ORIGINAL ARTICLE

Unseen Challenges: Presbyopia in Free Eye Camp

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Abstract:

Objectives: Free eye camps were conducted to find the magnitude, gender distribution and age of onset of presbyopia in the underserved communities.

Methods: Cross sectional study was conducted in 17 free eye camps in Peshawar District during 2016-2020. Those aged ≥30 years and with visual acuity (VA) of 6/6 to 6/12 at distance who complained of near vision problems were included. Presbyopia defined as the inability to read at N4 corrected with at least +1.0 D lens. Snellen chart was used to assess visual acuity and retinoscopy was used for the assessment of refraction. Data collected were analyzed descriptively and by using chi-square tests in the Statistical Package for the Social Sciences (SPSS) version 22.

Results: Of 10,983 patients examined, 1,867 (17.0%) were presbyopic. Females accounted for 61.0% and males 39.0% (ratio 1:1.56). The highest prevalence was seen in the age group of 35-40 years, which was prior to the global averages. Patients aged 56-60 were most affected, up to +2.50 required to correct near vision. There was a statistically significant association found between age group and gender ($\chi^2 = 38.09$, $p < 0.001$).

Conclusions: The prevalence of presbyopia is high in the rural communities and onset of presbyopia occurs at an earlier age and is more of a burden for females. Free eye camps successfully meet unmet needs and, especially, the needs of women who are excluded from hospital based care. There is a high need for sustainable outreach and incorporation of presbyopia in national vision care planning. *Al-Shifa Journal of Ophthalmology 2026; 22(1): 56-62.*

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Introduction:

Presbyopia, which is a loss of lens accommodation, usually occurs after the age of 40, and can present as problems with close-up vision like reading or sewing[1-3]. It is a condition caused by progressive changes of the crystalline lens, zonules and ciliary body that impact the eye's ability to focus on close objects[4]. Hofstetter's formulas illustrate what happens to the amplitude of accommodation as a person ages, from about 20 D at birth to less than 1 D by age 60 [4].

In 2015, 1.8 billion people in the world were afflicted with presbyopia, and by 2030, this number is projected to increase to 2.1 billion[5]. This burden is especially severe in low income countries (LIC) where 94% (26 of 28) people with profound near vision disability are uncorrected[6]. There are geographical variations, ranging from 43.8% in Japan to 88.9% in the USA, and highest prevalence reported was 90% in Nicaragua[7]. The prevalence of hepatitis B

infection has been reported in Pakistan as 57.5% [8]. The challenges to correction are low availability of eye care services, especially in rural areas, where it is more prevalent; low awareness and poor affordability[9,10].

The WHO's Vision 2020 aimed at eliminating avoidable blindness, highlighting the fact that 75% of all blindness in the world is in the poorer countries[11]. Free eye camps have always been an important part of eye care services in Pakistan and South Asia in reaching people with limited access to eye care services[12,13]. However, with the limited resources of the national health care systems allocated to eye care, these outreach efforts continue to be vital.

This study aimed to determine the prevalence of presbyopia, evaluate its distribution across genders, and identify the age at onset among individuals attending free eye camps in District Peshawar.

Methodology:

This was a cross sectional study carried out in 17 free eye camps, which were organized in District Peshawar, Khyber Pakhtunkhwa from 09/2016 to 01/2020. The Government National Program for the Prevention and Control of Blindness had been put in place by arranging camps with Lions Club International and Pakistan Institute of Community Ophthalmology (PICO).

Enrollment of participants was through consecutive sampling. The following inclusion criteria were used: Distance VA 6/6-6/12 (WHO classification); age ≥30 years. Presbyopia is when a person cannot read N4 optotypes at 40 cm corrected +1.0D or higher. The following patients were excluded in this study: diabetes, pseudophakia, patients with diabetes who did not understand the near chart, and patients who have other eye diseases that affect their near vision.Patients with diabetes, pseudophaks, diseases that impaired close-up vision and patients who did not wish to be included were excluded from the study.

Snellen chart was used to assess visual acuity. The refraction was carried out by trained optometrists and the near vision spectacles had to be given immediately following the refraction. The rest of the patients with ophthalmic diseases received treatment on-site or referred to Hayatabad Medical Complex.

Permission for all camps and the study was obtained from the medical director of Hayatabad Medical Complex, provincial health authorities, and local administration. Descriptive statistics summarized demographic and clinical characteristics. Near vision before and after correction was recorded. A chi-square test examined the association between age group and gender. Data were analyzed using SPSS version 22.

