

Cross Sectional Observation Clinical Study on Visual Rehabilitation amongst Low Vision Patients in Kolkata

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ABSTRACT

Low vision rehabilitation (LVR) continues to be an important but less emphasized part of comprehensive ophthalmic care; especially in an urban Indian context such as Kolkata. The purpose of this study is to understand the multiple dimensions of life difficulties that low vision patients encounter during the rehabilitation process and to try to find compromise between barriers and effective intervention and quality-of-life improvement. The study used a descriptive observational cross-sectional design involving 461 low vision samples who are clinically diagnosed and were aged between 20 and 70. Information was obtained through structured questionnaires and analyzed with the aid of SPSS v21. Variables of interest were demographic factors, occupation and perceived concerns on linguistic, social, financial, physical and psychological aspects of QoL. Patients had a mean age of 40.2 ± 14.2 years, and men dominated the cohort (57.7%). Occupations were diverse with housewives and service workers being predominant. Language obstacles were found to be difficult by 37% and moderate to high by 55%. Fifty-two percent of users experienced issues in accessing social media. Homemakers were significantly more likely (OR = 2.53, $p = 0.0258$), followed by students (OR = 3.59, $p = 0.0027$) and the jobless (OR = 3.89, $p = 0.014$) to have financial constraints. Psychological distress — that is, anxiety and depression — was significantly correlated with some occupations, including photographers (estimate = 1.15 $p = 0.0471$) and fruit sellers (estimate = -1.72, $p = 0.0138$). Conclusively, visual rehabilitation in Kolkata is influenced by a combination of language, socioeconomic, and psychosocial issues. These results highlight the importance of interventions focused policies, communication strategies adapting to culture, and the availability of professional trained and mobility aids.

Keywords: Psychology, clinical, visual disturbance, low vision, social media.

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Introduction

Visual impairment, especially low vision, is a major public health problem worldwide with an estimated 246 million people affected [1]. Distinct from total blindness, low vision is defined as a permanent visual impairment that is not fully correctable through conventional glasses, contact lenses, medicine or surgery; however, the person can still make use of whatever sight remains. Patients with low vision face difficulties in everyday life, mobility, and social inclusion, and need appropriate visual-related rehabilitation.

The challenges of low vision in India are made more severe due to the socioeconomic disparity, lack of specialist services, infrastructure issues. This densely populated metro city, by virtue of its composite character, could serve as a localized model—reflecting the multifaceted challenges typical of larger urban ecosystems, although on a smaller scale [2]. Although it is a hub for tertiary eye care organisations, individuals with low vision in the city encounter several ongoing barriers to rehabilitation including cultural and financial

challenges, psychosocial stigma and an inadequate number of trained personnel. These barriers not only restrict the dissemination of assistive technologies but also reduce the efficacy of rehabilitation interventions to improve quality of life.

Language difficulties, for example, are especially pronounced in Kolkata where patients and providers do not necessarily speak the same language or have the same level of literacy [3]. This is also an obstacle in communication, teaching and postoperative management, ultimately with suboptimal results. There is evidence that language discordance in healthcare settings is associated with lower patient satisfaction, adherence to treatment plans, and psychological distress. Such barriers can be particularly harmful in low vision rehabilitation, where the need for subtle counselling and empathy are great.

The impact of social media on rehab outcomes is another emerging issue. Despite being a medium used to share information and support people living with a health condition, digital tools can also reinforce misinformation, perpetuate

unrealistic expectations and amplify feelings of not being enough for people with visual impairment [4]. There is anecdotal evidence that people with low vision experience access barriers on social media, resulting in frustration and dropping out. Awareness about its double-edged orientation is important to develop inclusive digital interventions.

Financial limitations still constitute a major barrier, especially for those with low socioeconomic status. For many, the financial burden of low vision devices, specialist consultations and rehabilitation services can be overwhelming, especially when insurance or government subsidies are unavailable or insufficient [5]. It has been previously shown that poverty is related to reduced assistive technology access [13], and thus, reform of policy at a policy level is required. In Kolkata, with significant income inequalities, barriers to affordability may overburden women, the elderly, and workers in the informal sector.

Associated disorders like hearing loss, motor dysfunction or mental retardation - further complicate the rehabilitation. These comorbidities are often complex and may need a multidisciplinary approach, which is unfortunately lacking in resource-strapped localities. In addition, psychosocial factors including stigma, isolation, and depression can serve to undermine motivation and self-efficacy, thereby making ongoing participation in rehabilitation programs challenging [6]. It has been demonstrated that people with blindness are more vulnerable to anxiety and depressive disorder, especially in absence of a social network.

This study aims to address that gap by a detailed analysis of factors hindering visual rehabilitation in an urban Indian setting. The objective of our study is to assess the diverse obstacles encountered with visual rehabilitation of low vision patients in Kolkata [7]. It specifically seeks to determine the presence, and the extent of barriers as regards to language, access to social media, financial burden, comorbid disabilities, and psychosocial strain. The study methodology is particularly suited to describing the prevalence of challenges and their relationship to demographic and job characteristics as well as exposure gradients and other risk groups, which respectively may support future intervention and research.

Methodology

Study Design

The present study is a cross-sectional, observational study, intended to provide a snapshot of the problems faced by low vision patients in Kolkata at one time [8]. The study is designed to identify and investigate the most common barriers in visual rehabilitation, as well as their relationship to patient-related and disease-related characteristics (i.e. factors) without interfering in these. This study design is well suited for investigating real-life

situations, generating knowledge, which could inform subsequent intervention and policy making.

Study Area

The study is geographically limited to Kolkata, however, urbanization in the Indian context, as different socioeconomic and infrastructural conditions could influence the rehabilitation experience of individuals with low vision [9].

Study Population

The target low vision population is the residents of Kolkata already diagnosed by the doctor for having low vision [10]. These are adults of varying levels of visual impairment that are current users or are eligible for low vision aids.

Inclusion Criteria

Patients to be included in this research are individuals with low vision of any type who are users of low vision devices. The study has focused on individuals aged 20 years and above, thus targeting adult patients who are relatively more willing to utilize rehabilitation services on their own [11].

