

Pattern of ocular morbidity amongst patients of elderly age group in Central India

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Abstract

Elderly population in India is rapidly on an increase due to increased life expectancy. Visual status is one of the most important health quality indicators for the elderly who are highly prone to develop various eye diseases which form a major health problem to them. So we have tried to study the pattern of ocular morbidity in this age group, to understand the risk factors responsible for blindness in the elderly so that we can focus on the preventive measures that we can adopt to avoid this. In our hospital based cross sectional study 500 patients above 50 years of age were taken. Detailed history based on pre-prepared questionnaire was taken followed by complete ocular examination and relevant investigations to diagnose the ocular disease in these elderly people. We found that refractive errors followed by cataract were found to be the most common ocular problems in our sample population. Various risk factors like age, gender, residence, educational status, socio-economic status, hypertension, diabetes, cooking fuel used, smoking, alcoholism, and tobacco consumption were tabulated and their significance in causing ocular morbidity and blindness was studied. Finally we concluded that there is a high incidence of ocular morbidity in old age individuals most of the causes being either treatable or preventable. Therefore the focus should be on providing affordable quality eye care services at both the urban and rural areas so that we can prevent ocular morbidity and blindness in these elderly individuals specially those with low educational and socioeconomic status.

Keywords: Cataract, Glaucoma, Dry eye, Retinopathy, Refractive errors.

Introduction

By 2025, the population of elderly is expected to be about 840 million in low income countries.¹ In India, 10.4% of the total population will be 60 years or older by 2020.² With rapid increase in elderly population, emphasis should be laid on their better quality of life comprising physical, social and economic well being. The visual status is one of the major factors determining the quality of life.¹ In 2010 an estimated 285 million people worldwide were visually disabled, about nearly 90% of them living in developing countries.¹ According to a fact about 80% of the blindness is avoidable and about 65% of all people who are visually impaired are aged >50 years.¹

These facts and figures signify that in a developing country, like India, little concern is given to the geriatric health problems and limited information is available about the pattern of ocular morbidity in elderly population.³ This provides a rationale to conduct our study as it will provide knowledge about prevalence of different ocular morbidities and its associated risk factors in geriatric population so that a large number of elderly population can be prevented and treated for the prevailing ocular morbidities which is also included under 'VISION 2020: the right to sight'¹ programme.

The formulation of any effective intervention health programme begins with the knowledge of the magnitude of the problem in a given community. Although costly and time consuming the actual assessment of a health problem is far less expensive than the intervention itself and may suggest where and how prevention activities can best be implemented. The

study was designed to diagnose elderly patients with ocular diseases by thorough history taking, examination and relevant investigations which was then analysed to know about the prevalence of ocular diseases. The study was significant as large and random population of both rural and urban area could be screened for the different ocular morbidities in a cost effective way. The present study assisted to know the prevalence of different ocular morbidities and identify their associated risk factors that may help to formulate measures to eliminate avoidable blindness and compare our results with some previous studies; enabling us to tackle it more effectively.

Aims and Objectives

1. To determine the prevalence of the different types of ocular morbidities in elderly.
2. To study about the risk factors associated with ocular morbidity and prevention of blindness in elderly.

Materials and Methods

A hospital based cross-sectional study was carried out at ophthalmology OPD of a hospital. The sample population included patients of >50 years of age who visited the eye O.P.D in between working hours. The sample size of the population was 500.

Exclusion Criteria: The patients < 50 years of age, the patients who did not give consent, and patients of dementia and mental derangements in whom the history was unreliable were excluded from the study.

Inclusion Criteria: Patients >50 years of age who visited the opd and gave consent were included in the study.

An informed consent was obtained from the patient on a consent form before proceeding further. Ethical approval regarding the study was obtained from the relevant authority. A thorough history taking procedure to know the chief complaints was carried out with special emphasis on the associated factors. A predesigned questionnaire was asked to the patient (to know about the associated factors of ocular morbidities); as given in the case record form attached. The questions were asked in a manner that the patient understood. The socio-economic status of the patient was ascertained by Kuppuswamy scale¹ for urban population and Prasad's scale⁴ for rural population. The patients for diabetes were investigated by blood sugar estimation and for hypertension, blood pressure was recorded and diagnosed by comparing with standard results.⁵ After history taking, external ocular examination was done with the help of torch light and loupe.⁶

