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Low-vision at a tertiary eye care centre in Western India: a five-year retrospective study

Rikta Paul[1], Sourav Karmakar[2], Rituparna Ghoshal[3], Animesh Mondal[4]

[1]*Adamas University School of Health and Medical Science, Department of Allied Health, West Bengal, India*
[2]*Swami Vivekananda University School of Allied Health Sciences, Department of Optometry, West Bengal, India*
[3]*CT University, Department of Optometry, Punjab, India*
[4]*Affiliated to HNB Uttarakhand Medical Education University, Garhwal Institute of Paramedical Sciences, Department of Optometry, Dehradun, India*

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Corresponding Author:
Sourav Karmakar, Asst. Prof., Swami Vivekananda University School of Allied Health Sciences, Department of Optometry, West Bengal, India
souravoptm@gmail.com

ORCID:
orcid.org/0000-0002-7754-0289

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ABSTRACT

Aims: To examine (1) the etiological patterns of low vision across pediatric, working-age, and geriatric populations; (2) the severity distribution of visual impairment; and (3) the prescription trends of low-vision devices (LVDs) at a single tertiary eye care centre in western India.

Methods: This single-center retrospective study reviewed the records of 1,039 patients who visited a low-vision clinic between January 2019 and April 2024. Demographic details, ocular diagnoses, visual acuity [classified per International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10)], and LVD prescriptions were analysed.

Results: The cohort consisted predominantly of male patients (70.0%), with the following age distribution: working-age adults (45.0%; mean age 38.9±16.1 years), children (40.2%; mean age 10.2±3.3 years), and geriatric patients (14.7%; mean age 76.0±6.6 years). Retinal disorders (57.8%) were the leading cause of low vision, with age-specific variations: nystagmus (17.9%) and congenital cataracts (20.3%) in children; retinitis pigmentosa (25.0%) and diabetic retinopathy (25.6%) in working-age adults; and age-related macular degeneration (37.9%) and cataracts (55.6%) in the geriatric population. Moderate visual impairment was most common (48.8%), followed by blindness (25.9%). Telescopes were the most frequently prescribed LVDs (72.9%), and spectacle magnifiers were the most common near-vision aid (83.4%).

Conclusions: The findings highlight distinct age-related patterns in the etiology of low vision and assistive device needs within this patient population. Although limited by its single-centre scope, this study offers valuable baseline data to guide age-specific rehabilitation strategies.

Introduction

Low vision is widely recognized as a significant public health concern (1). Evidence suggests that individuals with functionally impaired vision often experience permanent sight loss, which can hinder their ability to perform daily activities such as reading, recognizing faces, writing, and participating in social interactions (2). Additionally, accidents, loss of independence, and feelings of loneliness or grief may further exacerbate these challenges. Such difficulties may adversely affect physical and emotional well-being (3). From a clinical perspective, two primary approaches are commonly used to manage low vision: low-vision rehabilitation and low-vision devices (LVDs). LVDs—including optical, non-optical, and electronic tools—may enhance patients' performance by maximizing their remaining vision (4).

Comprehensive rehabilitation and low-vision services may provide individuals with tools to optimize their residual eyesight, potentially enabling them to engage in meaningful activities and maintain a degree of personal independence. These services may also alleviate some of the challenges associated with visual impairment (3).

Understanding the causes of low vision plays a critical role in assessing the need for treatment and rehabilitation services, supporting blindness prevention efforts, informing eye health policies, and guiding research priorities for diverse populations. While studies have examined trends in low-vision rehabilitation services and causes of low vision in southern and northern India, comparable reports from the western region remain limited (5). This region, comprising 1,866 villages with a population of 7.4 million, has received relatively little attention in the literature. Given the limited data on low-vision care in western India, this study seeks to address a critical gap in the literature by investigating the causes and management of low vision. Previous studies suggest that regional differences may influence both the underlying causes of visual impairment and the availability of vision rehabilitation resources (6). By examining these factors, the study aims to inform targeted interventions and health policies to address this important public health concern. The primary goal of this study was to explore potential factors contributing to low vision among patients from three age groups attending a hospital-affiliated low-vision rehabilitation clinic. Additionally, the study examined patient characteristics such as the severity of visual impairment and the types of LVDs prescribed to them.

