

Demographic and Clinical Profile of Presbyopia in a Tertiary Care Centre

Vabita Bhagat¹, Anu Radha Bharti², Pallavi Sharma³, Sachit Mahajan^{4*}

¹Senior Resident, Department of Ophthalmology, Government Medical College, Kathua, Jammu and Kashmir, India

²Senior Resident, Upgraded Department of Ophthalmology, Government Medical College, Jammu, Jammu and Kashmir, India

³Senior Resident, Upgraded Department of Ophthalmology, Government Medical College, Jammu, Jammu and Kashmir, India

⁴Senior Resident, Upgraded Department of Ophthalmology, Government Medical College, Jammu, Jammu and Kashmir, India

Received: 13-11-2021 / Revised: 24-12-2021 / Accepted: 15-01-2022

Abstract

Introduction: Presbyopia is an age related loss of accommodative amplitude leading to difficulty with near vision and near work. The onset of presbyopia occurs around 40-45 years of age in most individuals. It may lead to difficulty in performing various tasks of daily routine. Keeping in view the high prevalence of uncorrected presbyopia, this study was conceptualized to study the demographic profile of presbyopia, in order to create awareness among the general population, which would help us in managing this condition, more effectively. **Material and methods:** This observational, cross-sectional study was carried out among 500 patients who presented to out-patient clinics. Detailed medical history and ocular examination was done. Distance visual acuity was recorded with Snellen chart and near vision with Jagger's chart. All data was entered in Microsoft excel and subsequently analyzed with OpenEpi software version 3. **Results:** The prevalence of presbyopia was 22.8% with mean age of 52.17±9.52 years and age range of 32- 60 years. Females were more commonly affected (75.44%) as compared to males. Most of the patients presented with difficulty in near vision (69.29%) and were emmetropic for distance vision (63.15%). Maximum patients were literate (80.7%). Homemakers and office-worker seek medical advice earlier as compared to others. **Conclusions:** Females were more commonly affected and had younger onset of presbyopia as compared to males. Hypermetropia was more commonly associated with presbyopia as compared to myopia.

Key words: Presbyopia; Myopia; Hypermetropia; Eye glasses.

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

Presbyopia is an age related loss of accommodative amplitude leading to difficulty with near vision and near work[1]. The changes in the accommodative amplitude occur due to changes in ciliary muscle, lens zonules and its capsule and vitreous. The onset of presbyopia occurs at around 40-45 years of age in most individuals, although variations occur[2,3]. Majority of patients with presbyopia complaint of blurring of vision at near, especially in reduced illumination. Presbyopia makes an excessive effort to see clearly at the normal reading and working distance leading to eye strain and headache[3]. Uncorrected near vision may lead to difficulty in performing various tasks of daily routine like reading newspaper, seeing mobile numbers, sewing, sorting rice and winnowing grain. Presbyopia can be treated by simple refraction and prescription of spectacles, although newer methods like contact lens and accommodative intra-ocular lens make the patient spectacle independent[4,5]. Prescribed spectacles need to be changed regularly between 40-60 years of age as flexibility of crystalline lens, to alter its shape during accommodation, decreases with advancing age[3].

Population based surveys have estimated that 1.04 billion people are affected by presbyopia, globally, with 517 million patients having inadequate spectacle correction[6].

Studies from Tanzania, South India, Brazil and Iran have shown that prevalence of presbyopia is around 62%, 55.3%, 54.7% and 58.2% respectively[4,7-9]. Despite the high prevalence of presbyopia and its easy treatment, it is not given due recognition as a cause of visual impairment, as definitions of visual impairment do not take into account the near vision[4]. Keeping in view the high prevalence of uncorrected presbyopia, specially among the rural population, this study was conceptualized to study the demographic and clinical profile of patients with presbyopia, in order to create awareness among the general population, which would help us in managing this condition, more effectively.

Material and Methods

This observational, cross-sectional study was carried out over period of six months from June 2019 to December 2019 in a tertiary care teaching hospital in North India after obtaining clearance from Institutional Ethics Committee.

This study included 500 patients who attended eye out-patient clinics. Patients who fulfilled the following criteria were included in the study and a written informed consent was taken from all the study participants after explaining the purpose of the study.

Inclusion criteria

Patients above 30 years of age of either sex. (Patients less than 45 years of age were also included in order to study the younger onset presbyopia)

Exclusion criteria

1. Patients who have undergone cataract surgery in either eye.

*Correspondence

Dr. Sachit Mahajan

Senior Resident, Upgraded Department of Ophthalmology, Government Medical College, Jammu, Jammu and Kashmir, India.

E-mail: mahajansachit1992@gmail.com

2. Patients having ocular diseases like cataract, glaucoma, age related macular degeneration, macular edema.
3. Patients having decreased visual acuity <6/12 without any justifying cause.