The visual acuity with and without pin hole was taken with the help of snellen's chart for literate and landolt's C-chart for illiterate patients.⁶ Retinoscopy⁶ and/or autorefractometry⁶ were done to find out the refractive error. A visual acuity of <6/9 was considered as a visual impairment. A detailed examination of conjunctiva, sclera, cornea, iris, pupil, anterior chamber, lens, posterior chamber and posterior segment was carried out to find out any abnormality.⁶ Instruments used-Measurement of intra ocular pressure by tonometry, examination of lacrimal apparatus by syringing, Schirmer's strip and fundus examination by ophthalmoscope and slit lamp was done as required.⁶ Based on the clinical features, examinations and investigations diagnosis was confirmed for the type of ocular morbidity present.⁶ The data was then organised, examined and analysed to calculate the prevalence of different ocular diseases by the standard formula and methods.¹

The correlation of the different factors associated with the prevalent ocular morbidities was determined and test of significance such as chi square test, chi square test with Yates' correction and Fisher exact test were applied to find out any statistical significance was present or not.

Results

The prevalence of different ocular morbidities in the 500 patients that we examined is shown in Fig. 1.

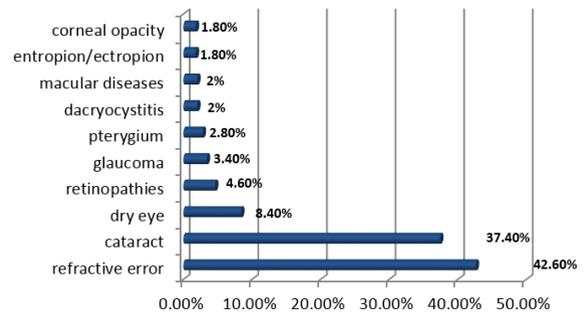


Fig. 1: Prevalence of different ocular morbidities in >50 year patients

Apart from the above; less than 5 cases of the following diseases were also observed: Blepharitis, colour blindness, exophthalmos, ocular allergy, strabismus and sty. In the present study many patients were having >1 ocular morbidity, either in the same eye or in the opposite eye. All the multiple ocular diseases found in the same patient were taken as separate diseases. Maximum patients were found in age group 51-60 years (n= 220), out of which 91(41.36%) had refractive errors. No statistically significant findings seen age wise (p value > 0.05). Total 265 males and 235 females were examined. The difference in occurrence of refractive error and cataract between males and females is statistically significant (p value <0.05). In remaining ocular morbidities, no gender wise difference was seen.

Table 1: Distribution of ocular morbidities on the basis of residence

Ocular morbidity	Rural patients (n=218)	Urban patients (n=282)	P value
Refractive errors	83(38.07%)	130(44.5%)	0.0719
Cataract	80(36.6%)	107(37.9%)	0.7752
Dry eye	30(13.7%)	12(4.1%)	0.0001
Retinopathies	8(3.67%)	15(5.32%)	0.3826
Glaucoma	8(3.6%)	9(3.08%)	0.7698
Pterygium	5(2.29%)	9(3.08%)	0.5462
Dacryocystitis	4(1.83%)	6(2.13%)	0.8166*
Macular diseases	5(2.29%)	5(1.77%)	0.6801
Entropion/ectropi	3(1.38%)	6(2.13%)	0.7736*
Corneal opacity	4(1.83%)	5(1.77%)	0.9589*

The difference in occurrence of dry eye between urban and rural patients is statistically highly significant (p value<0.01) (Table 1).

Table 2: Distribution of ocular morbidities on basis of educational status

Ocular morbidity	Illiterate (n=140)	Primary (n=102)	Middle (n=110)	High (n=63)	Graduate &> (n=85)	P value
R.errors	44(31.4%)	44(43.14%)	54(59%)	31(49.2%)	40(47.06%)	0.028
Cataract	66(47.1%)	42(41.18%)	40(36.3%)	15(23.8%)	24(28.24%)	0.006
Dry eye	26(18.5%)	10(9.8%)	4(3.64%)	1(1.59%)	1(1.18%)	<0.001
Retinopathies	3(2.14%)	4(3.92%)	5(4.55%)	7(11.12%)	4(4.71%)	0.1*
Glaucoma	4(2.86%)	3(2.94%)	2(1.82%)	2(3.17%)	6(7.06%)	0.5674*
Pterygium	5(3.57%)	3(2.94%)	4(3.6%)	—	2(2.35%)	0.834*
Dacryocystitis	3(2.14%)	2(1.96%)	3(2.73%)	1(1.59%)	1(1.18%)	0.99*
Macular	1(0.71%)	—	1(0.91%)	4(6.35%)	4(4.71%)	0.037*
Entropion/ectropion	2(1.43%)	2(1.96%)	3(2.73%)	2(3.17%)	—	0.975*
Corneal opacity	3(2.14%)	3(2.94%)	1(0.91%)	—	2(2.35%)	0.945*

