

A retrospective study to analyse the ocular morbidity in the slum-dwelling population of central India

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DOI: DOI: <https://doi.org/10.17511/jooo.2021.i04.03>

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Background: The study aimed to evaluate the prevalence of different ocular pathologies in the slum-dwelling population of central India and to find its correlations with socio-demographic factors.

Methodology: The study was conducted as a cross-sectional study in 84 slum areas across Bhopal, Jabalpur and areas in the vicinity using a camp-based approach during the study period of 3 years. A total of 15478 participants attended the camp, and of them, 6177 patients had various ophthalmological conditions. A detailed history was obtained, and participants were subjected to a complete ophthalmological examination. Based upon their diagnosis, they were prescribed treatment. Referral to the tertiary care centre was done when needed. **Results:** The prevalence of ocular morbidities was 39.9%. The most common ocular morbidity documented in our study was refractive errors (22.7%). Proportions of lid pathologies were significantly higher in patients belonging to less than ten years of age (36.4%). In contrast, refractive errors were observed in higher proportions of patients belonging to more than ten years of age ($p < 0.05$). Pterygium ratio was significantly higher in males, whereas ocular malignancies were higher in females ($p < 0.05$). Proportions of almost all the ocular morbidities were substantially higher in patients with low socioeconomic status ($p < 0.05$). **Conclusion:** The overall prevalence of ocular morbidities in the slum population is high. The most common ocular morbidity includes refractive error and allergic conjunctivitis. These morbidities correlated with age, gender and socioeconomic status. We recommend periodic screening of the slum population across all age range to prevent long term complications and disabilities.

Keywords: Ocular morbidity, Slum, Refractive errors, Age, Socioeconomic status

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Poorva Shrivastava, Senior resident, , Gandhi medical college, Bhopal, Madhya Pradesh, India. Email: poorvashrivastava1995@gmail.com	Poorva Shrivastava, Apoorva soni, Salil kumar, Lalit shrivastava, A retrospective study to analyse the ocular morbidity in the slum-dwelling population of central India. Trop J Ophthalmol Otolaryngol. 6;4(2021):69-74. Available From https://ophthalmology.medresearch.in/index.php/jooo/article/view/202	

Manuscript Received
2021-07-08

Review Round 1
2021-07-10

Review Round 2
2021-07-17

Review Round 3
2021-07-24

Accepted
2021-07-31

Conflict of Interest
Nil

Funding
Nil

Ethical Approval
Yes

Plagiarism X-checker
19%

Note



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Introduction

The word "slum" for first used to describe the "room of low repute" or "low, unfrequented parts of the town" in the 19th century in London. However, the definition and its meaning have changed over time to include physical, social, spatial, and even behavioral aspects of urban poverty. [1,2]. According to United Nations, a Slum is defined as "one or a group of individuals living under the same roof in an urban area, lacking in one or more of the following five amenities, i.e. durable housing, sufficient living area, access to improved water, access to improved sanitation facilities and Secure tenure.[3].

The pattern of ocular morbidities among residents of the slum population may depend on overcrowding, unhygienic conditions, nutritional status, socioeconomic status, education, working conditions and health-seeking behavior. Ocular morbidity has been defined as any ophthalmologic pathology requiring clinical intervention or follow up.[4]. Overall, the prevalence of ocular morbidity in India has been reported to range between 20% and 90%. [5-7]. Various ocular morbidities reported in India include Vitamin A deficiency, refractive error, conjunctivitis, amblyopia, strabismus, cataract, pterygium etc. [8]. Ocular morbidity may be one of the leading causes of visual impairment as well as preventable blindness. Literature suggests that approximately 85% of moderate to severe visual impairment and 80% of blindness is preventable and treatable.[9].

Data on the prevalence of ocular morbidities is primarily derived from hospital-based studies or institutions such as schools, blind homes etc. Community-based studies on ocular morbidities are lacking. The present study was therefore conducted to evaluate the prevalence of different ocular pathologies in the slum-dwelling population of central India and to find its correlations with socio-demographic factors.

