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Assessment of Blindness Among Women in Mumbai

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ABSTRACT:
Purpose: This cross-sectional survey study aimed to identify determinants of visual impairment and blindness among women and evaluate barriers affecting access to eye care, rehabilitation, vocational training, and supportive services in Mumbai district, Maharashtra, India. **Materials and Methods:** A survey was conducted in vocational training centers in Mumbai using the Visual Impairment-Accessibility-Factors Assessment Questionnaire (VI-A-FAQ). Data regarding demographic characteristics, education, marital and employment status, onset and causes of blindness, family and ocular history, social support, accessibility to eye care services, and awareness-related variables were collected. A total of 461 visually impaired/blind women participated in the study. **Results:** Among participants, 36% were unemployed and 59% were unmarried. Blindness since birth was reported in 71% of women, suggesting inadequate early diagnosis and intervention. Rehabilitation service utilization was poor, with only 9% attending rehabilitation training and 3% using low-vision devices. Financial dependency was highly prevalent, as 98% relied on family members or relatives for support, while only 2% received support from social workers or Non-Governmental Organization (NGOs). Educational status showed a positive association with rehabilitation service utilization and low-vision aid usage. Limited rehabilitation services, inadequate awareness, poor accessibility to assistive devices, and lack of vocational training facilities were identified as major barriers to healthcare access. **Conclusion:** Visually impaired women face substantial barriers in accessing rehabilitation and eye care services. Strengthening awareness programs, rehabilitation facilities, vocational training, and governmental support is essential to reduce healthcare inequalities and improve quality of life.

1. INTRODUCTION:
Globally, women account for 55% of blindness cases and are more likely to become blind than men due to poor healthcare access, illiteracy, unemployment, and financial dependency.[1,2] In India, women are 1.8 times more likely to experience blindness, reflecting persistent gender disparities in eye care utilization.[3-5] Despite initiatives such as National Programme for Control of Blindness and Visual Impairment (NPCB&VI) and Vision 2020,

accessibility to rehabilitation and care services remains inadequate.[6-8] Maharashtra, India's economically advanced state, provides an important setting to evaluate determinants and barriers affecting visually impaired women.

2. MATERIALS AND METHODS:

2.1 Study Population and Study Setting

The present cross-sectional study was conducted among adults with visual impairment or blindness attending vocational training programmes at nine blind organizations in Mumbai, Maharashtra, India. Data were collected from 6 September 2023 to 28 December 2025. Eligible participants from the selected organizations who met the inclusion criteria and provided written informed consent were enrolled in the study.

2.2 Ethical Considerations

The present cross-sectional study was conducted in accordance with the ethical principles of the Declaration of Helsinki (2013 revision). Ethical approval was obtained from the Institutional Ethics Committee, NIMS University, Jaipur, India (Approval No. IEC/P-178/2023; approved on 6 March 2023). Written informed consent was obtained from all participants before enrolment after explaining the objectives and procedures of the study in their preferred language.

2.3 Sample Size

As this was a preliminary pilot cross-sectional study, a formal sample size calculation was not performed. Instead, all eligible visually impaired women attending the selected vocational training centres during the study period who met the inclusion criteria and provided informed consent were consecutively interviewed. A total of 461 participants were enrolled.

2.4 Study Design

The Visual Impairment Accessibility Factors Assessment Questionnaire (VI-A-FAQ) was implemented for data collection. The VI-A-FAQ was designed based on previously identified key factors contributing to inequalities in eye healthcare access among visually impaired women. The questionnaire focused on factors such as awareness regarding eye condition, familial and social support, accessibility of healthcare and rehabilitation services, and utilization of assistive devices. The questionnaire consisted of 30 self-reported questions (Supplementary Attachment-1).

A total of 461 adults with visual impairment/blindness were interviewed using the VI-A-FAQ. Participants were selected randomly from individuals attending vocational training centers in the Mumbai district. The examiner/interviewer explained the purpose of the study and participant information sheet in English, Hindi, and Marathi languages. Written informed consent was obtained from all participants through group discussion before enrollment into the study.

The study collected information regarding demographic and socioeconomic variables, including age, gender, nationality, education, employment status, and marital status. Clinical details such as cause, onset, and treatment history of vision loss, systemic health conditions, blindness certification status, healthcare accessibility, and social support were also recorded. Educational status was categorized into five groups: no formal schooling, up to secondary school, high school completed, college completed, and above college education.

