ORIGINAL ARTICLE

Current trends in eye diseases and its correlates in an urban population

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Abstract

Background: The trend of ocular diseases in urban areas is changing. Eye diseases due to chronic medical problems are being detected more in urban population. Therefore, there is a need to check for ocular diseases in each age group. **Objectives:** To find the prevalence and causes of ocular morbidity and blindness and their associated factors in urban population. **Methods:** This study was done in an urban area of Meerut. All the age groups covering 1613 subjects were interviewed and simple torchlight examination of the eyes, followed by testing of vision was done. **Results:** Prevalence of ocular morbidity was 53.0% and blindness 3.4%. The most common ocular morbidity was refractive error (86.4%), followed by cataract (22.5%) and conjunctivitis (6.0%). The causes of blindness were cataract (72.7%), posterior segment pathologies (20.0%), ocular injury (5.5%) and corneal opacities (1.8%). Both ocular morbidity and blindness were significantly higher in smokers, hypertensives and diabetics. Blindness was more prevalent in alcoholics and in those with history of ocular injury.

Key Words

Ocular morbidity; blindness; hypertension; diabetes; smoking

Introduction

WHO has defined visual impairment as a visual acuity of at least 6/18 and not less than 3/60 while blindness is anything with a visual acuity of less than 3/60 (1).There are an estimated 285 million people worldwide who have a visual impairment. Of these, 39 million persons are blind, about 90% of them living in developing countries. About 80% of blindness is avoidable. However, a large proportion of those affected remain blind for want of access to affordable eye care. Blindness not only leads to a downslide in the economic and social status but may also result in premature death. The major causes of blindness and their estimated prevalence are cataract (33%), glaucoma (2%) and uncorrected refractive errors (43%). Among persons who are blind worldwide, 65% are age 50+. An estimated 19 million children are visually impaired. Of these, 12 million children are visually impaired due to refractive errors, a condition that could be easily diagnosed and corrected (2).

An estimated prevalence of blindness in India for the year 2004 was about 11.2 per thousand population; of this, 0.1/1000 population was in the age group 0-14 years, 0.6/1000 in the age group 15-49 years, and 77.3 in 50+ age group (3). According to rapid national survey on blindness 2006-07, the prevalence

reduced from 1.1% to 1.0% and estimated national prevalence of childhood blindness/low vision was 0.8/1000 (4).

The major causes of blindness in the developed world are – accidents, glaucoma, diabetes, vascular diseases (hypertension), cataract and degeneration of ocular tissues esp. retina and hereditary conditions (5). In India, the main causes are – cataract, refractive error, glaucoma, posterior segment pathology, corneal opacity and others (4). The Central Council of Health and Family Welfare at its meeting held in 1975 resolved that one of the basic human rights was the right to see and therefore, it had to be ensured that no citizen went blind needlessly or being blind remained so; if by reasonable deployment of skill and resources, his eyesight could be prevented from deterioration or if already lost could be restored. Following this resolution, the National Program for Control of Blindness (6) was launched in the year 1976 as a 100% centrally sponsored program. The various activities under the program were – establishment of regional institutes of ophthalmology, up-gradation of medical colleges and hospitals and development of mobile eye units. The goal of the program was to reduce the prevalence of blindness to less than 0.3% by the year 2000. (7)

However, the above goal could not be achieved by 2000. The prevalence of blindness in India was still 1.0% as per a rapid national survey (5). Hence, Vision 2020 was launched in India at a meeting in Goa on October 10-13, 2001. The target diseases prioritized for India are – Cataract, Childhood Blindness, Corneal Blindness, Refractive Errors and Low Vision, Diabetic Retinopathy, Glaucoma and Trachoma.

Aims & Objectives

The present study was planned to carry out a baseline survey to assess the prevalence of ocular morbidity and blindness and the associated factors in the urban area served by the UHTC of the dept of Community Medicine, LLRM Medical College, Meerut.

Material and Methods

The present study was a community based cross-sectional study done under the Department of Community Medicine, LLRM Medical College, Meerut. With the estimated prevalence of ocular morbidity in the general population (p) = 20%, Confidence Limits = 95%, Relative precision (L) = 10%, the sample size came out to be 1600. The study

unit was taken as the family (since individuals of all age groups were to be studied) and the average family size as five (the area was under UHTC and therefore surveyed by the medico-social workers; the average family size for the purpose of the study was calculated by dividing the total population with the number of families residing in that area). Thus, the number of families to be studied was calculated to be 1600/5 = 320. These 320 families were equally divided over the nine colonies served by the UHTC and so, from each colony 40 families were randomly selected using the random number tables and 1613 individuals were finally covered for this study.