Methodology

Setting- 84 slum areas across Bhopal, Jabalpur and areas in the vicinity using a camp-based approach

Duration and type of study - cross-sectional study during the study period of 3 years, i.e. from 1st June 2017 to 31st May 2021.

Sampling methods – Purposive sampling.

Inclusion criteria – All residents attending the camps and having various ophthalmological conditions were selected using universal sampling.

Exclusion criteria – All the participants not willing to participate in the study

Data collection procedure- A total of 15478 participants attended the camp, and of them, 6177 patients having various ophthalmological conditions were selected using universal sampling. Detailed data regarding socio-demographic variables such as age, gender, socioeconomic status etc., was obtained from all the study participants. They were subjected to a complete ophthalmological examination. Examination techniques included visual acuity assessment on Snellen visual acuity chart, torchlight examination, fundus examination in the cases in which it was strictly needed.

Based upon their diagnosis, they were prescribed treatment. Treatment strategies included refraction for the patients with refractive errors, prescription of eye drops and eye ointments, advice on lid hygiene, and referral to the tertiary care centre in the cases where the detailed examination was needed, such as in the case of suspected retinal pathologies like diabetic retinopathy, retinal detachment etc. Patients requiring surgical intervention for pterygium were referred to the tertiary care centre. Few cases of suspected ocular malignancies were also referred to the higher centre.

Any scoring system- Nil

Surgical procedure if any- Nil

Ethical consideration & permission- the study was approved by the IEC committee of our institute

Statistical analysis- Data was compiled using MsExcel and analysed using IBM SPSS software version 20. Continuous data were expressed as frequency and proportions, whereas numerical data were expressed as mean and standard deviation. The Chi-square test was used to assess the correlations with various socio-demographic factors. A P-value less than 0.05 was considered statistically significant.

Results

In our study, a total of 15478 participants were

Screened for ocular morbidities using a camp based approach in selected slums during the study period. Of them, 6177 participants had ocular morbidities. Thus, the prevalence of ocular morbidities was 39.9%.

Table 1- Distribution of ocular morbidities according to socio-demographic variables

Socio-demographic variables		Ocular Morbidity				Total (n=15478)		P value
		Present (n=6177)		Absent (n=9301)		n	%	
		n	%	n	%			
Age	0-10	822	13.3	1849	19.9	2671	17.3	0.001
	11-30	1351	21.9	2845	30.6	4196	27.1	
	31-50	2002	32.4	2386	25.7	4388	28.3	
	>50	2002	32.4	2221	23.9	4223	27.3	
Gender	Male	3483	56.4	5772	62.1	9255	59.8	0.001
	Female	2694	43.6	3529	37.9	6223	40.2	
Socio-economic status	Lower	2873	46.5	3535	38	6408	41.4	0.001
	Lower middle	2178	35.2	3220	34.6	5398	34.9	
	Middle	1136	18.4	2546	27.4	3682	23.8	

The above table reveals ocular morbidities among residents of selected slums. The majority of participants belonged to the 31 to 50 years of age group (28.3%), whereas ocular morbidities were present in maximum patients belonging to more than 30 years of age ($p < 0.01$). Similarly, the prevalence of ocular morbidities was significantly higher in males and residents of low socioeconomic status ($p < 0.01$).

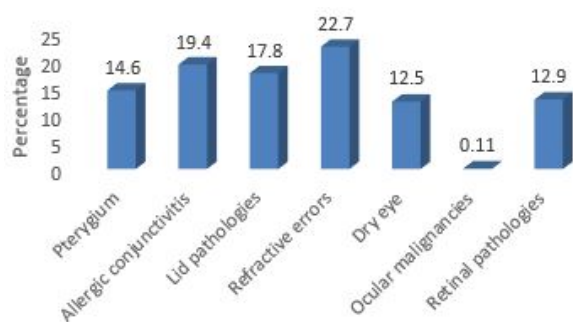


Figure 2: Distribution according to ocular comorbidities

The most common ocular morbidity documented in our refractive study errors was 22.7%, followed by allergic conjunctivitis (19.4%) and lid pathologies 17.8%. The least common morbidity was ocular malignancy observed in 0.11% of cases.

