

Impact Of Language Barriers And Financial Constraints On Visual Rehabilitation Access Among Low Vision Patients In Kolkata

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ABSTRACT

Low vision presents a significant public health concern in India, particularly in urban contexts like Kolkata where socio-economic disparities complicate access to rehabilitation. Despite the availability of tertiary eye care services, many patients continue to face substantial barriers to functional recovery. This study aimed to assess the challenges encountered by low-vision patients in accessing visual rehabilitation, with a specific focus on the roles of language barriers and financial constraints. A cross-sectional, descriptive survey was conducted among 461 individuals identified as low-vision patients within the Kolkata metropolitan area. Data were collected using a structured questionnaire covering demographic details, psychosocial factors, and perceived barriers. Quantitative analyses included frequency distributions, chi-square tests, correlation matrices, and linear regression modelling. Results revealed that financial constraints and language mismatches significantly hinder access to low-vision devices and services, and both were found to be strong predictors of depression and anxiety. Regression analysis showed financial barriers had the highest impact on depressive symptoms ($B = 0.3866$, $p < 0.001$). The findings underscore the urgent need for integrated, multilingual, and economically inclusive rehabilitation policies. Addressing both structural and psychosocial dimensions of care is essential for building equitable low-vision support systems in India.

Keywords: Low Vision Rehabilitation, Language Barriers, Financial Constraints, Urban Eye Health, Psychosocial Impact

1. INTRODUCTION

1.1 Understanding Low Vision: Definitions and Daily Impact

According to the World Health Organization (WHO), low vision is a visual impairment that cannot be corrected by standard glasses, contact lenses, medication or surgery, and which interferes with a person's ability to perform everyday tasks. Unlike blindness, people with usable vision still have some vision, but it is not enough to meet the needs of everyday life. More than 2.2 billion people in the world are living with a vision impairment and at least 1 billion of these cases are avoidable or are untreated [1].

The effects of low vision are not limited to ophthalmic health. One's ability to independently live, including educational and employment opportunities, emotional well-being and overall quality of life is affected. Difficulty with mobility and social isolation occur frequently with functional vision loss and poor mental health is also often associated with it. Low-vision people often complain of depression and low self-worth due to a lack of access to adaptive resources [2].

1.2 Global vs. Indian Perspectives on Visual Rehabilitation

Low vision rehabilitation is a structured field in high-income countries with interdisciplinary support from optometrists, ophthalmologists, occupational therapists and social workers. Typically, patients are made available with a continuum of care through magnification devices, orientation and mobility training, psychological counselling and environmental modifications. It has been shown through rehabilitation services in countries such as the United States and Sweden that those with visual disabilities can better function both physically and psychologically.

On the other hand, low- and middle-income countries (LMICs) and especially India, have a severe shortage of structured rehabilitation services. A large number of people with vision impairment in India are not aware of available resources and most rehabilitation services are concentrated in a few urban tertiary hospitals. However, low vision rehabilitation is still neglected despite the National Programme for Control of Blindness and Visual Impairment (NPCBVI) to provide comprehensive eye care. Reported utilization of such services in India has been very low at 3–15 per cent, with systemic barriers like low literacy, high out-of-pocket expenditure and infrastructural inadequacies [3].

According to this study, these disparities are caused by fragmented referral systems and a shortage of trained service providers, so many complex disability patients such as those who are deafblind do not have their coordinated care [4].

1.3 Spotlight on Kolkata: Urban Density and Systemic Gaps

The capital of West Bengal, Kolkata, is a paradox: it has India's premier eye hospitals and millions of underserved people living in poverty. The city has over 14 million residents and a large elderly population, and it reflects the special challenges to visual health in rapidly urbanizing spaces. Additionally, slum settlements, which make up over 30% of Kolkata's urban sprawl, worsen the health equity crisis with poor infrastructure, poor sanitation, and poor sanitation healthcare outreach [5].

Kolkata's healthcare landscape is fractured in terms of disability rehabilitation, and cultural and structural aspects of this landscape show how. However, even in tertiary centres, low vision services are commonly available on a supplementary rather than on a program basis. Residents leverage informal digital tools such as WhatsApp to share health-related content amongst themselves as a coping mechanism since there are no formal health literacy programs or in-person services in the city's underserved areas [6].