Methods

Study design and participants

This study employed a retrospective design to analyze secondary data from patients treated at the low-vision clinic of a tertiary eye care hospital located in Pune, Western India, from January 2019 to April 2024. The Dr. D. Y. Patil Medical College, Hospital and Research Centre, Pune Ethics Committee approved this research (reference no.: DYPV/EC/489/2020, date: 04.02.2020), and all procedures followed the ethical guidelines outlined in the Declaration of Helsinki.

Participants were diagnosed with visual impairment attributable to various ocular conditions. All participants underwent a low-vision assessment and were deemed to require rehabilitation. Participants were included if they had a confirmed diagnosis of visual impairment and complete medical records. Those with incomplete datasets or missing follow-up data were excluded to ensure the reliability of the analysis.

Data collection and measurements

Certified ophthalmologists and optometrists examined patients over a specific period to gather relevant data. Variables such as age, gender, ocular conditions causing low vision, visual acuity (VA), and types of prescribed LVDs were recorded. VA was assessed binocularly using a Snellen chart to determine best-corrected VA. Visual impairment was classified according to the International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10, World Health Organization, 2016) criteria. According to ICD-10 criteria (Category H54), visual impairment was classified into four stages: mild (VA 6/18), moderate (VA 6/18-6/60), severe (VA 6/60-3/60), and blindness (VA <3/60) (7).

Availability of LVDs

The clinic maintained a fixed and comprehensive inventory of optical, non-optical, and electronic LVDs throughout the study period (January 2019 to April 2024). This standard inventory, which included the full range of devices reported in the results, was consistently available. The prescription of specific devices was based solely on the individual patient's visual needs, task requirements, and functional goals as assessed by the certified low-vision optometrist and ophthalmologist. The stability of the inventory ensures that the prescribing patterns analyzed in this study reflect genuine clinical practice and patient requirements rather than temporal variations in device availability.

Statistical Analysis

Microsoft Excel 365 and IBM SPSS Statistics for Windows, version 26.0 (IBM Corp., Armonk, NY, USA) were used for data collection and analysis. Descriptive statistics, including means, standard deviations, and frequencies (percentages), were generated to summarize demographic factors, the degree of visual impairment, and the types of LVDs prescribed across different age groups. Inferential statistical analyses were also performed. Chi-square (χ^2) tests were used to examine the associations between (i) age group and severity of visual impairment, (ii) age group and primary etiology, (iii) gender and severity of visual impairment, and (iv) gender and primary

etiology. A one-way analysis of variance was conducted to assess whether the mean age differed across the categories of visual impairment severity (mild, moderate, severe, blind). A p-value <0.05 was considered statistically significant.

Results

Demographic characteristics of the study population

The study involved 1,039 patients, of whom 727 (70.0%) were male, and 312 (30.0%) were female. The low-vision clinic primarily served working-age individuals (n=468, 45.0%), followed by children (n=418, 40.2%) and geriatric patients (n=153, 14.7%).

Mean ages for each group were: pediatric patients, 10.2±3.3 years (range 2-16 years); working-age patients, 38.9±16.1 years (range 17-65 years); and geriatric patients, 76.0±6.6 years (range 66-91 years). There was no statistically significant difference in the mean age across the mild, moderate, severe, and blindness categories [F (3, 1035)=0.99, p=0.40]. This indicates that the severity of visual impairment was not associated with a specific age group within this patient population. These demographic details are summarized in Table 1.

We further investigated associations between gender and clinical characteristics. While no significant association was found between gender and the severity of visual impairment [χ^2 (3)=2.77, p=0.43], a highly significant association was identified between gender and the underlying etiology of low vision [χ^2 (5)=138.57, p<0.001].

Comorbidities

Comorbidities were identified through a retrospective review of medical records and diagnostic evaluations. In the pediatric group, the most common comorbidities were congenital cataracts (20.3%) and retinopathy of prematurity (14.8%). Among working-age patients, diabetic retinopathy (DR) (25.6%) and glaucoma (20.3%) were the most frequently observed. Age-related macular degeneration (AMD) (58.8%) and cataracts (55.6%) were the leading comorbidities in geriatric patients. The mean number of comorbidities varied across age groups: 1.5±0.8 in the pediatric group, 2.1±1.2 in the working-age group, and 2.8±1.5 in the geriatric group.

