



Utilization of Prescribed Low-Vision Devices by Patients Attending a Tertiary Eye Hospital in Bangladesh

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Received: October 03, 2025

Published: October 20, 2025

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Abstract

Low vision, distinct from blindness, refers to a significant but usable reduction in eyesight that cannot be improved with standard corrective measures such as glasses, contact lenses, or surgery. It lies between correctable vision and total blindness. Individuals with low vision require access to specialized care, assistive technologies, and opportunities to maintain independence. Recognizing the challenges associated with low vision and implementing interventions to enhance autonomy are essential.

This study assessed the utilization of prescribed low vision devices among patients attending a tertiary government eye hospital in Bangladesh. A hospital-based prospective observational design was adopted at the low vision department of the National Institute of Ophthalmology & Hospital (NIO&H), Dhaka. Based on the National Blindness and Low Vision Survey of Bangladesh, the calculated sample size was 180. Participants ranged in age from 4 to 76 years (mean 32.9 ± 13.9 years); 59.3% were male and 40.7% female. Retinitis pigmentosa and fundus dystrophy were the most frequent causes of low vision. The most commonly prescribed devices were binocular telescopes and hand-held magnifiers. The overall utilization rate was 30.5%. Reasons for non-use included financial constraints, lack of awareness, social stigma, and fear of job loss.

This study provides insight into the demographic and clinical characteristics of patients with low vision in Bangladesh, highlights utilization patterns of prescribed devices, and identifies barriers to service uptake in a government setting.

Keywords: Low Vision; Assistive Devices; Utilization; Bangladesh

Introduction

Blindness and low vision are major causes of morbidity and have profound impacts on the quality of life, restricting the independence, mobility, and economic participation of affected individuals and their families [1]. Although international initiatives have advanced eye care globally, low-vision services remain underutilized, even in high-income countries, and coverage is particularly limited in low- and middle-income settings [2].

Low vision has a negative impact on visual, functional, psychological, social, and economic well-being [3]. Despite the importance of rehabilitation, only an estimated 5–10% of individuals with low vision consistently access low-vision services [3]. Barriers include lack of awareness among patients, insufficient training of eye care professionals in rehabilitation, and inadequate referral practices.

Definitions of low vision vary and are often used interchangeably with terms such as visual impairment, visual disability, or partial sight. In general, low vision refers to a persistent loss of functional vision that cannot be corrected with standard treatments or refractive measures [4]. Some researchers emphasize that it should be considered a disability rather than merely an impairment, as it directly limits the ability to perform daily activities such as reading, face recognition, and mobility. Low vision can be described subjectively, in terms of perceived task difficulty, or objectively, in terms of measurable task performance [5].

According to the World Health Organization, individuals require low-vision care if they experience reduced visual function despite appropriate treatment or correction, with visual acuity worse than 6/18 but above light perception, or a visual field constricted to less than 10 degrees from the point of fixation. Importantly, such individuals retain the ability—or, at the very least, the potential ability—to utilize residual vision for planning and executing tasks [6].

Globally, an estimated 246 million people live with low vision, while 39 million are blind [7]. In Bangladesh, low vision is a ne-

glected issue. Only two government hospitals provide specialized low-vision services: NIO&H in Dhaka and the Gopalganj Eye Hospital and Training Institute. A small number of NGO hospitals also operate low-vision programs, though not as a core priority. Many individuals remain unaware that their vision loss is irreversible and that rehabilitation strategies are necessary to adapt.

This study aims to investigate the utilization of prescribed low-vision devices by patients attending a tertiary eye hospital in Bangladesh.

Methodology

This study employed a hospital-based prospective observational design. It was conducted at the Low-Vision Department of the National Institute of Ophthalmology & Hospital (NIO&H), Dhaka, over a six-month period during 2021–2022.

Study population and eligibility criteria

Patients who attended the low-vision clinic for the first time, were prescribed low-vision devices, and consented to participate were included. Exclusion criteria were:

- Uncorrected visual acuity (UCVA) better than 6/18 in the better eye and worse than 6/18 in the other eye, and
- Cases in which prescribed devices did not improve vision.

Sample size and sampling

According to the National Blindness and Low Vision Survey of Bangladesh, the prevalence of low vision is 13.8%. Using a 95% confidence interval and 5% margin of error, the calculated sample size was 180 (182.71). A purposive sampling strategy was applied.

Variables

Data were collected on demographic and socio-economic factors (age, gender, religion, place of residence, housing type, education, occupation, and monthly family income), clinical causes of low vision, types of prescribed devices, and utilization status.

Ethical considerations

Informed written consent was obtained from all participants or their guardians. The consent form was prepared in English, translated into Bengali, and administered in the local language. Ethical approval was obtained before the commencement of data collection.

