

Original Research Article

Prevalence and causes of blindness in patients coming to a tertiary eye care centre in western Uttar Pradesh

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ABSTRACT

Background: Objective of the research was to study the prevalence of blindness in adult patients coming to a tertiary eye care centre in Western Uttar Pradesh and assess their causes.

Methods: A cross-sectional study was conducted on adult patients coming to the outpatient department of a tertiary eye care centre over a period of 3 months and 375 patients were identified as having blindness. Complete ophthalmological examination was conducted to find out the cause for the same.

Results: The prevalence of blindness was found out to be 4.096%. The major causes for blindness in adults were identified as cataract (33.06%), glaucoma (13.6%), ARMD (5.6%), diabetic retinopathy (5.06%), corneal scar/opacity/dystrophy (26.93%), amblyopia (3.2%) and trauma (2.13%).

Conclusions: Knowledge of prevalence of blindness in a region is important in developing and implementing eye care services. Avoidable blindness needs to be identified and treated as soon as possible.

Keywords: Blindness, Prevalence, Cataract, Corneal diseases

INTRODUCTION

World Health Organisation (WHO) estimates that around 2.2 billion people suffer from blindness worldwide of which 1.1 billion cases have preventable cause of blindness. The disease burden is higher in low and middle-income group population, rural areas, females, migrants and people with other disabilities.¹

WHO defines blindness as best corrected visual acuity of 3/60 (Snellen) or less or a visual field of 10 degrees or less in its widest diameter, in the better eye.¹

The most common eye conditions resulting in blindness include age related macular degeneration, cataract, corneal opacity, diabetic retinopathy, glaucoma, refractive error, trachoma and others. The various risk factors include

ageing, genetics, lifestyle exposure, behaviours, infections and other co morbid conditions.²

Eyesight is the most vital of all five senses which is essential right from infancy for optimal cognitive development to adult education and career prospects to old age independence. Blindness leads to impairments, limitations and restrictions in physical, social and financial interactions; therefore, a visual handicap exists.³ Thankfully, majority (more than two third) of this visual impairment and blindness is avoidable either by prevention or treatment.

In last 30 years, concerted actions have been taken over globally by international as well as national agencies in the field of preventive, corrective and rehabilitative eye care to ensure healthy eyes and promote well-being for all.

Therefore, identifying prevalence of blindness and assessing their causes are imperative towards programming and implementation of preventive and therapeutic eye care services at the healthcare delivery system, including allocation of resources and health service planning, and prioritisation of scientific advances and industry research.

METHODS

After obtaining approval and clearance from institutional ethical committee, a cross sectional hospital-based study was done in the Department of Ophthalmology, Shri Ram Murti Smarak Institute of Medical Sciences, Bareilly, Uttar Pradesh to study the prevalence and causes of blindness in patients coming to the outpatient department.

The study period was 3 months, from January to March 2023. The inclusion criteria were patients who fulfilled WHO’s definition of blindness. The blind patients according to WHO, were defined as patients having best corrected distance visual acuity (BCVA) of 3/60 or less in the better eye or a visual field restricted to 10 degree or less in the widest diameter of vision. Out of a total of 9154 adult patients presenting to the OPD within the stipulated time period, 375 adult patients were identified as having blindness. Exclusion criteria included patients with BCVA better than 3/60 in either eye and visual field more than 10 degree in either eye.

Detailed evaluation was done for these 375 patients identified as having blindness. Demographic details including age, sex, occupation, socioeconomic status etc. were recorded. Detailed history was taken. Any associated systemic conditions were noted.

All patients underwent complete ophthalmic examination - uncorrected visual acuity (UCVA) and best corrected visual acuity (BCVA) was done using Snellen’s chart and using finger counting wherever applicable. Tonometry was done using applanation tonometry or Schiottz tonometry. Perimetry was done using Humphrey visual field analyser or using confrontation test, wherever applicable. Detailed slit lamp examination was done. Fundus examination was done using 90D or 78D lens on slit lamp and through indirect ophthalmoscopy. B scan ultrasonography was done where required.

The presentation of the categorical variables was done in the form of number and percentage (%). The data entry was done in the Microsoft excel spreadsheet and the final analysis was done using the statistical package for social sciences (SPSS) software, IBM manufacturer, Chicago, USA, version 25.0.

RESULTS

Out of 9154 adult patients presenting to ophthalmology OPD within the given time period, 375 patients were diagnosed as having blindness. The prevalence of

blindness was found out to be 4.096% (Figure 1). These patients were analysed in detail.