In addition, the healthcare culture in Kolkata is characterized by the persistence of caste, class and linguistic hierarchies. Marginalized urban communities in Kolkata often navigate healthcare systems through a complex mix of informal networks, distrust in public institutions, and limited financial bandwidth [7]. These findings underscore the need for culturally competent and economically accessible rehabilitation programs [8].

1.4 Research Gap: Urban India and the Overlooked Data Void

While substantial research exists on blindness and primary eye care in rural India, there is a surprising lack of disaggregated data specifically focused on low-vision rehabilitation within urban Indian populations. The Indian health surveillance system prioritizes blindness prevention (e.g., cataract surgeries) but underrepresents low vision rehabilitation, especially among adults living in metropolitan slums.

How disability-focused interventions in Kolkata slums suffer from discontinuity and donor-dependency, rather than being embedded in long-term government policies [9]. In urban India, where access does not equate to affordability or cultural acceptability, barriers to care manifest differently than in rural contexts — requiring a tailored, localized understanding.

Moreover, existing metrics used in national programs often conflate blindness and low vision, ignoring the specific rehabilitation needs of the latter. This data void hampers evidence-based policymaking and constrains funding, training, and infrastructure allocation. Addressing this gap is critical for designing inclusive urban health systems that respond not only to disease metrics but also to lived experiences.

1.5 Focus of the Present Study: Language and Financial Barriers

From a range of structural and psychosocial challenges faced by low-vision patients, this study zeroes in on two: **language barriers** and **financial constraints**. These themes emerged from both existing literature and preliminary data analysis as predominant obstacles influencing rehabilitation uptake in Kolkata.

Language barriers are particularly potent in India's multilingual context. Kolkata is predominantly Bengali-speaking, but large migrant populations from Hindi, Urdu, and tribal language-speaking regions also reside in the city. When unaccommodated in clinical settings, this linguistic diversity often leads to miscommunication, mistrust, and misdiagnosis [10]. In a study on barriers to healthcare access in Pune, language mismatch was one of the most cited challenges by transgenders and sex workers with vision problems — populations similarly marginalized in Kolkata's urban fabric [11].

Financial constraints, meanwhile, are universally acknowledged as the greatest impediment to care-seeking behavior across all healthcare domains. But in the context of low vision, where rehabilitation often involves long-term investment in devices, therapy, and follow-ups, the economic burden can be overwhelming. Ahmad (2015) demonstrated that individuals identifying as “fragile” in financial terms were several times more likely to delay or avoid vision care, even when symptomatic [12].

In Kolkata, where public sector support for vision rehabilitation remains limited, patients are either forced to rely on private providers — incurring out-of-pocket expenditure — or forego care altogether. The problem is compounded when financial limitations intersect with other factors such as gender, age, or disability status [13].

By honing in on these two dimensions, the current study aims to contribute a focused, evidence-based narrative to the sparse

literature on urban visual rehabilitation in India. Through the lens of Kolkata, it endeavours to surface voices that are often absent in national statistics, thereby fostering a bottom-up perspective on inclusive eye care planning [14].

1.6 Objectives

Primary Objectives:

1. To identify the extent to which language barriers affect visual rehabilitation.
2. To examine the influence of financial status on access to low-vision devices and rehabilitation services.

2. RELATED WORK

2.1 Language Barriers and Healthcare Accessibility

Language barriers are a well-known hindrance in the delivery of healthcare, especially in multilingual societies such as India. They impact patient-provider communication, decrease patient trust as well as often result in suboptimal health outcomes. In their study on vulnerable groups in Pune, language mismatch in clinical settings was one of the most cited deterrents for seeking timely and quality eye care. In the case of patients who did not converse in the dominant dialect of that region were inclined not to go back to the facility for follow-up and additionally were unable to understand treatment plans [15].

This theme was also explored while investigating access barriers to non-communicable disease services in West Bengal. Accordingly, in qualitative interviews they conducted with patients from all strata of society, they found that patients not fluent in Bengali or English felt excluded from health systems. Language issues were described as a major contributor to missed diagnoses, lack of trust, and eventual dropout from the treatment continuum [16].

