi-square test was applied to test the statistical significance. **Results:** A total of 812 individuals formed the study population. The majority of patients were from the age group 11–20 years. The prevalence of ocular morbidities was 54.1% among males and 45.9% among females. Conjunctivitis (22.5%), refractive errors (20.0%) and cataract (16.4%) formed more than 50% of ocular morbidities followed by strabismus (7.6%), corneal opacity (7.0%), glaucoma (5.9%), amblyopia (2.9%), Vit A deficiency (2.8%), blepharitis (2.8%), and ptosis (2.2%). **Conclusion:** The study reveals that conjunctivitis and refractive errors were the most common causes of ocular disorder among children and cataract was the most common cause of visual impairment among the elderly population. Since majority of the causes were either treatable or preventable, therefore health education activities and programs should be intensified.

Keywords: Cataract, Conjunctivitis, Northern India, Ocular morbidities, Prevalence, Refractive errors

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Introduction

Probably of all the senses, vision loss has the greatest impact on our lifestyle because it affects our employment, the ability to drive, and it can affect our ability to socially communicate with other people, to read all sorts of things. As humans, we are actually visual beings so to lose this has a massive impact. Earlier studies on ocular morbidities and blindness have shown that blindness and visual impairment remain major public health problem that needs to be addressed. Globally, out of the 7.33 billion people alive in 2015, an estimated 36.0 million were blind, 216.6 million people had moderate to severe visual impairment, and 188.5 million had mild visual impairment.[1] As for the children, approximately 500,000 children become blind every year, which is equivalent to one child being every minute; 60% die within 1 to 2 years of becoming blind.[2] The prevalence of childhood blindness is especially high in low resource areas; among 1.5 million children worldwide, 70-90% of them are in the poorest countries of Asia and Africa.[3] An epidemiologic, population-based approach to meeting the certain challenge of this burden will be critical.

The prevalence and spectrum of ocular problems not only vary from country to country but also from region to region in the same country. It may be due to environmental, climatic, racial, socio-economic and literacy factors.[4] To reduce the prevalence of visual impairment and blindness, it is imperative to acquire data on their prevalence. Eye diseases and visual impairments are not carefully monitored, due to low socioeconomic status and living standard in and around Aligarh. Thus, in view of the importance of the problem of blindness and the lack of precise information on the prevalence of this disability in our region, the present work was undertaken with the aim to determine the prevalence of ocular morbidities in the patients attending an eye hospital in relation to their age, gender and urban/rural residence.

We hope that the information obtained from our study will provide new data to assist the government and non-governmental organizations (NGOs) in planning and to facilitate the incorporation of primary eye care into the existing primary health care structure of the region.

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Methods

A hospital-based cross-sectional study was conducted in the Gandhi Eye Hospital, Aligarh from April 2018 to June 2019. All the patients from all age groups attending the outpatient department on alternate working days during the study period were included in the study by convenient sampling method. Those who were uncooperative and came for follow-up visits were excluded from the study. A total of 812 individuals formed the study population.

The visual acuity test was done using the Snellen VA chart by the optometrist in the hospital. The more comprehensive eye examinations such as slit-lamp examination for the anterior segment, retinoscopy, dilated fundus examination and applanation tonometry for measuring the intraocular pressure were done by ophthalmologists.

The information regarding name, gender, age, area of residence, and diagnosis was recorded from the prescription cards. The patients were asked regarding the marriage pattern

of their parents. In the case of children, history and other relevant details were taken from their parents or the guardian accompanying them. The age groups were stratified into the age intervals of 10.

Statistical Analysis

Chi-square test (χ^2) was applied to test the association of factors and $P < 0.05$ was accepted as indicative of statistical significance.

Results

Age group and gender-wise distribution of patients having ocular morbidities were calculated. Out of 812 patients, 439 (54.1%) were male and 373 (45.9%) were female with the highest number of patients in 11–20 age group (21.7%) [Figure 1]. The mean age of female patients was 33.9 ± 21.4 years and for males, it was 35.5 ± 22.2 years. The differences in the distribution of eye diseases between males and females in all age groups were found to be statistically significant ($r^2 = 19.821$, $P < 0.05$).

The distribution of various eye diseases is shown in Table 1. The total number of patients is seen more in the table than the study population because some individuals had more than one eye disease.