The difference in occurrence of refractive error and macular diseases between educational statuses of the patient is statistically significant (p value<0.05) (Table 2). The difference in occurrence of cataract and dry eyes between educational statuses of the patient is also statistically significant (p value<0.01).

Table 3: Distribution of ocular morbidities on basis of socioeconomic statuses

Ocular morbidity	Upper (n=2)	Upper middle (n=130)	Lower middle (n=140)	Upper lower(95)	Lower (133)	P value
R.errors	1(50%)	70(53.85%)	71(50.7%)	26(27.36%)	45(33.83%)	<0.0001
Cataract	—	47(36.15%)	50(35.7%)	38(40%)	52(39.09%)	0.8520
Dry eye	—	1(0.77%)	4(2.8%)	10(10.5%)	27(20.3%)	<0.0001#
Retinopathies	1(50%)	4(3.08%)	10(7.1%)	3(3.1%)	5(3.7%)	0.399*
Glaucoma	—	2(1.53%)	6(4.2%)	3(3.1%)	6(4.5%)	0.516
Pterygium	—	2(1.5%)	6(4.2%)	3(3.1%)	3(2.2%)	0.782*
Dacryocystitis	—	1(0.77%)	1(0.71%)	6(6.32%)	2(1.51%)	0.0442*#
Macular diseases	—	5(3.85%)	1(0.71%)	3(3.1%)	1(0.75%)	0.446*
Entropion/ectropion	—	3(2.31%)	1(0.71%)	4(4.21%)	1(0.75%)	0.444*
Corneal opacity	—	2(1.5%)	—	4(4.21%)	3(2.2%)	0.985*

Kuppuswamy scale¹ was used for urban population and Prasad's scale⁸ was used for rural population. The difference in occurrence of dacryocystitis between socioeconomic statuses of the patient is statistically significant. (p value<0.05) The difference in occurrence of refractive errors and dry eyes between socioeconomic statuses of the patient is statistically highly significant. (p value<0.01) (Table 3).

Table 4: Distribution of ocular morbidities in hypertensives and diabetics patients

Ocular morbidity	Hypertensives (n=135)	Non-hypertensives (n=365)	P value	Diabetics (n=62)	Non-diabetics (n=438)	P value
R.errors	50(37.03%)	163	0.1261	19(30.6%)	194	0.042
Cataract	58(42.9%)	129	0.1179	25(40.3%)	162	0.6114
Dry eye	6(4.4%)	36	0.0525	8(12.95%)	34	0.1720
Retinopathies	12(8.8%)	11	0.0054	9(14.5%)	14	0.0001
Glaucoma	8(5.9%)	9	0.0580	4(6.5%)	13	0.2973*
Pterygium	2(1.5%)	12	0.4629*	2(3.2%)	12	>0.05*
Dacryocystitis	—	10	-	2(3.2%)	8	>0.05*

Macular diseases	3(2.3%)	7	>0.05*	1(1.6%)	9	>0.05*
Entopion/ectropion	1(0.7%)	8	>0.05*	–	–	–
Corneal opacity	1(0.7%)	8	>0.05*	1(1.6%)	8	>0.05*

The difference in occurrence of retinopathies between hypertensives and non-hypertensives is statistically highly significant (p value<0.01). The difference in occurrence of retinopathies between diabetics and non-diabetics is statistically highly significant (p value<0.01). The difference in occurrence of refractive errors between diabetics and non-diabetics is statistically significant (p value<0.05) (Table 4).