Methodology: A house-to-house survey was done for the forty randomly selected families in each of the nine colonies of the area. Each member of the family was interviewed using an oral questionnaire method. If any of the selected family was absent or hostile, during the time of study, the next family was interviewed. The information from each family was collected on a pre-designed and pre-tested schedule. Each of the family members was then examined for visual acuity and then a torch light examination was done for any sign of ocular morbidity in the anterior segment of the eye. The suspected cases were then confirmed by examination by an expert of the Upgraded Department of Ophthalmology, L.L.R.M Medical College, Meerut. The data thus collected was transferred to a master chart from which simple and correlation tables were prepared, analyzed and statistically evaluated using SPSS 16.0 and Epi-info version 6.

Results

Prevalence of ocular morbidity was 53.0% and blindness was present in 3.4% of the population (Table 1). The proportion of various ocular morbidities found from this study was - Refractive Error (86.4%), followed by Cataract (22.5%), Conjunctivitis (6.0%), Pterygium (2.6%), Squint (2.5%) and Blepharitis (1.5%). Trachoma and Entropion comprised a bare minimum of 0.2% each. The causes of blindness were found to be cataract (maximum 72.7%), posterior segment pathologies (20.0%), ocular injury (5.5%) and corneal opacities (least 1.8%) (Table 2). Ocular morbidity and blindness were found to be significantly associated with smoking, hypertension and diabetes (P value ranging from <0.05 to <0.0001). However, alcohol intake was only associated with a significantly higher ocular morbidity (P<0.04) and not blindness (P=0.39)

(Table 3). Ocular morbidity was found to be significantly more prevalent (P<0.01) in people with history of ocular trauma (87.9%) as compared to those with no such history (52.3%) (Table 4). History of ocular injury was positive in 42.9% cases of squint, followed by blindness (5.5%), refractive error (3.8%) and cataract (2.1%) while it was least in cases of corneal opacity and glaucoma (0% each) (Table 5).

Discussion

In this study, the prevalence of ocular morbidity was found to be 53.0% which is higher as compared to 47.28% reported by Gulati *et al* (8) (1984, Delhi). The prevalence of blindness was found to be 3.4% in the present study (males = 3.3% and females = 3.5%) which was similar to 4.4% reported by the ICMR Survey (9) (2001) and 3.7% as reported by Serge *et al* (10) (2004).

Cataract was the major cause of blindness (72.7%) which was lower than 81% reported by Limburg *et al* (11) (1996) but similar to 76% reported by ICMR Survey (9) (2001). In the study, other causes of blindness were posterior segment causes (20%) and corneal opacities (1.8%) which were similar to the findings of Limburg *et al* (11) (4-28% and 2% respectively) and ICMR Survey (9) (17% and 4% respectively). The prevalence of ocular morbidity was observed to be significantly higher in individuals with habit of alcohol consumption (62.7%) as compared to those with no such habit (52.4%) in the present study (P<0.05). However, no significant relationship was observed between the prevalence of blindness and habit of alcohol consumption (P>0.1). Alcohol consumption may be indirectly associated with ocular morbidity in being a determinant for other chronic systemic diseases complicated into ocular morbidity. In this study, prevalence of ocular morbidity was found to be significantly related to smoking (P<0.01). This finding was also corroborated by Klein *et al* (12) (1998) and also in the study by Hepson *et al* (13) (2001, Scandinavia) which implicated smoking as a significant risk factor in tobacco induced toxic optic neuropathy, thyroid ophthalmopathy and cataract.

In this study, ocular morbidity was found to be significantly more prevalent (P<0.001) in people with history of ocular trauma (87.9%) as compared to those with no such history (52.3%). Blindness and refractive errors in the people with history of ocular injury were 9.1% and 84.8% respectively but these were different from the findings of Mathew *et al* (14)

(1988, Pondicherry; 20.3% and 48.5%respectively). Ocular trauma was responsible for 5.5% of the blind people in this study while in a study by Rekhi *et al* (15) (1991, Jaipur) ocular trauma accounted for 11.8% of blindness.

In the present study, hypertensives had a significantly higher prevalence (P<0.001) of ocular morbidity (90.8%) as compared to non hypertensives (46.8%). Prevalence of blindness was also found to be higher in hypertensives (13.6%) as compared to non hypertensives (1.7%) (P<0.01). However, this was higher as compared to 2.6% reported by Rekhi *et al* (15) (1991, Jaipur). This difference might be due to the fact that in the present study, most people with hypertension also had diabetes mellitus and the higher prevalence of blindness may be due to the confounding influence of both hypertension and diabetes.

