

Spectrum of Ocular Morbidity in Rural and Urban Screening Eye Camps in Ludhiana, Punjab

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ABSTRACT

BACKGROUND

India was the first country in the world to launch 'National Programme for Control of Blindness' (NPCB) in the year 1976. According to the survey by NPCB 2011, the spectrum of ocular morbidity in India is cataract (62.6%), refractive errors (19.7%), glaucoma (5.8%), posterior segment disorders (4.7%), surgical complications (1.2%), corneal blindness (0.9%) & other causes (5%). Various studies have been conducted regularly across the country to determine the pattern of ocular morbidity. There has been a difference in the spectrum of ocular morbidity in rural and urban eye camps. Ocular morbidities are more prevalent in rural population (2.14%) as compared to urban population (1.8%). We wanted to study the spectrum of ocular morbidity in rural and urban eye camps in Ludhiana district, Punjab and compare the patient profile and spectrum of ocular morbidity between the two.

METHODS

This retrospective data analysis included all the patients [2,138 patients (Group A-1053 patients from a rural eye camp, and Group B-1085 patients from an urban eye camp) who attended the screening eye camps (one rural and one urban) conducted by the Mobile Eye Services, CMC & Hospital, Ludhiana, in October 2019. A brief history of each patient having ocular complaints was noted, along with details of the patients, as per the protocol. A record of the visual acuity with Snellen's test types for distant and near, the finding of the torch light examination of the anterior segment and wherever performed, the posterior segment details were noted as per the patient's records. The intraocular pressure readings were also noted. All the findings were recorded, along with the final diagnosis which was then compared for Group A and Group B.

RESULTS

According to our study, the spectrum of ocular morbidity in the urban population was refractive errors (37.7%), cataract (30.9%), others (25.4%), corneal opacity (4.2%), allergic conjunctivitis (4.1%), glaucoma (2.1%) and pterygium (1%) as compared to the rural population where the spectrum was refractive errors (36.4%), cataract (28.3%), others (23.4%), allergic conjunctivitis (10.5%), corneal opacity (3.7%), pterygium (2.2%) and glaucoma (1.3%).

CONCLUSIONS

The leading cause of ocular morbidity in our study is refractive errors followed by cataract. However, a significant difference between the populations is seen in the prevalence of allergic conjunctivitis, glaucoma and diabetic retinopathy among the two groups. We would suggest a larger sample size for a survey on causes of visual impairment in children, diabetic retinopathy and glaucoma.

KEYWORDS

Ocular Morbidity, Rural and Urban Screening Camps, Cataract, Refractive Errors

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BACKGROUND

The National Programme for Control of Blindness (NPCB) was launched in India in the year 1976, making India the first country in the world to do so. The goal was to reduce the prevalence of blindness from 1.38% to 0.31% by the year 2000.^{1,2} The programme's basic components were strengthening of facilities at urban levels and extension of eye care services to rural areas.¹

Since then, various studies have been conducted across the nation to determine the pattern of ocular morbidity.^{3,4} According to the NPCB survey conducted in 2011, the spectrum of ocular morbidity in India was cataract (62.6%), refractive errors (19.7%), glaucoma (5.8%), posterior segment disorders (4.7%), surgical complications (1.2%), corneal blindness (0.9%) & other causes (5%).²

More recent Indian studies conducted in Karnataka and Maharashtra have also put cataract as the leading cause of blindness, accounting for almost 3/4th of the blindness burden.^{5,6}

According to the National Blindness and Visual Impairment Survey India (2015-2019), the rural population has a higher prevalence of ocular morbidities (2.14%) as compared to the urban population (1.8%).⁷ Similar results are seen in a study conducted by Patil et al, in which the prevalence of blindness in rural population was 9.8% as compared to 8.4% in urban population.⁸

Along with a difference in prevalence, there has also been a difference in the spectrum of ocular morbidity in rural and urban screening eye camps.⁹ Singh et al found that in the rural population in the Wardha district of Maharashtra, refractive errors (40.8%) and cataract (40.4%) were almost equally prevalent.¹⁰ A study of the rural population in Andhra Pradesh showed that refractive errors were much more common (56%) than cataract (33%).¹¹

Considering the differences in ocular morbidity between urban and rural populations from different studies, we conducted a study in our subset of patients with the objective of studying the spectrum of ocular morbidity in rural and urban screening eye camps in Ludhiana district, Punjab, and to compare the two.

