Original Article

Demographic and Aetiological Outline of Patients Requiring Low Vision Aids in a Tertiary Care Hospital in Rural Eastern India

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ABSTRACT

Introduction: Patients with low vision and functional blindness have been increasing. Low vision aids (LVA) are devices or tools that help individuals with visual impairments to enhance their existing vision and maintain physical independence. Understanding demographic profile is crucial to tailor interventions and services to meet their specific needs.

Objective: To assess demographic and aetiological profile of patients attending low vision clinic at a tertiary grade teaching eye hospital.

Methodology: This retrospective, non-interventional study was conducted in a tertiary grade teaching eye hospital. All patients (census) attending LVA clinic between 2022 April 12 and 2023 April 12 were included. Patient data were collected through evaluation of registered patient records after institutional ethical committee approval.

Result: Majority of LVA clinic patients were males (64.77%), with ages from 11-20 years (25.15%). Posterior segment pathologies (87.42%) were more common than anterior (12.57%). The overall common causes of low vision were: retinitis pigmentosa (10.06%), retinochoroidal coloboma (7.54%), macular scar (5.66%). In males, posterior segment involvement was 86.40%; retinal causes 82.02% and optic nerve: 17.97%; common vitreoretinal causes were retinochoroidal coloboma (20.54%), macular scar (12.32%), retinitis pigmentosa (12.32%); common optic nerve causes were primary optic atrophy (12.5%), secondary optic atrophy (87.5%); and common corneal causes: microphthalmos (42.85%), leucomatous corneal opacity (7.14%), anterior staphyloma (7.14%). In females, posterior segment involvement was seen in 83.92%, retinal causes 80.85%, optic nerve 19.14%; the common vitreoretinal causes were retinitis pigmentosa (26.31%), macular scar (13.15%), HMD (10.52%); common optic nerve causes were primary optic atrophy (33.33%), secondary optic atrophy (66.66%), and common corneal causes: Leucomatous corneal opacity (33.3%), microphthalmos (22.2%), microcornea (22.2%).

Conclusion: The LVAs are essential tools to provide functional vision to those with severely compromised vision. Better awareness and understanding of this visual rehabilitation are vital to individualise treatment for such patients to help enhance quality of life.

Key words: Demography; low vision aids; ophthalmology; retinitis pigmentosa.

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INTRODUCTION

Low vision and blindness patients have progressively been increasing, in spite of major advancements in Ophthalmology. World Health Organisation (WHO) has defined an individual with low vision, as person who has impairment of visual functioning, even after treatment and/or standard refractive correction and has best corrected visual acuity of less than 6/18 to light perception, or visual field of less than 10 degrees from point of fixation, but who uses or is potentially able to use vision for planning and/or execution of task for which vision is essential (Dhiman et al., 2017). Blindness is visual acuity of less than 3/60 or corresponding visual field loss of less than 10 degrees in better eye with best possible correction (Dandona et al., 2001). Various low vision devices currently in use are spectacle magnifiers, hand held magnifiers, stand magnifiers, digital devices, telescopes, See-TV spectacles, and non-optical devices for visual rehabilitation (Bray et al., 2017). Medical devices with signal or voice, include reading machine, travel device, talking book, clock, calculator, watches, typewriter-audiologic equipment, filters or tinted lenses notex typoscope, signature guide, lamp, filters/tints, contrast enhancers and enlarged fonts (Virgili et al., 2013; Moisseiev and Mannis, 2016). Low vision aids (LVAs) are devices or tools that help by enhancing existing vision in maintaining their independence. Low vision causes are scarred age-related macular degeneration, advanced/refractory diabetic retinopathy, advanced glaucoma, and cataracts. There is growing need for LVAs to support population and individuals with chronic conditions, as visual impairment prevalence continues to increase (Khan et al., 2005; Kovai et al., 2007; Pollard et al., 2003). Understanding demographic profile of LVA patients is crucial to tailor interventions and services to meet their specific needs. The purpose of this study was to elaborate demographic and aetiological profile of patients attending low vision clinic at a tertiary eye hospital.

METHODOLOGY

This retrospective, non-interventional (observational) study was conducted in a tertiary care teaching eye hospital, following the guidelines of the Declaration of Helsinki. Since this was a retrospective study of reviewing electronic medical records of patients visiting the low vision clinic, permission from the institutional ethical committee was taken, hence individual patient consent was not taken. The study included all patients who attended the Low Vision Aid (LVA) clinic from 2022 April 12 to 2023 April 12.

