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Original Research Article

Proportion of various ophthalmic ailments and causes among the participants on their first visit to a tertiary care ophthalmic OPD- A cross sectional survey from south central Kerala

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ABSTRACT

Background: Blindness, loss of eyesight, could be temporary or permanent. Damage to any portion of the eye, optic nerve or the brain that is responsible for this function results in visual impairment. The commonest causes for blindness are cataract, refractive errors, glaucoma, corneal opacities.
Aim: Assess major causes of visual impairment among new patients visiting ophthalmology OPD.
Settings and Design: Study conducted using a cross sectional survey design. Data collected from ophthalmology OPD of a tertiary care hospital.
Materials and Methods: The proportion of ocular diseases, degree of blindness and causative factors were assessed and recorded. Patient's visual impairment status was classified as mild, moderate, severe and blind according to WHO classification for visual impairment and blindness (Oct. 2019). Visual acuity, auto refraction, colour vision, intra ocular pressure measurement, slit lamp and fundus examinations were carried out. Data Entry: MS Excel. Statistics: chi square, proportions.
Results: There were 303 participants, 42.2% males and 57.8% females and 0.3% were blind, 1% severely visually impaired, 3.3% moderately impaired, 4% mildly impaired. Among the 106 diabetic patients, 30 diabetic retinopathy cases were observed. There were 1.02% participants with impaired colour vision, refractive errors 54.8%, cataract 35.4%, diabetic retinopathy 9.9%, glaucoma 9.2%.
Discussion: Refractive error and cataract were most frequent. Color blindness was less common. Cataract and glaucoma was not observed before 40 years of age.
Conclusion: Visual impairment across regions are similar, refractive error and cataract were leading causes of visual impairment.

1. Introduction

Blindness, loss of eyesight, could be temporary or permanent. Damage to any portion of the eye, optic nerve or the brain that is responsible for this function results in visual impairment. The quality or productivity of the life of a person can thus be crippled. According to the WHO criteria, blindness is defined as a visual acuity of less than 3/60 in the better eye. The commonest causes for blindness worldwide are cataract, refractive errors, glaucoma, corneal opacities, age related macular degeneration, childhood blindness, diabetes, trauma and other retinal disorders.[1–7] Most of these conditions are treatable.

It is estimated that, globally 2.2 billion people live with some level visual impairment.[2] In India, the estimated blindness is 4.8 million in 2019. Prevalence of visual loss from various causes in India were similar to Global causes for impaired vision.[1,2,5,8,9] Extensive studies have reported significant disparities in prevalence and causes for visual impairment and blindness in various states of India.[10] Evaluation of colour perception is often included in the routine ophthalmic examination. Reported percentage of

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colour perception varies. In Europe, Nepal, Ethiopia and in North India, they were found to be 8.4%, 3.9%, 4.2% and 8.35% respectively.[11–14]

There is a paucity in reported studies on incidence and prevalence of various levels of blindness and causative factors in Kerala, which holds a unique demography. Present study has been conducted to estimate the incidence of visual impairment and the factors associated.

2. Materials and Methods

Present cross-sectional study has been conducted at Believers Church Medical College hospital, a tertiary care hospital, from south central part of Kerala. Ethical permission was obtained from the institutional ethical committee. Consented subjects from the ophthalmology out-patient department, attending either for their ophthalmic ailments or for certifying their visual status for their official requirements for the first time were enrolled. The proportion of ocular diseases, degree of blindness and causative factors were assessed and recorded.

A sample total number of 303 patients were examined. We followed the classification by WHO for vision impairment and blindness (Oct. 2019), given as mild (presenting visual acuity worse than 6/12 in the better eye), moderate (presenting visual acuity worse than 6/18 in the better eye), severe (presenting visual acuity worse than 6/60 in the better eye), and blindness (presenting visual acuity worse than 3/60 in the better eye).