METHODS

This study included all the patients who attended the screening eye camps (one Rural and one Urban) conducted by the Mobile Eye Services, CMC & Hospital, Ludhiana.

Group A included all the patients that attended the rural eye camp (n=1053) and Group B included all the patients that attended the urban eye camp (n=1085). The total sample size was 2,138 patients.

A brief history of each patient having ocular complaints was noted, along with details of the patients, as per the protocol. A record of the visual acuity with Snellen's test types for distant and near, the findings of anterior segment and wherever performed, the posterior segment details were

noted as per the patient's record. The intraocular pressure readings were also noted. All the findings were recorded, along with the final diagnosis which were then compared for Group A and Group B.

As per the Eye camp protocol, all the patients from both the camps who required further investigations and/or management were referred to the Base hospital for the needful.

All statistical analysis was performed using SPSS (Statistical Packages for Social Sciences, version 21.0. Armonk, NY: IBM Corp). The data was analysed using the Chi-square test. A p-value of <0.05 was considered significant.

RESULTS

A total of 2,138 patients from ages 3-92 years and both genders were examined in the camps (1,085 from the urban eye camp and 1,053 from the rural eye camp).

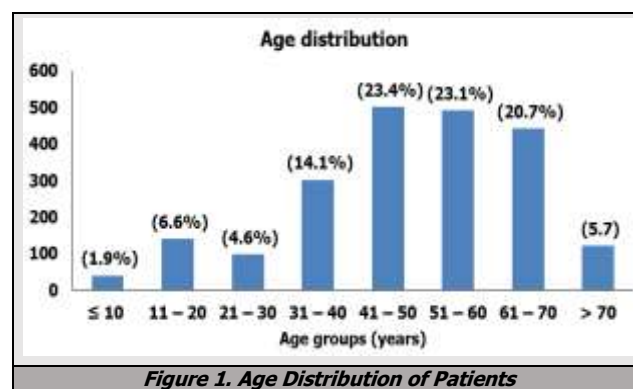


Figure 1. Age Distribution of Patients

	Urban (n=1085) n (%)	Rural (n=1053) n (%)	P-Value
Age (Mean ± SD)	51±16.2	49±17.3	0.010
Gender			
Male	467 (43.0)	410 (38.9)	0.022
Female	560 (51.6)	560 (53.2)	
Child	58 (5.3)	83 (7.9)	
Cataract	335 (30.9)	298 (28.3)	0.192
Refractive error	409 (37.7)	383 (36.4)	0.516
Glaucoma	31 (2.9)	14 (1.3)	0.014
Corneal opacity	46 (4.2)	39 (3.7)	0.526
Allergic Conjunctivitis	44 (4.1)	111 (10.5)	<0.001
Pterygium	11 (1.0)	23 (2.2)	0.031
Others	276 (25.4)	246 (23.4)	0.264