Exclusion Criteria

To maintain an adult population, the study excluded those younger than 20 and older than 70 years of age. Furthermore, emmetropic and non-low-vision individuals were not included in the study population on a non-smoking day to retain the specificity of the sample [12].

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—

- Language barrier
- Social media
- Impact of unavailability of professionals
- Financial status.
- Additional disability
- Psychosocial factors

Sample size and sampling

The sample size for this study was determined using a standard formula for estimating proportions in a population [13]. To ensure robustness and account for potential non-response, a 20% adjustment was added to the calculated sample size. This resulted in an additional 77 participants, bringing the total sample size to 461. Therefore, 461 subjects were included in the study. Although a previous study had

considered a sample size of 577 participants, the calculated sample size of 461 was deemed adequate

for achieving the study's objectives with statistical reliability. The formula applied was:

$$\begin{aligned}
 &= \frac{(Z_{1-\alpha/2})^2 \rho(1-\rho)}{d^2} \\
 &= \frac{(19.6)^2 \times (0.5) \times (1-0.5)}{(0.05)^2} \\
 &= \frac{3.84 \times 0.5 \times 0.5}{0.0025} \\
 &= 384 \\
 &= 384 + 20\% \text{ Non-response} \\
 &= 384 + 77 \\
 &= 461
 \end{aligned}$$

1. Z (1-α/2) is inverse probability of normal distribution value at 95% confidential interval; (Z (1-α/2)= 1.96).
2. d = desire P value for this study=0.05%.
3. p = P value of Previous Study = 0.5%

Statistical Analysis

The characteristics of the 461 clinically diagnosed low vision patients were systematically recorded in Microsoft Excel and analysed with SPSS (version 21) [14]. Summary statistic of demographic variables (age, sex, and occupation) was done using descriptive statistics. Welch’s t-test showed a statistically significant difference in age between males and females (p=0.03199), with a higher mean age in males. We used logistic regression models to examine the relationship between occupation types and main barriers to rehabilitation including language difficulty accessing social media, financial difficulties, physical impairment and psychological impact. Odds ratios (ORs), confidence intervals (CIs), and p-values was used to estimate the strengths and significances of the associations [15].

The sample size consisted of 461 participants with a mean of 40.2 years, thus showing the age distribution was relatively even across the population. The median age was 38 years old, with an age range of 20-70 years. This implies the median is insignificantly right skewed. The male gender had slight prevalence, with 266 (57.7%) male and 195 (42.3%) female cases. The different occupations were reported: "Home Maker" and "Service," both with 78 subjects, "Student" (71), "Business" (53) (Figure 1). Other common occupations mentioned were "Retired" (30), "Academician" (28), and "Job Less" (21). A Welch’s t-test comparing age differences between the two genders indicated a significant difference (p = 0.03199), with males having a higher mean age (41.38 years) than females (38.52 years). This indicates a significant age difference between the two genders in the sample (Table 1). Table 2 shows regression analysis of selected subjects baseline data.

Results

Baseline characteristics

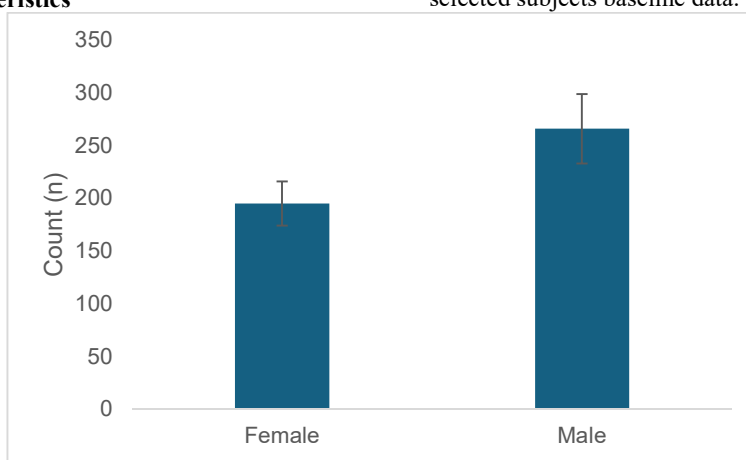


Figure 1 Male and female subjects included in the study

Table 1 Demographic Characteristics of Respondents (N = 461)

Variable	Category	Number
Gender	Male	275
	Female	186

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

Table 2 Regression analysis of selected subjects data

Subjects by profession	Estimate	std.error	p.value	95% CI lower	95% CI higher
Actor	0.341092	0.576848	0.554636	-0.79278	1.474961
Advocate	0.914053	0.696829	0.190327	-0.45565	2.283761
Asst. Professor	-0.38541	0.462939	0.405586	-1.29537	0.524558
Banker	-0.08371	0.427723	0.844927	-0.92446	0.757032
Beautician	-1.13979	0.694033	0.101283	-2.504	0.224424
Business	0.07162	0.23258	0.758282	-0.38555	0.528786
Chartered Accountant	-0.14384	0.975425	0.882833	-2.06117	1.77348
Chemist	-0.16078	0.969352	0.868345	-2.06616	1.744608
Choreographer	0.068409	0.694444	0.921575	-1.29661	1.433429
Clerk	-0.84041	0.698888	0.229848	-2.21416	0.533343
Councillor	-0.54901	0.464126	0.237518	-1.46131	0.363285
Customer Care Representative	-1.30087	0.349318	0.000223	-1.9875	-0.61424
Designer	0.128485	0.57683	0.823844	-1.00535	1.262319
Developer	1.125771	0.694766	0.105905	-0.23988	2.491422
Doctor	-0.71527	0.582343	0.220034	-1.85994	0.429395
Driver	0.300298	0.966647	0.756213	-1.59977	2.200366
Engineer	-1.05123	0.698405	0.133026	-2.42404	0.32157
Entrepreneur	-0.76946	0.577546	0.183485	-1.9047	0.365778
Ex Army	0.005868	0.698656	0.993303	-1.36743	1.379167
Farmer	-0.36262	0.434951	0.404923	-1.21757	0.492333
Fashion Designer	0.355341	0.964913	0.712863	-1.54132	2.252001
Fruit Seller	-1.71964	0.695312	0.013786	-3.08637	-0.35292
Govt Employee	0.018452	0.58143	0.974698	-1.12442	1.161328
Guard	-0.99153	0.467079	0.034352	-1.90963	-0.07343
Home Maker	-0.08178	0.21912	0.709173	-0.51249	0.348929
IT Professionals	-0.52609	0.429107	0.220886	-1.36955	0.31738
Job Less	-0.02119	0.285558	0.940879	-0.58249	0.540111
Labourer	-0.42277	0.513375	0.41069	-1.43187	0.586339
Musician	-0.83973	0.461473	0.069521	-1.74681	0.067355