The ophthalmic examination was done by four optometrists and three ophthalmologists. Demographic data and presenting complaints were recorded by the optometrists. Visual acuity was tested with an illuminated Snellen chart. Auto refraction was performed with (Topcon KR-800) and subjective correction was performed on subjects on whom visual impairment was detected, to obtain best corrected visual acuity. Individuals who could not read the largest letter on the chart were tested for counting fingers, hand movements and light perception. Both the eyes were tested separately. Before the evaluation by an ophthalmologist, colour vision evaluation using Ishiara pseudo-isochromatic plates and IOP measurement, employing a non-contact tonometer (Topcon RL T6) were performed.

After these preliminaries, a comprehensive ocular examination was done that includes distant direct ophthalmoscopy, slit lamp examination, applanation tonometry, gonioscopy - for all who had a history of trauma, suspected narrow angles and elevated intraocular pressure- and a post-dilatation examination for assessing the lens and retina. Ocular Pupil dilatation was done with 5% Phenylephrine and 0.8% Tropicamide. Eyes with narrow angles were dilated only after performing a YAG iridotomy.

Data collected on basic demography (age and gender), level of blindness, causative factors and examination findings were recorded in structured proforma developed for recording the data observed. Presence or absence of commonest ocular ailments (Refractive error, cataract, corneal opacity, glaucoma, diabetic retinopathy, other macular pathologies, Trauma and PCO) responsible for the impairment of the vision were considered and recorded. In addition, primary and secondary diagnoses (if any) of the participants were documented for each eye.

The proforma was filled in and completed by the ophthalmologist. Data were entered into MS excel and analyzed using statistical software (SPSS- 21). Descriptive statistics were obtained and bivariate differences calculated using chi-square test.

3. Results

There were 303 participants, 128 (42.2%) males and 175 (57.8%) females, enrolled into the study. Among them, 54 (17.8%) were less than 40 years of age, 157 (51.8%) were 40 to 65 years of age and 92 (30.4%) were above 65 years of age. Majority of females were housewives (68.0%) whereas males were either in business category (45.3%) or retired (30%) on their occupational status.

According to the WHO criteria on classification of visual impairment, among the recruited participants, 1 (0.3%) was found to be blind, 3 (1%) were severely impaired, 10 (3.3%) were moderately impaired, 12 (4%) were mildly impaired and the remaining 277 (91.4%) subjects had normal vision (Figure 1).

Among the 293 participants tested for colour vision, (ten participants could not be assessed due to other ocular pathology in both eyes), three participants (1.02%) were found to have impaired colour vision (two males, one female). Refractive errors (54.8%), cataract (35.4%), diabetic retinopathy (9.9%), glaucoma (9.2%), Macular pathology (1%) and PCO (1.3%) were observed to be the common causes of visual impairment among the participants (Table 1, Figure 2).

There were a total of 106 (34.98%) participants reported to be diabetics. Among them, 30 (28.3%) had diabetic retinopathy. Further, diabetic retinopathy was compared against age of the participants (diabetics less than 40 years of age, 40 to 65 years of age and above 65 years of age) and observed that 1 (25%) among the ‘less than 40 years’ of age (0 male, 1 female), 23 (35.9%) among ‘the 40 to 65 years’ of age (12 males, 11 females) and 6 (16.2%) among the ‘above sixty-five years’ of age (5 males, 1 female) had diabetic involvement of their retina. In addition, we observed that, among the diabetics, 17 males, (30.9%) and 13 females, (26%) had diabetic retinopathy. Among the males, 70.6% and among females, 84.6% of diabetic retinopathy cases were in the age group of 40 to 65 years (Table 2, Figure 3). Diabetic retinopathy among diabetics was distributed equally across gender (Chi- value= 0.309, p= 0.667), (Figure 1). The calculated percentage of diabetic

retinopathy among the total participants was 9.9%.