Results:

Of 10,983 patients examined, 1,867 (17.0%) met the criteria for presbyopia. Among these, 1,139 (61.0%) were female and 728 (39.0%) were male (ratio 1:1.56).

Table 1. Distribution of patients attending the free eye camps

Categories	Male n (%)	Female n (%)	Total n (%)
Children <18 years	651 (5.92)	994 (9.05)	1655 (15.07)
Adults ≥18 years	3743 (34.07)	5595 (50.94)	9338 (84.49)
Total	4394 (40.0)	6589 (60.0)	10,983 (100)

Table 1 shows the total number of patients (adults and children) who attended the eye camps.

Table 2. Age distribution of enrolled presbyopic patients by gender

Age groups (years)	Male (n)	Female (n)	Total (n)
35–40	174	298	472
41–45	108	211	319
46–50	121	186	307
51–55	150	278	428
56–60	175	166	341
Total	728	1,139	1,867

Table 2 shows the age distribution of male and female patients enrolled in the study.

Table 3. Near vision before and after correction among presbyopic patients

Age groups (years)	Male (n)	Female (n)	Total (n)	Near vision before correction (target size)	Lens power (D)	Near vision after correction (target size)
35–40	174	298	472	< 6–8	+1.00	6
41–45	108	211	319	< 10	+1.25	6
46–50	121	186	307	< 12	+1.50	6
51–55	150	278	428	< 14	+2.00	6
56–60	175	166	341	< 18	+2.50	6
Total	728	1,139	1,867	—	—	—

Table 3 shows patients near vision before and after correction, measured with the Snellen chart, for both male and female participants.

Table 4. Chi-square test of association between age group and gender among presbyopic patients

Statistic	Value	df	Sig. (p-value)
Pearson Chi-Square	38.087	4	<0.001
Likelihood Ratio	36.108	4	<0.001
Linear-by-Linear Association	14.328	1	<0.001
N of Valid Cases	1867	—	—

Table 4 shows that the chi-square test demonstrated a statistically significant association between age group and gender among presbyopic patients ($\chi^2 = 38.09$, $df = 4$, $p < 0.001$).

Discussion:

Uncorrected presbyopia can negatively impact quality of life, affecting productivity, mental well-being, and daily activities. Economic burden: The condition, especially when uncorrected, leads to significant productivity losses worldwide. Our study shows (Table 1) that a large number of people in the community are unable to access hospital-based eye care services. Many welfare organizations, such as Layton Rahmatulla Benevolent Trust (LRBT), Al-Shifa Eye Trust Hospital, Al-Mustafa Welfare Trust, and the Prevention of Blindness Trust (POBT), have also reported a high number of patients examined through free eye camps. The LRBT alone reported 2.9 million numbers of patients in their Annual Review/Annual Report 2017[14]. The high turnout (presbyopic and eye disease patients) in our eye camps reflects the effective coverage of underprivileged community members who are unable to utilize hospital services, which may be due to poverty and poor accessibility.

The age of participants presenting with symptoms of presbyopia in our study ranged from 35 to 60 years. We observed the development of presbyopia at an earlier age compared to other studies, which generally report onset at 40 years and above. The onset of presbyopia symptoms is typically around 40 years in Western societies, while earlier onset has been observed in countries closer to the equator, such as those in Central and South America [15]. The reason for this earlier or before 40 years of onset of presbyopia in central/ south American countries was presumed to it may be because of premature degradation of the crystalline lens which may be caused by ultraviolet radiation exposure[16]. In our rural communities, outdoor activities and sun exposure are more frequent than in Western societies. Therefore, early onset of presbyopia among both men and women in our population may be linked to UV-induced lens changes. Additionally, Jonathan S. Pointer's study on presbyopia reported that presbyopia tends to occur earlier in women than in men, possibly due to hormonal differences [17]. Individuals in rural areas often spend more time outdoors and have little engagement in near-work activities, such as reading or sewing, which are common among literate populations. Jonathan S.Pointer studied presbyopia and reported that with increasing age, the power of lenses increases, and there are gender differences in optical changes of the onset of presbyopia [17]. Another reason may be that these people in their childhood may have spent more time in outdoor activities and have no interest in reading(illiterate)or near work activities like reading, playing games on a computer or mobile, which leads to preventing myopia development in childhood. The Beijing Children Eye Study on myopia development, Wu, P. C., Tsai, C. L., Wu, H. L., et al and Read S.A. reported that children who spent more time in outdoor activities will be having less chance of developing myopia as compared to those who spent more time in indoor activities[18-20] and thus these changes in lens, size of eyeball, and outdoor activities may lead to early onset of presbyopia.