Etiological analysis of low vision across age groups

The causes of low vision across the three age groups are summarized in Table 2. The retina was the most commonly affected anatomical site, with 597 (57.8%) of the 1,039 patients presenting with retinal disorders. In the pediatric age group, the most frequently observed ocular pathologies were nystagmus (n=75, 17.9%), retinitis pigmentosa [(RP); n=45, 10.8%], and macular dystrophy (n=35, 8.4%). In the working-age group, RP (117, 25.0%), myopic macular degeneration (50, 10.6%), and nystagmus (36, 7.7%) were the primary causes. In the geriatric group, the leading causes were AMD (n=58, 37.9%), DR (n=17, 11.1%), and glaucoma (n=15, 9.8%). Among documented cases of optic atrophy, the likely etiologies were heterogeneous. In pediatric patients, causes were often congenital or hereditary (e.g., related to perinatal events or genetic disorders). In adults, etiologies were typically acquired and included glaucomatous, ischemic, inflammatory (e.g., post-optic neuritis), and compressive causes (6). Statistical analysis confirmed a highly significant association between age group and the primary etiology of low vision [χ^2 (10)=487.80, p<0.001]. This supports the observed clinical pattern in which specific conditions, such as nystagmus and congenital disorders, are prevalent among children, whereas age-related conditions, such as AMD and cataracts, predominate among older adults.

Severity of visual impairment across age groups

Among the 1,039 patients, 77 (7.4%) had mild visual impairment, 507 (48.8%) had moderate impairment, 186 (17.9%) had severe impairment, and 269 (25.9%) were blind. In the pediatric age group (n=418), visual impairment was

Table 1. Demographic characteristics of the study population (n=1.039)

Characteristics	Category	Frequency (n)	Percentage (%)
Gender	Male	727	70.0
Male distribution by age	Pediatric	270	64.6*
	Working adults	334	71.4*
	Geriatric	123	80.4*
	Female	312	30.0
Female distribution by age	Pediatric	148	35.4*
	Working adults	134	28.6*
	Geriatric	30	19.6*
Age group	Pediatric (0-16 years)	418	40.2
	Working adults (17-65 years)	468	45.0
	Geriatric (≥66 years)	153	14.7

Percentages marked with an asterisk (*) indicate the proportions of males and females in each age group

Table 2. Causes of low vision in pediatrics, working adults and geriatrics

Causes of low vision in pediatrics	Frequency (n)	Percentage (%)	Causes of low vision in working adults	Frequency (n)	Percentage (%)	Causes of low vision in geriatrics	Frequency (n)	Percentage (%)
Nystagmus	75	17.9	Retinitis pigmentosa	117	25.0	ARMD	58	37.9
Retinitis pigmentosa	45	10.8	MMD	50	10.7	Diabetic retinopathy	17	11.1
Macular dystrophy	35	8.4	Nystagmus	36	7.7	Glaucoma	15	9.8
Coloboma	34	8.1	Macular dystrophy	33	7.1	Myopic macular degeneration	15	9.8
Microcornea	30	7.2	Diabetic retinopathy	32	6.8	Optic atrophy	10	6.5
Optic atrophy	27	6.5	Optic atrophy	30	6.4	Macular scar	8	5.2
MMD	21	5.0	Coloboma	17	3.6	Retinitis pigmentosa	6	3.9
Microphthalmos	20	4.8	Microcornea	16	3.4	Macular dystrophy	4	2.6
Albinism	17	4.1	Glaucoma	15	3.2	BRVO	3	2.0
ROP	14	3.4	ARMD	14	3.0	Coloboma	3	2.0
Cone dystrophy	14	3.4	Retinal detachment	13	2.8	RD	3	2.0
Stargardt's disease	13	3.1	Macular scar	11	2.4	Corneal opacity	3	2.0
Amblyopia	13	3.1	Stargardt's disease	11	2.4	Others	8	5.2
Glaucoma	12	2.9	Microphthalmos	11	2.4			
Aniridia	7	1.7	Maculopathy	11	2.4			
Cone rod dystrophy	6	1.4	Toxoplasmosis	8	1.7			
Toxoplasmosis	5	1.2	Albinism	6	1.3			
Retinal hypoplasia	5	1.2	Corneal opacity	6	1.3			
Others	25	6.0	Cone dystrophy	6	1.3			
			Amblyopia	5	1.1			
			Aphakia	5	1.1			
			Others	15	3.2			
Total	**418**	**100.0**	**Total**	**468**	**100.0**	**Total**	**153**	**100**