Table 5: Distribution of ocular morbidities among smokers and non-smokers with tobacco consumption

Ocular morbidity	Smokers (n=112)	Non-smokers (n=388)	P value	Tobacco Consumption (n=160)	No tobacco consumption (n=340)	P value
R.errors	30(26.8%)	183	0.0001	51(31.9%)	162	0.0009
Cataract	38(33.9%)	149	0.3887	40(25%)	147	0.0001
Dry eye	6(5.3%)	36	0.1875	6(3.75%)	36	0.0101
Retinopathies	6(5.3%)	17	0.6641	1(0.62%)	22	0.0073*
Glaucoma	2(1.8%)	15	0.4624*	5(3.125%)	12	0.8159
Pterygium	1(0.9%)	13	>0.05*	2(1.25%)	12	>0.05*
Dacryocystitis	1(0.9%)	9	>0.05*	2(1.25%)	8	>0.05*
Macular diseases	2(1.8%)	8	>0.05*	2(1.25%)	8	>0.05*
Entopion/ectropion	1(0.9%)	8	>0.05*	–	–	–
Corneal opacity	1(0.9%)	8	>0.05*	1(0.625%)	8	>0.05*

The difference in occurrence of refractive errors between smokers and non-smokers is statistically highly significant (p value<0.001). The difference in occurrence of cataract between smokers and non-smokers is statistically significant (p value<0.05). The difference in occurrence of refractive errors, cataract, dry eye and retinopathies between tobacco consumers and non-consumers is statistically highly significant (p value<0.01) (Table 5).

Table 6: Distribution of ocular morbidities with cooking fuel use

Ocular morbidity	Gas cylinder/stove users (n=455)	Smoky chulha users (n=45)	P value
R.errors	201(44.2%)	12(26.7%)	0.0235
Cataract	166(36.5%)	21(46.7%)	0.1781
Dry eye	38(8.3%)	4(8.8%)	0.9014*
Retinopathies	19(4.2%)	4(8.8%)	0.2861*
Glaucoma	13(2.9%)	4(8.8%)	0.0894*
Pterygium	12(2.6%)	2(4.4%)	0.8202*
Dacryocystitis	9(1.9%)	1(2.2%)	0.9111*
Macular diseases	10(2.2%)	–	0.6106^
Entopion/ectropion	8(1.7%)	1(2.2%)	0.8233*
Corneal opacity	7(1.5%)	2(4.4%)	0.4174*

The difference in occurrence of refractive errors between LPG users and biomass fuel users is statistically significant (p value<0.05) (Table 6).

Discussion

The present study was undertaken in the light of the available literature to determine the prevalence of the different types of ocular morbidities and to study about the risk factors associated with ocular morbidity

and prevention of blindness in 500 patients of > 50 years of age. In the present study, the most prevalent ocular morbidities included refractive errors myopia, hypermetropia, astigmatism, aphakia, pseudophakia, and anisometropia. The prevalence was 42.6% that is lesser than found by Agrawal D et al⁷ in study carried out in an urban population, which might be due to the fact that only patients >50 years were considered in the present study. Refractive errors were most prevalent in the study done by Shrote VK et al⁸ in the rural area of central India Singh MM et al,³ Rizyal A et al,⁹ Ukponmwan CU¹⁰ but the prevalence was lower as it was carried out in all the age groups. The prevalence of refractive error was found lesser in the studies done by Singh A et al,¹¹ Normalina M et al,¹² Khadse A et al,¹³ Garg P et al,¹⁴ Inaamul Haq et al.¹⁵ The second most prevalent ocular morbidity was cataract. Its prevalence rate was 37.4%. It is higher than the studies carried out in an urban population by Agrawal D et al,⁷ Shrote VK et al,⁸ Rizyal A et al,⁹ Ukponmwan CU,¹⁰ Khadse A et al,¹³ Inaamul Haq et al,¹⁵ Singh JP et al,¹⁶ In the Aravind Comprehensive Eye Survey,¹⁷ the prevalence of cataract in those aged 50 years and above was found to be 47.5%. The results in the Blue mountain eye study¹⁸ conducted in nursing home residents also shows a higher prevalence of cataract. In the studies done by Singh MM et al,³ Normalina M et al,¹² Garg P et al,¹⁴ cataract was found to have a higher prevalence. Cataract was found to be most prevalent ocular morbidity (41.89%) in a study done by Singh A et al¹¹ which might be due to the fact that it included only rural population.

