TO STUDY THE DEMOGRAPHIC PATTERN OF PRESBYOPIA IN A TERTIARY TEACHING HOSPITAL

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HOW TO CITE THIS ARTICLE:

P. Sudhir Babu, Dhanunjaya A. V, G. Amaresh. "To Study the Demographic Pattern of Presbyopia in a Tertiary Teaching Hospital". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 04, January 12; Page: 650-657, DOI: 10.14260/jemds/2015/95

ABSTRACT: BACKGROUND: Presbyopia is inability to see near objects it is global physiological refractive error problem seen in patients above the age of 40 years, where in accommodation progressively decreases. prevalence of presbyopia is high in developing world. uncorrected presbyopia leads to various symptoms like head ache eye strain, watering. **DESIGN & METHOD:** This was a prospective study conducted in 473 patients coming to Ophthalmic OPD with refractive error. Complete anterior segment and posterior segment examination and refractive error correction was done for all cases. Demographic characteristics including age, sex, occupation onset of presbyopia were recorded. **RESULTS:** Prevalence of presbyopia among 935 subjects above the age of 30 years was 50.58%. Out of 473 subjects studied 53.27% were males and 46.72% females. 23.25% of patients were in the age group of 50 - 55 years. The productive age group 36 – 55 years consisted of 84.76% subjects. Mean age at presentation was 51.51 (± 6.27) years, 49.68% subjects were Emmetropes, 30.29% of subjects had hypermetropia and 20.08% had myopia. 34.88% were office workers seeking presbyopic correction. 18.08% were Businessmen farmers, house wives forming 14.58% & 13.10% respectively. 11.41% subjects were Skilled. 58.35% subjects had near vision difficulty. Headache was seen in 17.54% of subjects, eye strain and watering was seen in 13.53%, 10.57% of subjects. In 62.36% subjects presbyopia started between 41 – 45 years of age in 136 subjects onset of presbyopia was between the age of 36 – 40. Mean age of onset was 41.35 years (sd ± 2.56). **CONCLUSION:** with this pilot study we conclude that Presbyopia is a common physiologic refractive error problem seen in both the sex females presenting early as compared to their male counterparts of same age. Hypermetropes and patients with Hypermetropes presented correction as compared to Emmetropics and Myopes.

KEYWORDS: Presbyopia, Hypermetropia, Near Vision, Convex Lens.

INTRODUCTION: Presbyopia is the age related loss of ability to comfortably sustain the accommodation necessary for clear near vision. Symptoms include blurred or uncomfortable near vision and blurred distance vision after prolonged use of near vision.¹

Presbyopia is caused by age-related elasticity changes in the crystalline lens and its capsule.² Natural crystalline lens loses its elasticity resulting in decreased accommodation.

Presbyopia can be either Functional or Objective.

Functional Presbyopia: Need for a significant optical correction ($\geq +1.00D$) added to the presenting distance refractive correction to achieve a near visual acuity criterion of N8 print.^{3,4}

Objective Presbyopia: Need for a significant optical correction ($\geq +1.00D$) added to the best distance optical correction to improve near vision to a near visual acuity criterion of N8.^{3,4}

Presbyopes usually complain of headaches, eye strain, and hold objects progressively further away from their eyes in order to see clearly. Prevalence of Presbyopia in South India is 55.3 %⁵ and

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62% in rural Tanzania⁶. Duarte et al. in Brazil estimated the prevalence of presbyopia in 3,000 adults 30 years and older at 54.7%.⁷ Although presbyopia is age related, the age of its onset varies around the world. For example, presbyopia develops earlier in people who live closer to the equator.⁸

Presbyopia is a manifestation of the general aging process of crystalline lens due to its unique status as closed biological system in which new cells continue to grow while old cells remain. The "geographical factor" can further accelerate the aging process of the crystal line lens. Two interdependent components of this factor are recognized as separate elements: a) Solar Radiation, particularly its ultraviolet content; b) High average environmental temperatures. Of These two causes, this study found the latter to be more important in the onset of Presbyopia.⁹

Women have both a higher prevalence of, and more severe, presbyopia.¹⁰ Presbyopia occurs early in females and hypermetropes as compared to males and myopes of same age group. Presbyopia is corrected by using convex lenses, which converge the diverging rays emerging from near object on to the retina. Presbyopic correction is always given by algebraic sum to distant vision correction. Presbyopic correction should be tailored and need based, depending on the present occupational need of the patient. eg; Gold smith and watch repair workers need more extra correction as they work very near and work on minute objects and design.

AIM: To study the Demographic pattern of presbyopia in a Tertiary Teaching Hospital.

OBJECTIVE: To study the demographic pattern of presbyopia; in relation to Prevalence, Age, Gender, Refractive Errors, Occupation, and Age of onset.

MATERIALS AND METHODS: This was a prospective study conducted at ophthalmology OPD in a Rural Tertiary Teaching Hospital of Nalgonda Dist. of Telangana state. Approval from ethical committee was taken before the start of study. Informed written consent was taken from all the subjects before enrolling them into the study.

Inclusion Criteria:

- All patients above 30 years with refractive error and near vision defect.
- All patients above 30 years of age complaining of near vision defect.