Percentages reflect the proportion of each cause within the respective age groups. "Others" includes less frequent conditions, such as aphakia, maculopathy, retinal detachment, corneal opacity, dislocated lens, and optic neuritis as detailed below. The pediatric group "Others" includes aphakia (n=4), maculopathy (n=4), retinal detachment (n=4), corneal opacity (n=4), dislocated lens (n=3), corneal scar (n=3), macular scar (n=2), and optic neuritis (n=1). The working-age group "Others" includes: retinal hypoplasia (n=3), uveitis (n=3), cone rod dystrophy (n=2), corneal scar (n=2), vitelliform macular dystrophy (n=1), aniridia (n=1), macular hole (n=1), and BRVO (n=1). The geriatric group "Others" includes macular hole (n=2), toxoplasmosis (n=2), aphakia (n=2), and albinism (n=2). Association between age group and primary etiology (chi-square test): χ^2 (10)=487.80, p<0.001

MMD: Myopic macular degeneration, ARMD: Age-related macular degeneration, RD: Retinal detachment, ROP: Retinopathy of prematurity, BRVO: Branch retinal vein occlusion

distributed as follows: moderate in 209 patients (50.0%), blindness in 107 patients (25.6%), severe visual impairment in 75 patients (17.9%), and mild visual impairment in 27 patients (6.5%). Similarly, among working-age adults (n=468), 231 (49.4%) had moderate impairment; blindness was noted in 121 (25.9%), severe impairment in 82 (17.5%), and mild impairment in 34 (7.3%). A comparable trend was observed in the geriatric age group (n=153), in which the majority had moderate impairment: 67 (43.8%), followed by blindness: 41 (26.8%), severe impairment: 29 (19.0%), and mild impairment: 16 (10.5%). There was no statistically significant association between age group and visual-impairment severity [χ^2 (6)=3.58, p=0.73], indicating that the distribution of mild, moderate, and severe visual impairment and blindness was similar across pediatric, working-age, and geriatric populations. Table 3 provides a detailed breakdown of VA and severity classifications across all age groups. Figure 1 illustrates the distribution of visual impairment severity across the three major age groups, demonstrating that moderate visual impairment was the most frequent category across all groups.

Prescription patterns of LVDs

Among the 1,039 patients, telescopes were most frequently prescribed as distance optical devices (757, 72.9%), followed by near optical devices (457, 44.0%), and non-optical devices (329, 31.7%). Additionally, 31 electronic devices (3.0%) were prescribed based on the specific needs of the patients. Among the optical LVDs prescribed for close-up tasks, spectacle magnifiers (381, 36.7%), reading stands (159, 15.3%), and overhead reading lamps (116, 11.2%) were the most commonly recommended. Binocular telescopes were prescribed to 413

Table 3. Severity of visual impairment across age groups

Age group (n)	Visual acuity range*	Severity classification (ICD-10)	Frequency (n)	Percentage (%)
Pediatrics (418)	≥6/18	Mild	27	6.5
	<6/18-6/60	Moderate	209	50.0
	<6/60-3/60	Severe	75	17.9
	<3/60-1/60	Blindness	70	16.8
	<1/60-LP†	Blindness	37	8.9
Working adults (468)	≥6/18	Mild	34	7.3
	<6/18-6/60	Moderate	231	49.4
	<6/60-3/60	Severe	82	17.5
	<3/60-1/60	Blindness	72	15.4
	<1/60-LP†	Blindness	49	10.5
Geriatrics (153)	≥6/18	Mild	16	10.5
	<6/18-6/60	Moderate	67	43.8
	<6/60-3/60	Severe	29	19.0
	<3/60-1/60	Blindness	24	15.7
	<1/60-LP†	Blindness	17	11.1

*Visual acuity ranges are based on the ICD-10 classification of the World Health Organization.
†LP: Light perception, ICD: International Statistical Classification of Diseases and Related Health Problems, 10th Revision
Association between age group and severity of visual impairment (chi-square test): χ^2 (6)=3.58, p=0.73

