

Original Research Article

Prevalence of vision threatening retinal conditions in patients referred for cataract surgery from rural cataract camps: making the invisible visible

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ABSTRACT

Background: Cataract is the major cause of blindness in developing nations, in India it has been reported to be responsible for 50-80% of the bilaterally blindness in the country. Patients coming for community cataract surgery are being screened for retinal diseases which are third most blinding condition after cataract and glaucoma.

Methods: This was a hospital based retrospective study. Patients included were of age between 40 to more than 80 years of age from 1st September to 31st December 2019. Comprehensive ocular and systemic examinations were done.

Results: The age ranged from 40 to >80 years with a mean±SD age of 69.64±7.31 years. Mean±SD age of men was 69.98±7.37 years, and women were 69.36±7.26 years. Nearly half of the study subjects (48.5%) were between 60 and 69 years of age, whereas 3.9% were of 80 years and above. The prevalence of unilateral retinal disorders was 18.9% (95% CI: 17.2–20.8%), while bilateral retinal disorders was 33.5% (95% CI: 31.2–35.6%) The prevalence of retinal disorders was 45.47% between age 60–69 years, 54.48% between age 70–79 years, and 25% for age 80 years and above.

Conclusions: Without screening programs, patients often fail to notice developing visual impairment until the disease progresses to advanced stage, especially in their nondominant eye. So community patients should also be screened for glaucoma and retinal diseases which are second and third most common blinding conditions in developing countries like India.

Keywords: Age related macular disorder, Camp cataract, Diabetic retinopathy, Retinal diseases, Screening camp

INTRODUCTION

Cataract is the major cause of blindness in developing nations, in India it has been reported to be responsible for 50-80% of the bilaterally blindness in the country.¹⁻⁶ In developing nations, mainly India, South America and some Western Pacific countries, causes other than cataract have started assuming significance. In developed countries, retinal diseases are the most common cause of irreversible blindness. This is primarily due to a change in

the demographic shift where there is a trend towards increasing prevalence of other noncommunicable eye diseases, such as diabetic retinopathy (DR) and age-related macular degeneration (AMD).⁷⁻¹⁴ On the other hand, with improvement in management of neonatal care, there is also an increase in the trend of retinopathy of prematurity (ROP) as seen in the major cities of countries such as Latin America and India.

India is set to emerge as the diabetic capital of the world. According to the WHO, 31.7 million people were affected by diabetes mellitus (DM) in India in the year 2000. This figure is estimated to rise to 79.4 million by 2030, the largest number in any nation in the world. Almost two third of all Type 2 and almost all Type 1 diabetics are expected to develop diabetic retinopathy (DR) over a period of time.^{13,15}

Age-related macular degeneration (ARMD) accounts for 8.7% of the total blindness globally and is the third common cause of visual impairment. It is the primary cause of visual impairment in industrialized countries.^{16,17} The persons with ARMD are likely to increase from three to six million by the year 2020. This could be due to a decline in avoidable blindness, due to anterior segment pathologies, and the increasing life expectancy of the global population. Globally, it is estimated that there will be 244 million people (14.9% of the population) that are 65 years and older by 2050, compared with 42 million (4.5% of the population) in 1995.¹⁴ It has therefore been included in the action plan of the World Health Organization, to address avoidable blindness in VISION 2020 program.¹⁷

With an increase in the availability of proper documentation of the retinal diseases and an increase in the diagnostic skills required for detection of early retinal disease, more information regarding retinal disease and blindness may become available in the literature. It is recognized that many eye conditions are amenable to being treated within the community if effective eye care services were available. This approach is supported by the World Health Organization and the International Agency for the Prevention of Blindness.¹⁸⁻²⁰

The aim of this study was to assess the prevalence and causes of vision threatening Retinal Conditions in patients from rural screening camps referred for cataract surgery.

METHODS

It is a hospital based retrospective cross sectional study for all the patients aged 40 years and above coming for cataract surgery to the tertiary center over a period of 4 months (from 1st September to 31st December, 2019). The study was approved by the Institutional Review Board of the parent institution and adhered to the tenets of the Declaration of Helsinki. Informed consent was obtained from all patients before undertaking treatment options.