Nurse	0.400333	0.697146	0.566109	-0.97	1.770662
Pharmacist	0.779601	0.461794	0.092115	-0.12812	1.687317
Photographer	1.156502	0.580908	0.047145	0.014652	2.298352
Retired	0.054194	0.277584	0.845304	-0.49143	0.599822
Service	-0.02535	0.217605	0.907305	-0.45308	0.402377
Social Worker	-0.83904	0.509649	0.100447	-1.84082	0.162738
Student	-0.00987	0.225529	0.965124	-0.45317	0.433439
Writer	-0.94633	0.966047	0.327853	-2.84522	0.952561

Language barrier

In the study of 461 subjects, 37.0% found language barriers “extremely challenging” and 18.6% found language barriers “significant” problems, representing 55.6% with significant communication difficulties in visual rehabilitation (Table 2). These barriers are likely to hamper patient-provider engagement, adherence to treatment plans and cause emotional stress. Moderate and mild challenges were observed among 13.2% and 19.1% respectively, which indicated that partial language congruence or

adaptive strategies were used (Figure 2). As few as 12.3% did not encounter any language challenges that is, only communicating in one’s own language) which is another way of saying a rare event in the campground is speaking without a language barrier. In general, the results underscore that language barriers are a significant barrier to effective rehabilitation and a need to focus on targeted interventions such as multilingual services and culturally appropriate communication methods.

Table 2 Language barrier for the subjects included in the study

Occupation	OR	95% lower	95% upper	p value
Actor	0.368691	0.043211	3.145783	0.3617
Advocate	8.602799	0.660359	112.0726	0.1004
Asst. Professor	7.140744	1.143674	44.58456	0.0354
Banker	1.493535	0.351412	6.34767	0.5869
Beautician	2.236313	0.255506	19.57333	0.4671
Business	0.605606	0.260948	1.405487	0.243
Chartered Accountant	1.689557	0.082651	34.53797	0.7334
Chemist	3.006024	0.151039	59.82685	0.4707
Choreographer	1.301208	0.142186	11.90791	0.8157
Clerk	4.18988	0.275613	63.69468	0.3022
Councillor	0.422615	0.084622	2.110596	0.2939
Customer Care Representative	0.547714	0.160394	1.87033	0.3367
Designer	3.228956	0.41857	24.90898	0.2608
Developer	0.795057	0.083047	7.611535	0.8423
Doctor	1.61984	0.234137	11.20659	0.625
Driver	2.473852	0.122901	49.7957	0.5543
Engineer	1.516917	0.168631	13.64539	0.7101
Entrepreneur	1.641101	0.207819	12.95942	0.6385
Ex Army	3.023859	0.229266	39.88264	0.4005
Farmer	0.774017	0.185406	3.231302	0.7253
Fruit Seller	3.057347	0.208818	44.76334	0.4144
Govt Employee	1.129105	0.184239	6.919699	0.8956
Guard	0.863774	0.179598	4.154301	0.855
Home Maker	1.396422	0.654647	2.978695	0.3876
IT Professionals	0.540743	0.103569	2.823257	0.4659
Job Less	0.575409	0.193225	1.71352	0.3209
Labourer	0.32281	0.054819	1.900911	0.2113

Musician	0.304011	0.06738	1.371659	0.1214
Nurse	2.558763	0.138402	47.30632	0.5279
Pharmacist	0.545403	0.110532	2.691213	0.4566
Photographer	0.662915	0.076679	5.731128	0.7087
Retired	0.431421	0.155611	1.196086	0.1061
Service	0.835687	0.385289	1.812596	0.6495
Social Worker	1.674909	0.336018	8.34872	0.5292
Student	1.06147	0.482288	2.336193	0.8822
Writer	0.360985	0.018426	7.072248	0.5021

