Ocular Morbidity Among Elderly Population in Rural Areas of Bundelkhand

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Abstract

Purpose: The purpose of this prospective study was to present the epidemiological profile of ocular diseases in elderly population living in villages of Bundelkhand..Advancing age is susceptible to numerous diseases especially the degenerative disorders.Estimates say that from 2015 to 2050, the proportion of the world's population over 60 years will nearly double from 12% to 22%. By 2020, the number of people aged 60 years and older will outnumber children younger than 5 years. In 2050, 80% of older people will be living in low- and middle-income countries.The frequency of eye diseases may start increasing further around 60 years of age. Proper understanding of the occurrence of ocular diseases in the community would help in planning for geriatric eye care services.

Methods: This was a cross-sectional study conducted in patients of rural area of Bundelkhand visiting the outdoor unit of Department of Ophthalmology, Maharani LaxmiBai Medical College, Jhansi between May 2015 to April 2016.A total of 820 persons above 50 years were screened. Data were collected on demographic characteristics,general health and family history. Snellen's chart was used for screening and refractions of respondents. Data were collected and analyzed by using frequency tablesand expressed as percentage/prevalence.

Results: The prevalence of low vision was 37% while that of blindness was 13.7%. Ocular morbidity rate was 1.24 lesions per elderly person and it increased significantly with increasing age (p<0.001). Ocular diseases were found to be more prevalent among males, low socio-economic status group and labourers (p<0.001). There was a high prevalence of refractive errors (43.4%), cataract (41%), pterygium (18.8%), aphakia (14.2%) glaucoma (3.7%) and corneal opacities (3.2%). Prevalence of diseases of the lens and iris increased significantly with increasing age (p<0.001).

Conclusion: Strategies for reducing the burden of ocular diseases and improvementof geriatric eye health

Keywords: ocular morbidities, geriatric, cataract, pterygium, refractive error

I. Introduction

About 161 million people are visually disabled in the world today, and the number is steadily increasing because of population growth and aging.[1] Blindness, with its social and economic consequences, represents a significant public health problem in many parts of the world.[2]Between 2015 and 2050, the proportion of the world's population over 60 years will nearly double from 12% to 22%. By 2020, the number of people aged 60 years and older will be outnumber children younger than 5 years.In 2050, 80% of older people will be living in low- and middle-income countries. The pace of population ageing is much faster than in the past. All countries face major challenges to ensure that their health and social systems are ready to make the most of this demographic shift.[3]Advancing age is susceptible to numerous diseases especially the degenerative disorders. The frequency of eye diseases has been suggested to start increasing around 40 years of age, with an even steeper increase beginning around 60 years of age.[4]

Cataract is the most common easily correctable cause of blindness in the developing regions of the world.[5] In India alone 3.8 million people become blind from cataract each year.[6] In many parts of the world refractive errors would become the second largest cause of treatable blindness after cataract, if the blindness were defined on the basis of 'presenting' distance visual acuity.[7] Glaucoma is now the second leading cause of blindness globally, after cataract.[1] The epidemiology of corneal blindness is complicated and encompasses a wide variety of infectious and inflammatory eye diseases that cause corneal scarring, which ultimately leads to functional blindness. Trachoma, ocular trauma, and corneal ulceration are significant causes of corneal blindness, which are often underreported, but may be responsible for millions of new cases of monocular blindness every year.[8]

Considering the complicated epidemiology of visual impairment and the wide variety of factors involved, region specific intervention strategies are required for every community. Therefore, providing appropriate data is one of the first steps in these communities. There has been a lack of appropriate community-based data on the prevalence of ocular morbidities in elderly. Thus, in view of the importance of the problem of ocular morbidities and the lack of appropriate community-based data on their prevalence in elderly, especially in and around Bundelkhand, The present study was undertaken with the following aims and objectives:
1. To determine the prevalence of common ocular morbidities (cataract, refractive errors, glaucoma, and corneal opacities) in the study population.
2. To determine the sociocultural and demographic factors in relation to the ocular morbidities.

