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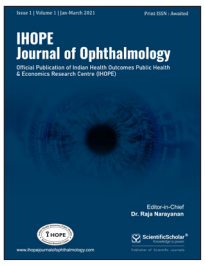

Original Article

Prevalence and causes of visual impairment and use of low-vision devices at a tertiary eye hospital in western Uttar Pradesh, India

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ABSTRACT

Objectives: The objective of this study was to determine the hospital-based prevalence and major causes of visual impairment in patients attending the low-vision clinic of a tertiary eye institute.

Materials and Methods: This study was a retrospective non-intervention hospital-based study. Clinical records of visually impaired patients presented to the department of low vision from February 2017 to December 2021 were retrieved. Blindness has been defined as the best-corrected distance visual acuity of <3/60 and/or <10° visual field in the better eye. Low vision was defined as a best-corrected distance visual acuity of <6/18 but equal to or better than 3/60 in the better eye. The presenting visual acuity, causes of low vision and blindness, and prescribed low-vision devices were recorded and analyzed to determine the prevalence and major causes of visual impairment.

Results: Among 414 visually impaired patients, the prevalence of low vision and blindness was 52.9% (n = 219) and 47.1% (n = 195), respectively. Retinitis pigmentosa (n = 57, 13.8%) and glaucoma (n = 43, 10.4%) were the major causes of low vision; however, glaucoma (n = 55, 13.3%) and cortical visual impairment (CVI) (n = 37, 8.9%) were the major causes of blindness. A total of 229 low-vision devices were dispensed, of them 166 (40.1%) were distance and 63 (15.1%) were near devices.

Conclusion: The hospital-based prevalence of low-vision patients was more as compared to blindness. The major causes of visual impairment were retinitis pigmentosa, glaucoma, and CVI. A comprehensive approach to the causes of low vision and low-vision services is needed to reduce the burden of visual impairment in the country.

Keywords: Low vision, Blindness, Prevalence, Low-vision devices

INTRODUCTION

In India, one of the most important public health concerns is blindness.[1-3] It has social and economic implications on an individual as well as their family members. Blindness increases poverty by reducing employment opportunities, or by incurring medical expenses.[4] The prevalence of blindness in India was found to be 9.91% (8.57–11.25%).[5] India was the first country to launch the national program for control of blindness in 1976 to reduce the prevalence of blindness.[6] The prevalence of blindness has decreased to 0.36% as a result of this program.[7] However, because India has a population of over 1 billion people, blindness remains a big social concern. The majority of the blindness burden is avoidable. A large number of patients either

refuse treatment or do not attain normal or near-normal vision following treatment. These patients constitute the visually impaired population. It is estimated that there are 441 million visually impaired people globally.[8] India is home to more than 137 million people who have near vision loss and 79 million who suffer from impairment.[9] This study was conducted to assess the causes and hospital-based prevalence of visual impairment, and pattern of low-vision device uses among patients at a tertiary eye care institute. Data from such studies are important for the planning and development of low-vision prevention and rehabilitation programs.

MATERIALS AND METHODS

This was a retrospective medical record review conducted at a tertiary eye care institute. The study was reviewed and approved by the Institutional Review Board (CL Gupta eye institute, CLGEI-IEC/21-222/23) of CLGEI and was conducted in compliance with the Declaration of Helsinki. All the clinical records of visual impairment patients presented to the department of low vision were retrieved from the electric medical record (EMR) from February 2017 to December 2021. The World Health Organization's definitions for low vision and blindness were used in the study.[10] Blindness was defined as the best-corrected distance visual acuity of <3/60 and/or <10° visual field in the better eye. Low vision was defined as a best-corrected distance visual acuity of <6/18 but equal to or better than 3/60 in the better eye.[10] We classified people with the primary schooling education as literates and those with no formal education as illiterates.[11] The details about demographic distribution, presenting visual acuity, and clinical findings were recorded. The presenting visual acuity was recorded with a calibrated, computerized Snellen's optotype presentation system, COMPlog, (http://www.complog-acuity.com/) at a 3 m viewing distance. In addition, low-vision trials and low-vision devices prescribed information was also collected. To determine the cause of visual impairment, the conditions affecting the single eye and both eyes in all individuals were listed. All data were tabulated in an excel sheet and descriptive analysis was done by calculating frequency and percentages for quantitative variables using Microsoft Excel 2013.