2.5 Statistical Analysis

Collected data were analyzed using Statistical Package for the Social Sciences (SPSS) software version 21 (IBM Corporation, New York, NY, USA). Data distribution and normality were assessed before analysis. Non-parametric statistical tests were applied considering the pilot nature and sample characteristics of the study. A p-value of <0.05 was considered statistically significant. Graphical representations were generated using online statistical tools available at S-DAT Statistical Tool.

3. RESULTS:

A total of 461 subjects were enrolled in the study. The age of participants ranged from 6 to 70 years, with the highest proportion belonging to the 6–19 years age group (n=169, 37%), followed by 36–49 years (n=136, 29%), 20–35 years (n=118, 26%), and 50–70 years (n=38, 8%). The mean age of participants attending blind schools and vocational training centers was 28.7 ± 14.6 years (Figure 1). The onset of blindness was most commonly

reported since birth in 327 (70.9%) participants, followed by onset before five years of age in 87 (18.9%) participants, while blindness occurring after five years of age was least common and observed in 16 (3.5%) participants. The majority of participants had total blindness (95%), whereas only 5% had low vision (Figure 2).

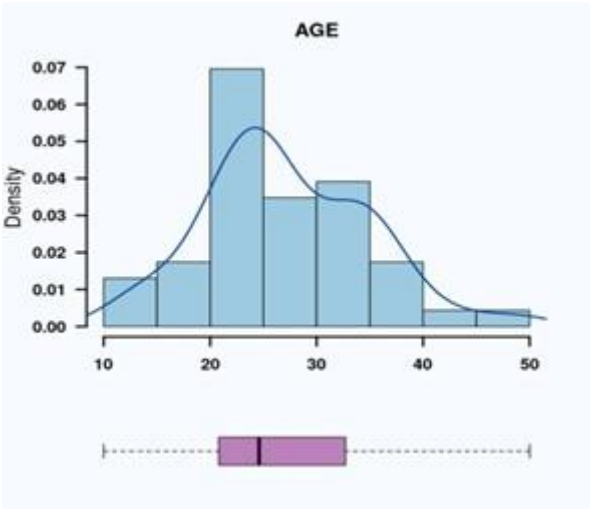

Figure 1. Distribution of Age Among Study Participants

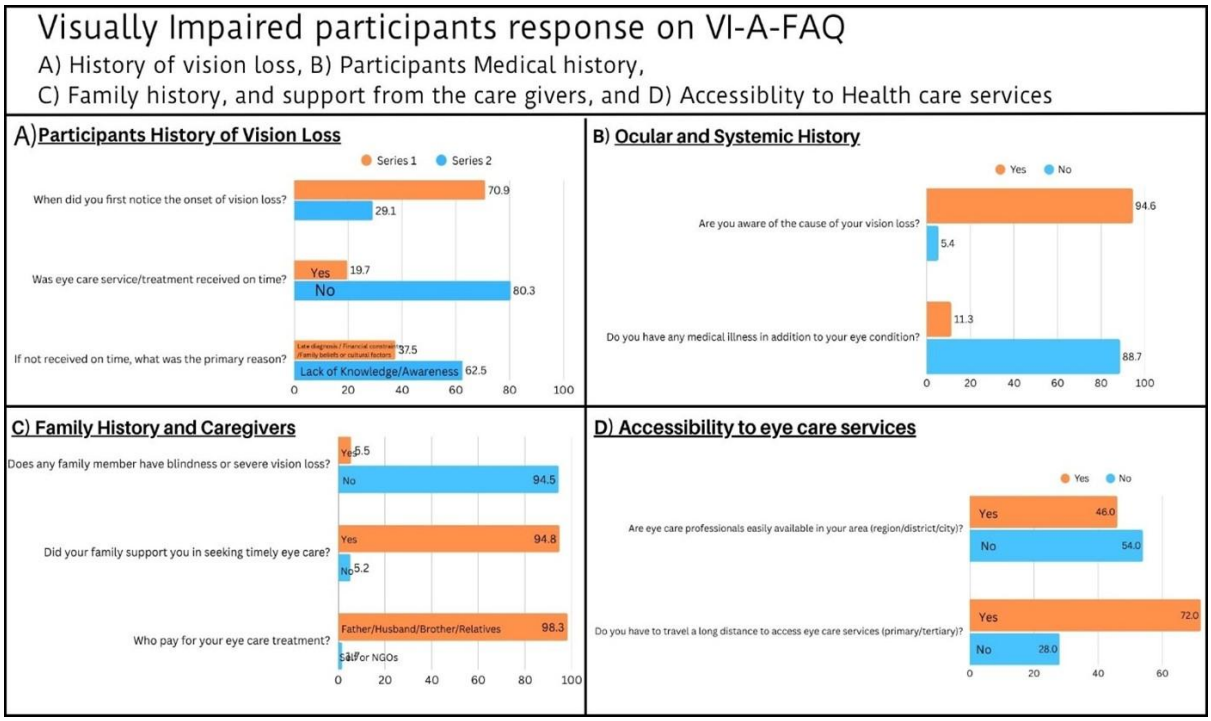

Figure 2. VI-A-FAQ Responses Among Visually Impaired Participants

Among the study participants, 185 (40.13%) women had obtained their legal blindness certificate from the Mumbai region, while 276 (59.87%) had received certification from other states of India. A large proportion of participants were unmarried (n=274, 59.43%), and 163 (35%) were unemployed. Concerning religion, the majority were Hindu (n=412, 89.37%), followed by Islamic (n=40, 8.68%) and Christian (n=4, 1%) participants attending the visited vocational training centers.

Educational status showed a significant positive association with the use of low-vision aids (P=0.050, r=0.20) and attendance at rehabilitation training/services (P=0.047, r=0.23). Employment status demonstrated a significant

association with marital status (P=0.003, r=0.43) and education level (P=0.047, r=0.31) (Figure 3). Education status distribution among participants included no formal education in 34 participants, primary schooling (1–5 standard) in 83 participants, secondary schooling (6–10 standard) in 188 participants, higher secondary education (11–12 standard) in 56 participants, bachelor's degree/diploma/technical courses in 91 participants, and master's degree education in nine participants. Rehabilitation training/services were attended by only 41 participants, while low-vision devices were used by 20 participants.