None of the participants were glaucomatous in less than forty years of age (Table 3). Also observed that, among 28 glaucoma patients 13 (46.4%) participants belonged to '40 to 65 years' and 15 (53.6%) to 'above 60 years' of age groups. Macular pathology was present only in 3 cases (1%).

None of the participants had cataract or glaucoma below 40 years of age (Table 3). Refractive error (100, 60.2%) and diabetic retinopathy (23, 76.7%) were found to be highest in the age group '40 to 65 years'. Trauma, even though less in numbers, were observed in younger age (4, 57.1%).

Table 1: Proportion of new cases attending eye OPD

Diagnosis	Frequency (%)
Emmetropia	26(8.6%)
Cataract	107 (35.4%)
Refractive error	166 (54.8%)
Diabetic Retinopathy	30 (9.9)
Glaucoma	28 (9.2)
Trauma	7 (2.3)
Optic Atrophy	3 (0.9)
Amblyopia	7 (2.3)
Macular Pathology	3 (1)
Corneal Opacity	8 (2.6)
Keratoconus	1(0.3)
Dry Eye	1 (0.3)
Extra Ocular Disorder	3(1)
Color Blindness	3 (1)
PCO	4 (1.3)
Conjunctivitis	9 (3)

Table 2: Percentage of diabetic retinopathy among the diabetics according to gender and age

Age	Male (n, %)	Female (n, %)
Less than 40 Years	0	1, 7.7
40 to 65 Years	12, 70.6	11, 84.6
Above 65 Years	5, 29.4	1, 7.7
Total	17 (100%)	13 (100%)

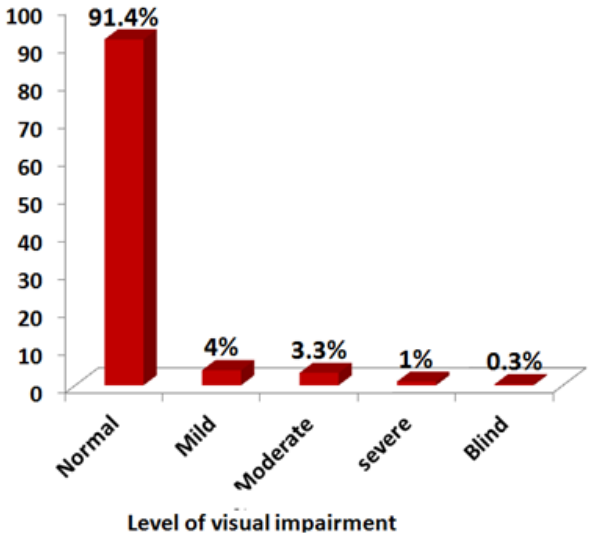

Fig. 1: Level of visual impairment of the participants based on WHO classification

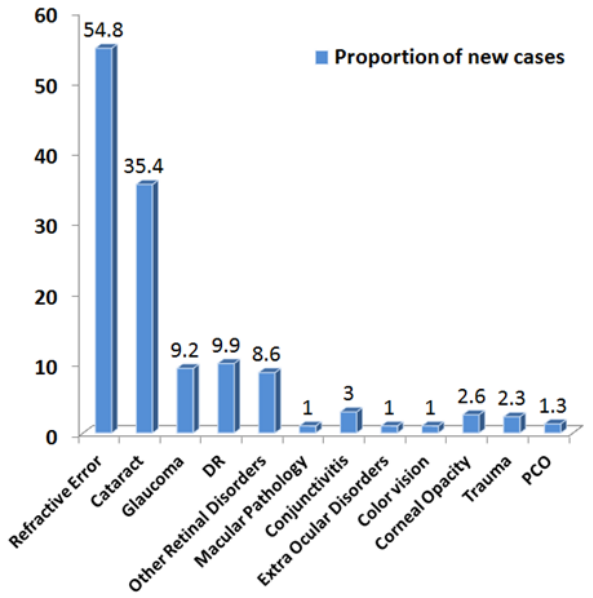

Fig. 2: Percentage of new cases attending eye OPD

4. Discussion

Visual deterioration is a major factor that hinders quality of life occurring across the population irrespective of their age, gender and socio-economic status. WHO estimates that globally, 2.2 billion people are visually impaired of which 1 billion could have been prevented. Although studies on the causes of blindness are amply available, data on the prevalence and causes is sparse in the region where this survey was performed.