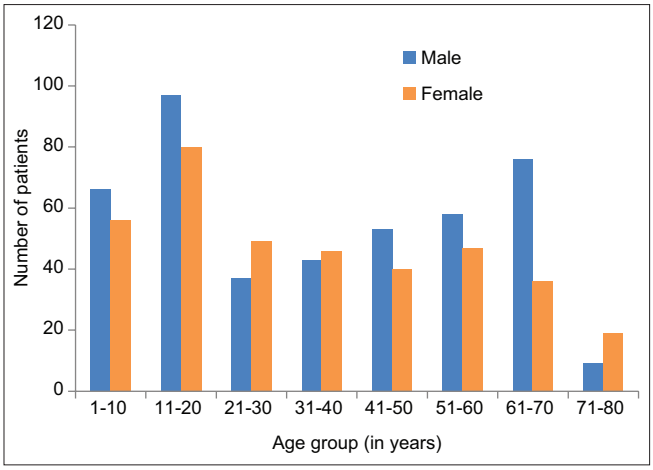

Figure 1: The age group and gender distribution of the patients (n=812)

Table 1: Pattern of distribution of ocular diseases at Gandhi Eye Hospital, Aligarh

Eye diseases	*No. of patients (%)*	*Eye disease*	*No. of patients (%)*
Conjunctivitis	183 (22.5)	RD	7 (0.8)
Refractive error	162 (20.0)	Micro/anophthalmos	7 (0.8)
Cataract	133 (16.4)	Staphyloma	5 (0.6)
Strabismus	62 (7.6)	Coloboma	5 (0.6)
Corneal opacity	57 (7.0)	Retinopathy	5 (0.6)
Glaucoma	48 (5.9)	Uveitis	5 (0.6)
Amblyopia	24 (2.9)	Limbal dermoid	4 (0.4)
Vit A deficiency	23 (2.8)	Albinism	2 (0.2)
Blepharitis	23 (2.8)	Stargardt disease	2 (0.2)
Ptosis	18 (2.2)	Ocular T.B.	1 (0.1)
Pterygium	9 (1.1)	Bell's palsy	1 (0.1)
Chalazion/Stye	9 (1.1)	Retinoblastoma	1 (0.1)
Optic Atrophy	7 (0.8)	Others*	4 (10.3)

*Others: Redness, itching, watering, eyestrain, traumatic injuries and foreign body, RD: Retinal detachment, TB: Tuberculosis

Our results show that conjunctivitis, the refractive errors and cataract accounted for more than 50% of ocular morbidities, seen in 58.9% of patients attending the hospital. Conjunctivitis was the most common ocular disorder seen in 22.5% of patients, followed by refractive error (20%), cataract (16.4%) strabismus (7.6%), corneal opacity (7.0%), glaucoma (5.9%), amblyopia (2.9%), Vit A deficiency (2.8%). Blepharitis (2.8%) was the most common eyelid disease distributed almost equally in all the age groups. Ptosis was seen in 18 patients (2.2%) followed by pterygium (1.1%), chalazion/stye (1.1%), and retinal detachment (0.8%). Other rare conditions such as staphyloma, coloboma, retinoblastoma, micro/anophthalmos, stargardt disease, ocular T.B. were also seen. A large number of patients (10.3%) were found to be complaining about common ocular symptoms such as discharge and watering (2.1%), redness (1.1%), itching (2.8%) and eyestrain (1.3%), and 3.0% were the cases of traumatic injuries.

The prevalence of conjunctivitis was more in lower age groups, with the highest number of patients present in 11–20 years of age group. The number of patients with conjunctivitis decreased with an increase in age [Table 2]. The mean age of the patients suffering from conjunctivitis was 19.1 ± 12.9 years. Both the male and female were seen to be equally affected. However, rural patients were found to be complaining of conjunctivitis more than the urban ones.

Refractive errors were the second-highest ocular morbidities and the main cause of visual impairment. The mean age of patients affected with refractive errors was 27.5 ± 14.3 years. On comparing its prevalence within various age groups, it was found to be the most prevalent in age group 11–20 years (24.0%). The total number of affected females was more than the males. This result was found to be statistically significant ($r^2 = 17.74.84$, $P < 0.001$). Cataract was found to be more prevalent among older people from rural areas. The mean age of patients with cataract was 47.9 ± 22.7 years. The number of female patients with cataract was higher (63.1%) than males. Out of the total, 16 children (12.3%) had congenital cataract as a cause of visual impairment while 7 (5.4%) were cases of traumatic cataract. The number of patients attending the hospital from rural areas (60.3%) was more than the patients from urban areas (39.7%) [Table 3]. This difference was found to be statistically highly significant ($r^2 = 25.92$, $P < 0.001$).