Exclusion Criteria:

- Patients with cataract.
- Patients with other ocular diseases like glaucoma, corneal degeneration, opacities.

METHODOLOGY: All subjects above 30 years of age were examined and screened for near vision defect. Subjects having near vision defect were included in the study. Complete history was taken regarding the ocular symptoms, and presenting complaints. Enrolled subjects underwent unaided visual acuity testing for distant vision using snellen's chart and near vision Optotype chart. Inability to read N8 Optotype at 40cm distance was taken as presbyopia. Any improvement with pin hole for distant vision was documented and refraction was performed by a trained refractionist and later on confirmed by a senior ophthalmologist. After that patients underwent complete anterior and

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posterior segment evaluation. Patients were prescribed for appropriate glasses wherever needed. Questionnaire regarding Occupation, Age of onset of presbyopia was filled and recorded.

OBSERVATIONS AND RESULTS: Out of 935 subjects examined 473 met the inclusion criteria of presbyopia.

RESULTS: Prevalence of Presbyopia: Out of 935 subjects of age 30 years and above having refractive errors 473 met the inclusion criteria of having presbyopia and were included in the study. Prevalence of presbyopia was found out to be 50.58% Gender: Males were 252 (53.27%) and females comprised of 221(46.72%) with male: female ratio of 1.0: 0.9 Age: Age at presentation: Maximum number of patients were in the age group of 50 - 55 (23.25%)years and the active productive age group 36 – 55 years consisted of 84.76%. Youngest patient was of 33 years age, oldest patient was 75 years old. Mean age at presentation was 51.51 (sd $\pm$ 6.27) years, median age at presentation 52 years; Refractive error for distant vision: 235 (49.68%) subjects were Emmetropes, 143(30.29%) subjects had hypermetropic correction and 95 (20.08%) of subjects had myopic correction. Occupation: Office workers in govt and private sector formed the major bulk seeking presbyopic correction ie.165 (34.88%). business class workers comprising of 86 (18.08%) followed by farmers and house wives forming 69 (14.58%) and 62(13.10%) respectively. Skilled workers comprised of 54 (11.41%).Mode of presentation: 276 (58.35%) of 473 subjects presented with difficulty in near vision next common mode of presentation was headache seen in 83 (17.54%) subjects. Eye strain and watering was seen in 64(13.53%) and 50 (10.57%) subjects respectively. Age of onset: In 295 (62.36%) subjects presbyopia started between 41 – 45 years of age in 136 subjects onset of presbyopia was between the age of 36 – 40. In 15 subjects there was early onset of presbyopia ie; between 31 – 35 years, and in 27 subjects onset of presbyopia was delayed by 46 – 50 years of age. mean age of onset of presbyopia was 41.35 years (sd $\pm$ 2.56). median age of onset of presbyopia was 42 years.

DISCUSSION: Prevalence: In the present study prevalence of presbyopia was 50.58% in southern India, Nirmalan et al⁵ (2006) found prevalence of 55.3% in people aged 30 years and older. Duarte et al.⁷ (2003) in Brazil estimated the prevalence of presbyopia in 3, 000 adults 30 years and older at 54.7% Gender: In present study it was observed that 53.27% were males and 46.7% females. similar findings were observed by Keziah N. Malu (2013)¹¹ found that 55% male, 45% female. M Ghatak, et al (2013)¹² in his study observed 55% males and 45% females. Age: In the present study Mean age at presentation was 51.51 years (sd $\pm$ 6.27) years, median age at presentation 52 years. With age range of 30 – 75 years. Study conducted by Uche JN, et al (2014)⁴ showed The mean age of 49 ($\pm$ 11.1) years. The age range was 35–99 years. Similarly Keziah N. Malu (2013)¹¹ in his study documented mean age of patients at presentation as 47.8 $\pm$ 8.2 (range 35-80) years. Nirmalan et al ⁵(2006) in their study conducted in APEDS found mean age to be 47.5 years $\pm$ 13.0 years. Median, 45.0; range 30–102.

Females usually presented late by 2-3 years as compared to their male counterparts as they needed an attendant to reach hospital and financial constraints and can manage without glasses attitude was reason given for late presentation. Refractive Error For Distant Vision: In present study 49. 68% were Emmetropic for distant vision, 30.23 % were having hypermetropia and 20.08 % were myopic. Myopes seeked intervention late as compared to their emmetropes and hypermetropes of same age group. Keziah N. Malu (2013) ¹¹ in their study found 249/482 (51.65%) subjects to be