The sample size of 380 was calculated with 5% absolute precision and effect size of 1 (confidence level 95%), using anticipated prevalence of 55.3%, according to study conducted in South India.⁴ Sample size of 500 patients was taken with adjustment of 20%. Detailed history regarding ocular symptoms was taken. Distance visual acuity was

recorded with Snellen chart and near vision with Jaeger’s chart. Inability to read N8 letter line at 40 cm was taken as presbyopia. Refraction was done by senior optometrist. All the patients were given questionnaires regarding their age, gender, residence, religion, literacy levels and occupation. All the data was entered into Microsoft excel and subsequently expressed as percentages and proportions. Data was analyzed with Open Epi software version 3 using Fisher exact test. p value <0.05 was considered as statistically significant. All p values used were two-tailed.

Results

Out of 500 patients included in our study, 114 patients met the criteria from presbyopia. The prevalence of presbyopia was 22.8% (CI 19.34-26.68). The socio-demographic profile of patients with presbyopia is shown in table 1.

Table 1 : Socio-demographic profile of patients with presbyopia

Age	Males	Females	Total
30- 40 years	3 (2.6%)	16 (14.03%)	19 (16.7%)
41-50 years	17 (14.91%)	55 (48.24%)	72 (63.15%)
51-60 years	8 (7.01%)	15 (13.15%)	23 (20.17%)
Total	28 (24.56%)	86 (75.44%)	114 (100%)
Residence	Males	Females	Total
Urban	16 (14.03%)	41 (35.96%)	57 (50%)
Rural	12 (10.5%)	45 (39.47%)	57 (50%)
Literacy level	Males	Females	Total
Literate	26 (22.8%)	66 (57.9%)	92 (80.70%)
Illiterate	2 (1.7%)	20 (17.54%)	22 (19.30 %)
Occupation	Males	Females	Total
Office worker	16 (14.04%)	11 (9.64%)	27 (23.68%)
Laborer	3 (2.63%)	1 (0.87%)	4 (3.50%)
Farmer	5 (4.3%)	0	5 (4.3%)
Homemaker	0	63 (55.26%)	63 (55.26%)
Skilled worker	3 (2.63%)	11 (9.6%)	14 (12.28%)
Business	1 (0.87%)	0	1 (0.87%)
Religion	Males	Females	Total
Hindu	15 (13.15%)	44 (38.59%)	59 (51.75%)
Muslim	8 (7.01%)	23 (20.17%)	31 (27.19%)
Sikh	4 (3.50%)	19 (16.67%)	23 (20.17%)
Christian	1 (0.8%)	0	1 (0.8%)

Table 2: Socio-economic status as determinant of socio-demographic profile of patients with presebyopia

Socio-economic status (Udai-Pareekh scale)*	n	percentage	Socio-economic status (Kuppuswami scale)**	n	percentage
Upper Class	05	4.38	Upper (I)	05	4.38%
Upper Middle Class	15	13.15	Upper Middle (II)	22	19.29%
Middle Class	23	20.17	Lower Middle (III)	16	14.03%
Lower Middle class	11	9.64	Upper Lower (IV)	12	10.52%
Lower Class	03	2.63	Lower (V)	02	1.75%
Total	57	50%	Total	57	50%

*= Udai Pareekh scale for Rural Patients, **= Kuppuswami scale for Urban patients

The mean age of patients with presbyopia was 52.17±9.52 years with an age range of 32- 60 years. Females were more commonly affected by uncorrected presbyopia, with female to male ratio of 3.07:1. In addition to this, females also had a younger onset of presbyopia, with 16 females (14.03%) developing presbyopia before 40 years of age. Equal number of patients belonged to rural and urban areas. Most of the males belonged to urban areas (57.14%), whereas most females (53.32%) belonged to rural area. Most of the patients were literate

(80.70%) with 76.74% females and 92.85% males being literate. As evident from the table 1, majority of patients (51.75%) were Hindu and only one male patient was Christain.

As evident from table 3, most of the patients belonged to middle class, both from rural (42.98%) and urban areas (33.4%).

Patients with presbyopia presented with symptoms of headache, eye strain, difficulty in doing near work and watering from the eyes. The relative frequencies of each presenting symptom is shown in table 3.

Table 3 : Presenting symptoms of presbyopia

Symptom	Males	Females	Total
Headache	5	17	21 (18.42%)
Eye strain	10	14	24 (21.05%)
Difficulty in near vision	20	59	79 (69.29%)
Watering	2	12	14 (12.28%)

Total percentages were not equal to 100 as patients presented with more than one symptom. The refractive error associated with presbyopia is shown in figure 1.