The distribution of patients according to various demographic parameters viz. age groups, gender, area of residence, religion and major ocular morbidities is shown in Figure 2. Among the various causes of visual impairment and blindness refractive error accounted for 32.8%, cataract 26.9%, corneal opacity 11.5%, glaucoma 9.7%, amblyopia 4.8%, Vit A deficiency 4.6%, pterygium 1.8%, optic atrophy and retinal detachment 1.4% [Figure 3].

Congenital eye anomalies were noted in 51 patients (6.2%) in the present study. These included 16 children with cataract, 12 with ptosis, 8 with micro/anophthalmos, 5 with coloboma, 4 children presented with glaucoma and 3 with strabismus. 2 patients had occulocutaneous albinism. Retinoblastoma was seen in 1 child. The majority of the patients attending the hospitals were non-Muslims (63.7%). In all, 194 (36.3%) were Muslims, out of which 24 (12.3%) had consanguineous marriages.

Discussion

Our study conducted in Aligarh, Uttar Pradesh, a part of northern India confirms the high prevalence of ocular morbidity in children. In our study, we compared the group-wise distribution of ocular

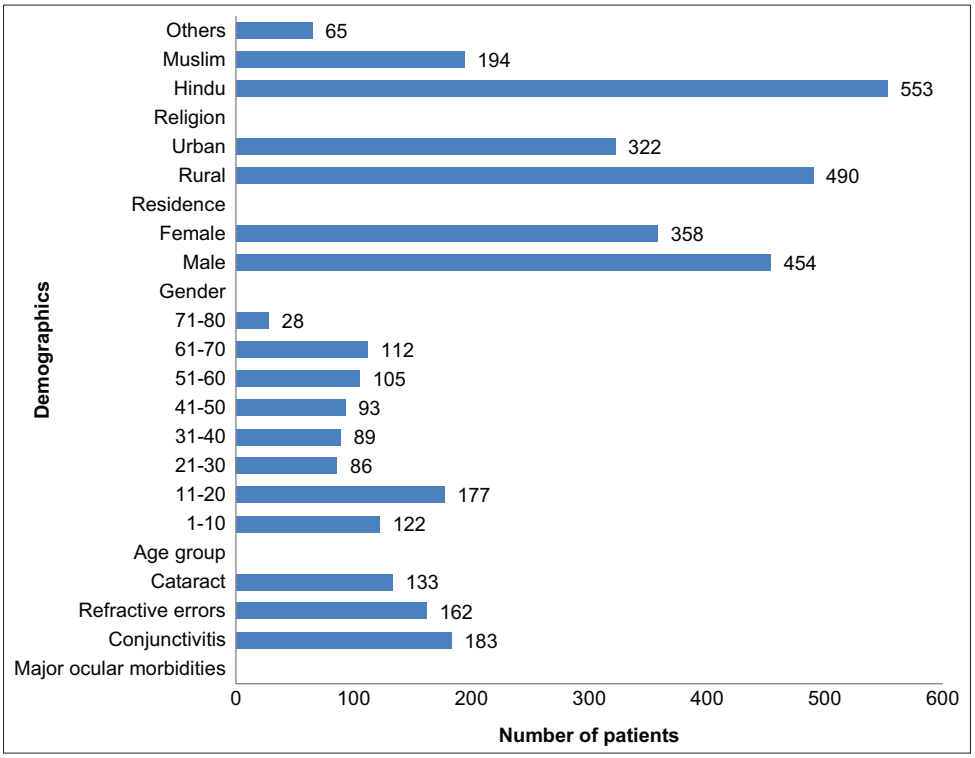

Figure 2: Distribution of the patients according to demographic parameters viz. age-group, gender, residence, religion, and major ocular morbidities in the study population

Table 2: Comparison of major ocular morbidities with different age groups and gender

Age group (in years)	*Conjunctivitis (n=183)*		*Refractive error (n=162)*		*Cataract (n=133)*	
	Male (%)	*Female (%)*	*Male (%)*	*Female (%)*	*Male (%)*	*Female (%)*
1–10	19 (3.9)	26 (5.4)	12 (2.5)	7 (1.4)	7 (1.4)	12 (2.5)
11–20	46 (9.6)	32 (6.6)	22 (4.6)	17 (3.5)	5 (1.0)	3 (0.6)
21–30	15 (3.1)	17 (3.5)	9 (1.8)	28 (5.8)	2 (0.4)	1 (0.2)
31–40	8 (1.6)	6 (1.2)	11 (2.3)	24 (5.0)	1 (0.2)	6 (1.2)
41–50	6 (1.2)	2 (0.4)	9 (1.8)	15 (3.1)	4 (4.4)	9 (1.8)
51–60	1 (0.2)	2 (0.4)	0 (0)	5 (1.0)	13 (2.7)	20 (4.1)
61–70	2 (0.4)	1 (0.2)	2 (0.4)	1 (0.2)	12 (2.5)	26 (5.4)
71–80	0 (0)	0	0	0	5 (1.0)	7 (1.46)
Total	97 (20.2)	86 (17.9)	65 (13.5)	97 (20.2)	49 (10.2)	84 (17.5)
P-value	<0.535		>0.001		<0.561	