All study patients underwent a comprehensive ophthalmic and systemic examination including Distant Visual acuity using Snellen's Chart both unaided (UCVA) and Best corrected visual acuity (BCVA) including Near Vision, Tonometry, Slit Lamp Examination of Anterior Segment which included Cornea, Anterior Chamber, Iris, Lens, Fundus Evaluation using 90 D and 20 D. Cases were also subjected to ultrasound, automated perimetry, laboratory

and radiological investigations if considered essential and treated along the standard line of treatment.

Sample size

We calculated a sample size of 3000 persons, all above 40 years of age. This assumed that a 0.5% prevalence of an eye disease in either of these age groups may be of public health significance. The planned sample would estimate this prevalence as 0.3% to 0.8% at the 95% confidence level.

Statistical analysis

The analysis was done in SPSS version 16.0 for windows. Descriptive analysis such as mean, standard deviation and percentage were used to exhibit the clinical parameters. All the statistical tests were examined with 5% ($p \leq 0.05$) level of significance.

RESULTS

Table 1: Demographic characteristics of study patients.

| Variables | Number of examined patients | Number of patients with retinal disorders |
|--------------------|-----------------------------|---|
| Age (years) | | |
| 40-49 | 940 | 121 |
| 50-59 | 1224 | 150 |
| 60-69 | 2910 | 517 |
| 70-79 | 290 | 158 |
| >80 | 236 | 59 |
| Gender | | |
| Male | 3760 | 704 |
| Female | 2240 | 301 |
| Occupation | | |
| Agriculture | 4250 | 864 |
| Others | 1750 | 141 |
| Total | 6000 | 1005 |

The age ranged from 40 to >80 years with a mean \pm SD age of 69.64 \pm 7.31 years. Mean \pm SD age of men was 69.98 \pm 7.37 years, and women were 69.36 \pm 7.26 years. Nearly half of the study subjects (48.5%) were between 60 and 69 years of age, whereas 3.9% were of 80 years and above. There were more males in the study (3760; 62.66%) than females. The demographic characteristics and prevalence of retinal disorders in the study population are shown in Table 2. The prevalence of unilateral retinal disorders was 18.9% (95% CI: 17.2–20.8%), while bilateral retinal disorders was 33.5% (95% CI: 31.2–35.6%) The prevalence of retinal disorders was 45.47% between age 60–69 years, 54.48% between age 70–79 years, and 25% for age 80 years and above. The prevalence of retinal disorders was 18.72% for males and 13.43% for females. Among those with agricultural

occupations, 20.32% had a retinal disorder, while among the other occupations it was 8.06% (Table 2).

Table 2: Retinal causes of visual impairment.

| Causes | Prevalence | % among all retinal diseases |
|--------------------------|-------------|------------------------------|
| Diabetic retinopathy | 192 | 19.1 |
| ARMD | 166 | 16.5 |
| Retinal breaks | 16 | 1.5 |
| Retinal detachment | 10 | 9.2 |
| BRVO | 57 | 5.6 |
| CRVO | 52 | 5 |
| ERM | 23 | 2.2 |
| Macular hole | 44 | 4.4 |
| Myopic fundus | 66 | 6.5 |
| Macular scar | 43 | 4.2 |
| Retinitis pigmentosa | 56 | 5.5 |
| CSCR | 54 | 5.3 |
| Retinal vasculitis | 41 | 4 |
| Hypertensive retinopathy | 61 | 6 |
| Chorio-retinal coloboma | 31 | 3 |
| Macular dystrophy | 81 | 0.8 |
| Retinal hemorrhage | 12 | 1.2 |
| Total | 1005 | 100 |

Table 3: Types of AMD and severity of DR.

| | Number | Percentage |
|-----------------|------------|-------------|
| AMD | | |
| Dry | 131 | 78.9 |
| Wet | 26 | 15.6 |
| RPE changes | 7 | 4.2 |
| Familial drusen | 2 | 1.2 |
| Total | 166 | 99.9 |
| DR | | |
| Mild NPDR | 31 | 16.1 |
| Moderate NPDR | 63 | 32.8 |
| Severe NPDR | 62 | 32.3 |
| PDR | 36 | 18.8 |
| Total | 192 | 100 |

The commonest retinal disease was DR involving 192 eyes (19.1%). AMD, affected 166 eyes (16.1%) followed by RD was the third commonest, affecting 26 eyes (10.7%) of which 71% were rhegmatogenous, 17.2% exudative, and 11.8% tractional RD. There were 57 cases of branch RVO (BRVO), 52 cases of central RVO (CRVO). Myopic degeneration affected 66 eyes, and retinitis pigmentosa (RP) was seen in 56 eyes. Other retinal diseases diagnosed were hypertensive retinopathy in total of 61 eyes, central serous chorioretinopathy in 54 eyes, macular scar in 43 eyes, macular hole in 44 eyes,

retinal vasculitis in 41 eyes, and others detailed in Table 2. 94.8% of full thickness macular hole and 84.6% lamellar macular hole were unilateral. The fundus was found to be normal in 4995 patients. The types of AMD and the severity of DR are shown in Table 3.

