Ophthalmology

CHANGING TRENDS IN PRESBYOPIA DUE TO MOBILE PHONES

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ABSTRACT **Introduction:** Presbyopia is a physiological insufficiency of accommodation, impairs the ability to perform near task which usually seen around the age of 40, but with the excessive use of mobile phones and other electronic gadgets causes Presbyopia at an early stage. This study conducted in 100 patients at Regional eye hospital, Kurnool from January 2019 to December 2019 to evaluate the changing trends in Presbyopia due to mobile phones. Patients aged 30 years or more who presented with difficulties in near work were included in this study. The mean age of presentation in presbyopics was 43.12 years, Female sex, Smart phone usage, occupation requiring near work, and hypermetropia were most common risk factors. Presbyopia reduces the functional efficiency and affects quality of life. Occurrence of early Presbyopia can be prevented by avoiding the long-hour use of mobile phones and other electronic gadgets.

INTRODUCTION

Presbyopia is a chronic disorder involving changes in accommodation of the eye and causes difficulty in near vision. Almost all persons older than 50 years are likely to have Presbyopia [1,2]. In India, it sets in by 38 to 40 years [3]

It is a gradual decrease in accommodative amplitude, from about 15D in early childhood to 1 D before the age of 60 years. The onset of Presbyopia occurs approximately at the age of 45, when the amplitude of accommodation is about 3.5 diopters [4], Individuals whose occupation requires extensive use of near vision often notice symptoms earlier than similarly aged individuals. Changes in work place environment, such as computer technology may create new type of visual demands. Conditions such as diabetes mellitus, vascular disease, trauma, or the use of certain medications (e.g., anti anxiety, antidepressant, antipsychotic agents) may contribute to premature Presbyopia. Alcohol intake and smoking is also reported to be associated with early Presbyopia [5].

Onset of Presbyopia in females is due to Anemia, menopause [6]. Uncorrected hypermetropia and Environmental factors including high average ambient temperature, exposure to much ultraviolet radiation, chronic deficiency of essential amino acids, and exposure to toxic factors, play significant role in precipitating the early onset of presbyopia [7.]

MATERIAL AND METHODS

A hospital-based study conducted in 100 patients, at Regional eye hospital, Kurnool from January 2019 to December 2019.

Patients aged 30 years or more who presented with difficulties in near work were included in this study. Information taken regarding education, occupation and associated ocular problems like glaucoma.

Detailed history of presbyopic patients was taken

1. Smart phone users – Using smart phone for at least one hour at a stretch or for at least 2 hours throughout the day and over 6 months (except phone calls) than 1 year
2. Alcohol - At least thrice a week
3. Smoking - Persons smoking at least 5 cigarettes a day or greater
4. Multiparity – parity ≥ 3
5. Sun exposure – Exposed to sun for a minimum of 6 hours /day
6. Anemia - Hemoglobin <10 g/dl
7. History of trauma, debilitating diseases like Tuberculosis, pain abdomen, hypertension, Diabetes, Psychiatric illness was elicited.

Thorough **general examination** was carried out for all the patients.

Detailed **ocular examination** included recording of Distance and near

visual acuity, Slit lamp examination, Applanation tonometry, Posterior segment examination and Retinoscopy under mydriasis was performed to assess the refractive status of the patient.

RESULTS

TABLE 1: Distribution of patients according to their age group (n=100)

AGE GROUP	NO. OF PATIENTS	PERCENTAGE
30-35	2	2%
36-40	32	32%
41-45	38	38%
46-50	22	22%
50-55	6	6%
TOTAL	100	100%

A total of 100 patients were enrolled in the present study. Out of them 38% were in the age group of 41-45 years, followed by 36-40 years age group- 32%.

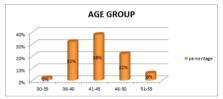**CHART 1: Distribution of patients according to their age group (n=100)**

TABLE 2: Distribution of patients according to their Gender

AGE GROUP	MALES	FEMALES
30-35	0	2
36-40	16	16
41-45	14	24
46-50	6	16
50-55	6	0
TOTAL	41	**59**

Out of total of 100 patients, females 59% are more in number than males 41% in this study. Among them 24 females belong to 41-15 age group.

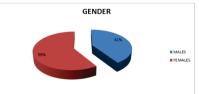**CHART 2: Distribution of patients according to their Gender**

TABLE 3: Distribution of Refractive Error among Different Age Groups

AGE GROUP	EMMETROPIA	HYPERMETROPIA	MYOPIA
30 - 35	-	2	-
36 – 40	18	14	-
41 – 45	13	21	4
46 – 50	8	10	4
51 – 55	2	4	-
Total	40	**52**	8

Out of total 100 patients, maximum number of Refractive error is seen in Hypermetropia 52 patients followed by emmetropia 40 patients, Among 52 patients of hypermetropia, maximum number (21) of patients belongs to 41-45 years age group.

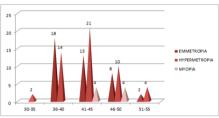**CHART 3: Distribution of Refractive Error among Different Age Groups**

TABLE 4: Distribution of risk factors according to their area of presentation

Risk Factors	RURAL	URBAN	Number
Mobile Users	23	26	49
Near Work	24	20	44
Glaucoma	1	1	2
Diabetes	1	4	5
Total	49	51	100

Among 100 patients, maximum number of patients 49% presented with complaint of difficulty in viewing mobile numbers followed by patient's complaints with near work difficulty 44%.