RESULTS

A total of 414 clinical records of patients attending low-vision clinics were retrieved from EMR. Out of these, 269 (65%) were male and 145 (35%) were female. The mean age of the patients was 34.77 ± 23.16 years. The majority of the patients were 82 (19.8%) and 73 (17.6%) between the age group 0–10 years and 11–20 years [Table 1]. Out of 414 patients, 207 (50%) patients were referred from the retina, 93 (22.5%) from neuro-ophthalmology, 57 (13.8%) from glaucoma, 24 (5.8%) from the cornea, and 33 (8%) from pediatric clinic. Among the studied patients, 162 (39.1%) patients were illiterate, and 252 (60.9%) patients were literate [Table 2]. The majority of the patients had no occupation 116 (28%), 78 (18.8%) were students, 49 (11.8%) were housewives, 44 (10.6%) were skilled workers, 42 (10.1%) were private jobs, 23 (5.6%) were retired staff, 17 (4.1%) were businessman, 4 (1%) were a government employee, and 29 (7%) unskilled workers [Table 2].

The hospital-based prevalence of visual impairment was 52.9% (n = 219), out of them, 0.2% (n = 1) patients had mild visual impairment, 35% (n = 45) had moderate visual impairment, 17.6% (n = 73) had severe visual impairment, and 47.1% (n = 195) patients had blindness [Table 3]. The blindness patients were 15.2% (n = 63), 5.8% (n = 24), 5.8% (n = 24), 5.1% (n = 21), and 6.3% (n = 26) in the age group 0–10, 11–20, 31–40, 41–50, and 61–70 years, respectively. However, majority of low-vision patients were 11.8% (n = 49), 7.7% (n = 32), and 8.0% (n = 33) in the age group 11–20, 21–30, and 61–70 years [Table 1].

The most common causes of blindness were glaucoma, cortical visual impairment (CVI), retinitis pigmentosa (RP), corneal scar, and foveal atrophy, that is, 13.3% (n = 55), 8.9% (n = 37), 5.8% (n = 24), 3.6% (n = 15), and 2.9% (n = 12) patients, respectively. However, the most common causes of low vision were due to RP, glaucoma, foveal atrophy, diabetic retinopathy, Stargardt disease, nystagmus, and pathological myopia, that is, 13.8% (n = 57), 10.4% (n = 43), 5.8% (n = 24), 4.6% (n = 19), 3.9% (n = 16), 3.1% (n = 13), and 2.7% (n = 11) patients [Table 4].

A total of 63 (15.2%) near low-vision aids were dispensed [Table 5]. The majority of these were dome magnifiers (n = 42, 10.1%) and light emitting diode (LED) handheld (n = 12, 2.90%). A total of 166 (40.1%) distance devices wear also dispensed, these included telescopes and tinted glasses [Table 5].

DISCUSSION

To the best of our knowledge, this was the first study in western Uttar Pradesh that reports the hospital-based prevalence and causes of visual impairment. The prevalence of low vision and blindness was 52.9% and 47.1% in this study. The Barba-Dos eye study reported a prevalence of blindness and low vision of 1.7% and 5.7%, respectively, in adults over the age of 40.[12] However, this study showed blindness and low vision of 18.4% and 22.7% in adults above 40 years of age. This is tertiary setting data while other data are population-based.

The prevalence of blindness in this study is higher than in hospital-based studies conducted in South Africa (10.9%) and Kenya (39.4%) Jordan (13.7%), and India (0.36%).[7,13-16] The low-vision prevalence is also higher than the study

Table 1: Age distribution among the visual impairment patients.

Age	Frequency (%)	Blindness			Low vision		
		Male (%)	Female (%)	Total (%)	Male (%)	Female (%)	Total (%)
0–10	82 (19.8)	39 (9.4)	24 (5.8)	63 (15.2)	9 (2.2)	10 (2.4)	19 (4.6)
11–20	73 (17.6)	16 (3.9)	8 (1.9)	24 (5.8)	33 (8.0)	16 (3.9)	49 (11.8)
21–30	40 (9.7)	7 (1.7)	1 (0.2)	8 (1.9)	20 (4.8)	12 (2.9)	32 (7.7)
31–40	49 (11.8)	18 (4.3)	6 (1.4)	24 (5.8)	18 (4.3)	7 (1.7)	25 (6.0)
41–50	47 (11.4)	11 (2.7)	10 (2.4)	21 (5.1)	13 (3.1)	13 (3.1)	26 (6.3)
51–60	38 (9.2)	9 (2.2)	8 (1.9)	17 (4.1)	16 (3.9)	5 (1.2)	21 (5.10)
61–70	59 (14.3)	15 (3.6)	11 (2.7)	26 (6.3)	25 (6.0)	8 (1.9)	33 (8.0)
71–80	22 (5.3)	8 (1.9)	2 (0.5)	10 (2.4)	10 (2.4)	2 (0.5)	12 (2.9)
81–90	4 (1)	1 (0.2	1 (0.2)	2 (0.5)	1 (0.2)	1 (0.2)	2 (0.5)

Table 2: Sociodemographic characteristics.