Reading glasses were prescribed based on appropriate refraction for near vision. The severity of presbyopia increased with age, and the number of early presbyopic subjects (aged 35–40 years) was higher than those aged 55–60 years. The dioptric power of near-vision correction most commonly prescribed ranged between +1.00 and +2.50 diopters (Table 3). Other studies have similarly reported the distribution of a large number of reading glasses among underprivileged communities. Jerry Vincent et al. reported that among adult refugees on the Thailand–Burma border, 84% of the 7,219 distributed glasses were for presbyopia[21]. As age increased, the required dioptric power for near correction also increased. In our study, individuals requiring +2.50 diopters for near vision were functionally blind for near tasks. Other research also indicates that with increasing age, both the severity and

prevalence of presbyopia increase, affecting up to approximately 85% of individuals aged 40 years and older. Presbyopia prevalence is greater in regions with longer life expectancies. Without optical correction, presbyopia negatively impacts daily life, leading to difficulties such as inability to read fine print, need for increased lighting, diplopia, epiphora, headaches, eye fatigue, and asthenopia, as well as problems performing tasks like threading a needle or viewing fine details [22]. However, appropriate visual correction can greatly improve productivity and quality of life[23].

Gender differences were also observed in our free eye camps, with a male-to-female ratio of 1:1.4. Female participants (60%) outnumbered males (40%) in both children and adults (Tables 1 and 3). Other free eye camps in Pakistan have similarly reported that about two-thirds of participants were female [24]. Research conducted in India, Tanzania, southwestern Uganda, Ghana, and Zanzibar reported presbyopia prevalence rates of 55.3%, 61.7%, 48%, 65%, and 89.24%, respectively, with women demonstrating a higher prevalence compared to men[25]. Furthermore, women aged over 40 years have consistently exhibited greater rates of presbyopia than their male counterparts within the same age category[26].

Jayaraman, R., Ray, D. B., & Wang, S.-Y Studies show that hospital visits among women are fewer than among men [27], yet in free eye camps, female participation is higher. We observed that many women were using the glasses of their husbands or other family members to manage daily tasks, while others had stopped sewing often their main source of income due to poor near vision.

Several factors may explain the higher number of female participants in our camps. First, women may not be given importance by male family members to be taken to hospitals for proper refraction and spectacles. Second, domestic responsibilities and mobility restrictions prevent them from visiting health centers independently. Third, they may tolerate visual problems until they become severe. When eye camps are organized near their homes, women can overcome these barriers and access services easily. Financial constraints may also limit access to hospital-based eye care, as economic status strongly influences frequency of eye care utilization and spectacle use among presbyopes. Another possible factor is the social stigma associated with wearing glasses, leading women to hide symptoms and delay care until free services are available. Women may also seek correction only when visual impairment begins to interfere with tasks requiring near vision, such as sewing or reading. The greater demand for presbyopia correction among women may be associated with variations in daily visual tasks and preferred working distances, rather than inherent physiological differences in accommodative function [28]. It is evident that women are more neglected in terms of vision care. With presbyopic correction, many were able to resume their income-generating and religious activities such as sewing, tailoring, and Quran recitation, as well as other near-vision tasks necessary for daily life.

Conclusion:

Presbyopia is highly prevalent in underserved communities, with earlier onset and greater burden among females. Free eye camps provide effective correction and highlight the importance of outreach programs in addressing inequities in eye care.

References:

1. Wade NJ. A natural history of vision. Cambridge (MA): MIT Press; 2000.
2. Khurana AK. Asthenopia, anomalies of accommodation and convergence. In: Khurana AK. Theory and practice of optics and refraction. 2nd ed. New Delhi: Elsevier; 2008. p.100–107.