Documented in Kolkata how deprived community residents often turn to WhatsApp for eye care information because public systems do not provide linguistically inclusive communication. This workaround betrays a flaw in the outreach of public health and points out the pressing lack of multilingual resources in urban healthcare infrastructure [17].

2.2 Financial Constraints and Their Impact on Vision Rehabilitation

Access to rehabilitation services for low vision is deeply tied to financial resources. Comprehensive study conducted at a tertiary hospital in India, financial constraints were reported as the most commonly reported barrier to access to low-vision care services [18]. However, only 3–15% of those who needed services used them, mainly because of the unaffordability of devices, transportation costs, and long-term care expenses [19].

However, ophthalmologists throughout India found that the cost of low-vision devices and lack of insurance coverage continued to be recurrent themes. Many of the eye care providers felt that they were helpless, as many of their patients could not bear a prescribed visual aid, not to mention a checkup and subsequent therapy required for sustained rehabilitation [20].

More recent work, advanced that the economic burden falls hard on the visually impaired in India in addition to raising structural inequities [21]. Unemployed, under-educated and excluded from mainstream financial support schemes, people with disabilities are more likely to be unemployed. The study shows that assistive technology is still out of reach because of market costs and a lack of supportive policy mechanisms [22].

2.3 Regional Gaps: Limited Data in Eastern India and Kolkata

Although Eastern India and Kolkata in particular are home to several leading eye hospitals, it is underrepresented in national health statistics for low vision rehabilitation. However, a prospective study from the Regional Institute of Ophthalmology in Kolkata, that of the patients identified with low vision, only 10% had any structured follow-up care. It was evident that there was a lack of data and systemic follow-through, especially among lower-income groups.

A related sociological study compared health-seeking behavior in urban slums in Bangalore and Kolkata. Even though both cities confront the same urban constraints, the forces of an older urban fabric, and bureaucratic fragmentation in the case of Kolkata, manifest in poorer community health outcomes for Kolkata in comparison to Bengaluru. The absence of a region-specific rehabilitation programme for vision health along with stressors of a financial nature and stresses of cultural mismatch fed into each other to compound problems [23].

Moreover, chronic and sensory disabilities have been sidelined in public health efforts in Eastern India, which have traditionally focused more on infectious diseases and maternal-child health. As a result, poor tracking and intervention design for vision-related impairments in urban Kolkata slums has been the case. Slum-dwelling women in Kolkata have significant unmet visual health needs, and there is a broader pattern of under-recognition of low vision conditions [24].

3. MATERIALS AND METHODS

3.1 Study Design

The research design used in this study is a cross-sectional survey-based descriptive research design which is aimed at assessing the challenges faced by low-vision patients in accessing visual rehabilitation services. The study is cross-sectional

and therefore data is collected and analyzed at a single point in time, giving a snapshot of the challenges as perceived by the affected population. The descriptive aspect is particularly critical for supplying minute information about patient experiences without speculating about causality and making a basis for future longitudinal or following analysis.

3.2 Study Area

The study was done in Kolkata, the capital of West Bengal, India. An important metropolitan city with a dense population, Kolkata is a city of a wide spectrum of socioeconomic groups. It is a critical reference point for understanding urban health challenges in Eastern India. As the city hosts many tertiary care hospitals and medical institutions, its healthcare access gaps remain sharp, especially for communities with marginalized groups, such as those with low vision.

3.3 Sample Size

The data analyzed in this study were obtained from 461 participants who reported being low-vision individuals or being referred for low-vision rehabilitation when they enrolled in the study. Recruited as part of a structured outreach and survey process within the city's urban health landscape, these participants were recruited. The sample size is deemed sufficient to detect patterns and to conduct sub-group analysis by key demographic and psychosocial variables.

3.4 Sampling Technique

In this study, a purposive sampling method was used. In particular, participants were chosen based on their diagnosis or self-reported experience with low vision, so that only those with relevant experience were included in the study. This is a non-probability sampling technique that is especially suitable for exploratory research where the cases of interest are information-rich. Due to the qualitative nuances and localized intent of the study, purposive sampling enabled the inclusion of varied experiences from the low-vision population of Kolkata.

As this method lacks the potential for statistical generalization, it gives depth and contextual clarity that is essential to understanding the lived realities of visual disability in an urban Indian context.