Among the AMD patients, dry AMD was the commonest type (78.9%), followed by wet AMD (15.6%), retinal pigment epithelium (RPE) change (4.2%), and familial drusen (1.2%). In contrast to the results of all patients, there was no statistical difference in the number of male (90) and female (76) AMD patients. Among these patients, 81.7% of the AMD was bilateral and 18.3% unilateral. As might be expected, patients with unilateral disease were significantly younger than those with bilateral disease.

Among DR eyes, moderate non-proliferative DR (NPDR) was the commonest (32.8%), followed by severe NPDR (32.3%), proliferative diabetic retinopathy (PDR) (18.8%), and mild NPDR (16.1%). A total of 125 eyes had clinically significant macular edema (CSME): 50.9% involving left eyes and 49.1% right eyes. Like the AMD patients, the DR group contained more males (112) than females (80), but this was not significant.

DISCUSSION

To achieve the goal of VISION 2020, the global initiative should be taken by countries around the world to develop suitable strategies to eliminate avoidable blindness,^{17,22,23} which should ideally be based on current data of blindness. We assessed the current prevalence and causes of blindness in the eastern part of Uttar Pradesh, where patients are coming for community cataract surgery at the tertiary center. The patients coming for the cataract surgery had various other diseases other than cataract including glaucoma and retinal diseases. Among retinal diseases diabetic retinopathy and age related macular degenerations were on the top of the list.

Diabetes was once considered a disease of developed countries but has become a pandemic with nearly two - third of diabetics living in the developing world. globally it is estimated that the total number of diabetics was 171 million in year 200 and expected to rise to 366 million by year 2030, a 114% rise.¹³ These projections are based on increased life expectancy with changes in lifestyle and more urbanization. It is estimated that there will be a 42% increase in the prevalence of diabetes in developed countries and nearly a 150-200% rise in developing countries.¹³ In Asia, it is estimated to increase by threefold with major burden shared by India and China. It is expected to increase from 31.7 million to 79.4 million in India and from 20.8 to 42.3 million in China in a span of 30 years from 2000 to 2030.¹³ Similar changes will be noticed in other developing countries also.

The most important ocular complication, which can lead to visual disability due to diabetes, is DR. There are few

studies from the developing world reporting prevalence of DR and most of them are from India. Different studies in India have reported the prevalence of DR in known diabetics to be 20-34% and for newly diagnosed diabetics, 5.1-7.3%.²⁴⁻²⁸ As duration of diabetes is one of the major risk factor for development of retinopathy and with an increased life expectancy and early onset of diabetes, incidence of retinopathy is expected to increase.^{26,27,29} WHO estimates at present suggest that it is responsible for the blindness of 4.8 million people in the world. Projections based on the increased life expectancy, changes in lifestyle, decreased incidence of communicable diseases with superimposed genetic and environmental factors, it is presumed that if there is no timely intervention, a further rise is expected.

Age-related macular degeneration (ARMD) accounts for 8.7% of the total blindness globally, and is the third common cause of visual impairment. It is the primary cause of visual impairment in industrialized countries.^{30,31} The persons with ARMD are likely to increase from three to six million by the year 2020. It has therefore been included in the action plan of the World Health Organization, to address avoidable blindness in VISION 2020 program.

The literature exhibits several studies to determine the magnitude and risk factors of ARMD including that in Indian subcontinent.^{5,32-35} However, to our knowledge, no such data have been generated in the state of Uttar Pradesh - the most populous in India (Census 2010).

Limitations

The limitation of our study was its retrospective nature.

CONCLUSION

We found that without screening programs, patients often fail to notice developing visual impairment until the disease progresses to advanced stage, especially in their nondominant eye. In India and populous state like Uttar Pradesh special attention should be given to screening programs specially for diabetes which has life threatening and sight threatening complications. This study indicates that low-cost screening and management programs for retinal disease could be of immense value in developing countries.

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