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Barriers to the Utilization and Acceptance of Low Vision Devices among Patients at Al-Shifa Trust Eye Hospital, Rawalpindi

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ABSTRACT

Low vision significantly impairs daily functioning and quality of life, yet the acceptance and sustained use of low vision devices remain limited. Understanding barriers to utilization is crucial for developing effective rehabilitation strategies, particularly in low- and middle-income settings where access to vision care is constrained. **Objectives:** To determine the frequency of acceptance and to identify barriers influencing the utilization of low vision devices among patients with visual impairment. **Methods:** A cross-sectional study was conducted at the Department of Ophthalmology, Al-Shifa Trust Eye Hospital, Rawalpindi. A total of 150 patients aged 15–70 years with low vision were enrolled using non-probability consecutive sampling. Demographic, occupational, and clinical characteristics were recorded, and patients were asked about their acceptance of LVDs. Those who declined were further interviewed regarding barriers. Data were analyzed using SPSS v26, applying Chi-square and t-tests, with $p<0.05$ considered statistically significant. **Results:** Overall acceptance was 37%, while 63% declined the use. Acceptance was highest among patients aged 31–45 years (39.3%) and lecturers (69.2%). Diagnosis was significantly associated with acceptance ($p=0.010$), with higher uptake in maculopathy (35.7%) and pathological myopia (55.6%) compared to retinitis pigmentosa (14.3%) and optic atrophy (8.3%). Affordability emerged as the most critical barrier (41.6% among non-acceptors), while stigma, awareness, and usage difficulty were reported but not statistically significant. **Conclusions:** Acceptance of LVDs remains suboptimal, with affordability as the dominant barrier. Tailored counseling, structured training, and financial support mechanisms are essential to improve device uptake and enhance quality of life for individuals with low vision.

INTRODUCTION

One significant handicap that significantly affects both personal and professional facets is low eyesight. The resulting visual impairment makes it extremely difficult or impossible to carry out activities of daily living [1]. An estimated 2.2 billion people worldwide are blind or visually impaired, and 90% of those afflicted reside in low- and middle-income nations with inadequate access to eye health care [2]. Limited studies have been carried out on blindness and its causes in Pakistan. However, as per a 2008 survey from Pakistan prevalence of low vision among adults was reported as 2.1% [3]. There has been a significant increase in Pakistan in vision loss and visual impairment by 55% between 1999-2017 [4]. Due to their lack of access to specialized care for eye conditions, including cataracts and refractive errors, two of the leading causes of visual impairment worldwide, these individuals live with diminished vision [2, 5]. Low vision devices are tools designed to support individuals with low vision by enhancing their ability to see printed materials and other visual information. These devices are categorized as either optical, which use magnification, or non-optical, which are adaptive equipment that do not utilize lenses [6]. A

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person's quality of life is significantly impacted by visual impairment, which interferes with everyday tasks, including eating, walking, cooking, taking a shower, and identifying faces. Adults who are visually impaired frequently experience increased rates of anxiety and depression as well as reduced levels of employment involvement and productivity.7 Because the general public is not aware of low vision rehabilitation services, outpatient care delivery models usually follow this pipeline: (i) the ophthalmologist or optometrist identifies the patient, (ii) the clinician recommends and refers the patient to a low vision rehabilitation service, and (iii) the patient uses the service [8]. Through focused educational programs for optometrists who do not perform low vision rehabilitation, for instance, attempts to enhance the practice management of patients with poor vision can be informed by the identification of modifiable barriers to low vision rehabilitation [9]. Although there is adequate knowledge on low vision services, a few barriers are the reasons for the non-utilization of the low vision services. Hence, the need for recommendations such as education on low vision services, training of eye health workers, and the formulation of policies on low vision services [10, 11]. Lack of training/knowledge, lack of awareness, and non-availability of low vision devices were the major barriers for the provision of low vision care [12]. Other barriers to low vision care were social stigma, followed by low awareness, denial of magnitudes, fear of losing a job, low necessity, usage difficulty, and low affordability [13].

The rationale for conducting this study is to determine the frequency of barriers to the acceptance and utilization of low vision devices. Literature showed that the frequency of unacceptance of low vision devices is very high. But not much work has been done before, and no study is available in the local literature. Therefore, we want to conduct this study to get evidence regarding the extent of the problem and the unacceptability of low vision devices in the local population. So that in the future, patients can be guided well in order to improve their knowledge and acceptance of low vision devices. This study aims to determine the frequency of barriers to the acceptance and utilization of low vision devices.