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Emmetropic, 157/482 (32.57%) – Hypermetropic and 76/482 (15.76%) subjects myopic M Ghatak, H Sowbhagya, (2013)¹² found equal number of hyperopic presbyopes and myopic presbyopes. Occupation: Office going workers of government and private sector formed highest number seeking early intervention for presbyopia as compared to others, intervention was sought when they had difficulty in reading small prints which hampered their routine office work. 86/473 (18.18%) of Business men had difficulty in seeing the retail price printed on the sales goods. Farmers comprised of 69/473 (14.58%), house wives who had difficulty in threading the needle and sorting grains constituted 62/473 (13.10%) of study group. Skilled workers were 54/473 (11.41%) who had difficulty in carrying out skilled fine task. Manual labourers were least to seek presbyopic intervention 37/473 (7.8%). Keziah N. Malu (2013)¹¹ in his study found civil servants forming the major bulk 53.31% (257/482) of study group, 19.50% (94/482) were businessmen, 10.99% (53/482) were House wives, and Farmer constituted 3.11% (15/482) of study group. Mode of Presentation: Most common mode of presentation was difficulty in Near Vision seen in 276/473 (58.3%) followed by headache seen in 83/473 (17.54 %), Eye strain was seen in 64 /473 (13.53%) of subjects, watering was seen in 50/473 (10.57%) of subjects. Keziah N. Malu (2013)¹¹ reported difficulty in Near Vision as most common mode of presentation seen in 296/482 (61.41%), (15.7%) subjects presented with glasses of inappropriate corrections that was causing visual strains.

Age of onset: In the present study mean age of onset was 41.35 (sd $\pm$ 2.56) years and median age of onset was 42 years. Brien A. Holden, (2006)¹³ reviewed various studies on presbyopia and compared Assumed age at onset, it was found that age of onset was 40 years in Nigeria, South West Uganda, Ghana, and Pakistan.^{14,15,16,17} Khalaj et al. (2014),¹⁸ compared age of onset in smokers and non-smokers and found that 85 (55.92%) subjects of smoking group, entered presbyopia at the age of 39-40 years, whereas in 75.66% patients onset and progression of presbyopia was reported at ages 41-45 years of normal group. In a study conducted by Carnevali T and Southaphanh P. (2005)¹⁹ presbyopia developed in the reviewed Hispanic population at 39.31 years of age in comparison to development in non-Hispanics at 40.22 years.

CONCLUSION: With this study we conclude that females have more prevalence of presbyopia and but seek less or delayed intervention as compared to their male counter parts. Hypermetropes have early onset of presbyopia and Myopes have delayed onset of presbyopia. There is continuous progression of presbyopia as the age advances. Occupation and gender are the major factors confounding for seeking presbyopic correction, office workers and those involved in near work seek early presbyopic correction while others ignore or delay. Females were either reluctant or ignorant in seeking presbyopic correction though prevalence was high in females. Another confounding factor in seeking presbyopic correction was financial constraints.

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Fig.1: Male: Female

Fig. 2: Prevalence of Presbyopia

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Age	Male	Female	Total	%
31 – 35	1 (002.11%)	2 (0.0042%)	3	0.0063%
36 – 40	1 (002.11%)	2 (0.0042%)	3	0.0063%
41 – 45	61 (12.89%)	51 (10.78%)	92	19.45%
46 – 50	62 (13.10%)	50 (10.57%)	102	21.56%
51 – 55	50 (10.57%)	60 (12.68%)	110	23.25%
56– 60	54 (11.41%)	43 (9.09%)	97	20.50%
> 60	19 (4.01%)	13 (2.74%)	32	6.76%
TOTAL	252 (53.27%)	221(46.7%)	473	100%

Table 1: Age of patient. N=473

Refractive Error	N = 473	%
Emmetropia	235	49.68
Hypermetropia	143	30.23
Myopia	95	20.08
Total	473	100

Table 2: Refractive Error for Distant Vision in Presbyopes; n = 473

Occupation	Male (%)	Female (%)	Total (%)
Office Worker	98 (20.71)	67 (14.16)	165 (34.88)
Farmer	46 (9.72)	23 (4.86)	69 (14.58)
Skilled Worker	41 (8.66)	13 (2.74)	54 (11.41)
House wife	-----	62 (13.10)	62 (13.10)
Business man	45 (9.51)	41 (8.66)	86 (18.18)
Labourer	22 (4.65)	15 (3.17)	37 (7.82)
Total	252 (53.27)	221 (46.72)	473 (100)

Table 3: Occupation of presbyopes n = 473

Mode of presentation	Male (%)	Female (%)	Total (%)
Head ache	44 (9.30)	39 (8.24)	83 (17.54)
Eye strain	38 (8.03)	26 (5.49)	64 (13.53)
Difficult near vision	148 (31.28)	128 (27.06)	276 (58.35)
Watering and others	22 (4.65)	28 (5.91)	50 (10.57)
Total	252 (53.27)	221 (46.72)	473 (100)

Table 4: Mode of Presentation of Presbyopia: n =473

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Age	Male (%)	Female (%)	Total (%)
31 – 35	6 (12.6)	9 (1.90)	15 (3.17)
36 – 40	55 (11.62)	81 (17.12)	136 (28.75)
41 – 45	176 (37.20)	119 (25.15)	295 (62.36)
46 – 50	15 (3.17)	12 (2.53)	27 (5.70)
TOTAL	252 (53.27)	221 (46.72)	473 (100)

Table 5: Age of onset of Presbyopia. N = 473

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Date of Submission: 26/12/2014.
Date of Peer Review: 27/12/2014.
Date of Acceptance: 03/01/2015.
Date of Publishing: 10/01/2015.