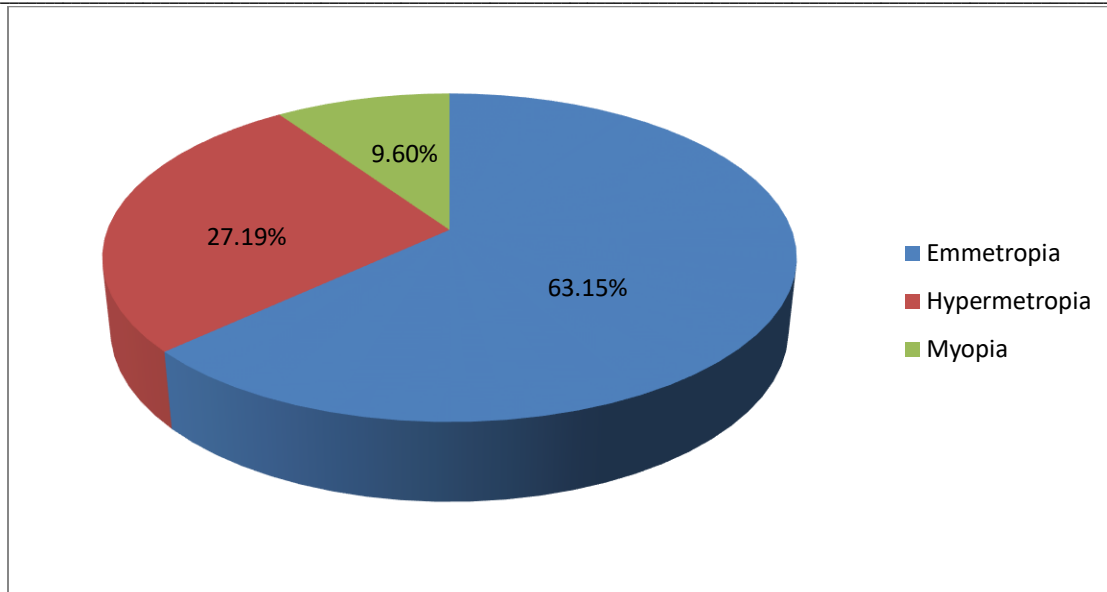


Fig. 1: Refractive error associated with Presbyopia

Most of the patients were emmetropic for distance vision (63.15%). Most of the patients with hypermetropia (27.19%) had earlier onset of presbyopia, before 40 years of age.

Discussion

The prevalence of presbyopia in present study was 22.8%. Umar M et al reported prevalence of 30.4%[5], and Lawan A et al reported prevalence of presbyopia to be 10.9% in their study[10]. Nirmalan PK et al, reported prevalence of 55.3% in patients above 30 years of age[4] and Uche JN et al noted prevalence of 63.4%[11] in their study. The mean age in our study was 52.17 ± 9.52 years, which is similar to that reported by P Sudhir Babu et al, mean age of 51.51 ± 6.27 years[12], Nirmalan PK et al, mean age of 47.5 years \pm 13.0 years[4], Uche JM et al, mean age of 49 ± 11.1 years[11] and Malu KN, mean age of 47.8 ± 8.2 years[13].

There were 75.44% females and 24.56% males in our study. Uche JM et al reported 67.35% females and 32.65% males[11], similar to our study. Whereas, P Sudhir Babu et al noted 53.27% males and 46.7% females[12], Malu KN reported 55% males and 45% females[13] and M Ghatak et al, reported 55% males and 45% females in their studies[14].

The most common presenting symptom in our study was difficulty in near vision (69.29%). P Sudhir Babu et al, noted that most common mode of presentation was difficulty in near vision (58.3%), followed by headache seen in 17.54 % patients, eye strain seen in 13.53% of patients and watering seen in 10.57% patients[12]. Malu KM also reported difficulty in near vision as most common mode of presentation (61.41%), similar to our study[13].

Most of the patients were emmetropic (63.15%) followed by hypermetropic (27.19%) and myopic (9.60%) for distance vision, in our study. Similar findings have been reported by Malu KM, who reported 51.65% emmetropes, 32.57% Hypermetropes and 15.76% myopes in their study[13]. P Sudhir Babu et al reported 49.68% Emmetropes for distant vision, 30.23 % hypermetropes and 20.08 % myopes in their study[12].

Most of the males who presented with presbyopia were office workers (14.04%) and most of the females were homemakers (55.26%). Office workers had difficulty in reading small prints which hampered with their office work and most females complained that they had difficulty in sorting grains, reading numbers on cell phones and reading small prints on newspaper. Malu KM noted that most of the patients were civil servants (53.31%), 19.50% were businessmen, 10.99% were House wives, and 3.11% were farmers[13]. P Sudhir Babu et al reported that 34.88% patients were office workers, 14.58%

were farmers, 11.41% were skilled workers, 13.1% were housewives, 18.18% were businessmen and 7.82% were labourers[12].