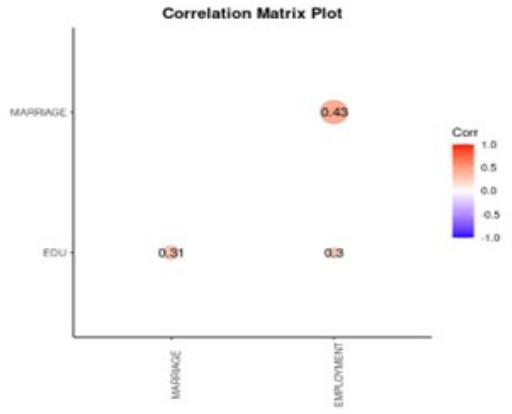

Figure 3. Correlation Plot between education level, employment, and marital status

4. DISCUSSION:

Visual impairment and blindness continue to represent major public health concerns, particularly in low- and middle-income countries, where a substantial proportion of cases are attributable to preventable or avoidable causes. Limited accessibility to eye care services, rehabilitation training, and assistive devices further contributes to the burden of visual disability in these regions. Women and the elderly population are particularly vulnerable to visual impairment, and the prevalence is expected to increase significantly by 2050 if effective interventions are not implemented.[8] The present preliminary study was conducted to explore the various factors influencing accessibility to eye care and rehabilitation services among visually impaired women in Mumbai, one of the highest gross state domestic product regions in India.

Globally, epidemiological data consistently demonstrate a higher prevalence of blindness among women. Several factors including age, illiteracy, unemployment, poor hygiene, financial dependency, and limited independent decision-making contribute to the disproportionately high burden of blindness among women. In addition, women generally have longer life expectancy, predisposing them to age-related ocular diseases such as cataract and age-related macular degeneration, which may partially explain the observed gender differences in blindness prevalence.

In the present study, the majority of participants had total blindness, were unmarried, unemployed, and had education below the higher secondary level. A large proportion of participants also belonged to districts outside Mumbai and other regions of Maharashtra. These findings highlight the need for improved awareness regarding eye health, blindness-related disorders, rehabilitation services, and healthcare accessibility among visually impaired women. The study further emphasizes the persistence of gender-based inequalities within the healthcare and eye care delivery systems.

The largest proportion of participants belonged to the 20–35 years age group, and blindness since birth was the most commonly reported onset pattern. Corneal opacity, optic atrophy, and retinitis pigmentosa were among the frequently reported causes of visual impairment. Similar findings were reported by Sohil PS et al.,[9] who emphasized the need for targeted intervention programs and support centers for visually impaired individuals to improve social inclusion and quality of life.