Patient data were obtained from registered records, including demographic details (age, sex), clinical history (duration and progression of vision loss, family history), and ocular findings. A comprehensive ophthalmic evaluation was performed, which included: i) Visual acuity assessment using Snellen's chart or LogMAR chart; ii) Refraction (both subjective and objective); iii) Slit lamp biomicroscopy for anterior segment examination; iv) Fundus examination using indirect ophthalmoscopy and slit lamp biomicroscopy with a +90D lens; and v) Additional investigations such as optical coherence tomography (OCT) and visual field analysis, if available.

The inclusion criteria were: patients with best-corrected visual acuity (BCVA) ≤ 6/18 in the

better eye and those attending the LVA clinic for low vision rehabilitation. Meanwhile, patients with incomplete records, those with treatable causes of visual impairment, or those unwilling to undergo further evaluation were excluded.

A total enumeration sampling method (census) was used, including all eligible patients within the specified period. The collected data were entered into Microsoft Excel and analysed using IBM SPSS Statistics for Windows, version 20 (IBM Corp., Armonk, N.Y., USA). Descriptive statistics such as mean, standard deviation, and percentage distribution were used for demographic and clinical parameters.

RESULT

Of the patients presenting to the LVA clinic the mean age was 17 years and age range of 0-80 years (Figure 1). The findings showed that approximately 56 out of 159 (35.23%) patients were female, while 103 out of 159 (64.77%) were males (Table 1). Among the 159 patients posterior segment pathologies were common as compared to anterior segment pathologies (Table 2). Posterior segment pathologies were seen in 139 (87.42%) patients and anterior segment pathologies were seen in 20 (12.57%). The most common causes identified for the compromised vision were retinitis pigmentosa (Figure 2) in 16 (10.06%), followed by retinochoroidal coloboma (Herren et al., 2023) in 12 (7.54%), and macular scar (Wikipedia, 2023) in nine (5.66%). Among the 103 males, posterior segment involvement in 89 (86.40%) was more than anterior segment in 14 (13.59%). Among the 89 posterior segment of males, retinal causes were in 73 (82.02%), optic nerve causes in 16 (17.97%). Among the 73 vitreoretinal causes in males most common were retinochoroidal coloboma in 15 (20.54%), macular scar in nine (12.32%), Retinitis Pigmentosa in nine (12.32%). Among the 16 optic nerve causes in males were primary optic atrophy in two (12.5%), secondary optic atrophy in 14 (87.5%). Among the 14 anterior segment causes in males were microphthalmos in six (42.85%), leucomatous corneal opacity in one (7.14%),

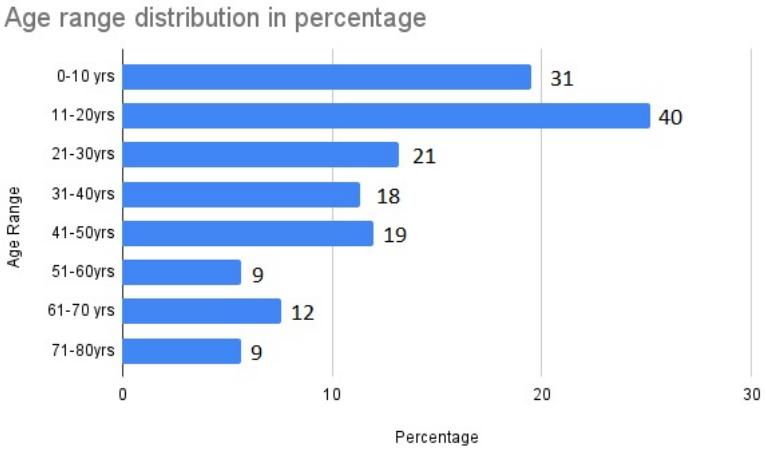

Figure 1: Age range distribution in percentage.