Equal number of patients belonged to rural and urban areas in our study with 80.70% patients being literate. The presbyopia occurred earlier in females as compared to males in our study. Similar findings have been noted by Uche JM et al[11] and P Sudhir Babu et al[12] females being affected more in younger age groups. Studies conducted in Nigeria, South West Uganda, Ghana, and Pakistan have shown age of onset being 40 years for the onset of presbyopia.

Conclusion

Thus, we conclude that females were more commonly affected and had younger onset of presbyopia as compared to males. Hypermetropia was more commonly associated with presbyopia as compared to myopia. Patients who had difficulty with near work such as office workers and housewives, seek medical advice earlier as compared to persons engaged in other occupations.

Limitations of study

Patients presenting to out-patient clinic only were included in this study, which may have under-estimated the actual prevalence of the presbyopia in general population.

Acknowledgements

Our sincere thanks to all the participants of this study for their compliance.

References

1. Elkington AR, Helena J Frank, Michael J. Clinical Optics. 3rd ed. Blackwell Publishers; July1999. pp. 141–51.
2. Burke AG, Patel I, Munoz B, Kayongoya A, McHiwa W, Schwarzwaldner AW, West SK. Population-based study of presbyopia in rural Tanzania. *Ophthalmology*. 2006; 113(5):723-7.
3. Weale RA .Epidemiology of refractive errors and presbyopia. *Surv Ophthalmol*. 2003; 48(5):515-43.
4. Nirmalan PK, Krishnaiah S, Shamanna BR, Rao GN,ThomasRA population-based assessment of presbyopia in the state of Andhra Pradesh, south India: the Andhra Pradesh Eye Disease Study. *Invest Ophthalmol Vis Sci*. 2006; 47(6):2324-8.

5. Umar M, Muhammad N, Alhassan M. Prevalence of presbyopia and spectacle correction coverage in a rural population of North West Nigeria. *Clin Ophthalmol.* 2015;9:1195-1201.
6. Holden BA, Fricke TR, Ho SM, Wong R, Schlenker G, Cronje S et al. Global vision impairment due to uncorrected presbyopia. *Archives of Ophthalmology* 2008; 126: 1731-9.
7. Burke AG, Patel I, Munoz B, Kayongoya A, McHiwa W, Schwarzwald AW et al. Population-based study of presbyopia in rural Tanzania. *Ophthalmology* 2006; 113: 723-727.
8. Duarte W, Barros A, Dias-da-Costa JS, Cattán JM. Prevalence of near vision deficiency and related factors: a population-based study. *Cadernos de Saude Publica* 2003; 19: 551-559.
9. Hashemi H, Khabazkhab M, Jafarzadehpur E, Mehravaran S, Emamian MH, Yekta A et al. Population-based study of presbyopia in Sharoud, Iran. *Clinical & Experimental Ophthalmology.* 2012; 40: 863-868.
10. Lawan A, Okpo E, Philips E. Refractive errors in presbyopic patients in Kano, Nigeria. *Ann Afr Med.*2014;13:21-4.
11. Uche JN, Ezegwui IR, Uche E, Onwasigwe EN, Umeh RE, Onwasigwe CN. Prevalence of presbyopia in a rural African community Rural and Remote Health.2014; 14: 2731.
12. P Sudhir Babu, Dhanunjaya AV, G. Amaresh. To study the Demographic Pattern of Presbyopia in a Tertiary Teaching Hospital. *Journal of Evolution of Medical and Dental Sciences.* 2015;4(12):650-7.
13. Malu KN. Presbyopia in plateau state, Nigeria: A hospital study. *J Med Trop* 2013;15:151-5.
14. M Ghatak, H Sowbhagya, N Himamshu, Sandeep, A Punjabi. Uncorrected Refractive Errors in Presbyopes attending medical college eye OPD. *The Internet Journal of Ophthalmology and Visual Science.* 2009 Volume 7 Number 2.
15. Nwosu SN. Ocular problems of young adults in rural Nigeria. *Int Ophthalmol.* 1998; 22 (5): 259- 263.
16. Kamali A, Whitworth JA, Ruberantwari A, et al. Causes and prevalence of non-vision impairing ocular conditions among a rural adult population in SW Uganda. *Ophthalmic Epidemiol.* 1999; 6 (1): 41-48.
17. Morny FK. Correlation between presbyopia, age and number of births of mothers in the Kumasi area of Ghana. *Ophthalmic Physiol Opt* 1995; 15 (5): 463-466.
18. Hussain A, Awan H, Khan MD. Prevalence of non-vision-impairing conditions in a village in Chakwal district, Punjab, Pakistan. *Ophthalmic Epidemiol.* 2004; 11(5): 413-426.

Conflict of Interest: Nil Source of support: Nil