II. Materials And Methods

This cross-sectional study was conducted at Department of Ophthalmology, Maharani LaxmiBai Medical College, Jhansi between May 2015 and April 2016. A total of 820 persons above 50 years were screened, out of them 670 adults aged 60 years and residing in rural areas were selected and consenting for interview and examination were included in the study. A resident was defined as, "a person residing in the household for at least six months prior to the study". People refusing interview or examination were excluded from the study. The selected persons were interviewed according to a pre-designed and pre-tested proforma. Details about the socio-demographic characteristics were obtained. Modified Prasad's Classification was used to calculate the social class of an individual.[9] Details were noted about the presence of any complaints related to eyediseases,pasthistoryandfamilyhistory.Each person was tested for visual acuity using Snellen dot charts (separately for distant and near vision).Improvement of vision using pinhole was recorded as the best visual acuity and person was labeled blind when the visual acuity was less than counting fingers at three meters in the better eye. A torchlight examination of the globe, eyebrows, eyelashes, eyelids, conjunctiva, sclera, cornea, pupil, iris, and lens was made in a dimly lit room of the house. Digital tonometry was done and the results noted. Subjects with any one of the conditions below were called to the respective health training centers for a detailed ocular examination: 'Cannot read' the 6/9 'E' chart with either eye, Presence of symptom(s) and/or sign(s) of ocular disease and/ or Family history of glaucoma.

Detailed ocular examination of the invited persons at our department included a 'presenting' and 'best corrected' visual acuity using Snellens chart, retinoscopy using a streak retinoscope, measurement of intraocular pressure using Schiotz Tonometer, and direct ophthalmoscopy.Confrontation test was performed todetect any gross diminution of field of vision. Fundoscopy was carried out by direct ophthalmoscope with dilatation of pupils whenever a person was found to have the visual acuity less than 6/9. Refractive error was crudely estimated from lens power readings of the ophthalmoscope. Any lenticular opacity visiblewith distant direct ophthalmoscope against a red reflex was labeled as cataract.
Lacrimal sac disorders were diagnosed based on clinical signs and symptoms. Probing and syringing was performed toassess the patency of lacrimal ducts among the symptomatic subjects.
Diagnosis of retinal diseases was based on clinical findings.

The following definitions were used for the study:
Visual impairment: A 'presenting' visual acuity of < 6/18 in the better eye.[10]
Low vision: A 'presenting' visual acuity of < 6/18, but ≥ 6/60 in the better eye.[10]
Blindness: A 'presenting' visual acuity of < 6/60 in the better eye.[10]
Cataract: Lens opacity accompanied by or capable of causing some level of visual loss.[11]
Corneal opacity: Loss of normal transparency of the cornea.
Glaucoma: An intraocular pressure of more than 21 mm Hg accompanied by a horizontal or vertical cup-disc ratio difference ≥ 0.6 or a horizontal or vertical cup-disc ratio difference ≥0.2.[12]
Myopia: Myopia was defined as a spherical equivalent less than – 0.50 diopter sphere (DS).[13]
Hypermetropia: Hypermetropia was defined as a spherical equivalent greater than + 0.50 DS.[13]
Astigmatism: Astigmatism was defined as a cylindrical error more than 0.50 diopter cylinder (DC) in any axis.[13]

Data entry and statistical analysis were done by using Microsoft 2007 Data Analysis. Univariate analysis was done with the help of the chi-square test. Mantel-Haenszel chi-square test ($\chi2MH$) was used to control any possible confounding variable, wherever necessary. A P value of less than 0.05 was taken as significant.

III. TABLES

Table.1: Distribution of study population according to socio-demographic characteristics

socio-demographic characteristics	Sub-category	Frequency(N=670)	Percentage (%)
Gender	Male	367	54.8
	Female	303	45.2
Age	60-70yrs	251	37.5
	70-80yrs	201	30.0
	80yrs and above	95	14.2
Class	Lower	382	57.0
	Lower middle	233	34.8
	Higher	55	8.2
Religion	Hindu	470	70.1
	Muslim	135	20.4
	Others	65	9.5

Table.2 Distribution of study population according to presenting and best corrected visual acuity in the better eye