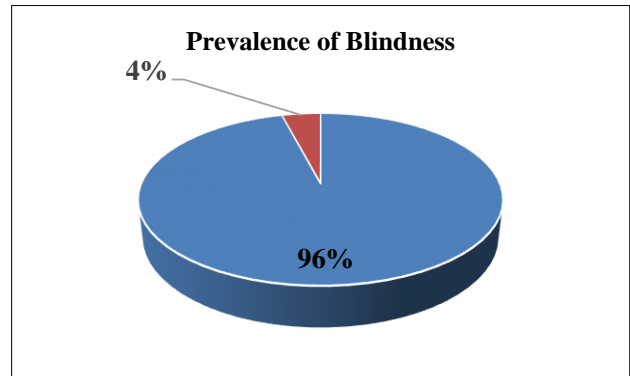


Figure 1: Prevalence of blindness.

Of the 375 patients, 197 patients were males and 178 females (Figure 2).

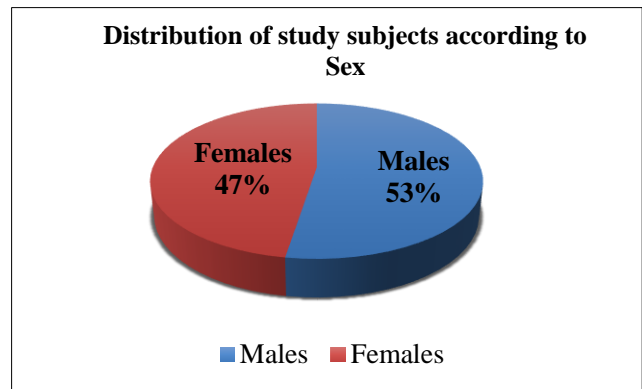


Figure 2: Distribution of study subjects according to sex.

62 out of 375 patients belonged to the age group 21-40 years (16.53%), 119 belonged to the age group 41-60 years (31.7%), 167 belonged to the age group 61-80 years (44.5%) and 27 patients were more than 80 years old (7.2%) (Table 1).

Table 1: Distribution of study subjects according to age.

Age group (years)	Frequency (n=375)	Percentage
21-40	62	16.53
41-60	119	31.7
61-80	167	44.5
>80	27	7.2

31 out of 375 patients (8.26%) belonged to the upper socioeconomic status, 52 to the upper middle (13.86%), 79 to the lower middle (21.06%), 98 to the upper lower (26.13%) and 115 to the lower socioeconomic status (30.66%) (Table 2).

Table 2: Distribution of study subjects according to socioeconomic status.

Category	Frequency (n=375)	Percentage
Upper	31	8.26
Upper middle	52	13.86
Lower middle	79	21.06
Upper lower	98	26.13
Lower	115	30.66

According to modified Kuppuswamy scale⁴

124 out of 375 patients (33.06%) had cataract as the cause of blindness, 51 had glaucoma (13.6%), 21 had age related macular degeneration (ARMD) (5.6%), 19 had diabetic retinopathy (5.06%), 101 had corneal disease including corneal scarring, corneal opacity, corneal dystrophy, and corneal degeneration (26.93%), 12 had amblyopia (3.2%), 8 had blindness due to traumatic causes (2.13%). Other causes of blindness were retinitis pigmentosa, myopic maculopathy, optic nerve disorders etc. which were grouped together as other causes (10.4%) (Table 3).

Table 3: Causes of blindness in the adult population.

Cause of blindness	Frequency (n=375)	Percentage
Cataract	124	33.06
Glaucoma	51	13.6
ARMD	21	5.6
Diabetic Retinopathy	19	5.06
Corneal scar/opacity/dystrophy	101	26.93
Amblyopia	12	3.2
Trauma	8	2.13
Others	39	10.4

DISCUSSION

There are an estimated 4.95 million blind people (0.36% of the total population) in India.⁵ The projected prevalence of blindness in India in DGRHS, MOHFW, Govt. of India report for 2015–2019 was 0.45%. The target set was to reduce it to below 0.3% by the year 2020.⁶

There have been significant developments in the field of blindness prevention, management, and control since the “Vision 2020: The right to sight” initiative has been implemented over the last two decades.² There is a substantial reduction in the prevalence of blindness in India. There is a nearly 50% reduction in vision impairment in 2020 from 2010 estimates.⁵ This indicates that there have been sustained efforts toward the reduction of the prevalence of blindness in India by various organizations and institutions.⁷

