Original articles

Ocular morbidity in the rural areas of Allahabad, India

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Abstract

Background: Although there has been a considerable reduction in the infective causes of ocular morbidity, the global burden of blindness has not significantly altered for over a decade.

Objectives: To find the extent of ocular morbidity in different subgroups of the rural population and to study the factors associated with ocular morbidity.

Materials and methods: A cross-sectional study was conducted at the Jasra and Saidabad blocks of Allahabad District. A total of eight villages were selected by multistage random sampling technique. The data were analyzed with SPSS Software.

Results: Among 9,736 people surveyed, 931 cases of eye diseases were identified. Ocular morbidity was highest (40.92 %) among those aged above 60 years. A higher morbidity was also observed among females (53.60 %), illiterates (69.50 %) and those belonging to low socioeconomic strata (42.86 %). The main causes of ocular morbidity in the study population were cataract (41.89 %), uncorrected refractive errors (21.59 %), xerophthalmia (10.20 %) and glaucoma (4.83 %).

Conclusions: Programs for cataract surgery, detection and treatment of glaucoma, correction of refractive errors and vitamin A prophylaxis for xerophthalmia need to be targeted to further reduce the burden of ocular morbidity.

Key- words: ocular morbidity, eye diseases, rural areas

Introduction

The estimated number of visual impaired people worldwide is 161 million of whom thirty seven million are blind and 124 million have low vision. The important causes of blindness are cataract, followed by glaucoma and age-related macular degeneration (WHO, 2002).

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India has 6.7 million blind people. The estimated national prevalence of blindness (VA ≤ 3/60) in general population is 0.7 %. Andhra Pradesh, Bihar, Madhya Pradesh, Uttar Pradesh, Maharashtra and Tamil Nadu contribute nearly two-third cases of blindness in India. Blindness is more common in rural areas, female gender, and the poor (WHO, 2002). The major reasons for the high prevalence of ocular morbidity in India may be increasing life expectancy, significantly more people aged above 40 years, poor access to eye care facilities in rural areas, misconceptions about cataract surgery, com-

promised water quality and environmental conditions, and lack of effective eye health education program (NPCB India 1998, 2002).

Data regarding the prevalence of ocular morbidity among rural inhabitants is scarce. Such studies will be beneficial in formulating programs to further reduce the burden of visual impairment. With this background, the present study was conducted in the rural areas of Allahabad district to find the extent of ocular morbidity in different subgroups in the study population and identify the factors associated with ocular morbidity.

Materials and methods

This cross-sectional study was conducted in the rural areas of district Allahabad. A multistage random sampling technique was adopted to select the study subjects. Out of three regions, trans-Ganga (rural), city (urban) and trans-Yamuna (rural) at the first stage a sample of one block from each rural region was selected randomly. A block is covered by Community Health Centre or Primary Health Centre in the district. Within each selected first stage unit (block), a sample of two PHCs or new PHCs was drawn randomly as second stage units. From each selected second stage unit, one Sub Centre was selected by random sampling in order to have a sample of four Sub Centres as third stage units. From each selected Sub Centre, a sample of two villages was drawn by random sampling technique. In this way a sample of eight villages was available as fourth and last stage units. Within villages selected at the previous stage, the entire population (1602 households) was covered by house to house survey for a period of one year from May 2003 to April 2004. All members in the households of selected villages were surveyed and comprised study unit. The study tools used for survey were measuring tape, weighing machine, torch, stethoscope, Anaeroidmeter Snellen's chart, ophthalmoscope, and tonometer. The information was collected using predesigned, pretested questionnaires on background characteristics like age, gender, socioeconomic status and education. The general medical history was collected and all respondents were examined clinically for ocular morbidity. The persons having ocular problems were referred to an ophthalmic specialty hospital (Manohar Das Eye Hospital, Allahabad) for confirmation of diagnosis and further treatment.

Modified Prasad's classification was applied for assessing socioeconomic status (Agarwal, 2008). The WHO definition for blindness i.e. social blindness (VA< 3/60 or its equivalent in the better eye with best corrected visual acuity) was used.

The data was analyzed with the help of SPSS (12.0) software and the Chi-square test was used to know the level of significance.

Results

Out of 9736 individuals surveyed, 5170 were males and 4566 were females. There were 5074 literates and 4662 illiterates in the study population. Out of the 1602 households surveyed, the majority (673, 42.01 %) belonged to lower socioeconomic class, followed by lower-middle (420, 26.22 %), middle (258, 16.10 %), upper-middle (206, 12.86 %) and upper classes (45, 2.81 %), as per modified Prasad's classification.