This study was the first of its kind to have conducted in the south central region of Kerala where the literacy rate is almost 100% and per capita income 60% higher than India's average. Among the participants, 91.4% were normal and visual impairment was noticed in 8.3% of them. On comparing these data from neighboring regions, this was higher than a similar study conducted in Sri Lanka (5.9%)[9] and less than an urban study conducted among Indians in Singapore.[15] An Iranian eye study, the YAZID eye study showed a visual impairment of 4.4%[16] while only 0.3% visual impairment prevailed in an eye study among Latinos in Los Angles.[17] Blindness was found to be of a very low percentage in this analysis that reported as only 0.3%. This was comparable to the prevalence of

Table 3: Participant's diagnosis according to age group

Diagnosis	Age group			Chi Square, p- value
	Less than 40 n, %	40 to 65 n, %	Above 65 n, %	
Cataract Total= 107	0	45 (42.1)	62 (57.9)	75.312, 0.001
Refractive error Total= 166	33 (19.9)	100(60.2)	33 (19.9)	19.192, 0.001
Diabetic Retinopathy Total= 30	1 (3.3)	23 (76.7)	6 (20)	4.494, 0.106
Glaucoma Total= 28	0	13 (46.4)	15(53.6)	11.144, 0.004
Trauma Total= 7	4(57.1)	3(42.9)	0	8.503, 0.014
Corneal OpacityTotal= 8	3 (37.5%)	3 (37.5)	2 (25%)	2.188, 0.335

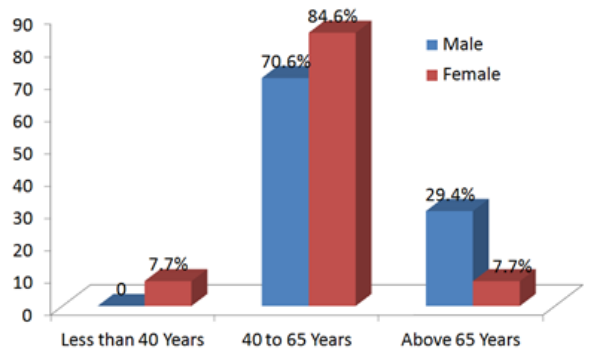

Fig. 3: Percentage of diabetic retinopathy among the diabetics according to gender and age

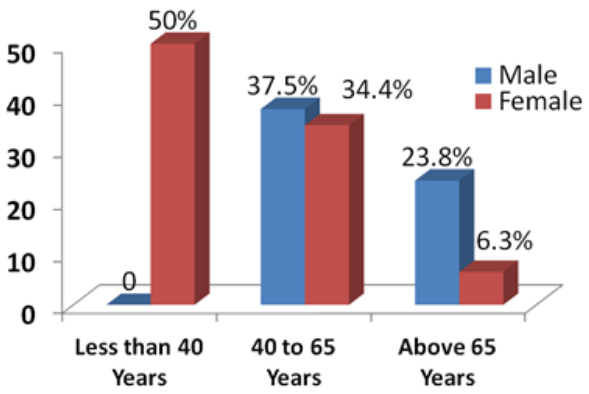

Fig. 4: Percentage of diabetic retinopathy among diabetics in each age group according to gender and age

blindness of 0.4% in a study among Indians in Singapore[15] and among Latinos in U.S.[17] An extensive study conducted in South India,[6] prevalence of blindness was found to be 1.84%. Neighboring Tibet,[18] Pakistan[8] and Sri Lanka[9] had a prevalence of 2.3%, 2.7% and 1.1% respectively.