METHODS

This cross-sectional study was conducted at the Department of Ophthalmology, AL-Shifa Trust Eye Hospital, Rawalpindi, during 9 months from 01 October 2024 to 30 June 2025. Ethical approval was taken from the institutional ethical review committee (Reference No. ERC-35/AST-24). Informed consent was taken from all enrolled patients. A total of 150 participants were included in the study. Sample size calculation was done as follows by using the WHO calculator, a sample size of 150 patients was calculated with 95% confidence level, 6.5% margin of error, and a percentage of low necessity, i.e., 20% for utilization of low vision device [13]. A non-probability consecutive sampling technique was used for sample selection. Included patients were aged 15-70 years of age, either gender, presenting with low vision (assessed through visual impairment screening questionnaire). The normal range for visual acuity, defined by the WHO, is 20/20. All study participants underwent a detailed history taking, including demographic details and medical history, conducted by an experienced ophthalmologist. Ocular diagnoses (maculopathy, retinitis pigmentosa, diabetic retinopathy, high/pathological myopia, glaucoma, optic atrophy, albinism/nystagmus, and aphakia) were made by a consultant ophthalmologist based on best-corrected visual acuity, slit-lamp and dilated fundus examination (with Takagi slit lamp microscope 30 GL using 90 D), with retinal imaging and Optical Coherence Tomography (with Heidelberg SPECTRALIS software_V6.16.2) used where indicated to confirm the diagnosis. However, patients with best corrected distance visual acuity in better eye <1/60 or residual field less than five degrees around central fixation, and Patients with low intellectual level or cognitive problems (defined as a score of ≤5 on the mini-mental scale examination) were excluded from the study. Demographic information, i.e., name, age, gender, duration of symptoms, history of smoking >5 pack years, diabetes (BSR>200 mg/dl), hypertension (BP≥140/90mmHg), occupation, screen time, diagnosis, and visual acuity were recorded. Then, patients were asked for acceptance of vision devices (patients using low vision devices as prescribed by the ophthalmologist) by using a simple proforma designed for the study. The patients who had not accepted the use of low vision devices were later on asked about barriers or causes of unacceptance of low vision devices. Based on a literature review, the seven potential barriers were identified and defined: social stigma, low awareness (lack of knowledge about low vision devices, their benefits, and availability), denial of magnitude (reluctance to acknowledge the severity of visual impairment), fear of losing a job (concern over reduced job opportunities due to low vision devices), low necessity (belief that low vision devices are unnecessary and that they can manage without them), usage difficulty (struggles in using devices due to discomfort or technical issues), and low affordability (high cost of devices, making it difficult for patients to acquire them).[13] A proforma was developed to record the responses of study participants, and all questions in the proforma were closed-ended. The proforma was reviewed by two consultant ophthalmologists with expertise in low vision rehabilitation for content validity, and it was pilot-tested on a small group of patients to check clarity and

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feasibility; minor wording changes were made before formal data collection. A face-to-face interview was conducted to collect data on the barriers to acceptance of low vision devices. The researcher explained each question in detail to ensure accurate responses from the participant. For every item, patients indicated whether the barrier applied to them using a dichotomous response format ("Yes" / "No"), and more than one barrier could be selected. Data entry and analysis were done with SPSS version 26. Normality was checked by the Kolmogorov-Smirnov test. Quantitative variables (Age, screen time) were presented with mean ± SD, and qualitative variables (Gender, affected side, comorbidities, diagnosis, occupation, and visual acuity and barriers for not accepting low vision device) were presented with frequency and percentage. Association of barriers with patients' characteristics and acceptance of low vision device was assessed with the help of Chi square test. An independent sample t-test/ Mann Whitney u test was applied to compare age and screen time among participants with and without acceptance for low vision devices. p-value <0.05 was considered statistically significant.

RESULTS

Overall acceptance is 37% (56/150) versus 63% (94/150) non-acceptance. (Figure-1).

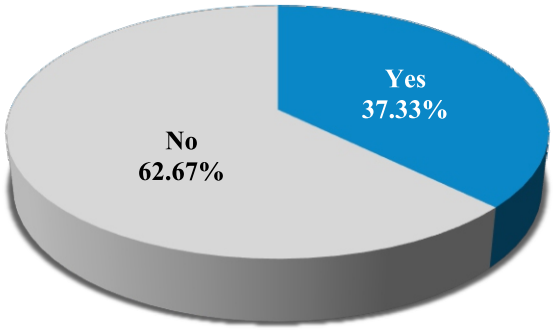

Figure 1: Acceptance of Low Vision Devices (n=150)

This study describes the visual acuity for study participants for the right and left eyes (Figure 2).