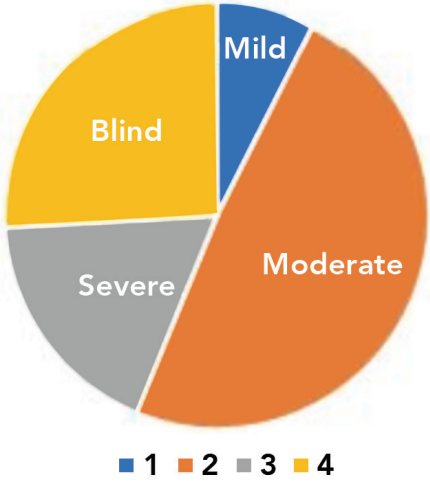

Figure 1. Severity of visual impairment in all age groups
1: Mild (≥6/18), 2: Moderate (<6/18-6/60), 3: Severe (<6/60-3/60), 4: Blindness (<3/60-1/60 to <1/60-PL)

patients (39.7%), and 344 patients (33.1%) were provided with monocular telescopes. Of the 329 non-optical devices (31.7%), canes (19; 5.8%) and flashlights (18; 5.5%) were offered to assist with orientation and mobility, while filters and tinted lenses (17; 5.2%) were prescribed to reduce glare-related discomfort. Table 4 summarizes the number of LVDs prescribed across all age groups.

Discussion

Retinal disorders were the leading cause of visual impairment in this study, accounting for 57.8% cases and demonstrating distinct age-specific patterns. This finding aligns with the growing burden of retinal diseases as a leading cause of low vision globally, but reveals critical age-specific variations: nystagmus and congenital cataracts were most common in children, whereas AMD and DR were most common in older adults. Furthermore, moderate visual impairment was the most prevalent severity category (48.8%), and telescopes were the most frequently prescribed LVDs (72.9%). These results underscore the heterogeneous etiology and functional demands across age groups within this population, highlighting the imperative for customized, evidence-driven rehabilitation strategies. The distinct patterns observed, particularly the high prevalence of retinal pathologies, provide valuable baseline data for the western region of India and emphasize the need for targeted public health and clinical interventions.

Key contributors to vision loss in pediatric populations

In the pediatric cohort of our study, nystagmus, RP, and macular dystrophy were the most frequently observed causes of low vision, consistent with prior findings from South Asia and other developing regions. For instance, Sapkota and Kim (8) reported similar trends, with nystagmus, refractive errors (RE), and congenital cataracts emerging as dominant causes in Nepalese children, while Uprety et al. (9) found refractive error and amblyopia, RP, and macular dystrophy to be the most common causes of pediatric visual impairment in the same region. Gao et al. (10), who studied a comparable cohort in China, found high rates of congenital cataracts and optic atrophy. These shared aetiologies point to underlying patterns of inherited and congenital visual disorders among younger populations. However, notable regional variations remain, such

Table 4. Low vision devices prescribed across age groups

Device category	Specific device	Pediatric group (n=418), n (%)	Working age group (n=468), n (%)	Geriatric group (n=153), n (%)	Total (n=1,039), n (%)
Near optical devices	-	103	243	110	457
	Spectacle magnifiers	94 (91.3)	195 (80.3)	91 (82.7)	381 (83.4)
	Hand-held magnifiers	7 (6.8)	25 (10.3)	8 (7.3)	40 (8.8)
	Stand magnifiers	2 (1.9)	23 (9.5)	11 (10.0)	36 (7.9)
Distance optical devices	-	315	346	96	757
	Binocular telescope	158 (50.2)	176 (50.7)	79 (82.3)	413 (54.6)
	Monocular telescope	157 (49.8)	170 (49.0)	17 (17.7)	344 (45.4)
Non-optical devices	-	139	145	45	329
	Reading stand	70 (49.7)	65 (44.8)	24 (53.3)	159 (48.3)
	Overhead lamp	54 (37.6)	44 (30.3)	18 (40.0)	116 (35.3)
	Filters/tinted lenses	8 (5.0)*	9 (6.2)	-	17 (5.2)
	Canes	4 (3.6)	13 (9.0)	2 (4.4)	19 (5.8)
	Flashlight	3 (2.2)	14 (9.7)	1 (2.2)	18 (5.5)
Electronic devices	Video magnifier	6 (19.4)**	14 (45.2)**	11(35.5)**	31

*: Percentage discrepancy noted (original showed 5.0% but 8/139=5.8%)
**: Percentages calculated against total electronic devices (n=31) rather than group totals

as higher rates of RE and amblyopia reported by Verma et al. (11) in urban Indian schoolchildren and elevated prevalence of albinism and optic atrophy reported by Olusanya et al. (12) in low-resource Nigerian settings (13). These discrepancies likely stem from genetic, environmental, and healthcare access factors. Our findings contribute to this global landscape by reinforcing the need for early pediatric screening and diagnosis, particularly for nystagmus and hereditary retinal conditions.