Total number of individuals identified with eye diseases was 933 (9.56 %). Six hundred and seventy seven individuals (6.95 %) had social blindness (visual acuity ≤ 3/60). Out of total 931 cases, 390 (41.89 %) had cataract, 201 (21.59 %) had refractive errors, 95 (10.20 %) had xerophthalmia, 45 (4.83 %) had glaucoma and 44 (4.73 %) had infective diseases of eye.

Table 1 shows the distribution of respondents with eye diseases by age. Ocular morbidity was highest (40.92 %) among those aged above 60 years of age and lowest (13.86 %) among those aged between 20-39 years, the difference being statistically significant (p-value <.001). Thus an increasing trend with age was observed.

Table-1
Distribution of respondents with eye diseases by age

Diseases of eyes	Age groups (in years)				Total No. (%)
	0-19 No. (%)	20-39 No. (%)	40-60 No. (%)	>60 No. (%)	
Cataract / Aphakia / Pseudoaphakia	4 (1.03)	8 (2.05)	63 (16.15)	315 (80.77)	390 (41.89)
Refractive Errors	12 (5.97)	23 (11.44)	137 (68.16)	29 (14.43)	201 (21.59)
Glaucoma	2 (4.44)	20 (44.44)	21 (46.67)	2 (4.44)	45 (4.83)
Infective Diseases of eye*	15 (34.09)	12 (27.27)	12 (27.27)	5 (11.36)	44 (4.73)
Xerophthalmia	58 (61.05)	18 (18.95)	15 (15.79)	4 (4.21)	95 (10.20)
Uveitis	6 (20.00)	16 (53.33)	3 (10.00)	5 (16.67)	30 (3.22)
Corneal opacity	14 (33.33)	11 (26.19)	11 (26.19)	6 (14.29)	42 (4.51)
Others**	22 (26.19)	21 (25.00)	26 (30.95)	15 (17.86)	84 (9.02)
Total	133 (14.29)	129 (13.86)	288 (30.93)	381 (40.92)	931 (100)

x^2 = 758.3, df=21, p =<.001

* The group infective diseases of eye included conjunctivitis, trachoma, blepharitis, stye, chalazion, dacryocystitis, dacryoadenitis and corneal opacity.

** The group "others" included ocular trauma, squint, pterygium, vitreoretinal diseases, tumours of eye and congenital anomaly.

Table 2 shows the distribution of respondents with eye diseases according to gender. Ocular morbidity was more among females (53.60 %) as compared to males (46.40 %), the difference being statistically significant (p-value <.001).

Table-2
Distribution of respondents with eye diseases according to gender

Diseases of eye	Sex		Total No. (%)
	Male No. (%)	Female No (%)	
Cataract / Aphakia / Pseudoaphakia	168 (43.08)	222 (56.92)	390 (41.89)
Refractive errors	120 (59.70)	81 (40.30)	201 (21.59)
Glaucoma	7 (15.56)	38 (84.44)	45 (4.83)
Infective diseases	17 (38.64)	27 (61.36)	44 (4.73)
Xerophthalmia	42 (44.21)	53 (55.79)	95 (10.20)
Uveitis	13 (43.33)	17 (56.67)	30 (3.22)
Corneal opacity	24 (57.14)	18 (42.86)	42 (4.51)
Others	41 (48.81)	43 (51.19)	84 (9.02)
Total	432 (46.40)	499 (53.60)	931 (100)

x^2 = 36.75, df=7, p =<.001

Table 3 shows distribution of respondents with eye diseases by literacy status. Ocular morbidity was found to be significantly higher (p-value <.001) among the illiterates (69.50 %) than the literate ones (30.50 %).

Table-3
Distribution of respondents with eye diseases by literacy status

Diseases of eye	Literacy status		Total No. (%)
	Illiterate No. (%)	Literate No. (%)	
Cataract / Aphakia / Pseudo aphakia	314 (80.51)	76 (19.49)	390 (41.89)
Refractive errors	102 (50.75)	99 (49.25)	201 (21.59)
Glaucoma	35 (77.78)	10 (22.22)	45 (4.83)
Infective diseases	28 (63.64)	16 (36.36)	44 (4.73)
*Xerophthalmia	63 (66.32)	32 (33.68)	95 (10.20)
Uveitis	17 (56.67)	13 (43.33)	30 (3.22)
Corneal opacity	29 (69.05)	13 (30.95)	42 (4.51)
Others	59 (70.24)	25 (29.76)	84 (9.02)
Total	647 (69.50)	284 (30.50)	931 (100)

x^2= 60.64, df=7, p=<.001

*Note: The children below 6 years have been considered illiterate.