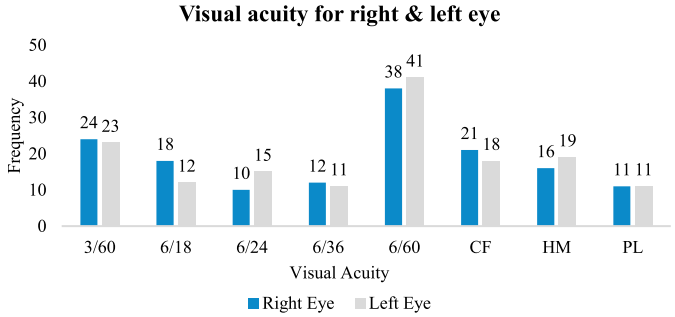

Figure 2: Visual Acuity for Right and Left Eye

Note: CF: Counting Finger, HM: Hand movement, PL: Light perception

The mean age of participants was 45.1 ± 13.5 years, with men comprising 57.3% of the sample. Occupationally, the largest groups were housewives (30.7%) and unemployed individuals (28.7%), indicating a socioeconomic profile with limited earning potential. Clinically, maculopathy (25.3%) and retinitis pigmentosa (20%) were the leading causes of low vision, followed by diabetic retinopathy (15.3%) and high/pathological myopia (12%). A significant association was observed for diagnosis (p=0.010), while age (p=0.395), gender (p=0.323), diabetes (p=0.896), and hypertension (p=0.088) were not significant predictors of acceptance. Table-1 analysis shows nuanced patterns: Younger participants aged 31–45 years had the highest acceptance (39.3%) compared to only 10.7% among those aged 15–30, though age overall was not statistically significant (p=0.395). Similarly, acceptance was slightly higher among males (62.5%) than females (37.5%), but without statistical significance (p=0.323). Laterality showed a comparable distribution, with right-eye involvement (58.9% acceptance) slightly exceeding left-eye involvement (41.1%) (p=0.190). Among comorbidities, diabetes was almost equally present in accepters (21.4%) and non-accepters (22.3%) (p-value=0.896), while hypertension showed a higher proportion among accepters (17.9%) compared to non-accepters (9.5%), though the association was borderline (p=0.088). Occupation presented some meaningful trends. Lecturers demonstrated the highest acceptance (69.2%), whereas students had the lowest (10%). Housewives (26.8%) and unemployed individuals (26.8%) formed a large share of non-accepters, pointing to financial dependency as a limiting factor. Diagnostic categories also revealed important differences: maculopathy (35.7% acceptance) and high/pathological myopia (55.6% acceptance) had better uptake, while retinitis pigmentosa (only 14.3% acceptance) and optic atrophy (8.3% acceptance) had markedly lower acceptance. This suggests that patients with progressive, irreversible conditions may be less inclined to adopt devices compared to those with treatable or functionally improvable pathologies (Table-1).

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Table 1: Acceptance of Low Vision Devices in Relation to Patients' Characteristics

Variables	Categories	n	Acceptance		p-value
			Yes	No	
Age (Years)	15-30	24 (16.0%)	6 (10.71%)	18 (19.15%)	0.395[(c)]
	31-45	51 (34.0%)	22 (39.29%)	29 (30.85%)	
	46-60	55 (36.7%)	19 (33.93%)	36 (38.30%)	
	>60	20 (13.3%)	9 (16.07%)	11 (11.70%)	
	Mean Age	45.11 ± 13.54	46.14 ± 13.11	44.50 ±13.82	0.474[(t)]
Screen Time	Mean Screen Time (Hours)	5.00 (IQR:4.85)	5.80 (IQR: 4.35)	5.00 (IQR: 5.13)	0.573[(ζ)]
Gender	Male	86 (57.3%)	35 (62.50%)	51 (54.26%)	0.323[(c)]
	Female	64 (42.7%)	21 (37.50%)	43 (45.74%)	
Effected Side	Right	78 (52%)	33 (58.93%)	45 (47.87%)	0.190[(c)]
	Left	72 (48%)	23 (41.07%)	49 (52.13%)	
Comorbidities	Diabetes	33 (22%)	12 (21.43%)	21 (22.34%)	0.896[(c)]
	Hypertension	18 (12%)	10 (17.86%)	8 (9.51%)	0.088[(c)]
Occupation	House Wife	46 (30.7%)	15 (26.79%)	31 (32.98%)	0.062[©]
	Laborer	16 (10.7%)	8 (14.29%)	8 (8.51%)	
	Lecturer	13 (8.7%)	9 (16.07%)	4 (4.26%)	
	Shopkeeper	22 (14.7%)	8 (14.29%)	14 (14.89%)	
	Student	10 (6.7%)	1 (1.79%)	9 (9.57%)	
	Unemployed	43 (28.7%)	15 (26.79%)	28 (29.79%)	
Diagnosis	Albinism/Nystagmus	8 (5.3%)	3 (5.36%)	5 (5.32%)	0.010[(F)]
	Aphakia	6 (4.0%)	1 (1.79%)	5 (5.32%)	
	Diabetic Retinopathy	23 (15.3%)	11 (19.64%)	12 (12.77%)	
	Glaucoma	15 (10.0%)	2 (3.57%)	13 (13.83%)	
	High/Pathological Myopia	18 (12.0%)	10 (17.86%)	8 (8.51%)	
	Maculopathy	38 (25.3%)	20 (35.71%)	18 (19.15%)	
	Optic Atrophy	12 (8.0%)	1 (1.79%)	11 (11.70%)	
	Retinitis Pigmentosa	30 (20.0%)	8 (14.29%)	22 (23.40%)	