Common causes of vision impairment in working-age adults

Among working-age adults in our study, visual impairment was most commonly associated with myopic macular degeneration, nystagmus, optic atrophy, macular dystrophy, and DR. This spectrum aligns with observations from regional and international studies. For instance, Chotikavanich et al. (14) in Thailand noted a similar burden of degenerative and systemic conditions among adults attending low-vision clinics. Likewise, Z Alotaibi (15) from Saudi Arabia identified optic atrophy, RP, DR, and AMD as the common causes of low vision in adults, while Zeried et al. (16) found DR, glaucoma, and cataracts to be the prevalent contributors to vision loss. The recurring presence of DR across studies reinforces the growing impact of systemic diseases on ocular health, particularly in middle-aged populations. These findings emphasize the importance of integrating ophthalmologic screening into chronic disease management programs, especially for conditions such as diabetes and high myopia, to address preventable vision loss in economically active age groups.

Primary causes of vision impairment in elderly adults

In the geriatric cohort, our study identified cataracts, AMD, and DR as major causes of visual impairment—highlighting a complex interplay of age-related degenerative and metabolic conditions. While AMD is widely recognized globally as a leading cause, our data emphasize the continued burden of treatable conditions such as cataracts in the elderly population in India. This pattern mirrors findings from Malaysia, where Chew et al. (17) reported high rates of untreated cataracts and DR in older adults, and from Haryana, where Malhotra et al. (18) reported that uncorrected RE and cataracts contributed substantially. These variations across regions likely reflect differences in healthcare access, surgical coverage, and population health-seeking behavior. Such observations reinforce the importance of local epidemiological surveillance and targeted outreach programs, particularly those aimed at improving surgical uptake and diabetes control among elderly individuals.

Gender-based barriers to eye care access

The gender distribution in our study revealed that male patients constituted nearly 70% of low-vision service users—a pattern that aligns with prior epidemiological studies across diverse healthcare settings (9,12,17,18,19). While this disparity may partly reflect demographic factors, it is more likely to underscore deeper systemic issues, such as gender-based differences in health literacy and access to care, and cultural norms that influence healthcare-seeking behaviour. Limited autonomy in travel, financial dependence, and lower awareness of available rehabilitation services may also disproportionately affect women in certain regions. These findings highlight the urgent need for gender-sensitive outreach strategies and community education programs to ensure equitable access to low-vision care. Further research using mixed-methods approaches can help unpack these barriers more deeply and inform context-specific interventions aimed at addressing gender inequities in vision rehabilitation.

Barriers to low-vision services among different age groups

Our study found that working-age adults (17-65 years) constituted the largest user group of low-vision services, consistent with observations from other developing countries (20,21). In contrast, the relatively lower representation of geriatric patients may reflect access-related barriers such as limited referrals, inadequate transportation, and reduced awareness of rehabilitative care. These challenges, often exacerbated by physical frailty and social dependency, can hinder service utilization among older adults despite their high burden of visual impairment. Addressing these disparities requires community-based screening, enhanced referral pathways, and geriatric-friendly service models to improve access to and utilization of low-vision rehabilitation among older adults.

Availability and prescription trends of LVDs

The predominance of telescopes for distance vision in our clinic reflects not only patients' needs but also the limited availability of alternatives. Near-vision rehabilitation relied largely on spectacle, hand, and stand magnifiers, suggesting a preference for simple, cost-effective optical solutions. Bakkar et al. (22) and Gao et al. (23) observed comparable patterns, reporting similar reliance on basic magnification tools in low-resource settings. These trends may be shaped by both institutional inventories and practitioner training, as the availability and familiarity with advanced electronic or customizable low-vision aids remain limited in many clinical environments. Enhancing optometric training and expanding device availability—particularly for pediatric and elderly users—could improve individualized rehabilitation outcomes.