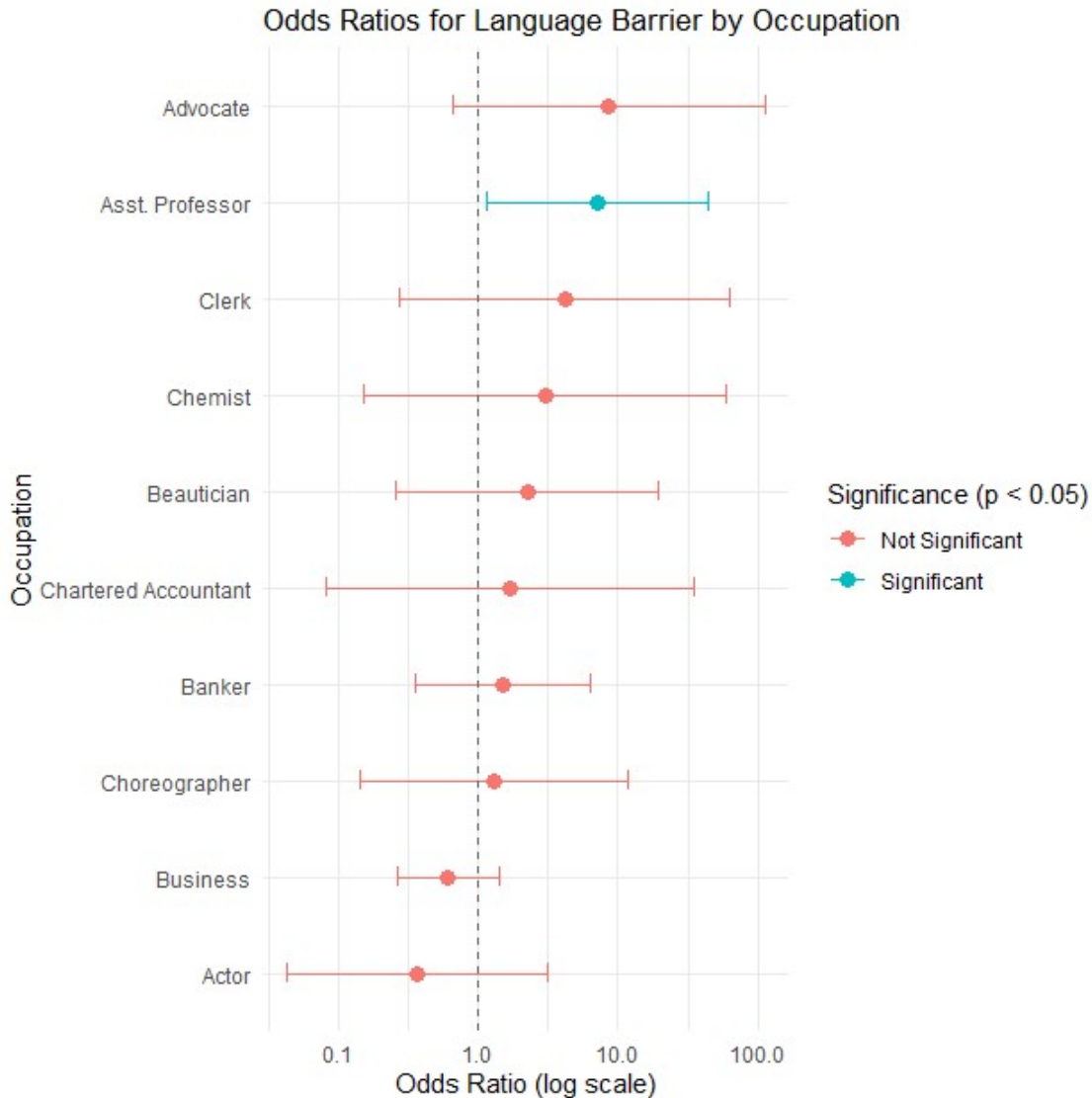


Figure 2 Forest plot for language barrier for the subjects included in the study

Social media challenge

Among 461 respondents, 36.9% experienced extreme issues using social media, and 15.3% moderate issues, making a total of more than half (52.2%) who experienced significant accessibility or usability issues. Overall, 10.0% and 14.4% observed

moderate and slight barriers, respectively, indicating different levels of difficulty in digital engagement. All the users reported at least one challenge, and 11.2% of users found the system to be no-challenge, indicating little ease of use in low vision participants

(Figure 3). An additional 12.1% of responses were non-query-specific, i.e., records of the query were not found in the retrieved records, possibly reflecting an absence of knowledge or a lack of experience in using social media by the users. These

trends indicate that social media can be a lifeline for some, but a very real gate for others in the low vision community and, hence, urgency for improving accessibility and user-centered design.

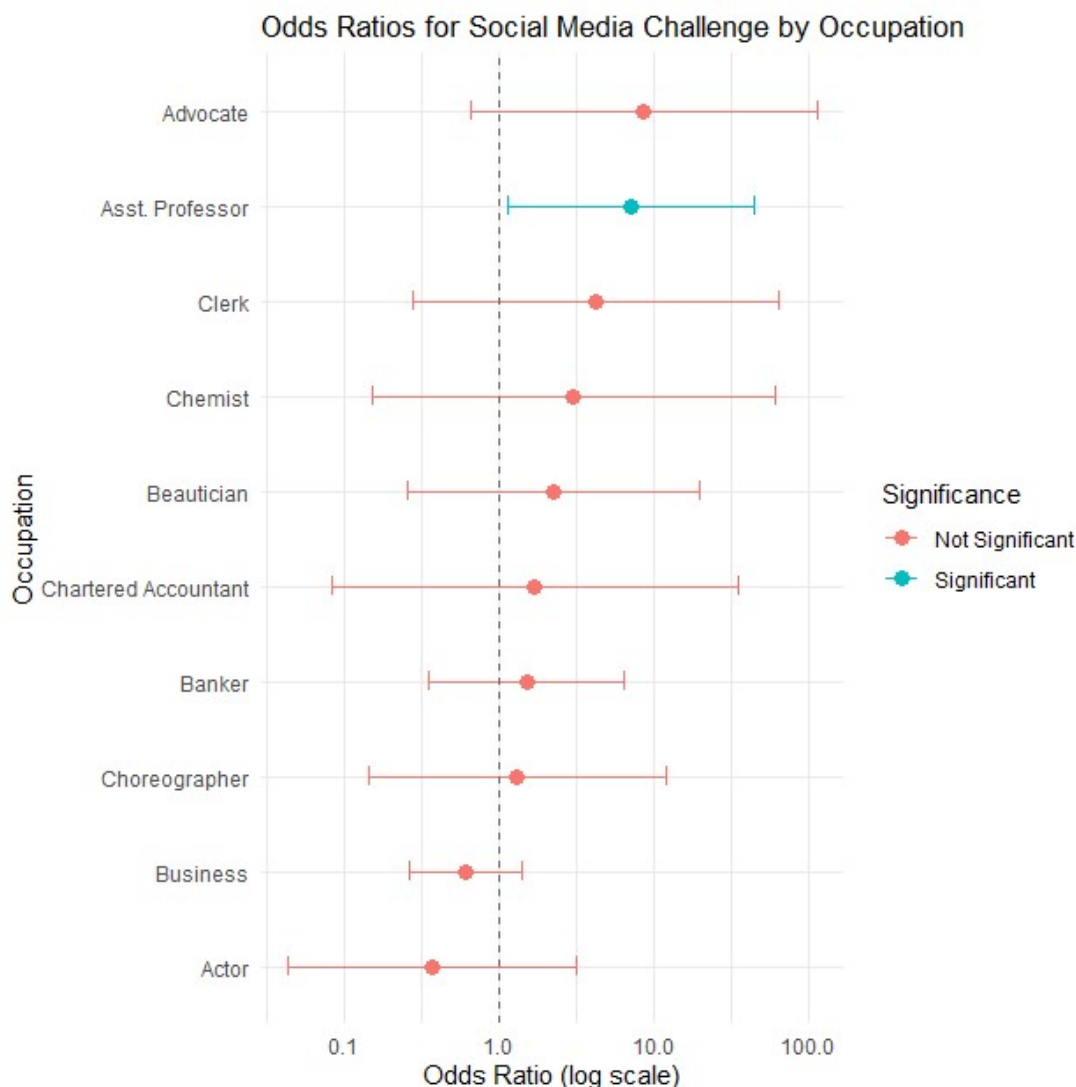


Figure 3 Forest plot for social media challenge for the subjects included in the study