Note: (C): Chi-square test, (F) Fisher exact test, (t) Independent sample t-test. (ζ): Mann-Whitney U test

Barrier analysis showed that most psychosocial and attitudinal factors were not significantly associated with device acceptance. Social stigma was reported by 55.4% of accepters and 45.7% of non-accepters (p-value=0.312), while low awareness was present in 60.7% and 53.2%, respectively (p-value=0.399). Denial of severity was reported by 25% of accepters and 20.2% of non-accepters (p-value=0.544). Fear of job loss (12.5% vs 14.9%, p-value=0.810), low necessity (7.1% vs 5.3%, p-value=0.728), and usage difficulty (41.4% vs 34%, p-value=0.484) showed no meaningful associations. However, affordability emerged as the most relevant factor, with 41.6% of non-accepters citing it compared to only 25% of accepters, approaching statistical significance (p-value=0.052). This reinforces financial constraints as the most credible barrier to device utilization. (Table-2)

Table 2: Association of Acceptance of Low Vision Devices with Barriers

Variables		Acceptance of Low Vision Devices		p-value[(c)]
		Yes	No	
Social Stigma	Yes	31 (55.4%)	43 (45.7%)	0.312
	No	25 (44.6%)	51 (54.3%)	
Low Awareness	Yes	34 (60.7%)	50 (53.2%)	0.399
	No	22 (39.3%)	44 (46.8%)	
Denial of Magnitude	Yes	14 (25%)	19 (20.2%)	0.544
	No	42 (75%)	75 (79.8%)	
Fear of Losing a Job	Yes	7 (12.5%)	14 (14.9%)	0.810
	No	49 (87.5%)	80 (85.1%)	
Low Necessity	Yes	4 (7.1%)	5 (5.3%)	0.728
	No	52 (92.9%)	89 (94.7%)	
Usage Difficulty	Yes	23 (41.4%)	32 (34%)	0.484
	No	33 (58.9%)	62 (66%)	
Low Affordability	Yes	14 (25%)	39 (41.55%)	0.052*
	No	42 (75%)	55 (58.5%)	

Note: (C); Chi-square test

DISCUSSION

This study assessed the acceptance and barriers to low vision devices (LVDs) among patients with visual impairment. Eye care specialists identified multiple barriers that hinder the effective delivery of low vision services. These included inadequate infrastructure, insufficient availability of essential devices, lack of uniform training standards for professionals, systemic shortcomings within healthcare, and limited public