Prescription patterns must be viewed in light of patients' functional visual abilities. The high prevalence (72.9%) of telescopes used for distance vision reflects the need for improved acuity in tasks such as face recognition and television viewing. However, the absence of visual field data in our study limits a more detailed analysis of the device's suitability for specific visual field defects. For instance, patients with peripheral field loss (e.g., from RP) may find high-power magnifiers less effective for navigation despite their utility in spot reading. Similarly, the widespread use of spectacle magnifiers (36.7%) may not accommodate the functional challenges faced by patients, such as children with nystagmus, who experience unstable fixation and may have difficulty maintaining precise alignment. These patients may benefit more from hand-held or stand-mounted devices. These functional considerations, which were not fully explored in retrospective analyses, are essential for tailoring rehabilitation strategies and underscore that device selection is influenced by a complex interplay among acuity, field loss, and oculomotor control.

Study Limitations

Our investigation provides important clinical observations on the etiology and management of low vision; however, several limitations warrant consideration. The retrospective methodology carries an inherent risk of information bias in both data recording and interpretation. Furthermore, because this is a single-institution study conducted in urban Pune, our results may not fully represent the diverse patient populations and practice patterns across Western India, particularly in rural communities, where access to vision rehabilitation services often differs substantially. Therefore, while the findings offer important clinical insights, they primarily reflect the experiences of this institution's patient population and should be interpreted cautiously when considering broader applications across Western India, given regional differences in healthcare infrastructure and disease patterns. The restricted inventory of assistive devices available during the study period may have influenced prescribing trends and the assessment of outcomes.

Additionally, visual field data, a critical functional parameter, particularly in conditions such as RP, glaucoma, and nystagmus, were not consistently available for analysis in this retrospective review. The lack of this functional measure limits our ability to make more nuanced interpretations of device selection, especially for patients with conditions where visual field loss plays a key role in determining rehabilitation strategies. For example, visual field loss is often a critical factor in prescribing LVDs such as bioptic telescopes for patients with glaucoma or prism lenses for patients with certain forms of nystagmus. Without this information, it is difficult to fully assess how patients' functional vision loss influenced prescription trends for assistive devices.

Notably, our study found no cases in which trauma was the primary etiology; this may reflect unique population characteristics or specific referral patterns at our tertiary center, where trauma cases are typically managed by surgical services rather than low-vision rehabilitation.

Furthermore, our etiological classification was based on ophthalmologic records. For patients with nystagmus—a sign of underlying pathology rather than a final diagnosis—a standardized neurological evaluation was not included in the routine protocol. Therefore, the potential contribution of underlying neurological conditions to vision loss in this subgroup may not be fully captured.

We recommend that future studies include visual field measurements to better understand their impact on device selection and rehabilitation strategies, which would provide a more comprehensive view of low vision rehabilitation in these conditions.

Conclusion

This study identifies retinal disorders as the leading cause of low vision (57.8%) across age groups in a Western Indian cohort, with distinct patterns of severity of visual impairment and prescriptions for assistive devices. The findings highlight (1) the need for age-specific rehabilitation strategies and (2) regional disparities in low-vision etiology compared with other

Indian states. While the single-centre retrospective design limits the generalizability of our findings, this study provides valuable baseline evidence to inform low-vision rehabilitation policies in Western India. To strengthen the applicability of these insights across diverse populations and settings, broader multi-centre research—particularly involving rural and underserved regions—is recommended.

Ethics

Ethics Committee Approval: The Dr. D. Y. Patil Medical College, Hospital and Research Centre, Pune Ethics Committee approved this research (reference no.: DYPV/EC/489/2020, date: 04.02.2020), and all procedures followed the ethical guidelines outlined in the Declaration of Helsinki.

Informed Consent: Retrospective study.

Footnotes

Authorship Contributions

Surgical and Medical Practices: R.P., R.G., Concept: R.P., R.G., Design: R.P., R.G., S.K., A.M., Data Collection or Processing: R.P., R.G., Analysis or Interpretation: R.P., S.K., R.G., A.M., Literature Search: R.P., S.K., A.M., Writing: R.P., R.G., S.K., A.M.

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