Refractive errors and cataracts were found to be the foremost causes of visual impairment in Andhra Pradesh eye disease study[6] where 45.8% and 39.9% were attributable for refractive errors and cataract respectively. Global estimates of visual impairment[4] rated refractive errors as a major cause of visual impairment (43%) followed by cataract (33%).

A visual impairment assessment done in Delhi, India[19] displayed similar results, where 53.4% of the visual impairment accounted for refractive error and 33.8% for cataract.

However, similar studies conducted in the western countries did not show refractive error as the dominant cause, but ARMD, retinal disorders and Glaucoma as the leading causes in them. Subjects were in the older age group, an expected number of cataract for this age group, unlike in most of the studies in the Asian continent, were not the primary cause for visual impairment.[2,20]

In this survey, refractive errors ranked high in the proportion of ocular disease followed by cataracts on causes for visual impairment. Glaucoma and diabetic retinopathy also contributes substantially for impaired vision and blindness which in proportion was less than refractive errors and cataract in this study. Diabetic retinopathy was not projected as an important causative factor for visual loss. When compared to the prevalence of the disease, 28.3% of the diabetics had diabetic retinopathy, comparable to the global data.[21]

We observed that among males, 70.6% and among females 84.5% of the diabetic retinopathy belonged to the '40-65 age group'. An extensive population based study done in North India recently, attributes only 1.4% of blindness and 0.2% of moderate visual impairment to diabetic retinopathy.[7]

The proportion of eye disorders observed in this study was proportional to the leading causes for impaired vision which was comparable to global data available[2,22] Macular pathology was present in 3 cases only (1%) that included ARMD also which was less compared to the western population.[2]

None of the participants had cataract or glaucoma below 40 years of age. As expected, the percentage of cataract advanced as age progressed and glaucoma showed only

a marginal advancement in the number of cases. Trauma was not present in the 'above 65' age group and equally distributed across gender. Corneal opacities were distributed evenly in all categories of age. Only 1% of the subjects had impaired colour vision, which was very low against similar studies.[11,12,14]

5. Conclusions

We conclude that, visual impairment across regions are similar, refractive error and cataract were found to be the leading causes of visual impairments. Colour blindness was less prevalent in our community. Even though diabetic retinopathy was equally distributed to any other study, diabetes was more prevalent in our community. Despite the high literacy rate and an excellent health care system of the state, avoidable blindness still exists that is comparable to areas with low literacy and socioeconomic status. Extensive, systematic, and organized assessments are essential for addressing the prevalence of morbidity.

6. Limitations

Data collection through a community based study would have been more informative.

7. Source of Funding

None.

8. Conflict of Interest

None.