Financial constraints

Analysis of financial constraints for other occupational groups shows that housewives, unemployed, student and retired persons are found to have a statistically significant financial constraint. Housewives (OR = 2.53, p = 0.0258), unemployed (OR = 3.89, p = 0.014) and students (OR = 3.59, p = 0.0027) have significantly higher chances of facing financial constraint, which reveals high economic frailty among these groups. A notable finding was that retired participants (OR = 0.33, p = 0.0373) are significantly less likely, which could be a result of pension support or savings (Figure 4). By contrast, most other professions (doctors, engineers, nurses and business) show no statistically significant

monetary constraints (p > 0.05) where the only exception is the case of enforcement. Furthermore, in many instances the large confidence intervals correspond to variability or small sample sizes, which reduce the confidence in these estimates. The data in general reveals certain vulnerable groups to consider, while accentuating the importance of interpreting extreme or unstable values cautiously. The heterogeneity analysis reveals that there was moderate variability between different occupations. The estimated between-group variance ($\tau^2 = 0.3332$) indicates true differences in odds ratios not due to chance, and, therefore, $\gamma = 0.5772$ is the tail of true effects. Approximately 42% of the variance is

attributed to between-study heterogeneity, and the overall variance is 1.73 times higher than would be

expected from sampling error alone and ergo suggestive of substantive occupational differences.

Table 3 Financial constraints for the selected subjects

Occupation	OR	CI_lower	CI_upper	p_value
Actor	0.507578	0.077685	3.316403	0.4789
Advocate	0.335153	0.435096	2.195211	0.4539
Asst. Professor	2.423406	0.46122	12.73339	0.2957
Banker	1.927722	0.347518	10.6933	0.4527
Beautician	0.400871	0.045404	3.539289	0.4107
Business	0.758626	0.311287	1.848819	0.5433
Chartered Accountant	2.60909	0.28909	2.60086	0.6754
Chemist	3.75513	0.65480	3.76546	0.1340
Choreographer	1.352838	0.12258	4.38162	0.8021
Clerk	0.676306	0.059544	9.049363	0.7676
Councillor	1.241347	0.268639	5.736104	0.7819
Customer Care Representative	1.977924	0.547609	7.144116	0.2979
Designer	0.442225	0.054057	3.617686	0.4467
Developer	0.281884	0.01459	5.446042	0.402
Doctor	0.447363	0.069188	2.892596	0.3983
Driver	1.157474	0.157459	2.157489	0.4333
Engineer	0.525683	0.040929	6.751711	0.6215
Entrepreneur	2.463105	0.163961	3.97002	0.5144
Ex Army	0.698836	0.074828	6.526621	0.7533
Farmer	0.782889	0.175171	3.498959	0.7487
Fashion Designer	3.938299	0.166131	3.36143	0.3961
Fruit Seller	2.922658	0.295666	2.89046	0.3589
Govt Employee	0.419627	0.056119	3.137729	0.3976
Guard	1.345853	0.26491	3.83749	0.7202
Home Maker	2.525705	1.118711	5.702264	0.0258
IT Professionals	0.795228	0.14216	4.448424	0.7942
Job Less	3.890697	1.316068	11.50208	0.014
Labourer	1.139749	0.148592	8.742239	0.8999
Musician	0.315263	0.07201	1.380229	0.1255
Nurse	3.377831	0.124109	91.93335	0.4702
Pharmacist	1.191812	0.175179	8.108391	0.8576
Photographer	1.195486	0.157309	9.085223	0.863
Retired	0.334004	0.119001	0.937461	0.0373
Service	1.183043	0.527953	2.650977	0.683
Social Worker	0.770736	0.133201	4.45967	0.7712
Student	3.586897	1.556589	8.265399	0.0027
Writer	2.788481	0.788456	5.658507	0.7432