3. Rutstein RP, Daum KM. Anomalies of binocular vision: diagnosis and management. St. Louis: Mosby; 1998.
4. Fricke TR, Tahhan N, Resnikoff S, Papas E, Burnett A, Ho SM, et al. Global prevalence of presbyopia and vision impairment from uncorrected presbyopia. Ophthalmology. 2018;125(10):1492–1499. doi:10.1016/j.ophtha.2018.04.013.
5. Chan VF, MacKenzie GE, Kassalow J, Gudwin E, Congdon N. Impact of presbyopia and its correction in low- and middle-income countries. Asia Pac J Ophthalmol. 2018;7(6):370–374. doi:10.22608/APO.2018449.
6. Gajapati CV, Pradeep A, Kakhandaki A, Praveenchandra R, Rao S. Awareness of presbyopia among rural female population in North Karnataka. J Clin Diagn Res. 2017;11(9):NC01–NC04. doi:10.7860/JCDR/2017/26125.10608.
7. Goertz AD, Stewart WC, Burns WR, Stewart JA, Nelson LA. Review of the impact of presbyopia on quality of life in the developing and developed world. Acta Ophthalmol. 2014;92(6):497–500. doi:10.1111/aos.12308.
8. Hookway LA, Frazier M, Rivera N, Ramson P, Carballo L, Naidoo K. Population-based study of presbyopia in Nicaragua. Clin Exp Optom. 2016;99(6):559–563. doi:10.1111/cxo.12402.
9. Abdullah AS, Jadoon MZ, Akram M, Awan ZH, Azam M, Safdar M, et al. Prevalence of uncorrected refractive errors in adults aged 30 years and above in a rural population in Pakistan. J Ayub Med Coll Abbottabad. 2015;27(1):8–12.
10. Dineen B, Bourne RRA, Jadoon Z, Shah SP, Khan MA, Foster A, et al. Causes of blindness and visual impairment in Pakistan: The Pakistan National Blindness and Visual Impairment Survey. Br J Ophthalmol. 2007;91(8):1005–1010.
11. David G, Pedrigi RM, Humphrey J. Accommodation of the human lens capsule using a finite element model based on nonlinear regionally anisotropic biomembranes. Comput Methods Biomech Biomed Engin. 2017;20(3):302–307. doi:10.1080/10255842.2016.1228907.
12. Venkataswamy G. Massive eye relief project in India. Am J Ophthalmol. 1975;79(1):135–140.
13. Bourne R, Dineen B, Jadoon Z, Lee PS, Khan A, Joson GJ, et al. The Pakistan National Blindness and Visual Impairment Survey: research design, eye examination methodology, and results of the pilot study. Ophthalmic Epidemiol. 2005;12(5):321–333.
14. Layton Rahmatullah Benevolent Trust. Annual report 2017. Karachi: LRBT; 2017.
15. Carlson NB, Denial OA. Hyperopia and presbyopia: a teaching case report. Optom Educ. 2017;42(3):78–82.
16. Sliney DH. Geometrical gradients in the distribution of temperature and absorbed ultraviolet radiation in ocular tissues. Dev Ophthalmol. 2002;35:40–59.
17. Pointer JS. The presbyopic add II: age-related trend and gender difference. Ophthalmic Physiol Opt. 1995;15(3):241–248.
18. Guo Y, Liu LJ, Tang P, et al. Outdoor activity and myopia progression in a 4-year follow-up of Chinese primary schoolchildren: the Beijing Children Eye Study. PLoS One. 2017;12:e0175921.
19. Wu PC, Tsai CL, Wu HL, et al. Outdoor activity during class recess reduces myopia onset and its progression in school children. Ophthalmology. 2013;120:1080–1085.
20. Read SA, Collins MJ, Vincent SJ. Light exposure and physical activity in myopic and emmetropic children. Optom Vis Sci. 2014;91:330–341.
21. Vincent JE. Simple spectacles for adult refugees on the Thailand–Burma

border. Optom Vis Sci. 2006;83:803–810.
22. American Optometric Association. Optometric clinical practice guideline: care of the patient with presbyopia. St. Louis: American Optometric Association; 2011.
23. Reddy PA, Congdon N, MacKenzie G, et al. Effect of providing near glasses on productivity among rural Indian tea workers with presbyopia (PROSPER): a randomised trial. Lancet Glob Health. 2018;6(9):e1019–e1027.
24. Anjuman-e-Behbood-e-Mareezan. 42nd Free Eye Camp statistics 2015. Lahore: ABM; 2015.
25. Weale RA. Epidemiology of refractive errors and presbyopia. Surv Ophthalmol. 2003;48:515–543.
26. Hickenbotham A, Roorda A, Steinmaus C, Glasser A. Meta-analysis of sex differences in presbyopia. Invest Ophthalmol Vis Sci. 2012;53(6):3215–3220. doi:10.1167/iovs.12-9791.
27. Jayaraman R, Ray DB, Wang SY. Gender differentials in eye care: access and treatment. London: International Growth Centre; 2013.
28. Hickenbotham A, Roorda A, Steinmaus C, Glasser A. Meta-analysis of sex differences in presbyopia. Invest Ophthalmol Vis Sci. 2012;53(6):3215–3220. doi:10.1167/iovs.12-9791.

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