Table 1. Age, Gender and Ocular Morbidity in Urban and Rural Groups

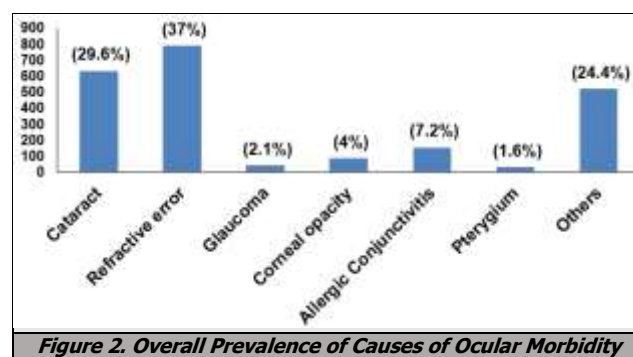


Figure 2. Overall Prevalence of Causes of Ocular Morbidity

	Male (n=877)		p-value	Female (n=1120)		p-value	Child (n=141)		P-Value
	Urban	Rural		Urban	Rural		Urban	Rural	
	n (%)	n (%)		n (%)	n (%)		n (%)	n (%)	
Cataract	178 (38.1)	144 (35.1)	0.359	157 (28.0)	153 (27.3)	0.789	0 (0)	1 (1.2)	0.402
Refractive error	156 (33.4)	230 (29.3)	0.188	233 (41.6)	236 (42.1)	0.856	20 (35.1)	27 (32.5)	0.753
Glaucoma	14 (3.0)	9 (2.2)	0.455	17 (3.0)	5 (0.9)	0.010	0 (0)	0 (0)	
Corneal opacity	22 (4.7)	18 (4.4)	0.820	23 (4.1)	19 (3.4)	0.529	1 (1.7)	2 (2.4)	0.781
Allergic Conjunctivitis	13 (2.8)	47 (11.5)	<0.001	21 (3.8)	43 (7.7)	0.005	10 (17.2)	21 (25.3)	0.255
Pterygium	8 (1.7)	15 (3.7)	0.072	3 (0.5)	8 (1.4)	0.130	0 (0)	0 (0)	
Others	116 (24.8)	94 (22.9)	0.508	146 (26.1)	145 (25.9)	0.946	14 (24.1)	7 (8.4)	0.010

Table 2. Distribution of Ocular Diseases in Urban and Rural Groups

Relation between Age, Gender and Ocular Morbidity in Urban and Rural Groups

The age wise distribution of the patients across both camps is shown in Figure 1. The majority of patients belonged to the 41-50 years and 51-60 years age groups. The least patients were seen in the less than 10 years age group. Both camps showed higher proportion of female patients as compared to male patients. (Table 1)

Overall, refractive errors were the most prevalent ocular morbidity present in the camps at 37%, followed by cataract (29.6%), other ocular morbidities (24.4%), allergic conjunctivitis (7.2%), corneal opacities (4%), glaucoma (2.1%), and pterygium (1.6%) (Figure 2).

Refractive errors were more prevalent in the urban population (37.7%) as compared to the rural population (36.4%) although this was not significant (p=0.516). (Table 1) Refractive errors were seen more in female patients as compared to male patients of both camps. (Table 2)

Distribution of Ocular Diseases

The prevalence of cataract was 30.9% and 28.3% in the urban and rural camps, respectively (p=0.192). (Table 1) Cataract was more prevalent in male patients (36.7%) as compared to females (27.7%) in the study (p<0.001). (Table 3)

	Total			P-Value
	Male (n=876)	Female (n=1120)	Child (n=141)	
	n (%)	n (%)	n (%)	
Cataract	322 (36.7)	310 (27.7)	1 (0.7)	<0.001
Refractive error	276 (31.5)	469 (41.9)	47 (33.6)	<0.001
Glaucoma	23 (2.6)	22 (2.0)	0 (0)	0.117
Corneal opacity	40 (4.6)	42 (3.8)	3 (2.1)	0.333
Allergic Conjunctivitis	60 (6.8)	64 (5.7)	31 (22.0)	<0.001
Pterygium	23 (2.6)	11 (1.0)	0 (0)	0.004
Others	210 (23.9)	291 (26.0)	21 (14.9)	0.014

Table 3. Overall Distribution of Ocular Diseases

Only 1 child in the study had a cataract. The highest prevalence of cataract was seen in patients over the age of 55 years in total (54.1%) as compared to other age groups (P<0.001). (Table 3) All other age groups showed no significant difference in the prevalence of cataract.