Table 2- Association of age with ocular morbidities

Morbidities	Age (years)				Total
	0-10	11-30	31-50	>50	
Pterygium	0 (0)	150 (16.7)	400 (44.4)	350 (38.9)	900
Allergic conjunctivitis	200 (16.7)	300 (25)	400 (33.3)	300 (25)	1200
Lid pathologies	400 (36.4)	250 (22.7)	200 (18.2)	250 (32.1)	1100
Refractive errors	150 (2.6)	350 (19.5)	450 (38.96)	450 (38.96)	1400
Dry eye	20 (2.4)	150 (11.1)	300 (14.98)	300 (14.98)	770
Ocular malignancies	2 (28.6)	1 (14.3)	2 (28.6)	2 (28.6)	7
Retinal pathologies	50 (6.25)	150 (18.8)	250 (31.25)	350 (43.8)	800
P value	0.001				

The above table reveals that proportions of lid pathologies were significantly higher in patients belonging to less than ten years of age (36.4%). In contrast, refractive errors were observed in higher proportions of patients belonging to more than ten years of age ($p < 0.05$).

Table 3- Association of gender with ocular morbidities

Morbidities	Gender				Total
	Male		Female		
	n	%	n	%	
Pterygium	550	61.1	350	38.9	900
Allergic conjunctivitis	650	54.2	550	45.8	1200
Lid pathologies	600	54.5	500	45.5	1100
Refractive errors	800	57.1	600	42.9	1400
Dry eye	430	55.8	340	44.2	770
Ocular malignancies	3	42.9	4	57.1	7
Retinal pathologies	450	56.3	350	43.7	800
P value	0.01				

In the present study, the proportions of pterygium were significantly higher in males, whereas ocular malignancies were higher in females ($p < 0.05$).

Table 4- Association of ocular morbidities with socioeconomic status

Ocular morbidities	Socioeconomic status		
	Lower	Lower middle	Middle
Pterygium	456 (50.7)	324 (36)	120 (13.3)
Allergic conjunctivitis	547 (45.6)	443 (36.9)	210 (17.5)
Lid pathologies	479 (43.6)	419 (38.1)	212 (19.3)
Refractive errors	745 (53.2)	456 (32.6)	199 (14.2)
Dry eye	300 (38.96)	247 (32.1)	223 (28.96)
Ocular malignancies	4 (57.1)	2 (28.6)	1 (14.3)
Retinal pathologies	342 (42.8)	287 (35.9)	171 (32.4)
Total	2873	2178	1136
P value	0.01		

The proportions of almost all the ocular morbidities were significantly higher in patients with low socioeconomic status ($p < 0.05$).

Discussions

The eyes are the most precious sense organ, which is essential for the normal physical and psychosocial development of an individual.[10]. Ocular morbidities can significantly affect visual acuity and may be responsible for partial or total blindness. Kumar et al. documented that approximately 30% of blind people in India lose their eyesight before 20 years of age, particularly in developing years of life (<5 years).[11]. The cause of blindness may vary depending upon age and working conditions. The most common causes of blindness in children and the younger population include refractive errors, Vitamin A deficiency, trachoma etc. [12,13]. However, in middle age and elderly individuals, cataracts, glaucoma. Refractive errors and complications due to comorbid conditions are possible etiologies. [14,15]. Thus to prevent blindness, its associated complications and ocular disabilities, it is essential to detect these morbidities as early as possible.[10].