Blindness certification provides important information regarding access to healthcare benefits, rehabilitation services, and demographic trends associated with visual impairment.[10] Previous studies have demonstrated that

men are more likely to utilize blindness-related benefits compared to women.[11] In the present study, most participants possessed blindness certification; however, nearly 70% had obtained certification from regions outside Maharashtra. This finding may reflect inadequate awareness regarding available services, poor accessibility to certification centers, or insufficient rehabilitation facilities within the state. These issues require further investigation and strengthening through coordinated governmental and non-governmental initiatives aimed at improving systematic eye care and rehabilitation services.

The findings also revealed poor utilization of rehabilitation training and low-vision assistive devices among participants. A considerable proportion of women had not attended rehabilitation training programs, thereby limiting opportunities for independence and improved quality of life. Educational attainment among participants varied substantially, with many women having education below secondary school level. These findings indicate the need for tailored educational interventions, accessible learning materials, and inclusive educational methods to ensure equal opportunities for visually impaired individuals across different educational backgrounds. Furthermore, the availability and affordability of rehabilitation services and assistive devices remain unevenly distributed across the country and require improved regulation and community-level awareness programs.[12]
The present study demonstrated significant associations between employment status, educational level, and marital status, as illustrated in Figure 3. These findings underscore the importance of education and rehabilitation training beginning at the household and community levels. The use of sustainable technologies and digital innovations may facilitate improved accessibility, employment generation, and independent living opportunities for visually impaired women.[13-16] In the current era of digital transformation and artificial intelligence, creation of remote and community-based employment opportunities appears increasingly feasible. Government agencies, non-governmental organizations, and private sector institutions should actively disseminate information regarding employment opportunities and support schemes through blindness certification systems and community outreach programs.[17-19]

The present study has several limitations. Being a preliminary pilot study, the sample size was relatively small and limited to women attending vocational training centers in a metropolitan region, thereby restricting the generalizability of the findings. However, conducting the survey within training centers may have provided a more independent and supportive environment for participants to express their responses without familial influence or hesitation. Since participants were already enrolled in training centers, educational and skill levels may have been overestimated compared to the general visually impaired population. Despite this, the study still demonstrated inadequate employment opportunities, low rehabilitation service utilization, poor awareness regarding health conditions, and limited prioritization of eye care services among participants.

Future studies should involve larger populations and broader geographic representation to further explore determinants such as socioeconomic status, familial consanguinity, educational awareness, vocational guidance, household management training, and accessibility to digital and innovative support services. Collaboration between training institutions, healthcare providers, Non-Governmental Organizations, and rehabilitation centers may substantially improve the quality of life and social inclusion of visually impaired women. Based on the findings of this pilot study, further implementation and expansion of the VI-A-FAQ tool has been planned for subsequent versions of the study.

5. CONCLUSION:

Blindness remains a significant public health problem worldwide, particularly among women in developing countries such as India. The present study highlights the important role of education, employment, awareness regarding eye health, and accessibility to rehabilitation and eye care services in determining the quality of life of visually impaired women. The findings from the VI-A-FAQ survey indicate that lack of vocational skills, inadequate rehabilitation facilities, poor awareness regarding available opportunities and healthcare services, low socioeconomic status, and limited knowledge about ocular and familial health conditions are major factors restricting access to essential care services among visually impaired women.

The study also demonstrated that financial dependency on family members for accessing rehabilitation training, vocational education, and essential household management skills acts as a major socioeconomic barrier. These findings emphasize the need for stronger support systems and policy-level interventions from governmental agencies, non-governmental organizations, and healthcare providers to improve accessibility to supportive services for visually impaired women. Furthermore, the study highlights the importance of establishing an

integrated chain-link system connecting training centers, eye care professionals, rehabilitation providers, and employment sectors to enhance social inclusion, independent living, and employment opportunities for the visually impaired population.

The VI-A-FAQ may serve as a useful rapid screening tool for large-scale public health studies aimed at identifying barriers related to accessibility of eye care and rehabilitation services. Strengthening awareness programs, improving rehabilitation infrastructure, and expanding employment opportunities may significantly improve the social well-being and quality of life of visually impaired women.

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SUPPLEMENT MATERIAL: Supplement-1, VI-A-FAQ_V1

DECLARATION OF CONFLICTING INTEREST:
The Authors declare no conflict of interest.

AUTHORS' CONTRIBUTIONS
YRG conceived the idea of this study, reviewed the literature, designed the study and VI-A-FAQ, and wrote the initial draft of the manuscript. PS contributed to the analysis and writing of the manuscript. NM and ST contributed in review of the manuscript. All Authors approved the final version of the manuscript.