In the present study prevalence of dry eye was found to be 8.4%. A lower prevalence of 4% was found in the study done by Rizyal A et al⁹ which might be due to the fact that only patients >50 yrs. were considered in the present study. However a higher prevalence was found by Garg P et al¹⁴ and Sahai A et al.¹⁹

In the present study prevalence of retinopathies that included diseases like retinal artery occlusion, retinal vein occlusion, diabetic retinopathy, hypertensive retinopathy; was found to be 4.6% slightly higher than found out by Garg P et al.¹⁴ A study done by Rizyal et al⁹ showed the prevalence of diabetic retinopathy to be 1% while that of Ukponmwan CU,¹⁰ Normalina M et al,¹² and Martinez GS et al²⁰ showed 2.5%, 0.7%, 0.5% respectively.

In the present study prevalence of glaucoma irrespective of its type was found to be 3.4%, similar to the results obtained in the studies done by Garg P et al¹⁴ and Martinez GS et al²⁰ but is higher than the prevalence found by Agrawal D et al,⁷ Normalina M et al,¹² Khadse A et al¹³ and Inaamul Haq et al.¹⁵ The prevalence of glaucoma was also found to be higher in the studies done by Ukponmwan CU¹⁰ and Singh A et al.¹¹

In the present study prevalence of pterygium was found to be 2.8% similar to that found by Khadse A et

al¹³ and is higher than the prevalence found by Agrawal D et al⁷ in a study conducted in an urban population of Meerut. A slight higher prevalence was found by Ukponmwan CU.¹⁰ A study done by Rizyal A et al⁹ showed the prevalence of both pterygium and pinguecula to be 10.8%. In the studies done by Singh MM et al,³ Normalina M et al¹² and Garg P et al¹⁴ pterygium was found to have a higher prevalence.

In the present study prevalence of dacryocystitis was found to be 2% that is slightly higher than the prevalence found by Agrawal D et al⁷ and Hussain A et al²¹ in a study conducted in an urban population of Meerut. The prevalence was lower than that found by Garg P et al.¹⁴ We found that prevalence of macular diseases, which consisted primarily of age related macular degeneration (ARMD); cystoid macular edema (CME), traumatic macular edema and macular hole, was found to be 2%. A higher prevalence of maculopathies was found by Ukponmwan CU¹⁰ with ARMD's as 3%. Studies done by Singh MM et al,³ Rizyal A et al,⁹ Garg P et al,¹⁴ Martinez GS et al²⁰ showed the prevalence of ARMD to be 2%, 5.25%, 6.4%, 6.89%, and 12.2% respectively. In a study done by Normalina M et al¹² none was found to have age related macular degeneration, however drusen were noted.

In the present study prevalence of diseases of the eye lids that included entropion and ectropion was found to be 1.8% that is lower than the results found by, Normalina M et al,¹² Garg P et al¹⁴ and some other studies. In the Blue Mountains Eye Study¹⁸ ectropion was found to be higher than the present study. The present study prevalence of the corneal opacity was found to be 1.8% that is higher than the prevalence found by Agrawal D et al⁷ but lower than the prevalence found in the studies done by Normalina M et al,¹² Garg P et al,¹⁴ Inaamul Haq et al.¹⁵

Thus, the results of the present study correlates with the results found by many studies but also controvert with the results of other studies which may be due to the difference in the design of the present study as compared to other studies or may be significant. The present study was a hospital based cross sectional study that might have caused a higher prevalence of certain diseases. The smaller duration of the study, the seasonal and geographical impact might also have affected the disease prevalence.

Many other studies were conducted taking into account the younger as well as older population, while the present study was conducted only in patients of >50yrs; thus was more specific with diseases of elderly and resulted in non-significance of age related increase in prevalence of certain diseases such as cataract. The screening and diagnosing criteria's might vary from some studies giving different outcome. However utmost care was taken during the whole study discrepancies in the results might have occurred due to some reasons. Firstly, the effect of certain factors might have been

exaggerated or suppressed by other interactive susceptible factor, both genetic and environmental. Secondly, a low no. of patients in several diseases might have led to the statistical insignificance with the associated factors. Thirdly, there were no control subjects so the risk factors were not studied separately but as combined. Fourthly, the screening and diagnosis of patients some humanitarian errors might be possible.

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