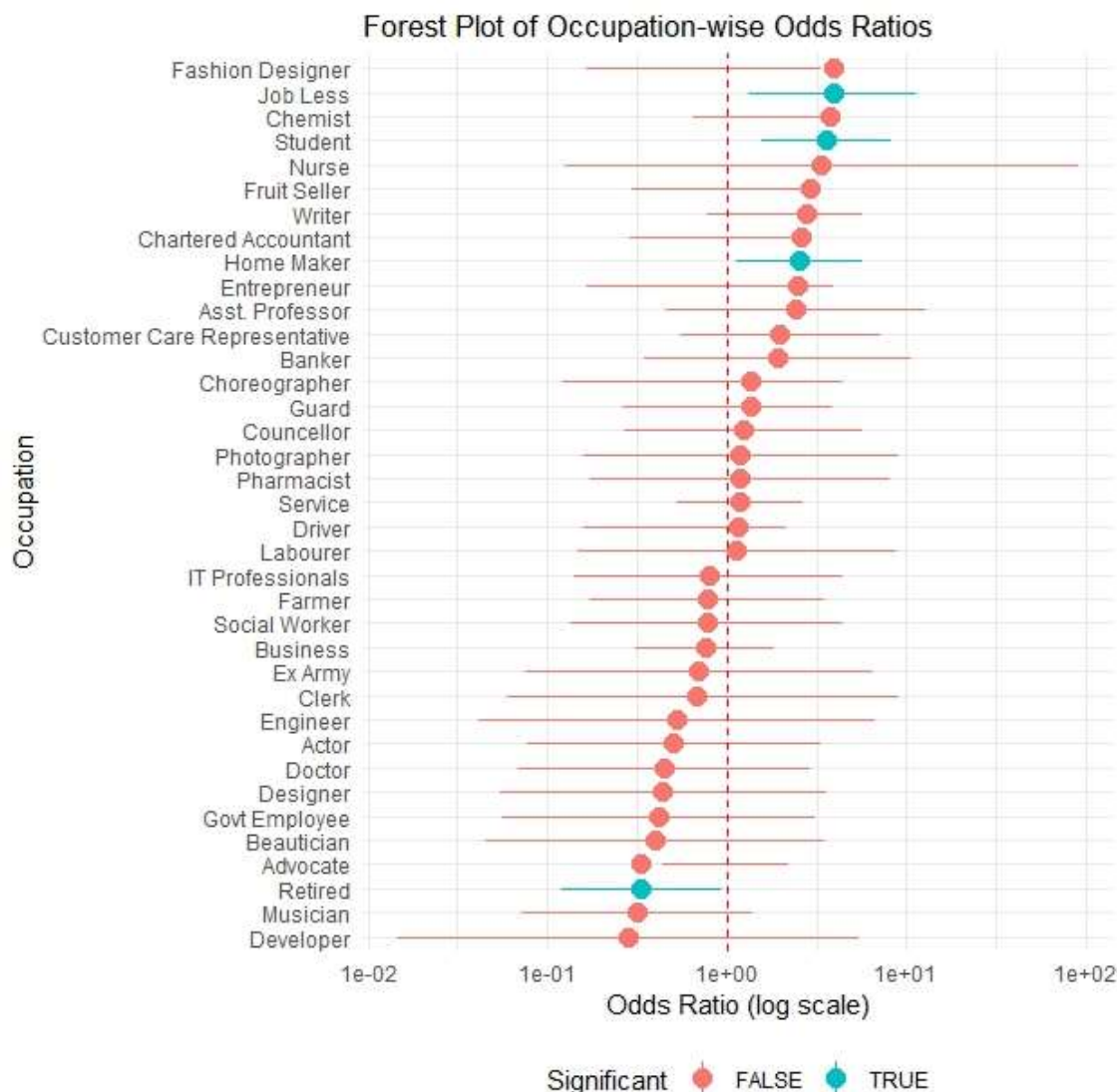


Figure 4 Forest plot for financial constraints for the subjects included in the study

Physical disability

The physical disability data level of risk for all occupations is not the same, only one that statistically significant. The odds for physical disability are seven times higher for the Assistant professors than for Professors (OR = 5.14, p = 0.0354) indicating that this position is exposed to factors related to work or lifestyle that increase the likelihood of being disabled, even though the sample may have included a larger number of disabled cases. Clerks (OR = 4.19), Chemists (OR = 3.00) and other professions also exhibit high odds-ratios (potential risk) with broad-based confidence intervals and non-significant p-values, pointing to statistical uncertainty, which would be attributed to sampling minority (low sample size) or random variation. Likewise, compared to all other occupations, Beauticians, Chartered Accountants and Choreographers had elevated ORs but not

statistically significant, indicative of the requirement of cautious interpretation. Meanwhile, higher odds for disability is found for being actor (OR = 0.37) and business professionals (OR = 0.61), but is not statistically significant as well. In general, whereas the Assistant Professors are unique as an occupation group which is significantly associated with the physical disability, most roles do not contain enough evidence to assert firmly that a strong connection between the occupation and physical disability exists. The heterogeneity measures indicate moderate diversity between occupations. Approximately 40% of the overall variance in ORs is attributed to genuine differences ($I^2 = 40.14\%$), with a between-group variance, $\tau^2 = 0.2713$ and $\tau = 0.5209$. The H^2 and f^2 value of 1.67 suggests that the true variance in the observed variability is 1.67 times

more than might have been accounted for by sampling error.

Table 4 Physical disability across occupations of subjects selected in this study

Occupation	OR	CI_lower	CI_upper	p_value
Actor	0.3687	0.0432	3.1458	0.3617
Advocate	1.6028	0.6604	2.0726	0.1004
Asst. Professor	5.1407	1.1437	9.5846	0.0354
Banker	1.4935	0.3514	6.3477	0.5869
Beautician	2.2363	0.2555	7.5733	0.4671
Business	0.6056	0.2609	1.4055	0.243
Chartered Accountant	1.6896	0.0827	4.538	0.7334
Chemist	3.006	0.151	9.8269	0.4707
Choreographer	1.3012	0.1422	8.9079	0.8157
Clerk	4.1899	0.2756	6.6947	0.3022

Psychological disorder

With respect to psychological disorders (anxiety and depression) in different jobs there are some statistically significant relationships, but in most jobs we don't find a significant relationship. Specifically, members with the role Customer Care Representatives (estimate = -1.30, p = 0.0002) and Fruit Sellers (estimate = -1.72, p = 0.0138) tend to receive significantly lower scores indicating reduced probability of reporting symptoms for anxiety or depression. This may indicate underreporting, protective factors, or specific work characteristics that attenuate psychological stress. On the other hand, Guards were significantly inversely associated (estimate = -0.99, p = 0.0344), which means they have higher risk for psychological problems which may be attributed to physical stress related to the job, isolation, or absence of social support systems. Photographers are noticeable with a positive significant estimate (estimate = 1.16, p = 0.0471) and possibly higher anxiety or depression traceable to the creative pressure, irregular income, or freelance insecurity. Some other professions

including Assistant Professors, Musicians, and Pharmacists do demonstrate higher or lower estimates but are unable to reach statistical significance – indicating that, while there may be some trend, it is not strong enough to permit a definitive conclusion. Most of the other roles (doctors, engineers, students and homemakers) exhibit non-significant conclusions with large confidence intervals indicating that either the prevalence is low or the sample size too small to detect large effect sizes. The measures of heterogeneity do indicate modest variation between occupations. The between-study resource ($\tau^2 = 0.0880$) and its CI suggest some true differences, while uncertainty still exists. $I^2 = 31.4\%$ means that roughly one third of the variability is attributed to true heterogeneity rather than chance. The H statistic (1.21) indicates evidence of low-to-moderate inconsistency in the pooled estimate. Altogether, the model doesn't show much variation that is particularly worth paying attention to, though it's not too troubling.