In the present study, ocular morbidity and blindness were found to be significantly higher (P<0.001, P<0.01 respectively) in people with diabetes mellitus (81.8%, 40.3%) as compared to those without diabetes (51.6%, 1.6%). This was similar to the conclusion drawn from the Diabetic Retinopathy Study (16) (1973) and another study by King *et al* (17) (1998). However, the findings were different from those reported by Rema *et al* (18) (2000, South India), Narendran *et al* (19) (2002, Southern India), Mohan *et al* (20) (2005, Chennai), for blindness due to diabetic retinopathy- 7.3%, 26.8% and 20.8% respectively. This difference might be due to the fact that in the present study, most people with diabetes mellitus also had hypertension and the higher prevalence of blindness may be due to the confounding influence of both diabetes and hypertension.

Conclusion

Almost half of the population was found to be having one or the other ocular problem, maximum being in the 60+ age group. Factors like smoking, alcohol, ocular injuries etc. influenced the rate of ocular morbidity while co-morbidities like hypertension and diabetes played a significant role in the prevalence of blindness, cataract, glaucoma etc. This study reveals that despite taking appropriate medicines, cataract and blindness cannot be prevented in the people suffering with diabetes.

Recommendation

On the basis of the findings of this study, half yearly screening of people suffering with other chronic

diseases for ocular problems esp. cataract and blindness, is recommended. Most of the blindness is preventable (as shown by the study) and therefore, screening of people especially the elderly will definitely bring down the rate of preventable blindness.

Limitation of the study

1. Subjects could not be followed up for long term evaluation of patients with other co morbidities.
2. On field evaluation of posterior segment pathologies could not be done due to resource constraints.
3. Long term effect of ocular injuries on eye should be further evaluated in detail which could not be pursued in this study.

Relevance of the study

From the study, it is quite evident that despite having all the knowledge about the ocular effects of life style diseases like hypertension, diabetes mellitus, ocular morbidities are difficult to prevent. Ocular injuries also seem to play an important role in the manifestations of certain eye conditions like squint and blindness.

Authors Contribution

DA: involved in conception, design, acquisition and interpretation of data and final drafting of the article. JVS: involved in conception, design and final approval of the article. SKG: interpretation of data and final drafting of the article. HC: interpretation of data and final drafting of the article. RR: final drafting of the article. MC: final drafting of the article.

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References

1. International Classification of Diseases. WHO, 1970. I.242.
2. Visual impairment and blindness fact sheet 2012. WHO, 2012: no. 282.
3. National Health Profile 2011. Ministry of Health and Family Welfare, New Delhi. Govt. of India, 2011.
4. Annual Report 2011-2012, Ministry of Health and Family Welfare, New Delhi. Govt. of India, 2012.
5. Visual Impairment and Blindness. In: Park K, editor. Park's Textbook of Preventive and Social Medicine, 22nd edn. Jabalpur: Banarsidas Bhanot; 2013. p. 371-4.
6. National Programme for Control of Blindness. In: Kishore J, editor. National Health Programmes of India, 4th edn. New Delhi: Century Publications; 2002. p. 168-75.
7. U. P. Journal of Ophthalmology, 2004;23(1): 3-4.
8. Gulati N, Gupta NK, Jain BK, Gupta AK, Mehta SP. Some epidemiological aspects of ocular morbidity in a resettlement colony of Delhi. Indian J Public Health. 1987 Jan-Mar;31(1):60-70. PubMed PMID: 3500126.[PubMed].
9. Ophthalmic Research in ICMR, 2001: 02.
10. Resnikoff S, Pascolini D, Etya'ale D, Kocur I, Pararajasegaram R, Pokharel GP, Mariotti SP. Global data on visual impairment in the year 2002. Bull World Health Organ. 2004 Nov;82(11):844-51. Epub 2004 Dec 14. PubMed PMID: 15640920; PubMed Central PMCID: PMC2623053.[PubMed].
11. Limburg H, Bachani D, editors-National Programme for Control of Blindness: Course material for training in District Programme Management, Revised, September 1996, New Delhi: Ophthalmology Section, Directorate General of Health Services, MOHFW, GOI, 1996:2,15,22-8.
12. Klein BE, Klein R, Lee KE. Diabetes, cardiovascular disease, selected cardiovascular disease risk factors, and the 5-year incidence of age-related cataract and progression of lens opacities: the Beaver Dam Eye Study. Am J Ophthalmol. 1998 Dec;126(6):782-90. PubMed PMID: 9860001.[PubMed].
13. Hepson F. I., Cem E. Acta Ophthalmology; Scands 2001; 79:53-58.
14. Krishnan MM, Srinivasan R. Ocular injuries--in union territory of Pondicherry--visual outcome. Indian J Ophthalmol. 1988 Apr-Jun;36(2):86-7. PubMed PMID: 3235170.[PubMed].
15. Rekhi GS, Kulshreshtha OP. Common causes of blindness: a pilot survey in Jaipur, Rajasthan. Indian J Ophthalmol. 1991 Jul-Sep;39(3):108-11. PubMed PMID: 1841881.[PubMed].
16. Editorial: The diabetic retinopathy study. Arch Ophthalmol. 1973 Nov;90(5):347-8. PubMed PMID: 4746083.[PubMed].
17. King H, Aubert RE, Herman WH. Global burden of diabetes, 1995-2025: prevalence, numerical estimates, and projections. Diabetes Care. 1998 Sep;21(9):1414-31. PubMed PMID: 9727886.[PubMed].
18. Rema M, Deepa R, Mohan V. Prevalence of retinopathy at diagnosis among type 2 diabetic patients attending a diabetic centre in South India. Br J Ophthalmol. 2000 Sep;84(9):1058-60. PubMed PMID: 10966967; PubMed Central PMCID: PMC1723618.[PubMed].
19. Narendran V, John RK, Raghuram A, Ravindran RD, Nirmalan PK, Thulasiraj RD. Diabetic retinopathy among self reported diabetics in southern India: a population based assessment. Br J Ophthalmol. 2002 Sep;86(9):1014-8. PubMed PMID: 12185129; PubMed Central PMCID: PMC1771268.[PubMed].
20. Rema M, Premkumar S, Anitha B, Deepa R, Pradeepa R, Mohan V. Prevalence of diabetic retinopathy in urban India: the Chennai Urban Rural Epidemiology Study (CURES) eye study, I. Invest Ophthalmol Vis Sci. 2005 Jul;46(7):2328-33. PubMed PMID: 15980218.[PubMed].