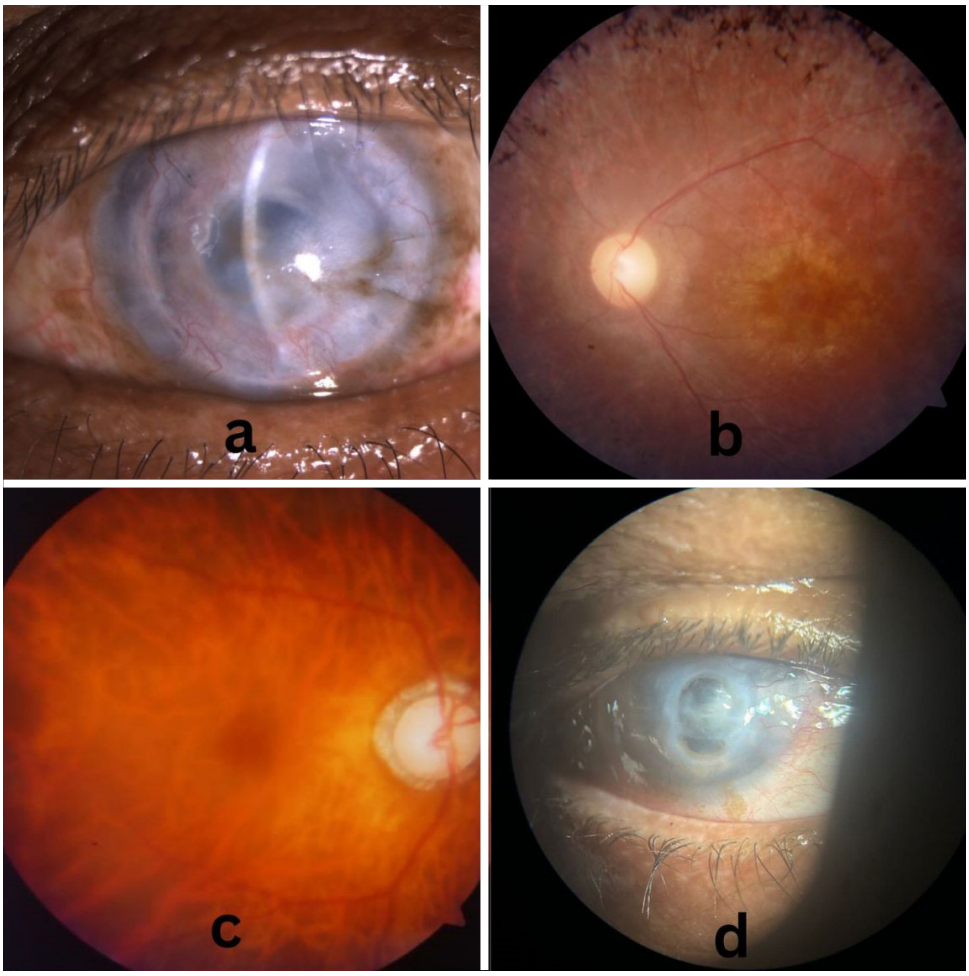

Figure 2: Causes of low vision: a) graft failure; b) advanced retinitis pigmentosa; c) glaucomatous optic atrophy; d) anterior staphyloma.

anterior staphyloma in one (7.14%). Among the 56 females, posterior segment involvement in 47 (83.92%) was more than anterior segment in nine (16.07%). Among the 47 posterior segment of females, retinal causes were 38 (80.85%), optic nerve causes in nine (19.14%). Among the 38 vitreoretinal causes in females were Retinitis Pigmentosa in 10 (26.31%), macular scar in five (13.15%), Heredomacular degeneration (HMD) in four (10.52%). Among the nine optic nerve causes in females were primary optic atrophy in three (33.33%), secondary optic atrophy in six (66.66%). Among the nine, anterior segment in females were leucomatous corneal opacity in three (33.3%), microphthalmos in two (22.2%), microcornea in two (22.2%).

Table 1: Distribution of anterior and posterior segment pathologies in males and females.