Table 3: Comparison of major ocular morbidities with area of residence

Ocular morbidities	*Area*	
	Rural (n=490) (%)	*Urban (n=322) (%)*
Conjunctivitis	107 (13.1)	76 (9.3)
Refractive error	72 (8.8)	90 (11.0)
Cataract	84 (10.3)	49 (6.0)
Others	227 (27.9)	107 (13.1)

morbidities prevalent in different age groups. A higher number of patients suffering from ocular morbidities were seen in lower age groups and the older age groups, which implies that children and old age people are more at the predisposition of developing eye disorders. Similar results were shown by Haq *et al*., (2009).[5] The tendency of ocular diseases to occur increases at around 40 years of age. Ocular morbidity shows a steep increase after the age of 60.[6]

The results and findings of our study are comparable with other studies done in different parts of our country suggesting that ocular morbidity is a serious and consequential health issue in our country that requires appropriate eye care programs and facilities to reduce the visual impairment burden.

The overall pattern of ocular morbidities among patients was studied and conjunctivitis was found to be the most prevalent eye disease. Conjunctivitis affects many people and imposes economic and social burdens.[7] A total of 22.5% (males 12.0%, females 10.5%) were diagnosed with conjunctivitis. Similar results were reported by Awais *et al*.[8] In our study the number of affected males is more than the number of females. Though the question of which gender is more predisposed to allergic conjunctivitis is a controversial one,[9] the differences in the genetic composition of both sexes could probably be responsible for the observed difference.[10] Allergic conjunctivitis was the most common type of conjunctivitis and accounted for 83.3% of conjunctivitis. This higher rate of prevalence might be because the survey was done in summers and studies have shown that it is more frequently observed in spring and summer. Although conjunctivitis does not

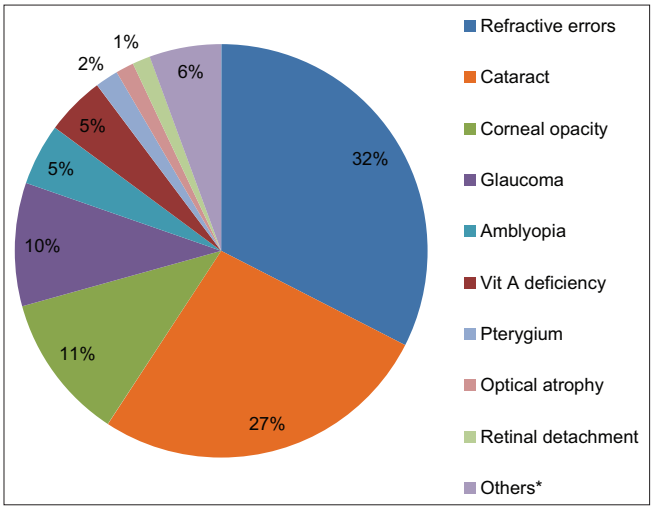

Figure 3: Pie-chart illustrating the various causes of visual impairment in the study population. Others:* Retinal detachment, staphyloma, coloboma, retinopathy, uveitis, stargardt disease, retinoblastoma

cause blindness[11] but discomfort because of signs and symptoms affect one's quality of life and productivity imparting a significant economic burden. Other infectious diseases such as blepharitis (2.8%) were also reported in the study population. This could be because of more exposure of the children in schools or due to the lack of personal hygiene.

Refractive errors which account mostly for low vision and visual impairment are also the second largest cause of ocular morbidity and accounted for 20%, which is inconsistent with other studies. The prevalence of refractive error was seen in 8.1% of males and 11.9% of females. This result was comparable with the Delhi-based study conducted by Kumar *et al*., (2007) and Gupta *et al*., (2009) who also found that refractive error was the most common disorder.[12,13] Das *et al*., (2007) in Kolkata and Desai *et al*., (1989) in Jodhpur also reported a similar prevalence of 25.1% and 20.8% respectively.[14,15] The results of comparison of visual impairment among children of different ages showed that it increases with age and is more prevalent in children aged 11–20 years. Similar results were shown in the study conducted by Sahoo *et al*., (2018).[16] The comparatively higher number of patients from urban areas could be because people in urban areas people tend to spend more timing in reading and writing and are generally more aware.