Data collection procedure

During the first three months, eligible patients were enrolled and advised to return for follow-up at three months. At follow-up, the utilization of prescribed devices was assessed.

Visual acuity was measured using log MAR charts (E-symbol and letter formats) for distance and metric (M units) for near vision.

Face-to-face interviews were conducted to obtain socio-demographic information, while medical details were retrieved from clinical records. At follow-up, information on device use and visual outcomes was recorded.

Results

A total of 180 new patients with low vision met the eligibility criteria during the study period. The mean age was 32.9 ± 13.9 years (range 4–76 years). The largest group was aged 16–30 years (35.6%), followed by 31–45 years (28.3%). Only 6.1% were older than 60 years. Overall, 59.3% of patients were male and 40.7% were female, resulting in a male-to-female ratio of 1.45:1 (Table 1, Figure 1).

Table 1: Demographic Characteristics of Study Population.

Demographic Characteristics	Frequency	Percent
Age Group		
0-15	23	12.78
16-30	64	35.56
31-45	51	28.33
46-60	31	17.22
> 60 years	11	6.11
Total	180	100
Gender		
Male	107	59.32
Female	73	40.68
Total	180	100
Education		
Illiterate	16	8.9
Primary School Certificate Pass	17	9.4
Junior School Certificate Pass	21	11.7
Secondary School Certificate Pass	23	12.8
Higher Secondary School Certificate Pass	46	25.6
Graduate	31	17.2
Masters	26	14.4
Total	180	100

Occupation	Frequency	Percent
Student	48	26.7
Service Holder	23	12.8
Business	19	10.6
Daily wages/laborer	33	18.3
Home Maker	31	17.2
Retired Personnel	15	8.3
Unemployed	11	6.1
Total	180	100
Monthly Family Income	Frequency	Percent
< 10,000	48	26.7
10,000 – 20,000	39	21.7
20,000 – 30,000	35	19.4
30,000 – 40,000	32	17.8
>40,000	26	14.4
Total	180	100

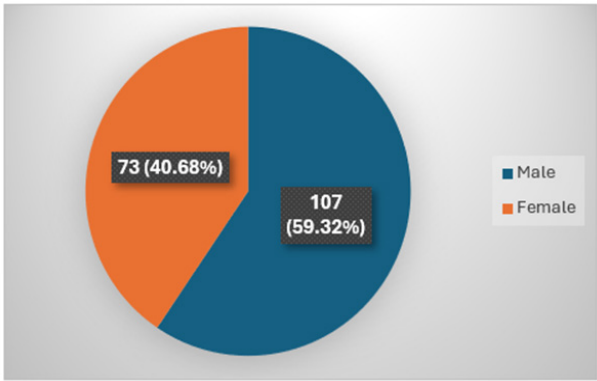


Figure 1: Gender Distribution of Study Population.

Causes of low vision

Retinal disorders were the leading causes of low vision. Retinitis pigmentosa (26.7%) and fundus dystrophy (20.0%) were the most common conditions, followed by high myopia (16.1%) and albinism (14.4%). Other causes included macular degeneration (9.5%), optic atrophy (6.1%), and miscellaneous conditions such as glaucoma, diabetic retinopathy, retinopathy of prematurity, and amblyopia (7.2%) (Table 2).

Prescribed devices and utilization

For near vision, hand-held magnifiers, dome magnifiers, and video magnifiers were prescribed, while binocular telescopes, monocular telescopes, and SeeTV devices were prescribed for distance vision. Most patients were prescribed both distance and near low-vision devices. Binocular telescopes (39.9%) and hand-held magnifiers (34.5%) were most frequently recommended.

Table 2: Causes of low vision among study participants.

Causes	Number	Percentage
Retinitis Pigmentosa	48	26.7
Fundas Dystrophy	36	20.0
High Myopia	29	16.1
Albinism	26	14.4
Macular Degeneration	17	9.5
Optic Atrophy	11	6.1
Others	13	7.2
Total	180	100

Overall, 30.5% of patients reported regular use of prescribed devices, while 69.5% did not utilize them. Utilization rates varied by device type: binocular telescopes (38.1%), monocular tele- scopes (36.7%), See TV (25.9%), hand-held magnifiers (23.3%), dome magnifiers (24.0%), and video magnifiers (14.3%) (Table 3).

Barriers to utilization

Non-utilization was primarily due to low affordability (47.8%), lack of awareness (19.4%), fear of job loss (18.3%), social stigma (11.7%), and lower priority (2.8%) (Figure 2).

Table 3: Prescribed low-vision devices and utilization rate.