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awareness of such services. From the patient standpoint, the most pressing challenges were the financial burden and restricted access to visual aids, the social stigma associated with their use, and the general unawareness of where and how to obtain appropriate support [14]. The overall acceptance rate was 37%, with 63% declining use, echoing international evidence that uptake of low vision rehabilitation remains suboptimal despite demonstrated benefits. The acceptance observed is comparable to findings in Rawalpindi, where Tariq *et al.* reported 41.17% compliance with prescribed devices [15]. In another local study acceptance rate was reported as 58.8%, which is slightly higher compared with this study [16]. In India, however, Priya Sivakuma *et al.* found a higher acceptance rate (43.1%) for low vision assistive products [13]. These comparisons suggest that while acceptance rates vary, consistent challenges in patient uptake persist across regions. In contrast, Konstantinos *et al.* in Greece reported markedly higher compliance (over 90%) one year after training sessions, suggesting that structured education and follow-up are powerful facilitators of adherence [17]. In this study, no significant association was seen between acceptance of low vision devices and age, gender, or occupation. However, a significant association was seen with diagnosis. However, Wardha Afzaal *et al.* in their study reported a higher acceptance rate in the age group 41-60 years, among female and for patients with diabetic retinopathy, Albinism and for patients with congenital optic nerve disease [16]. These findings align with the present study only in terms of age, but contrast with respect to gender and diagnosis. Priya Sivakumar reported a similar age trend for acceptance rate but a higher acceptance rate among males, which aligns with this study's results and the highest acceptance rate for diabetic retinopathy, which aligns with this study, followed by ARMD and glaucoma [13]. These discrepancies in acceptance rates in terms of the diagnosis of patients suggest that perception of disease reversibility and expected benefit may influence motivation differently across populations. Affordability consistently emerged as the leading obstacle, a finding corroborated across multiple settings [18]. Tariq et al. noted that 70.7% of Pakistani patients rejected devices due to cost [15], while Ashioya *et al.* in Kenya reported that 69.2% of non-users cited high device prices as the principal barrier [19]. Similarly, the study by Fatima *et al.* emphasized economic hardships as a central factor limiting awareness and utilization of assistive technology [20]. These patterns indicate that out-of-pocket expenditure remains the most pressing limitation, particularly in low-resource contexts. By contrast, Greek patients in the Oikonomidis study were less deterred by affordability, reflecting differences in health financing systems. This divergence underscores the need for subsidy programs or insurance coverage in countries where assistive devices remain unaffordable [1]. Despite subsidy some of the devices for low vision remain unaffordable for the patients. Stigma, denial of severity, and perceptions of "low necessity" strongly influenced patient decisions in both this and comparable studies [21]. Tariq *et al.* identified fear of being perceived as blind in 80% of their cohort [15], while Afzaal *et al.* reported stigma as the dominant barrier among younger adults and low necessity among older adults [16]. Sivakumar *et al.* likewise found that stigma was most pronounced in patients under 40, where over 41% declined devices for social reasons [13]. These findings resonate with the present study, which similarly recorded stigma and denial as frequent, albeit not statistically significant, barriers. In contrast, Ashioya *et al.* in Kenya highlighted more structural concerns, with distance to facilities and delivery delays emerging as notable deterrents [19]. The variation suggests that while stigma is a universal factor, its weight relative to other barriers differs by cultural and systemic context. Awareness gaps emerged strongly in both the current and external studies. Fatima *et al.* found that 58.5% of Pakistani patients had poor awareness of assistive technologies, with lack of training cited as the most frequent barrier [20]. Similarly, Sivakumar *et al.* emphasized inadequate patient knowledge and lack of professional guidance as central contributors to rejection [13]. In contrast, when Greek patients received structured counseling and hands-on training, long-term compliance was almost universal [17]. This comparison demonstrates that knowledge and guided practice are pivotal determinants of utilization and should be integrated into routine service delivery. Studies have reported low frequency for fear of losing a job as well as low necessity as a barrier [16, 20]. A similar trend was seen in this study, as no significant association was seen between fear of losing a job and acceptance for low vision device. When viewed collectively, the evidence suggests that barriers to LVD acceptance are layered, with affordability as the most consistent challenge across developing contexts, while stigma and awareness vary in intensity depending on cultural and health system factors. Diagnostic differences highlight the importance of tailoring counseling to patient expectations and disease trajectory. The positive outcomes reported in Greece underscore that with adequate training and structured rehabilitation programs; compliance can dramatically improve even in populations with historically low uptake.

This study was limited by its single-center, cross-sectional design, which restricts generalizability and prevents causal inference. Reliance on self-reported reasons for non-acceptance may have introduced recall and social desirability bias. In addition, psychosocial and cultural

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determinants were not explored in depth, and device availability was confined to those offered within the study setting. Future research should focus on multicenter studies to evaluate the applicability of these findings in enhancing care delivery.

CONCLUSIONS

In conclusion, this study finds that affordability is the most significant barrier to LVD adoption, followed by stigma and limited awareness. Diagnostic categories, occupation, and systemic issues also influence acceptance.

Authors' Contribution

Conceptualization: MK
Methodology: MK, ABN, AA, FA, TT
Formal analysis: MK, ABN
Writing and Drafting: MK
Review and Editing: MK, ABN, AA, FA, TT

All authors approved the final manuscript and take responsibility for the integrity of the work.

Conflicts of Interest

All the authors declare no conflict of interest.

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