Males, 103 (64.77%) of total	Anterior segment, 14 (13.59%) of males		Microphthalmous, 6 (42.85%)
			Leucomatous corneal opacity, 1 (7.14%)
			Anterior staphyloma, 1 (7.14%)
			Microcornea, 2 (14.28%)
			Graft failure, 1 (7.14%)
			Severe dry eye, 1 (7.14%)
			Keratoglobus, 1 (7.14%)
			Corneal dystrophy, 1 (7.14%)
Females, 56 (35.23%) of total	Anterior segment, 9 (16.07%)		Leucomatous corneal opacity, 3 (33.33%)
			Microphthalmos, 2 (22.22%)
			Microcornea, 2 (22.22%)
			Anterior staphyloma, 1 (11.11%)
			Graft failure, 1 (11.11%)
Males, 103 (64.77%) of total	Posterior segment, 89 (86.40%) of males	Retina, 73 (82.02%) of posterior segment of males	RC Coloboma, 15 (20.54%)
			Macular scar, 9 (12.32%)
			RP, 9 (12.32%)
			Macular dystrophy, 8 (10.95%)
			HMD, 2 (2.73%)
			Rod cone dystrophy, 2 (2.73%)
			RD, 1 (1.36%)
			ARMD, 2 (2.73%)
			Cone rod dystrophy, 1 (1.36%)
		Optic nerve, 16 (17.97%) of posterior segment of males	Primary optic atrophy, 2 (12.5%)
			Secondary optic atrophy, 14 (87.50%)
Females, 56 (35.23%) of total	Posterior segment, 47 (83.92%) of females	Retina, 38 (80.85%) of posterior segment of females	RP, 10 (26.31%)
			Macular scar, 5 (13.15%)
			HMD, 4 (10.52%)
			RC Coloboma, 4 (10.52%)
			Rod cone dystrophy, 2 (5.26%)

			Macular telangiectasia, 2 (5.26%)
			Cone rod dystrophy, 1 (2.63%)
			s/p laser ROP, 1 (2.63%)
			RD, 1 (2.63%)
		Optic nerve, 9 (19.14%) of posterior segment of females	Primary optic atrophy, 3 (33.33%)
			Secondary optic atrophy, 6 (66.66%)

Table 2: Various anterior and posterior segment disease in males and females.

Anterior segment pathologies	Posterior segment pathologies
Microphthalmos	RC Coloboma
Leucomatous corneal opacity	Macular scar
Anterior staphyloma	RP
Microcornea	Macular dystrophy
Graft failure	HMD
Severe dry eye	Rod cone dystrophy
Keratoglobus	RD
Corneal dystrophy	ARMD
	Cone rod dystrophy
	Primary optic atrophy
	Secondary optic atrophy

DISCUSSION

The LVAs are the answer for functional vision to those patients, in whom the vision has been severely compromised due to the advanced disease pathology. In this study the most common affected age group was between 11-20 years and the population included in the study were male predominant, which was also seen by Begum et al. and Bolutife et al. (Begum et al., 2019; Olusanya et al., 2012). Posterior segment involvement was found to be more common than the anterior segment, among current study patients, which was also identified by Garzon-Rodriguez et al. (Garzón-Rodríguez et al., 2023). In this study retino-choroidal coloboma was the most common pathology in the eyes with posterior segment involvement, although in other literature, such as in a study by Bolutife et al. (Olusanya et al., 2012). Retinitis pigmentosa has been identified as the commonest posterior segment disease in eyes warranting LVAs. After retinochoroidal (RC) coloboma, in descending

order macular scars and Retinitis pigmentosa were the other recognised posterior segment pathologies, similar to the findings of Labh et al. (Labh et al., 2015). Glaucomatous optic atrophy followed by non-glaucomatous optic atrophy were the optic nerve pathologies contributing to low vision in current study patients. This was in agreement with Chong et al. and Gupta et al., where glaucomatous optic atrophy was the commonest among the optic nerve causes leading to compromised vision (Chong et al., 2019; Gupta et al., 2018). Among the anterior segment causes, most of current study low vision patients had microphthalmos while Pal et al., in their study did not have that many patients with microphthalmos requiring low vision aids (Pal et al., 2006). This study highlights the burden of patients needing low vision aids in society. A better understanding of the aetiologies causing the vision compromise helps us to not only curb this visual handicap but also provides us avenues for these patients to have functional vision with these low vision aids, allowing them regain their self-esteem and be a positively contributing member in the society.

The limitations of the study could be that this study was retrospective, relying on medical records, which may introduce selection bias and data inaccuracies. It was conducted at a single tertiary care hospital, limiting the generalisability of findings to a broader population. Some patients with incomplete records were excluded, potentially affecting the overall representation of low vision causes. The study did not assess the long-term effectiveness of low vision aids in improving quality of life.

CONCLUSION

From the findings of the study, it can be concluded that the posterior segment pathologies were more common than anterior segment pathologies among patients requiring low vision aids. The most frequently identified cause of low vision was retinochoroidal coloboma, followed by macular scarring and retinitis pigmentosa. Males were more commonly affected than females, with a higher proportion of posterior segment involvement. The majority of patients belonged to the 11-20 years age group, highlighting the burden of low vision among younger individuals. Understanding the demographic and aetiological profile of low vision patients can aid in better rehabilitation strategies and tailored interventions.

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