Cataract is the most common easily correctable cause of blindness in the developing regions of the world.[17] Among all the groups the prevalence rate was higher in the older age group. The majority of the patients affected were above 40 years of age (72.1%). The close association of cataract with increasing age has been well documented by studies in India[18,19] and abroad[20,21] which confirms that cataract affects a significant proportion of older age population.

There was no significant association between cataract and gender. Similar results were shown by Haq *et al*. Sixteen (12.3%) childhood cataract cases in this study were congenital. Congenital cataract is hereditary in 8.3–25% of cases; with 75% being autosomal dominant in inheritance.[22] Pediatric cataract is a leading cause of childhood blindness. Untreated cataracts in children lead to tremendous social, economic, and emotional burden to the child, family, and society.[23]

In all, 62 (7.6%) patients were detected with strabismus or crossed eyes, a condition in which the eyes are not aligned properly while looking at an object. In our study, the prevalence rate for strabismus was 7.6% which was comparatively higher than other studies.[24] This could be due to the greater age range of our study population.

The findings of our study show that corneal opacity and glaucoma are the leading causes of visual impairment in older patients. The prevalence of corneal opacity was 7.0% which is higher when compared to other studies. Haq *et al*. (2009) and Singh *et al*. (1997) reported a prevalence of 2.9% and 4.2%, respectively, among older people. The prevalence of glaucoma was high (5.9%) in the present study when compared to the studies done earlier.[5,6,24] Many studies have reported that the prevalence of amblyopia varies in different age groups. Bharadwaj *et al*. (2017) in their study reported a prevalence rate of 1.75% which is comparable with the findings of the present study (2.9%).

In spite of national-level vitamin A supplementation programs by the government and various NGOs, Vit A deficiency was seen in 2.8% of patients. Similar findings were observed in the study by Sahoo *et al*. (2018). However, Desai *et al*. (1989), Kumar *et al*. (2007), Gupta *et al*. (2009) reported vitamin A deficiency in children in the proportion 5.39%, 4.1%, 1.8% respectively. Desai *et al*., (1989) demonstrated that the prevalence of Vit A deficiency decreases with an increase in age. Our study shows the same trend, with the deficiency more prevalent in the lower age group (mean age 7.8 years). Severe Vit A deficiency is the leading cause of serious eye issues such a dry eyes, keratomalacia and night blindness in children which may lead to permanent blindness if not treated on time (WHO, 2009).[25]

Ptosis was seen in 2.2% of patients, out of which 12 (66.6%) were congenital cases. However, Bharadwaj *et al*. (2017) reported a lower prevalence rate of 0.16% which is not comparable to the present study. Non-specific complaints such as itching, watering, redness, eyestrain are also reported in high percentage (9.8%), out of which 3.0% were the cases of ocular traumatic injuries showing male preponderance. Globally, the frequency of ocular trauma in children is also high and the major cause includes unsupervised play and the use of dangerous objects.

Congenital anomalies were seen in 6.2% of children. A slightly higher prevalence of 8.2% of congenital anomalies was reported by Sahoo *et al*. (2018). Studies have shown that congenital anomalies including both anterior and posterior segments of the globe are emerging as a major cause of blindness and visual impairment in children in recent years.[26]

There was more number of rural patients (60.9%) as compared to urban patients. Previous studies have also shown that ocular morbidities are more prevalent in rural populations.[5] A higher number of patients from rural areas could also imply that rural people have become more aware in recent years to uptake various eye care facilities.

Our study also reports the prevalence of consanguinity among Muslim patients. It is well documented and researched that the consanguineous marriage increases the chance of couple carrying any recessive gene that is being transmitted in their family manifests in homozygous state in their children. Conversely, it also increases the birth prevalence of infants with serious recessive disorders.

Conclusion

This study reveals that conjunctivitis and refractive errors were the most common causes of ocular disorder among children.

The majority of the causes were either treatable or preventable. Therefore, health education activities should be intensified among children, imparting awareness regarding ocular hygiene. Cataract was found to be the most common cause of visual impairment among the elderly population. Early detection and management reduce the disease progression and can prevent visual disability. Therefore, accessible and affordable eye care services should be increased. Health education programs should target both the children and older age groups.

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