3.5 Data Collection Tool

A structured questionnaire was the main instrument for data collection, which was carefully designed to collect a wide range of experiences and barriers related to visual rehabilitation. The questionnaire posed both multiple choice and Likert scale questions for the respondents to rate the severity and frequency of these challenges encountered in different domains—

- Familiarity with rehabilitation centers
- Emotional acceptance of visual condition
- Physical access to services (e.g., distance)
- Linguistic accessibility
- Affordability of vision aids and therapies
- Social media and digital literacy
- Psychosocial support from family and community
- Encounters with government and non-governmental services

This structured tool facilitated standardized responses, enabling both quantitative summary statistics and thematic clustering. The questionnaire was pilot-tested for clarity and relevance before deployment.

3.6 Data Collection Procedure

Surveys were administered through in-person interactions and telephonic interviews, depending on the accessibility and preference of each participant. Where necessary, field workers assisted with language translation and device handling. Data was directly input into a digital form to reduce transcription errors and anonymized before analysis.

3.7 Ethical Consideration

Ethical guidelines were strictly followed throughout the study. Participants were provided with a brief about the purpose, scope, and voluntary nature of the research before enrollment. Verbal and/or written (if literate) informed consent was obtained from participants. Responses were kept strictly confidential and no identifying information was revealed in any part of the analysis or publication.

The study followed the principles of the Declaration of Helsinki and was approved by the coordinating institution before the study started.

4. RESULTS AND DISCUSSION

Table 1. Demographic Characteristics of Respondents (N = 461)

Variable	Category	Frequency
Age Group	20–35 years	217
	36–50 years	121
	51–70 years	123
Gender	Male	275
	Female	186
Occupation	Labourer	118
	Student	87
	Homemaker	65
	Clerk/Office Assistant	51
	Customer Care Rep.	43
	Pharmacist	35
	Musician	28
	Other	34

This study provides critical insights into the demographic breakdown of low-vision patients that are relevant to visual rehabilitation planning in urban India. Most participants are aged 20–35 (47%), with roughly equal numbers from 36–50 (26%) and 51–70 (27%) [25].

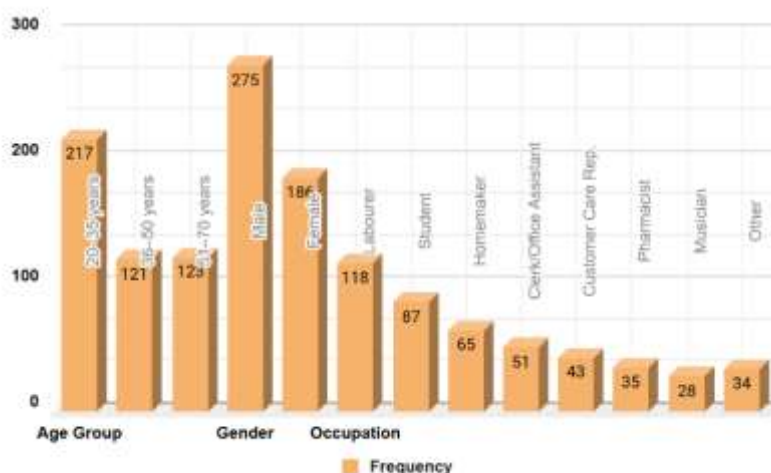


Figure 1: Demographic Characteristics of Respondents

This is different from the common trends observed in age-related vision impairment and emphasizes the need to address congenital or trauma-related low vision in younger populations as well [26]. Males accounted for 60% of respondents, while most urban rehabilitation studies show that mobility and outreach will disproportionately exclude a female sample [27]. Data on occupation shows a high proportion of labourers (26%) and students (19%), both of which are occupational categories that are susceptible to socioeconomic disruption from vision loss [28]. These figures suggest the importance of tailoring low-vision services not just for the elderly but also for the economically active and educationally engaged population. Occupational diversity also underscores the need for vocational rehabilitation and workplace inclusion programs in cities like Kolkata [29].