Table 4 shows distribution of respondents with eye diseases by socioeconomic status. Ocular morbidity was highest in lower classes (42.86 %) and lowest in upper (2.79 %) classes (P-value <.001). Thus an increasing trend with socioeconomic status was observed.

Table-4
Distribution of respondents with eye diseases by socioeconomic status

Diseases of eye	Socioeconomic classes					Total No. (%)
	Class I No. (%)	Class I No. (%)	Class III No. (%)	Class IV No. (%)	Class V No. (%)	
Cataract/ Aphakia/ Pseudoaphakia	9 (2.31)	46 (11.79)	76 (19.49)	107 (27.44)	152 (38.97)	390 (41.89)
Refractive errors	6 (2.99)	24 (11.94)	48 (23.88)	61 (30.35)	62 (30.85)	201 (21.59)
Glaucoma	2 (4.44)	5 (11.11)	8 (17.78)	11 (24.44)	19 (42.22)	45 (4.83)
Infective diseases	1 (2.27)	2 (4.55)	7 (15.91)	6 (13.64)	28 (63.64)	44 (4.73)
Xerophthalmia	0 (0.00)	4 (4.21)	7 (7.37)	16 (16.84)	68 (71.58)	95 (10.20)
Uveitis	0 (0.00)	2 (6.67)	2 (6.67)	5 (16.67)	21 (70.00)	30 (3.22)
Corneal opacity	4 (9.52)	4 (9.52)	7 (16.67)	10 (23.81)	17 (40.48)	42 (4.51)
Others	4 (4.76)	8 (9.52)	12 (14.29)	28 (33.33)	32 (38.10)	84 (9.02)
Total	26 (2.79)	95 (10.20)	167 (17.94)	244 (26.21)	399 (42.86)	931 (100)

x^2=72.884, df= 28, p=<.001

Discussion

In the present study cataract (41.89 %) was identified as the most common cause of ocular morbidity followed by refractive errors (21.59 %), xerophthalmia (10.20 %) and glaucoma (4.83 %). Our observations are compatible to those reported by Haq et al (2009) in their study conducted in North India, where the overall prevalences of cataract, refractive errors and glaucoma were found to be 21.7 %, 25.0 % and 0.9 % respectively. Similar findings have also been reported by a study conducted in south India by (Dandona & Dandona, 2001) where cataract and refractive errors were responsible for 60.3 % of blindness and 85.7 % of moderate visual impairment. Similar results were also observed in a study carried out in a Brazilian population by Schellini et al (2009), where refractive errors and cataract contributed to over 85 % of presenting visual impairment and over 60 % of WHO-defined visual impairment. Surveys carried worldwide have reported cataract a major cause of blindness (Hodge, 1995). Previous studies carried in India have shown similar trends. (Murthy et al 2001, Nirmalan et al 2002, Thulasiraj et al 2003).

The prevalence of ocular problems significantly increased with age in our study. Similar trends were reported by Haq et al (2009). Schellini et al (2009) observed higher prevalence of cataract (50.0 %) above 50 years in age group as compared to 21-50 years (3.2 %) and below 20years (0.0 %) age groups. Increasing age was also associated with higher risk of blindness in the South Indian study (Dandona & Dandona, 2001).

Ocular morbidity was more among females as compared to males in this study. Similar trends were reported by World Bank assisted cataract blindness control project (NPCB India, 2002). Dandona & Dandona (2001) also reported similar preponderance. On the contrary cataract and refractive error were not significantly related to gender in the studies conducted in North India and South India (Haq et al, 2009; Raju et al, 2004). In another study conducted in Indonesia no significant difference between the two sexes was found (Saw et al, 2002).

Ocular morbidity was found to be significantly higher among the illiterates than the literate ones in the current study. Haq et al (2009) also reported that the prevalence of cataract was highest in illiterates and decreased with increasing levels of education ($P < 0.001$).

Our study reveals that the ocular health problems were found to be significantly higher in the lower socio economic strata as compared to those be-

longing to upper classes. Decreasing socioeconomic status was associated with higher risk of blindness as reported by Dandona & Dandona (2001) .

Conclusion

The ocular problems in the rural areas of the district were highly prevalent and ocular morbidity favored the elderly, female gender, illiterates, and those belonging to lower socioeconomic strata. Cataract and non-corrected refractive errors were responsible for the majority of cases of blindness and low vision in the study population. A focus on operative intervention in the case of cataract and the optical correction of refractive error will significantly alleviate the burden of ocular morbidity and visual impairment. This will be facilitated by greater access to refraction services and a rejuvenation of government funding for the provision of cataract surgery and control of nutritional blindness in children.

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