Category of visual impairment	Visual acuity in the better eye		Frequency(%)
No visual impairment	6/6 to 6/18	Presenting	330(49.3)
		Best corrected	476(71.0)
Low vision	<6/18 to 6/60	Presenting	248(37.0)
		Best corrected	144(21.4)
Blindness	<6/60	Presenting	92(13.7)
		Best corrected	58(8.6)
Total		Presenting	670 (100.0)

Tables.3: Distribution of ocular morbidities in the study population

Ocular morbidities		Frequency	Prevalence (%)
Cataract	Present	275	41
	Bilateral	107	16
Aphakia	Present	95	14.2
Refractive errors	Present	291	43.4
	Myopia	176	26.3
	Hypermetropia	82	12.2
	Astigmatism	33	4.9
Glaucoma	Present	25	3.7
Corneal opacity	Present	22	3.3
	Bilateral	6	0.9

Table.4: Association of cataract with socio-demographic characteristics

Socio-demographic profile		Prevalence (%)	P value
Gender	Male	22	0.43
	Female	19	
Class	Lower	23	0.81
	Higher	18	
Education	Illiterate	32	0.001
	Literate	9	
Fuel used	Solid fuel	27	0.031
	LPG	13	

Table.5: Association of Myopia with socio-demographic characteristics

Socio-demographic profile		Prevalence (%)	P value
Gender	Male	22.4	0.08
	Female	21.0	
Class	Lower	22.2	0.69
	Higher	21.2	
Education	Illiterate	9.6	0.08
	Literate	24.3	

Table.6: Association of corneal opacities with Gender and age

Socio-demographic profile		Prevalence (%)
Gender	Male	3.8
	Female	2.6
Age	60-70yrs	18.4
	70-80yrs	10.6
	80yrs and above	6.4

IV. Results

A total of 820 persons aged 50 years and above were contacted, of whom 74 (9%) did not give consent or did not turn up for examination and were excluded from the study. Of the remaining 670 were called for further examination.

The study population consisted of 367(54.8%)males and 303(45.2%)females above 60 years of age. Th e age and sex wise distributionis shown in [Table 1]. The population in 60 to 80 years age group was 78.8% out of 820 screened persons in this study. The mean age was 65.4 years (65.3 years for males and 65.8 years for females).

Socio-economically, 57% belonged to lower group and 34.8% and 8.2% to in lower-middle and higher groups respectively.

Visual acuity: The distribution of the study population according to 'presenting' and 'best corrected' visual acuity in the better eye is shown in [Table 2]. The overall prevalence of low vision and blindness based on 'presenting' visual acuity was thus 37 % and 13.7%, respectively. Based on 'best corrected' visual acuity, the corresponding figures dropped to 21.4 and 8.6%, respectively.

Cataract: The overall prevalence of cataract (excluding aphakia) was found to be 41%. Bilateral cataract was present in 16% of the population. The prevalence of aphakia was 14.2% [Table 4]. Cataract was significantly associated with age, education, and fuel use [Table 4]. The prevalence of cataract was highest in illiterates (32%) and decreased with increasing levels of education (P < 0.001). People using only solid fuels (firewood, coal, cow dung) had a significantly higher prevalence of cataract (27%) than those using only LPG (13%) (P = 0.031). Cataract was not related to gender (P = 0.43), residence ($\chi 2MH$ = 0.091; P = 0.78) or social class (P = 0.81).

Refractive errors: Out of the 670 people examined, refractive error was present in 291(43.4%) person. Myopia was the most prevalent refractive error (26.3.%), followed by hypermetropia (12.2%), and astigmatism (4.9%) [Table 3] . Myopia was not related to gender (P = 0.08), social class (P = 0.69) or education. The prevalence of myopia was, however, lowest in illiterates (9.6%) and increased with higher levels of education, being highest in those with 12 completed years of education (24.3%), although this relationship was not statistically significant (P = 0.08) [Table 5]. Hypermetropia was not significantly associated with gender, social class or education.

Glaucoma: Glaucoma was diagnosed in 3.7% patients [Table 3].16 of the patients were females and belonged to the lower social class.