Prescribed Low-Vision Devices	Number (%)	Utilization (%)	Non-Utilization (%)
Binocular Telescope	139 (39.9%)	53 (38.1%)	86 (61.9%)
Monocular Telescope	30 (8.6%)	11 (36.7%)	19 (63.3%)
See TV	27 (7.8%)	07 (25.9)	20 (74.1%)
Hand-Held Magnifier	120 (34.5%)	28 (23.3)	92 (76.7%)
Dome Magnifier	25 (7.2%)	06 (24%)	19 (76%)
Video Magnifier	7 (2.0%)	1 (14.3%)	6 (85.7%)
	348	106 (30.5%)	242 (69.5%)

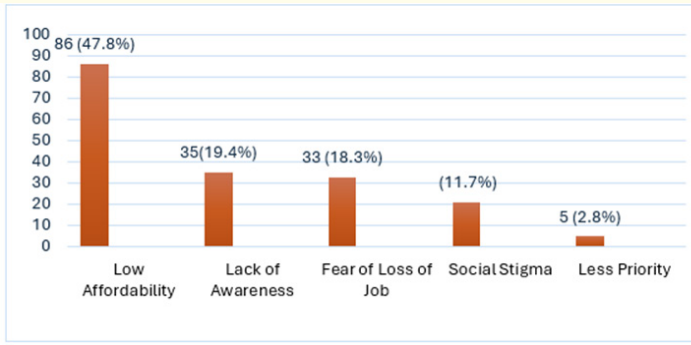


Figure 2: Causes of Non-Utilization of Low Vision Devices.

Discussion

The age distribution of this study differs from that reported in developed countries but is consistent with findings from other developing nations. Although low vision typically increases with age [8], more than half of the participants in this study (50.2%) were under 30 years old, and the vast majority (83.1%) were younger than 45 years. Only 3% were above 60 years. Similar patterns have been described in Malaysia, Korea, and India, where 74%, 69%, and 68% of patients, respectively, were under 50 years of age [9-11]. In contrast, studies in high-income countries have consistently shown that older populations are prevalent: in the UK, 77% of patients were aged 60 years or older; in Canada, 66% were 70 years or older; and in Australia, nearly 87% were 60 years or older [8,12,13]. This discrepancy likely reflects differences in population demographics, with developed countries having larger elderly populations.

The higher proportion of males in our sample (male-to-female ratio 1.45:1) is consistent with studies from Korea (1.8:1), Malaysia (2.2:1), and India (2.6:1) [9-11]. In contrast, female predominance has been reported in developed countries [8,9], suggesting that women in low- and middle-income countries may have less access to eye care services [14,15].

Retinitis pigmentosa emerged as the leading cause of low vision in this study, followed by fundus dystrophy and high myopia. This finding aligns with studies from India, where retinitis pigmentosa was also the most common cause [11], and Malaysia, where it was reported as the second most common [9]. Such differences in etiology between developing and developed countries suggest varying genetic, environmental, and healthcare factors.

The overall utilization rate of prescribed devices in this study (30.5%) was low, comparable to findings from other resource-constrained settings. Barriers included affordability, lack of awareness, fear of losing employment, social stigma, and low prioritization. Notably, 18.3% of participants reported not using devices due to fear of job loss, highlighting the socio-economic dimensions of visual disability. These findings underscore the need for increased advocacy, awareness campaigns, and the integration of low-vision care into broader healthcare and social systems.

Our results suggest that eye care professionals, including ophthalmologists, optometrists, and general practitioners, should be more proactive in identifying patients with low vision, particularly women and older adults, and ensuring timely referrals to rehabilitation services. Strengthening training and referral systems may help improve utilization and outcomes.

Conclusion

Comprehensive low-vision services require an integrated approach that encompasses referral, diagnosis, assessment, prescription, device supply, training, and patient education. Refraction remains a fundamental component of such care. This study highlights that utilization of prescribed low-vision devices in Bangladesh is low, with affordability, lack of awareness, fear of job loss, and social stigma acting as key barriers.

Collecting and analyzing clinical data on individuals with functional low vision is crucial for guiding the design of effective rehabilitation services. Reliable and up-to-date evidence will enable policymakers to strengthen low-vision programs and allocate resources more efficiently. Expanding service availability, improving referral pathways, and increasing public awareness are crucial to enhancing device utilization and alleviating the social and economic burden of low vision in Bangladesh.

Funding Statement

This research was funded by the Bangladesh Medical Research Council (BMRC).

Conflict of Interest Statement

The authors declare no conflicts of interest related to this work.

Acknowledgment

This study was supported by the Bangladesh Medical Research Council (BMRC). The authors thank the patients and caregivers for their valuable participation.

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