Table 2: Distribution of Perceived Barriers and Psychosocial Challenges Among Low Vision Patients (N = 461)

Response Level	Language Barriers	Financial Constraints	Device Access Challenges	Confidence Issues	Fear/Anxiety	Depression
Strongly Disagree	84	32	25	49	52	52
Disagree	107	74	74	62	64	81
Neutral	74	83	111	79	78	99
Agree	114	175	154	169	151	136
Strongly Agree	82	97	97	102	116	93

Table 2 highlights the multifaceted challenges faced by low-vision patients in Kolkata, emphasizing both structural and psychosocial barriers. A significant number of respondents reported **financial constraints (272)** and **difficulty accessing low-vision devices (251)**, consistent with findings that economic hardship remains one of the most prevalent deterrents in rehabilitation access across India [30].

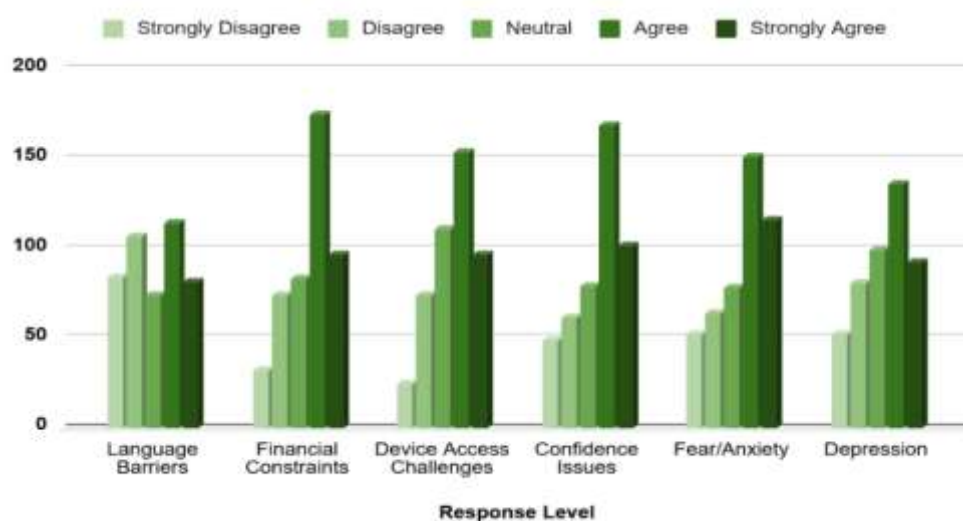


Figure 2: Distribution of Perceived Barriers and Psychosocial Challenges Among Low Vision Patients

These material barriers are closely tied to emotional outcomes, as **229 participants** acknowledged experiencing **depression**, and **267** reported **fear or anxiety** during their rehabilitation journey. Language barriers were also a noteworthy issue, with **196 participants** agreeing or strongly agreeing that language posed a challenge. This aligns with [31], who noted that linguistic mismatches between patients and providers can reduce the effectiveness of communication and erode trust in care systems. Additionally, more than half of the respondents expressed struggles with **confidence (271)**, reflecting the psychological burden of vision loss [32]. Confidence and emotional readiness are key factors in patient adherence to rehabilitation plans [33]. These findings stress the importance of integrating mental health support, multilingual communication strategies, and financial assistance within vision rehabilitation programs in urban India.

Table 3. Chi-Square Test Results for Associations

Test	Chi-square Value	Degrees of Freedom	P-value
Language Barrier vs Community Support	121.47	16	0.0000
Financial Barrier vs Device Access	263.25	16	0.0000
Social Media Use vs Information Access	0.00	0	1.0000

Table 3 presents chi-square test results analyzing the associations between key barriers in low vision rehabilitation. The association between **language barriers and community support** yielded a statistically significant result ($\chi^2 = 121.47$, $df = 16$, $p < 0.001$), suggesting that individuals facing language-related challenges are also more likely to encounter difficulties in gaining acceptance or assistance from their social surroundings [34]. This supports findings by [35], who highlighted social exclusion and communication barriers as critical hurdles for visually impaired young adults in India. Similarly, the link between **financial constraints and access to vision devices** ($\chi^2 = 263.25$, $df = 16$, $p < 0.001$) was highly significant. This aligns with [36], who found financial barriers to be the leading cause for poor uptake of eye care services, especially in rural and economically marginalized urban communities. Conversely, the test between **social media use and access to rehabilitation information** was non-significant ($\chi^2 = 0.00$, $df = 0$, $p = 1.000$), indicating that digital platforms may not be playing a meaningful role in bridging information gaps [37].