National blindness and visual impairment survey utilizes the rapid assessment of avoidable blindness (RAAB) strategy. These are conducted periodically in India to

know the current status of blindness in the country. The study conducted during 2015–19 in India reveals that the estimated prevalence of blindness in India was 1.99%. Among the 31 surveyed districts, the highest prevalence was seen in Bijnor, Uttar Pradesh (3.7%), whereas the lowest was seen in Thrissur, Kerala (1.1%).⁵ In our study the prevalence of blindness was found to be 4.096%. This is comparatively higher than the national estimate probably because this is a tertiary care centre receiving a huge number of referred cases. Money issues and lack of awareness also lead to delays in reporting to the centre by the patient, therefore by the time the patient presents to a tertiary care centre, the eyesight is usually far gone.

Among the 375 people enrolled in this study, 197 (52.53%) were males and 178 (47.46%) were females, which was comparable. The distribution of study subjects according to age showed that the maximum number of patients belonged to the age group 61-80 years (167 patients, 44.5%) followed by 41-60 years (119 patients, 31.7%), 21-40 years (62 patients, 16.53%) and >80 years (27 patients, 7.2%). In the RAAB survey 2015-2019, the prevalence of blindness was more with increasing age.⁵

The distribution of study subjects according to socioeconomic status showed that a greater number of patients belonged to the lower and upper lower categories (30.66% and 26.13% respectively) as compared to lower middle (21.06%), upper middle (13.86%) and upper category (8.26%). This is consistent with the RAAB Survey of 2015-2019 which showed that blindness was higher among illiterates and in rural population compared to literates and the urban population.⁵

In this study, the most common causes of blindness were found to be cataract in 124 patients (33.06%) and corneal diseases (including corneal scar, corneal opacity, corneal dystrophy, and corneal degeneration) in 101 patients (26.93%). The other causes were found to be glaucoma in 51 patients (13.6%), age related macular degeneration in 21 (5.6%), diabetic retinopathy in 19 (5.06%), amblyopia in 12 (3.2%) and trauma in 8 (2.13%). Other less common causes included myopic maculopathy, optic nerve disorders, retinal detachment, and retinitis pigmentosa. According to the RAAB survey 2015-2019, the most common causes of blindness included cataract (66.2%) followed by corneal opacity (7.4%), glaucoma (5.5%), posterior segment disease (5.9%) and others, which is almost similar to our study.⁵ There is a higher incidence of corneal related diseases in our study as compared to the national survey. This could be explained by the fact that our centre has an eye bank and corneal transplant surgeries are routinely performed here, therefore a high proportion of cornea cases are referred here.

The major causes of blindness differ slightly in different countries across the globe. In a study done in Ethiopia in 2018, the major causes for blindness were found to be cataract (20.5%), glaucoma (17.9%), trauma (8.2%), ARMD (3.3%) among others.⁸ In developed countries like

Canada, the major cause of permanent blindness is age-related macular degeneration (13%), while in China, the major cause of blindness is myopic macular degeneration (19.4%).^{9,10} In Jordan, retinitis pigmentosa is the most common cause of blindness in adults.¹¹

This study shows majority of the causes of blindness are either treatable or preventable. WHO is continuously working to recognize and build on the many strategies for eliminating preventable causes of blindness. While working out on a plan for comprehensive eye care, eye conditions that cause blindness are the main focus of prevention and intervention strategies. A considerable proportion of people with eye conditions will not develop vision impairment or blindness if they receive timely diagnosis and treatment. Another important fact to note is that certain conditions that do not typically cause blindness but may do so, if left untreated. Therefore, the importance of early identification and timely treatment for all eye conditions should always be emphasized. Knowing the magnitude and the major causes of blindness in a particular region, would help in better planning and implementing strategies for the prevention and treatment of blindness.

Limitations

This is a single centre study. A multicentric study is required for more accurate evaluation of the patients. Age wise prevalence needs to be calculated to better identify the prevalence and causes among different age groups. This will help in better planning of the eye healthcare services.

CONCLUSION

Knowledge of prevalence and causes of blindness in a region is important in developing and implementing eye care services, particularly tailored to that region. Avoidable blindness needs to be identified and treated as soon as possible. There is still a long way to go to achieve universal eye health and a comprehensive and dedicated approach is needed to effectively tackle the situation. The two major causes of avoidable blindness in the Western UP region were identified as cataract and corneal blindness according to this study. Therefore, there is a need of increasing the reach and effectiveness of community cataract surgeries and corneal donations, especially in these regions. Both the government and private sector should join hands in dealing with these conditions.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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