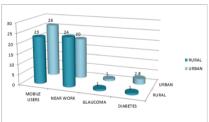**CHART 4: Distribution of risk factors according to their area of presentation**

TABLE 5: Distribution of correction for Near work according to age group

AGE GROUP	+1.00	+1.25	+1.50	+1.75	+2.00	Total
30-35	2	-	-	-	-	2
36-40	6	16	6	4	-	32
41-45	4	6	20	6	2	38
46-50	-	-	2	10	10	22
51-55	-	-	-	-	6	6
Total	12	22	**28**	20	18	100

Out of total 100 patients, maximum number of patients required +1.50 correction for near work, among them maximum number of patients belong to 41-15 years age group. And 16 patients required +1.25 correction for near work belonging to 36-40 years age group.

DISCUSSION:
A hospital-based study conducted in 100 patients, at Regional eye hospital, Kurnool from January 2019 to December 2019. Patients aged 30 years or more who presented with difficulties in near work were included in this study.

AGE:
Out of total 100 patients, age range showed between 33-52 years, among them **38%** were in the age group of 41-45 years, and 32% of patients belong to 36-40 years age group followed by 22% of patients

belonging to 46-50 years age.

Average age of onset of Presbyopia in this present study is 43.12 years; **Rambo[8] study 1957** reported that in Indian population Presbyopia developed at the age of 45.4 years. Andhra Pradesh eye study conducted by **Praveen K Nirmalan et al[5] in 2006** showed mean age of participants as 47.5 ± 13.0 years. **Niveditha**, **Previous study conducted in Regional eye Hospital[9]** between 2010 -2012 showed mean age of 47.33 years.

Table 6: comparison of average age of presentation with other studies

STUDIES	AVERAGE AGE IN YEARS
Rambo[8] study 1957	45.4 years
Nirmalan et al[5] 2006	47.5 ± 13.0 years
PR Niveditha Previous study[9] 2010-2012	47.33 years
Present study 2019	43.12 years

When compared to above studies, this present study showed early onset of Presbyopia. Which is similar to **Sujata Priyambada[10] study 2019** the mean age of presentation in premature presbyopics was 36.2 years.

GENDER:
In present study, Out of total of 100 patients, females 59% are more in number than males 41%. Among them 24 females belongs to 41-45 age group followed by 16 patients between 36-40years and 46-50 years age group. Females showed earliest onset 59% (30-35years) of Presbyopia than males 41% (36-40years).

This present study is similar to **Niveditha, previous study conducted at Regional eye Hospital[9]** 2010-2012 showed more number of females 59%   than males 41%, **Sujata Priyambada[10] study 2019** (61.13%) were females and (38.87%) males. Andhra Pradesh eye study by **Praveen K Nirmalan et al[5] in 2006** also showed more female than males. Recent studies **Hickenbotham[11]** confirm that women are indeed still being prescribed with higher near corrections than men of the same age.

Refractive Error:
Out of total 100 patients, maximum number of Refractive error is seen in Hypermetropia 52 patients followed by emmetropia 40 patients. Among 52 patients of hypermetropia, maximum number (21) of patients belongs to 41-45 years age group.

Present study showed maximum patients are hypermetropic than emmetropia which is followed by myopia. This is similar to **Sujata Priyambada[10] study** 2019. But study conducted **Niveditha previously in 2010-2012 Regional eye Hospital[9]** and **Lekha Mary Abraham et al.[12]** in 2005 showed emmetropia seen in maximum patients followed by hypermetropia and myopia.

Risk factors
Present study among 100 patients, maximum number of patients 49% presented with complaint of difficulty in viewing mobile numbers than with near work difficulty 44%.

This is similar to **Sujata Priyambada[10] study 2019**. Smart phone usage (37) followed by near work was the most common risk factor (30.6%).

But **Niveditha, previous study 2010-2012** conducted in Regional eye Hospital[9] showed close work have early onset of Presbyopia.

Area of presentation
Present study among 100 patients, there is no much difference in area of presentation.

This is similar to **Sujata Priyambada[10] study 2019** Rural patients comprised of 41.09% while 58.90% lived in urban settings, Andhra Pradesh eye study conducted by **Praveen K Nirmalan et al[5] in 2006** showed prevalence of Presbyopia in rural areas is higher than urban area.

Table 7: comparison of area of presentation with other studies

Studies	More Prevalence In Rural/Urban
Praveen K Nirmalan Et Al[5] In 2006	Rural

Sujata Priyambada[9] Study 2019	Urban
Present Study	Nearly Equal

Table 8: Comparison between Previous study[9] 2010-2012 and present study 2019 conducted in Regional eye Hospital.

Studies	Niveditha, Previous[9] study 2010-2012	Present study 2019
Mean Age	47.33years	43.12 years
Gender	Females	Females
High Refractive error	Emmetropes	Hypermetropes
Most common Risk factor	Near work	Mobile users

SUMMARY

In this study 100 patients were taken randomly for near vision problems. Average age of onset of Presbyopia in this present study is 43.12 years; Females showed more preponderance than males in the pre presbyopic age groups. Earlier onset of Presbyopia was observed in hypermetropes than in myopes. Maximum number of patients 49% presented with complaint of difficulty in viewing mobile numbers followed by patient's complaints with near work difficulty 44%, and showed nearly equal rural and urban areas of presentation. Comparing with previous[9] study 2010-2012 to present study conducted in Regional eye Hospital, mean age of presentation is early, type of refractive error changed from Emmetropes to hypermetropes and mobile users are the most common risk factors for Presbyopia.

CONCLUSION

Presbyopia reduces the functional efficiency of the individuals. It affects all section of society – literates and illiterates, rural or urban areas. Since near vision is required not only for office work but day to day activity as well. Increased visual demands associated with occupation or smart phone usage may lead to Presbyopia. The occurrence of Presbyopia at an early stage can be prevented by avoiding the long-hour use of mobile phones and other electronic gadgets.

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