References

1. Flaxman SR, Rupert RA, Resnikoff S, Ackland P, Braithwaite T, Cicinelli MV. Global causes of blindness and visual impairment 1990-2020: A systematic review and meta analysis. *Lancet Glob Health*. 2017;5(12):30393–5.
2. Munier A, Gunning T, Kenny D, O'Keefe M. Causes of blindness in the adult population of the Republic of Ireland. *Br J Ophthalmol*. 1998;82(6):630–3. doi:10.1136/bjo.82.6.630.
3. National blindness and visually impaired survey. 2015-2019 India. Available from: https://npcbvi.gov.in/writeReadData/mainlinkFile/File341.pdf.
4. Pascolini D, Mariotti SP. Global estimates of visual impairment: 2010. *Br J Ophthalmol*. 2012;96(5):614–8. doi:10.1136/bjophthalmol-2011-300539.
5. Nicolosi A, Marighi P, Rizzardi P, Osella A, Miglior S. Prevalence and Causes of Visual Impairment in Italy. *Int J Epidemiol*. 1994;23(2):359–64. doi:10.1093/ije/23.2.359.
6. Dandona R. Moderate visual impairment in India: the Andhra Pradesh Eye Disease Study. *Br J Ophthalmol*. 2002;86(4):373–7. doi:10.1136/bjo.86.4.373.
7. Poddar AK, Khan TA, Sweta K, Tiwary MK, Borah RR, Ali R, et al. Prevalence and causes of avoidable blindness and visual impairment, including the prevalence of diabetic retinopathy in Siwan district of Bihar, India: A population-based survey. *Indian J Ophthalmol*. 2020;68(2):375–80. doi:10.4103/ijo.ijo_1709_18.
8. Jadoon MZ, Dineen B, Bourne RRA, Shah SP, Khan MA, Johnson GJ, et al. Prevalence of Blindness and Visual Impairment in Pakistan: The Pakistan National Blindness and Visual Impairment Survey. *Investig Opthalmol Vis Sci*. 2006;47(11):4749–55. doi:10.1167/iovs.06-0374.
9. Edussuriya K, Sennanayake S, Senaratne T, Marshall D, Sullivan T, Selva D, et al. The Prevalence and Causes of Visual Impairment in Central Sri Lanka. *Ophthalmology*. 2009;116(1):52–6. doi:10.1016/j.ophtha.2008.08.034.
10. Murthy GVS, Gupta SK, Bachani D, Jose R, John N. Current estimates of blindness in India. *Br J Ophthalmol*. 2005;89:257–60.
11. Birch J. Worldwide prevalence of red-green color deficiency. *J Opt Soc Am A Opt Image Sci Vis*. 2012;29(3):313–20.
12. Shrestha RK, Joshi MR, Shakya S, Ghising R. Color Vision Defects in School Going Children. *J Nepal Med Assoc*. 2010;50(180):264–6. doi:10.31729/jnma.15.
13. Woldeamanuel GG, Geta TG. Prevalence of color vision deficiency among school children in Wolkite, Southern Ethiopia. *BMC Res Notes*. 2018;11(1):1–5. doi:10.1186/s13104-018-3943-z.
14. Fareed M, Anwar MA, Afzal M. Prevalence and gene frequency of color vision impairments among children of six populations from North Indian region. *Genes Dis*. 2015;2:211–8. doi:10.1016/j.gendis.2015.02.006.
15. Zheng Y, Lavanya R, Wu R, Wong WL, Wang JJ, Mitchell P, et al. Prevalence and Causes of Visual Impairment and Blindness in an Urban Indian Population: The Singapore Indian Eye Study. *Ophthalmology*. 2011;118(9):1798–1804. doi:10.1016/j.ophtha.2011.02.014.
16. Pakbin M, Katibeh M, Pakravan M, Yaseri M, Soleimanizad R. Prevalence and causes of visual impairment and blindness in central Iran; The Yazd eye study. *J Ophthal Vis Res*. 2015;10(3):279–85. doi:10.4103/2008-322x.170362.
17. Varma R, Ying-Lai M, Klein R, Azen SP. Los Angeles Latino Eye. Prevalence and risk indicators of visual impairment and blindness in Latinos. *Ophthalmology*. 2013;6:237–41.
18. Dunzhu S, Courtright FSWP, Liu L, Tenzing C, Bassett KL. Blindness and eye disease in Tibet. *British Journal of Ophthalmology*. 2003;87(12):1443–1448.
19. Gupta N, Vashist P, Malhotra S, Senjam SS, Misra V, Bhardwaj A. Rapid Assessment of Visual Impairment in Urban Population of Delhi, India. *PLOS ONE*. 2015;10(4):e0124206. doi:10.1371/journal.pone.0124206.
20. Ghafour IM, Allan D, Foulds WS. Common causes of blindness and visual handicap in the west of Scotland. *Br J Ophthalmol*. 1983;67(4):209–13. doi:10.1136/bjo.67.4.209.
21. Diabetes research and clinical practice No.13, 2019.
22. *WHO world report on vision*;.

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