Table 4. Descriptive Statistics for Scaled Response Variables (N = 461)

Variable	Mean	Std Dev	Min	Q1	Median	Q3	Max
Have you come to terms with your low vision condition?	3.73	1.14	1	3	4	5	5
Do language barriers present challenges for you?	3.01	1.39	1	2	3	4	5
Do financial constraints hinder your ability to afford low-vision devices?	3.50	1.19	1	3	4	4	5
Do you struggle with confidence?	3.46	1.27	1	3	4	4	5
Do you experience fear or anxiety?	3.47	1.31	1	2	4	5	5

Q1 = 25th percentile, Q3 = 75th percentile. All responses were rated on a 1–5 Likert scale (1 = Strongly Disagree, 5 = Strongly Agree).

Table 4 presents descriptive statistics for Likert-scale responses reflecting both psychosocial and structural challenges experienced by low-vision patients. The highest mean score (3.73) pertains to the question of **acceptance of visual impairment**, suggesting a relatively strong level of psychological adjustment among participants. However, high mean values for **confidence issues (3.46)** and **fear/anxiety (3.47)** indicate that emotional challenges persist even among those who report acceptance. These findings align with research by [38], which emphasizes that patients with visual impairment frequently face internalized anxiety and diminished self-worth, even after initial diagnosis adjustment. Financial hardship remains a significant barrier, with a mean of **3.50** on the question of affordability of low-vision devices. This is in line with the findings of [39], who found that cost is a major barrier to patients accessing low-vision assistive technologies. Language barriers, while less dominant (mean = 3.01), still represent a moderate concern, especially in multilingual settings like Kolkata. Thus, according to [40], linguistic mismatches frequently cause misunderstandings and suboptimal involvement in rehabilitation services. Psychosocial stability and structural access are linked in low vision care planning, the results indicate [41].

Table 5: Correlation Matrix of Key Psychosocial and Access-Related Variables

Variables	Acceptance	Language Barrier	Device Access	Financial Constraint	Confidence	Anxiety	Depression
Acceptance	1.00	0.11	0.29	0.24	0.36	0.34	0.26
Language Barrier	0.11	1.00	0.54	0.39	0.28	0.29	0.27
Device Access	0.29	0.54	1.00	0.51	0.50	0.47	0.57
Financial Constraint	0.24	0.39	0.51	1.00	0.40	0.42	0.41
Confidence	0.36	0.28	0.50	0.40	1.00	0.80	0.67
Anxiety	0.34	0.29	0.47	0.42	0.80	1.00	0.75
Depression	0.26	0.27	0.57	0.41	0.67	0.75	1.00

The correlation matrix reveals meaningful relationships among psychosocial and access-related variables in low vision rehabilitation. Especially, device access is strongly correlated to depression ($r = 0.57$), which indicates that when it is hard to obtain assistive tools, one's emotional well-being is affected too. This is in line with the findings that improved access to low-vision care services is associated with reduced psychological distress in patients [42]. Incorporated as a logical extension to that research is a very high correlation between confidence and anxiety ($r = 0.80$), reinforcing the notion that relationships between emotional vulnerability and self-efficacy are interdependent [43].