Corneal opacity: The prevalence of corneal opacity was 3.2%. Bilateral corneal opacity was prevalent in 0.8% of the population. Ocular trauma, corneal ulcer, and trachoma were the common causes of corneal opacity. The prevalence of corneal opacity was highest (18.4%) in the age group of 60 – 69 years. In females, the prevalence was 3.8% as compared to 2.6% in males (P > 0.50) [Table 6].

The ocular morbidity rate was 1.24 lesions per elderly person. The number of ocular lesions increased from 1.09 per person in the 60 to 69 years age-group to 1.91 per person in the 80 to 89 years age-group (r=+0.47; p<0.001).

The prevalence of pterygium was 18.8% with no significant variation in gender,social class or education. However, prevelance was highest amongst labourers (12.3%).

The overall prevalence of diseases of the lids/lacrimal apparatus was 12%of elderly population. Inflam matory conditions like chronic dacryocystitis, chalazion andblepharitis formed the commonest group of lesions (8.2%) in this category. Other diseases included 7.2% cases of stye and 6.4% cases of trichiasis.

Among retinal diseases, the commonest were degenerative conditions like age-related macular degener ation (5.2%) and choroidal sclerosis (1.1%).

There were 8 cases of injury. Other diseases include 3 cases each of amblyopia, nystagmus and phthisis bulbi.

V. Discussion

The present study found that one third of the elderly population above 60 years of age suffered from low vision and
another 13.7% were blind. The prevalence of blindness was slightly lower than that reported by Sharma et al (15.6%) among elderly people from North India.[14] The prevalence of ocular diseases among the elderly population was observed to be high. Each person above 60 yearsof age was susceptible to suffer from one or more ocular diseases. Ocular diseases were found to be more among males,people in the lower socioeconomicstrata, landless labourers and older age groups. The higher prevalence of ocular diseases in old age could be due to increasing degenerative conditions,increased susceptibility to infections, lack of proper care of the eyes, among other reasons.

The prevalence of pterygium was high. Reports from various studies in India showed the prevalence of pterygium ranging from 0.075% in Punjab[15] to 10.42% in Maharashtra[16] in the general population. The high prevalence of 18.8% in our study group could be attributed to rocky geographical region and high UV exposure in labourers of Bundelkhand, with further studies needed in the que.

High cataract prevalence rates have been reported from several other studies in India. In the Aravind Comprehensive Eye Survey, the prevalence of cataract in those aged 40 years and above was found to be 47.5%.[17] Higher cataract prevalence rates have been reported by several other studies in India.[18]

Myopia has been found to be significantly related to age by Dandona et al.[19], where the prevalence increased from the age group of 20 – 29 years to the age group of 50 – 59 years, but decreased thereafter. However, myopia has been reported to decrease with increasing age by studies outside India.[20]

The prevalence of glaucoma in the present study (3.7%) matched as reported by several Indian studies. The prevalence of glaucoma has been found to range from 2.6% to 7.2%.[21] The prevalence of corneal opacity was slightly high in the present study population when compared to other studies. Singh et al. have reported a prevalence of 2.99% in people aged above 50 years.[22] Poor knowledge about ocular health coupled with poor availability and use of eye healthcare services in our study area might be a possible reason for a higher prevalence of corneal opacity.

VI. Conclusion

Our study highlights the high prevalence of cataract, refractive errors, and corneal opacity in the study population, all of which are treatable or preventable. This heralds a need to define the priorities for eye care services based on the current population-based data. Short-term emphasis should be placed on cataract and refractive errors, and long-term emphasis should include glaucoma and corneal diseases as well. People should be educated about their causes, preventive measures, and appropriate treatment. Health education programs should target older age groups specifically and the population in general. The data reveals the need for more comprehensive studies of the geriatric ocular problems incorporating the identification of risk factors so as to design proper strategies to reduce the load of ocular diseases in the community. It is necessary to formulate uniform guidelines and diagnostic criteria for screening common ophthalmic conditions like pterygium, lacrimal sac disorders, glaucoma and ARMD.

Development of screening procedures using simple diagnostic criteria can be utilised for training of paramedical workers and ophthalmic assistants for early detection of these conditions, early referral and treatment. This will help in the ongoing activities of the National Programme for the Control of Blindness, and improve eye health care in our country. Affordable eye care services should be provided in addition to making these services available and accessible.

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