The present study was conducted camp-based research among the slum population belonging to any age group and either gender. A total of 15478 cases were enrolled belonging to the age range of 3 years to 78 years. The majority of participants belonged to 31 to 50 years ago. About 59.8% were males, and 41.4% belonged to low socioeconomic status. The prevalence of ocular morbidity in our study was 39.9%. similar findings were documented by Khadse et al., in which the majority of ocular morbidities among the slum population was 40.4%. [10]. Similarly, Gattani et al. demonstrated the prevalence of ocular morbidity in 42.3%.[16]. In contrast, Aggrawal et al. reported ocular morbidities in higher proportions, i.e., 53%, compared to the present study.[17]. The observed difference in the prevalence of ocular morbidities between the present study and the reference study could be attributed to the difference in health-seeking behavior of a population of two study areas.

Our study documented the prevalence of ocular morbidity significantly higher in middle-aged and elderly populations, among males and low socioeconomic status ($p < 0.05$). The spectrum of ocular morbidities in our study included

Refractive errors (22.7%), allergic conjunctivitis (19.4%), lid pathologies (17.8%), pterygium (14.6%), retinal pathologies (12.9%), dry eye (12.5%) and ocular malignancies (0.11%). Previous studies documented similar findings. [10,16,17]. Gulati et al. [15]. Dandona et al. [18] documented a statistically significant association of ocular morbidities with advancing age, supporting the present study's findings. Khadse et al. documented presbyopia as the most common ocular morbidity in the slum population and established the association of ocular morbidities with advancing age.[10].

The present study also assessed the association of various ocular morbidities with various socio-demographic variables. We observed significantly higher proportions of lid pathology in extreme age, i.e., <10 and >10 years. Allergic conjunctivitis, pterygium was observed in significantly higher proportions of participants belonging to 31 to 50 years. The prevalence of refractive errors was observed across all age groups, but it was significantly higher in the middle-aged and elderly. However, the retinal pathologies were significantly higher in the elderly population. These findings could be attributed to age-related changes in the accommodative power of the lens as well as systemic comorbidities such as diabetes and hypertension leading to retinal pathologies. [19-21]. Our study findings were supported by findings of Agrawal et al., in which incidence of individual ocular morbidities, especially refractive errors, increased with advancing age.[22].

We observed a significantly higher proportion of ocular morbidities among males as compared to females. Overall, the proportion of pterygium, refractive errors, retinal pathologies, dry eye, allergic conjunctivitis and lid pathologies were significantly higher in males, whereas ocular malignancies were significantly higher in females. These findings were contrasting to the previous studies in which the prevalence of ocular morbidities was significantly higher in males than females. [13,23]. The present study also aimed to assess the association of socioeconomic status with ocular morbidities. We observed that ocular morbidities were significantly higher in participants from low socioeconomic status. This could be attributed to lack of awareness, poor health-seeking behavior due to fear of loss of daily wages, unhygienic conditions and overcrowding. Our findings were supported by the findings of Prajapati

Et al. [12]. In which ocular morbidities were significantly prevalent in the participant of lower socioeconomic status.

This study had certain limitations. First, the study was conducted as a cross-sectional study; however longitudinal follow up study may have yielded a better result. Secondly, the patients requiring advanced investigations were referred to a higher centre, but the compliance of such patients remains unknown.

Conclusion

The overall prevalence of ocular morbidities in the slum population is high. The most common ocular morbidity includes refractive error and allergic conjunctivitis. These morbidities correlated with age, gender and socioeconomic status.

Author contribution: Dr Kumar and Dr L Shrivastava contributed to collecting and analysing the data of the patient who presented at the camps conducted across Bhopal. **Dr P. Shrivastava** participated and analysed in data collection and analysis of the patients presenting to the camps conducted across Jabalpur; she also analysed and observed significant correlations after the application of suitable statistical tests.

What does this study add to existing knowledge?

We recommend periodic screening of the slum population across all age range to prevent long term complications and disabilities.

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