Tables

TABLE 1 PREVALENCE OF OCULAR MORBIDITY AND BLINDNESS IN URBAN POPULATION OF MEERUT

Sex	Population	Ocular Morbidity	Blindness
Males	729	358(49.1%)	24(3.3%)
Females	884	497(56.2%)	31(3.5%)
Total	1613	855(53%)	55(3.4%)

TABLE 2 CAUSES OF BLINDNESS IN AN URBAN POPULATION OF MEERUT

Causes of Blindness	No. of People with Blindness
Cataract	40(72.7%)
Posterior segment Causes*(DR)	4(7.3%)
Posterior segment Causes (Other Causes)	7(12.7%)
Ocular Injury	3(5.5%)
Corneal Opacities	1(1.8%)
Total	55

TABLE 3 RELATIONSHIP BETWEEN DIFFERENT FACTORS, OCULAR MORBIDITY AND BLINDNESS IN URBAN POPULATION OF MEERUT

Alcohol Intake	Population (n=1613)	Ocular Morbidity (n=855)	Blindness (n=55)
Present	102	64 (62.7%)	5 (4.9%)
Absent	1511	791 (52.4%)	50 (3.3%)
		Chi square= 4.15;P=0.04	Chi square= 0.74;P=0.39
Smoking			
Present	127	91 (71.7%)	10 (7.9%)
Absent	1486	764 (51.4%)	45 (3.0%)
		Chi square= 19.25; P<0.001	Chi square= 8.34; P=0.004
Hypertension			
Present	228	207 (90.8%)	31 (13.6%)
Absent	1385	648 (46.8%)	24 (1.7%)
		Chi square= 152.17; P<0.001	Chi square= 83.66; P<0.001
Diabetes Mellitus			
Present	77	63 (81.8%)	31 (40.3%)
Absent	1536	792 (51.6%)	24 (1.6%)
		Chi square= 26.95; P<0.001	Chi square= 333.39; P<0.001

TABLE 4 PREVALENCE OF OCULAR MORBIDITY IN INDIVIDUALS IN RELATION TO OCULAR INJURY

History of ocular injury	Population	Ocular morbidity	
Present	33	29 (87.9%)	Chi square = 20.73 P value <0.01
Absent	1580	756 (52.3%)	
Total	1613	855 (53.1%)	

TABLE 5 PROPORTION OF OCULAR INJURY IN VARIOUS OCULAR MORBIDITIES IN AN URBAN POPULATION OF MEERUT

Cause of ocular morbidity	Total no. of cases	Positive history of ocular injury
Blindness	55	3 (5.5%)
Cataract	192	4 (2.1%)
Squint	21	9 (42.9%)
Corneal Opacity	3	0 (0%)
Glaucoma	6	0 (0%)
Refractive Error	739	28 (3.8%)
Base	855	33