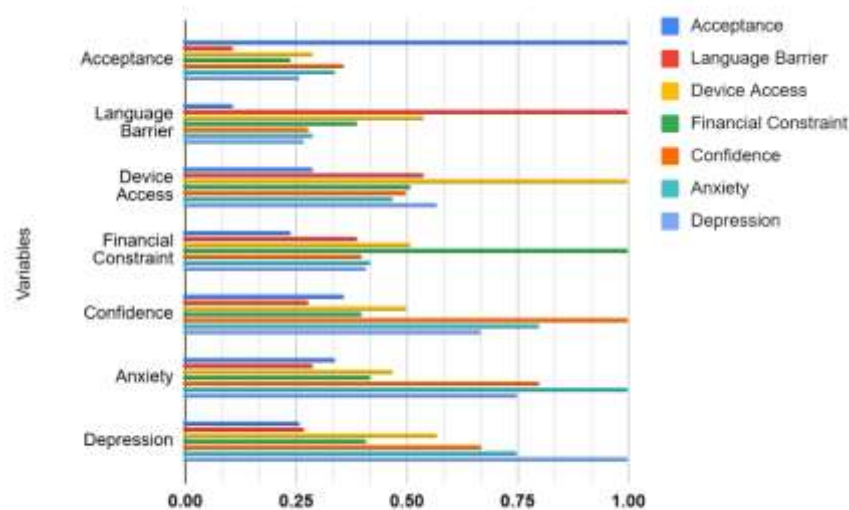


Figure 3: Correlation Matrix of Key Psychosocial and Access-Related Variables

As patients experience increased anxiety, their confidence in navigating everyday activities and seeking care appears to decline. [44] highlight how emotional health and functional limitations reinforce each other, particularly among elderly individuals with visual impairment in India. The matrix also shows a strong correlation between **anxiety and depression ($r = 0.75$)**, confirming the co-morbidity often reported in vision rehabilitation literature. According to [45], the psychological

burden is worse when social stigma and visual prognosis are unknown in resource-limited settings. These results highlight the requirement of a whole rehabilitation package based on psychosocial counselling along with economic and access-focused interventions [46].

Table 6. Regression Analysis: Predictors of Depression Among Low Vision Patients

Predictor	Coefficient (B)	Std. Error	t-value	p-value	95% CI (Lower)	95% CI (Upper)
Constant (Intercept)	1.5776	0.1787	8.83	< 0.001	1.2265	1.9288
Language Barrier (Q4)	0.1217	0.0425	2.86	0.0044	0.0382	0.2052
Financial Constraint (Q6)	0.3866	0.0496	7.80	< 0.001	0.2892	0.4841

The results of the regression analysis show that both language barriers and financial constraints are significant statistical predictors of depression among low-vision patients. Further, the model shows that the level of depression rises by 0.1217 ($p = 0.0044$) for each unit increase in perceived language difficulty and increases by 0.3866 units ($p < 0.001$) for each unit increase in financial barriers [47]. On the other hand, these results reflect the harsh toll that communication difficulties and economic hardship take as a double hit. Language barriers prevent patients and providers from interacting effectively, decreasing perceived support, and snapping individuals in need of direction [48], while there is limited access to visual aids and rehabilitation services due to financial constraints which give feelings of helplessness and dependency. Access to low-vision services is often mediated by socioeconomic factors, particularly, in low-resource settings as found by [49]. In addition, depression in this case is not just a consequence of functional limitations, but also a response to systemic neglect. [50] demonstrate that patients' access barriers to cost-effective therapeutics to deal with the sequelae of corneal inflammation also mean greater caregiver distress, highlighting the importance of crafting entire low vision care strategies that are integrated psychosocial and financial.

5. CONCLUSION AND FUTURE WORK

5.1 Conclusion

In addition, depression in this case is not just a consequence of functional limitations, but also a response to systemic neglect. Berger, Kuriakose, Khan, and Almeida (2017) demonstrate that patients' access barriers to cost-effective therapeutics to deal with the sequelae of corneal inflammation also mean greater caregiver distress, highlighting the importance of crafting entire low vision care strategies that are integrated psychosocial and financial. Finally, the correlation and regression analyses provide evidence to further support this interrelationship and demonstrate a strong statistical association between the barriers to access and mental health outcomes. The strongest predictor of depression turned out to be financial constraints and just behind that were language challenges. The implications are that we need to have vision rehabilitation policies that adequately take care of both access and emotional well-being. To understand these multilayered barriers, urban health systems based on an integrated model must adapt to complex and culturally, and economically diverse cities such as Kolkata. It includes multilingual support, financial subsidies and psychosocial counselling. India can be a more inclusive, equitable participatory player in rehabilitating its visually impaired by addressing the access and the affective dimension of care.

5.2 Future Work

Further research should employ a longitudinal design to address how language and financial barriers predict improvements in rehabilitation outcomes over time. The study could also be expanded to rural-urban comparisons to add to the knowledge of geographic disparities in access and awareness. In addition to this, qualitative interviews would contribute to the lived experience of survey responses specifically in women, the elderly and the tribal community. Intervention-based studies are a final necessity to assess the efficacy of policy reforms, financial aid models and multilingual counselling to increase the uptake of low-vision rehabilitation and psychosocial well-being.

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