Variable	Frequency (%)
Gender	
Male	269 (65)
Female	145 (35)
Low-vision clinic referral department	
Retina	207 (50)
Neuro-ophthalmology	93 (22.5)
Glaucoma	57 (13.8)
Pediatric	33 (8)
Cornea	24 (5.8)
Occupation	
No occupation	116 (28)
Student	78 (18.8)
Housewife	49 (11.8)
Skilled worker	44 (10.6)
Private job	42 (10.6)
Unskilled worker	29 (7)
Retired Staff	23 (5.6)
Businessman	17 (4.1)
Professional	12 (2.9)
Government employee	4 (1)
Education	
Primary school	102 (25)
High school	38 (38)
Intermediate	45 (11)
Graduate	48 (12)
Postgraduate and above	19 (5)
Illiterate	162 (39)

Table 3: Prevalence of different categories of visual impairment.

	Presenting visual acuity in better eye	Frequency (%)
Visual impairment		219 (52.9)
Mild visual impairment	<6/12–6/18	1 (0.2)
Moderate visual impairment	<6/18–6/60	145 (35)
Severe visual impairment	<6/60–3/60	73 (17.6)
Blindness	<3/60	195 (47.1)

Table 4: Causes of visual impairment.

Diagnosis	Blindness (%)	Low vision (%)
Glaucoma	55 (13.3)	43 (10.4)
Cortical visual impairment	37 (8.9)	-
Retinitis pigmentosa	24 (5.8)	57 (13.8)
Foveal atrophy	12 (2.9)	24 (5.8)
Diabetic retinopathy	6 (1.4)	19 (4.6)
Stargardt disease	2 (0.5)	16 (3.9)
Corneal scar	15 (3.6)	7 (1.7)
Pathological myopia	7 (1.6)	11 (2.7)
Nystagmus	5 (1.2)	13 (3.1)
Lebers congenital amaurosis	9 (2.2)	5 (1.2)
Choroidal coloboma	5 (1.2)	6 (1.4)
Oculocutaneous albinism	1 (0.2)	6 (1.4)
Amblyopia	2 (0.5)	6 (1.4)
Phthisis bulbi	5 (1.2)	1 (0.2)
Retinal detachment	5 (1.2)	1 (0.2)
Micro-ophthalmos	4 (1)	2 (0.5)
Retinopathy prematurity	-	1 (0.2)
BRVO	-	1 (0.2)
Hypertensive retinopathy	-	1 (0.2)

BRVO: Branch retinal vein occlusion

reports from Nigeria (9.2%), Cambodia (12%), India (5.11%), and the South African study (16.3%).[7,13,17,18] This reveals that many factors can contribute to geographical variations of low vision and blindness such as socioeconomic differences, climatic change, genetic and ethnic differences, healthcare service system, number of eye care providers, and support organizations, and not all of them can be considered in the present study.

The major causes of low vision vary across different populations around the world. The major causes of low vision have been reported to be albinism (31.9%) in Jordan,[19] RP (16.6%) in Nigeria,[20] optic atrophy (28.9%) in Saudi Arabia,[21] and congenital cataract (14.38%) in China.[22] However, in this study, the major causes of low vision were glaucoma (10.4%) and RP (13.8%). Similarly, glaucoma (13.3%) and CVI (8.9%) were the major causes of blindness in this study. The finding is similar to the recently published

Table 5: Near and distance low-vision devices dispensed.

Types of low-vision aids	Frequency (%)
Near devices 63 (15.1)	
Dome magnifier	42 (10.1)
LED hand-held magnifier	12 (2.9)
Base in spectacle magnifier	6 (1.4)
Stand magnifier	3 (0.7)
Distance devices 166 (40.1)	
Tinted glasses prescribed for constant use	116 (28)
Telescope	38 (9.2)
Galilean type binocular spectacle mounted telescope	12 (2.9)
Training 185 (44.7)	
Blind patients for rehabilitation training	149 (36)
Cortical visual impairment patients for vision stimulating exercise	36 (8.7)

population-based study which showed glaucoma as the main cause of blindness (31.7%).[10]

A total of 229 low-vision devices were dispensed with the majority (166) being distance-vision devices. A review reported that low-vision devices are effective in improving near and well-distance visual acuity and such improvements are sustained over time.[23] The near-low-vision aids were also effective with legal blindness and low vision. Various studies have shown clinical improvement in visual performance with low-vision aids, such interventions have been shown to improve the quality of life of patients.[23,24] There is also a growing emphasis on the multidisciplinary approach to the rehabilitation of visually impaired people through the inclusion of other specialists such as social workers, orientation and mobility specialists, and occupational therapists in addition to eye care professionals.[25]

CONCLUSION

We report the prevalence of low vision and blindness at a tertiary eye hospital in western Uttar Pradesh, India. Our results suggest that the major causes of low vision and blindness are RP, glaucoma, and CVI. There is a need for a comprehensive approach to addressing the preventable causes of visual impairment and the provision of limited vision services tailored to human needs.

Declaration of patient consent

The Institutional Review Board (IRB) permission obtained for the study.

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Conflicts of interest

There are no conflicts of interest.

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