Other ocular morbidities included ocular infections, strabismus, retinopathies (diabetic retinopathy in particular), anterior uveitis and degenerative conditions. The prevalence of such morbidities was seen more in the urban population (25.4%) as compared to the rural population (23.4%), although it was not significant (p=0.264). (Table 1) These

ocular morbidities were also more prevalent in females as compared to males in both groups. Children from the urban population had a higher prevalence of other ocular morbidities when compared to children from the rural camps: 24.1% and 8.4% respectively (p=0.010). (Table 2)

The prevalence of allergic conjunctivitis was more in the rural population (10.5%) than the urban population (4.1%) (p<0.001). (Table 1) It was more prevalent in children (22.0%) than any other age group (p<0.001). (Table 3) In both adults and children, allergic conjunctivitis was more prevalent in the rural population as compared to the urban population. (Table 2)

Corneal opacity was seen more in urban population (4.2%) than the rural population (3.7%), although this was not significant (p=0.526). (Table 1)

Glaucoma was diagnosed in a total of 45 subjects, in 2.9% of patients from the urban population and in 1.3% of patients from the rural population (p<0.014). (Table 1) The glaucoma suspects were investigated in the Base hospital (Visual field recording, along with optic disc evaluation and applanation tonometry) before reaching a provisional diagnosis. Overall, glaucoma was seen more in patients of in the 55 years and above age group (p<0.001). (Table 3) Females from the urban camp showed a much greater prevalence of glaucoma than those from the rural population (p<0.010). (Table 2)

Pterygium was seen in only 1.6% of all the patients in this study. (Figure 2) It was seen more in the rural population than the urban population (p<0.031). (Table 1) It was present in 2.6% of male patients and 1% of female patients (p=0.004). (Table 3)

DISCUSSION

In our study, we had a total of 2,138 patients from urban and rural camps. This is comparable to the studies done in Sindhudurg, Karnataka and Aligarh, which only included patients from 1 individual village or city. The proportion of male and female patients is also comparable to these studies.^{8,12,13}

It was observed in our study that the 3 main causes of ocular morbidity are the same for both urban and rural populations: refractive errors, cataract, and other causes. This differs from the NPCB survey in 2011 in which cataract was the main cause of ocular morbidity, with refractive errors a distant second.² This discrepancy may be explained

by the small sample size of our study. The high prevalence of refractive errors in our study is similar to the study by Venkataramana et al.,¹²

In our study we observed an increased incidence of ocular morbidities in patients aged 40 and above. This is in accordance with the studies done by Singh et al and Baldev et al.,^{10,14} It was also seen in our study that in elderly patients, refractive errors were more prevalent than cataract. This is also in accordance with a study done by Sehgal et al.,¹⁵ According to a study by Foster et al, glaucoma and corneal disorders have recently started becoming the major causes of ocular morbidity in the elderly population.¹⁶ Similar results were seen in our study in patients above 55 years of age.

In children, it was seen that refractive errors were the most common followed by allergic conjunctivitis in both populations. This is in accordance with a study done by Mehta et al, in which refractive errors (38.7%) and allergic conjunctivitis (14.1%) were responsible for childhood ocular morbidities in a rural setting.¹⁷

Refractive errors were by far the most common ocular morbidity. They were more prevalent in the urban population group. This could possibly be explained by the difference in the diet and usage of VDTs among the urban and rural community.

Cataract was seen more in the urban population. However, the overall incidence of cataract was much less than stated in the NPCB survey of 2011.² This may be due to the excellent health care facilities in the state of Punjab.

Allergic conjunctivitis was significantly more prevalent in the rural community, especially in children. This can be explained by the rural population being more exposed to allergens. The prevalence of diabetic retinopathy was slightly higher in the urban population, although not significant. This may be attributed to the diet and sedentary lifestyle of the urban population. However our sample size is too small to comment on this. Glaucoma was also seen more in the urban population. This could possibly be because of the disease being underdiagnosed in the rural population. Corneal opacities were more prevalent in the urban population, although not significantly. Pterygium was more prevalent in the rural community. This may be due to more exposure to the sun.

The prevalence of other ocular morbidities in our study was much higher than previous studies. This may be due to the fact that we have grouped together many morbidities.

CONCLUSIONS

The leading cause of ocular morbidity in our study is refractive errors followed by cataract. However, a significant difference between the populations is seen in the prevalence of allergic conjunctivitis, glaucoma, and diabetic retinopathy among the two groups. We would suggest a larger sample size for a survey on causes of visual impairment in children, diabetic retinopathy and glaucoma.

Small sample size is a limitation of our study.

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