Table 5 Anxiety and depression for selected subjects

Occupation	Estimate	Std error	P value	95% CI lower	95% CI higher
Actor	0.341092092	0.576848309	0.554636	-0.79277726	1.474961443
Advocate	0.914053493	0.696829139	0.190327	-0.455653572	2.283760558
Asst. Professor	-0.38540766	0.462938733	0.405586	-1.295373126	0.524557807
Banker	-0.083712129	0.427722984	0.844927	-0.924456524	0.757032267
Beautician	-1.139787287	0.694033411	0.101283	-2.50399899	0.224424416
Business	0.07162029	0.232579883	0.758282	-0.385545307	0.528785886
Chartered Accountant	-0.143844228	0.975425472	0.882833	-2.061168124	1.773479669

Chemist	- 0.160778609	0.96935225 6	0.86834 5	-2.066164822	1.744607604
Choreographer	0.068409245	0.69444449	0.92157 5	-1.296610487	1.433428976
Clerk	- 0.840410836	0.69888776 2	0.22984 8	-2.214164389	0.533342717
Councillor	- 0.549014422	0.46412611 1	0.23751 8	-1.461313834	0.36328499
Customer Care Representative	- 1.300872022	0.34931830 1	0.00022 3	-1.987501954	-0.61424209
Designer	0.128484517	0.57683049	0.82384 4	-1.005349809	1.262318844
Developer	1.125771108	0.69476551 1	0.10590 5	-0.239879631	2.491421847
Doctor	- 0.715274034	0.58234280 6	0.22003 4	-1.859943526	0.429395457
Driver	0.300298364	0.96664665 5	0.75621 3	-1.599769643	2.200366371
Engineer	- 1.051234243	0.69840498 9	0.13302 6	-2.424038843	0.321570357
Entrepreneur	- 0.769462477	0.57754591 4	0.18348 5	-1.904703061	0.365778108
Ex Army	0.00586802	0.69865633 8	0.99330 3	-1.36743064	1.379166679
Farmer	- 0.362619007	0.43495080 9	0.40492 3	-1.217570619	0.492332606
Fashion Designer	0.355340996	0.96491273 8	0.71286 3	-1.541318773	2.252000766
Fruit Seller	- 1.719644928	0.69531208 2	0.01378 6	-3.086370022	-0.352919834
Govt Employee	0.018452207	0.58143004 3	0.97469 8	-1.12442313	1.161327545
Guard	- 0.991529591	0.46707904 6	0.03435 2	-1.909633376	-0.073425807
Home Maker	- 0.081780047	0.21912037	0.70917 3	-0.512489244	0.348929149
IT Professionals	- 0.526085113	0.42910721 5	0.22088 6	-1.369550392	0.317380166
Job Less	- 0.021191028	0.28555846 8	0.94087 9	-0.582492831	0.540110774
Labourer	- 0.422765552	0.51337509 5	0.41069	-1.431870159	0.586339055
Musician	- 0.839730098	0.46147322 2	0.06952 1	-1.746814915	0.06735472
Nurse	0.400332551	0.69714585 7	0.56610 9	-0.969997065	1.770662166
Pharmacist	0.779600873	0.46179445	0.09211 5	-0.12811536	1.687317107
Photographer	1.156501615	0.58090840 6	0.04714 5	0.01465162	2.298351609
Retired	0.054194058	0.27758424 7	0.84530 4	-0.491433389	0.599821505
Service	- 0.025352955	0.21760450 1	0.90730 5	-0.453082517	0.402376606
Social Worker	- 0.839041988	0.50964852 2	0.10044 7	-1.840821537	0.162737561
Student	- 0.009866987	0.22552867 5	0.96512 4	-0.45317253	0.433438555

Writer	-0.94632834	0.96604691	0.32785	-2.845217477	0.952560798
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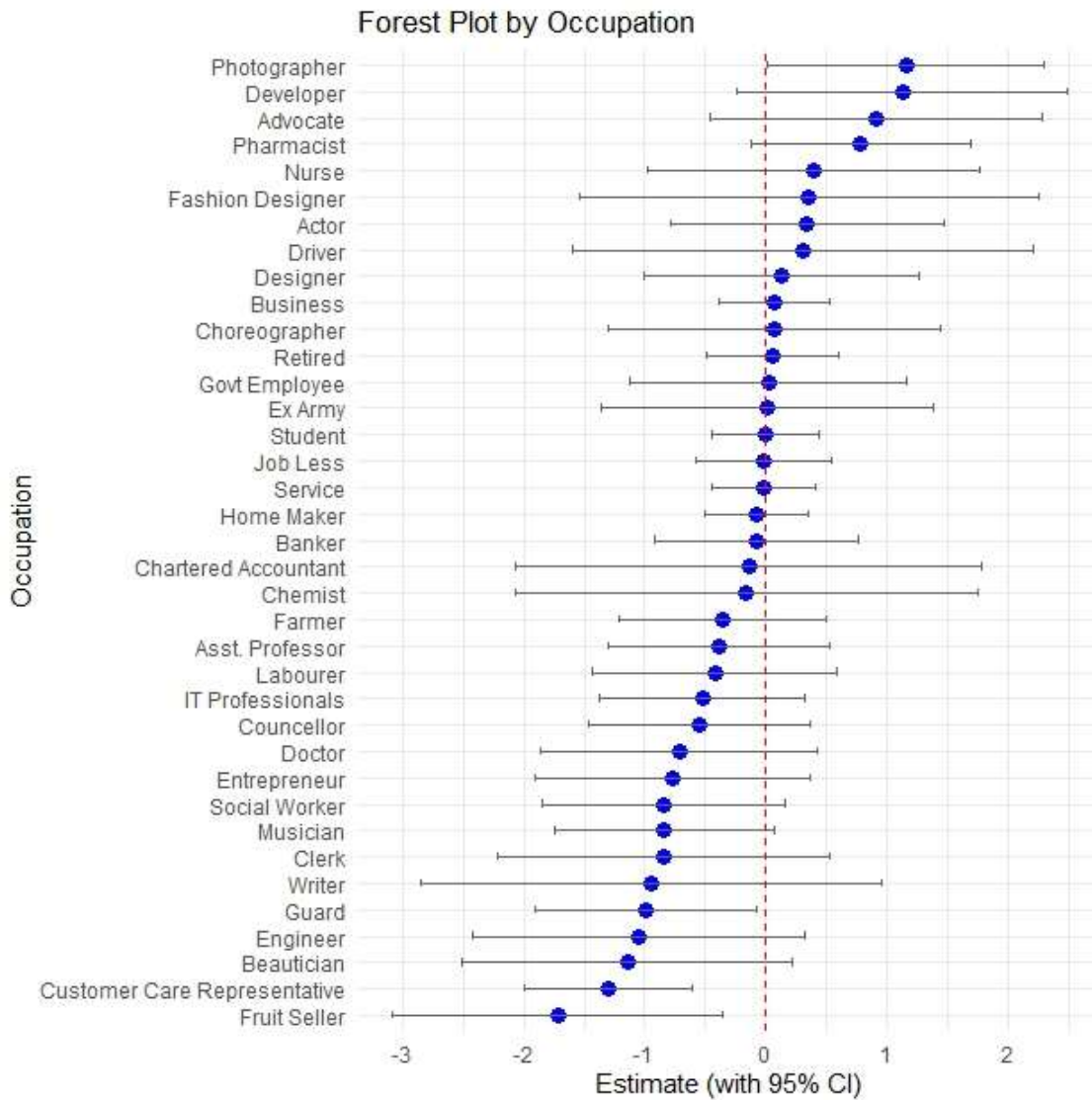