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REFERENCE:
1. Abou-Gareeb I, Lewallen S, Bassett K, Courtright P. Gender and blindness: a meta-analysis of population-based prevalence surveys. Ophthalmic Epidemiol. 2001 Jan 1;8(1):39-56.
2. Doyal L, Das-Bhaumik RG. Sex, gender and blindness: a new framework for equity. BMJ Open Ophthalmol. 2018 Sep 1;3(1).
3. Murthy GV, Pant MH, Bandyopadhyay MS, John N. Trends in gender and blindness in India. Community Eye Health. 2017 Feb 10;29(95):S04.
4. Prasad M, Malhotra S, Kalaivani M, Vashist P, Gupta SK. Gender differences in blindness, cataract blindness and cataract surgical coverage in India: a systematic review and meta-analysis. Br J Ophthalmol. 2020 Feb 1;104(2):220-4.
5. Singh S, Rajak B, Dehury RK, Mathur S, Samal A. Differential access of healthcare services and its impact on women in India: a systematic literature review. SN Soc Sci. 2023 Jan 13;3(1):16.
6. Vashist P, Senjam SS, Gupta V, Gupta N, Shamanna BR, Wadhwani M, et al. Blindness and visual impairment and their causes in India: Results of a nationally representative survey. PLoS One. 2022 Jul 21;17(7):e0271736.
7. Stern J, Yasmin S, Qureshi MB, Bourne R. 2030 In Sight: the future of global eye health. Eye. 2024 Aug;38(11):1979-80.
8. Bourne R, Steinmetz JD, Flaxman S, Briant PS, Taylor HR, Resnikoff S, et al. Trends in prevalence of blindness and distance and near vision impairment over 30 years: an analysis for the Global Burden of Disease Study. Lancet Glob Health. 2021 Feb 1;9(2):e130-43.
9. Sohil PS, Mahajan SA, Vaidya SM, Deshmukh RB, Adhya S, Sohil Jr PS, et al. Prevalence of Vision Problems and Associated Risk Factors Among Secondary Government School Girls: A Descriptive Cross-Sectional Study in Western Maharashtra, India. Cureus. 2025 Jul 4;17(7).
10. Ambastha A, Kusumesh R, Sinha S, Sinha BP, Bhasker G. Causes of visual impairment in applications for blindness certificates in a tertiary center of Bihar and its role in health planning. Indian J Ophthalmol. 2019 Feb 1;67(2):204-8.
11. Siddegowda S, Venkataramana PA, Ramamurthy MT, Shiveshi P. A study to evaluate the cause of blindness/low vision among certified visually disabled individuals in Mandya district of Karnataka. Indian Journal of Clinical and Experimental Ophthalmology. 2016 Jul;2(3):238-41.
12. Kumar DN, Kumar P, Rawat JS. Education of persons with visual disabilities in India. International Journal of Development Research. 2017 Aug 7;7(8):14757-61.
13. Alves CC, Monteiro GB, Rabello S, Gasparetto ME, Carvalho KM. Assistive technology applied to education of students with visual impairment. Revista Panamericana de Salud Pública. 2009 Aug;26(2):148-52.
14. Suherman YU, Juhanaini J, Maryanti RI, Rochyadi EN. Innovation of" Braille Corner" Digital Learning Based On Learning For The Students With Visual Impairment In Inclusion Settings. Journal of Engineering Science and Technology. 2022 Dec;17(6):4253-65.
15. Metatla O, Serrano M, Jouffrais C, Thieme A, Kane S, Branham S, et al. Inclusive education technologies: Emerging opportunities for people with visual impairments. InExtended abstracts of the 2018 CHI conference on human factors in computing systems. 2018:1-8.
16. Kharade K, Peese H. Learning by E-learning for visually impaired students: Opportunities or again marginalisation?. E-learning and Digital Media. 2012 Dec;9(4):439-48.
17. Ghapar AA, Azman F, Faudzi MA, Baskaran H, Rahim FA. Job Opportunities Recommendation for Visually Impaired People Using Natural Language Processing. J Theor Appl Inf Technol. 2022 Jan 31;100(2).
18. Candela AR, Wolffe K. The employment consortium: An innovative approach to assisting blind and visually impaired people to find jobs. J Vis Impair Blind 2001 Aug;95(8):494-7.

19. Yeh FH, Yang CC. Assisting the visually impaired to deal with telephone interview jobs using information and commutation technology. Res Dev Disabil. 2014 Dec 1;35(12):3462-8.