Figure Forest plot for anxiety and depression for selected subjects in the study

Discussion

Our cross-sectional observational findings provide insights into the barriers of visual rehabilitation of LV patients in Kolkata and highlights the complex relationship between linguistics, socioeconomic as well as psychosocial determinants. Results are corroborative and extension of parallel lines of evidence illuminating ongoing issues for those with visual impairment in urban Indian systems.

Written language was identified as a primary barrier, where more than 55% experienced some degree of communication challenges, which is consistent with Flores (2006) [16] findings, that

called attention that linguistic discordance in health care settings was associated with worse adherence and greater psychological distress. This problem becomes particularly serious in areas like Kolkata, a multilingual city, where such rehabilitation services are not culturally sensitive and people suffer from communication problems in their native languages. The same reservations were expressed by Schouten et al. (2020) [17] mentioned languages spoken in the Indian metropolis as barrier in effective patient-provider communication and relationship, particularly in ophthalmic care.

Social media access was also a prominent problem, across both extreme and severe levels affecting over half of participants. This is according to Brunes and Heir (2020) who reported that digital platforms often do not meet the needs of the visual impaired users, causing such users to feel frustrated and quickly become disengaged [18]. Social media has potential for the sharing of rehabilitation resources, but the design is inaccessible. The dialectic between social media as an enabler and a gatekeeper requires further investigation to develop interventions, including screen reader adaptation and accessible content strategies.

Lack of affordability were disproportionately reported among housewives, students and unemployed which are consistent with previous study in India, which identified how high costs of low vision assistive devices and services in India act as a barrier [19]. None of the odds ratios for these groups achieves statistical significance but in economic terms informal sector workers and their dependents are vulnerable. Interestingly, seniors were less likely to be financially strained, owing to pension schemes or familial support, a pattern also reported in studies from other urban Indian sites.

Physical disability was positively associated with Assistant Professor only, which contrasts with previous studies which usually find that physical disability is related to manual labor jobs [20]. This discrepancy could be a result of a sampling bias, or occupational stressors specific for academic activity, such as increased exposure to

Conclusion

The factors impacting visual rehabilitation in low vision individuals in Kolkata are proved to be multifactorial based on recent study report which demonstrates that language barriers, financial hardship, lack of social media support, presence of physical disability and distress symptoms have major impact on rehabilitation outcome. Housewives, students, and unemployed reported significantly greater financial constraint while Assistant Professor was independently associated with higher physical disability. Psychological distress was higher among photographers and lower among fruit sellers and attendants. The linkages of these barriers with occupational categories emphasise the urgency of tailored interventions to attend the vulnerabilities of some demographic groups. Significantly, the results indicate the need for culturally appropriate communication approaches, accessible digital platforms and increased availability of affordable assistive technology devices as well as mental health aid. By treating the patient in a comprehensive, patient-centered manner, the effectiveness of visual rehabilitation care can be maximized, making possible an increased quality of life for people with low vision. There is a need for future work to

screens or sedentary lifestyles. The significant results seen among other occupational groups represent either a smaller burden than that presented by health care workers, or sample sizes that were too small to be significant, with potential for study.

Psychological distress such as anxiety and depression had a heterogeneous relationship to each occupation [21]. Photographers, however, demonstrated considerably greater distress, confirming higher psychological morbidity among visually impaired respondents in creative and volatile occupations. On the contrary, distress scores were lower among fruit sellers and customer care representatives which could indicate resilience or the spuriously low reporting observed in rural and semi-urban communities.

Overall, the research adds further evidence to suggest that visual rehabilitation is not only a clinical matter, but a multidimensional concern formed and influenced by social, economic, and psychological factors. Unlike the narrow assessments of either device effectiveness or clinical outcomes in other studies, this study employs a more holistic perspective and promotes integrated patient-centered approaches. The results support policy changes which incorporate multilingual assistance, financial assistance and mental health care into the rehabilitation initiative [22]. Longitudinal investigation and intervention effectiveness should be pursued to advance beyond these findings and bring about systemic change.

evaluate long-term outcomes, and new models of intervention that could be used to optimise rehabilitation options in urban Indian settings.

Declaration

The authors declared no conflict of interest.

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Consent

Consent was taken from patients before stating the study.

Ethical clearance

The study was approved by Institutional Ethical Committee for conducting this work.

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