

# THE PREVALENCE OF PRESBYOPIA IN OPTOMETRY CLINIC FOR ONE YEAR

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**ABSTRACT:** *Presbyopia is a natural part of the aging process of the eye in which the loss of flexibility of the crystalline lens takes place over a number of years. This study aimed to determine the prevalence of presbyopia for all cases in the clinic of optometry in Erbil Technical Medical Institute for one year. During the study period optometric and ophthalmologic examinations were performed on all participants. Near vision was tested and corrected to the nearest 0.5 diopters. Presbyopia was defined as at least 1 line of improvement on a near visual acuity chart with an addition of a plus lens. presbyopic correction coverage was calculated and the results were analyzed using SPSS Program. A total of 750 participants' records were evaluated. Of those, 450 cases were females and 300 cases were males. Two hundred-twenty-five (30 %) of patients were presbyopia. Fifty-one patients of presbyopic patients (22.66%) were with ages between 39-45 year, seventy-five patients (33.33%) were with ages between 46-50 year, forty patients (17.77%) were with ages between 51-55 year, seventeen patients (7.55%) were with ages between 56-60, thirteen patients (5.77%) were with ages between 61-65 year, twenty patients (8.88%) were with ages between 66-70 year, six patients (2.66%) were with ages between 71-76 year, three patients (1.33%) were with ages between 76-80 year. Our study is the first population-based investigation of presbyopia in Erbil Clinics, with the aim of determining the prevalence of presbyopia in the clinic of Optometry that it is a sample of Kurdistan Region population. The results of this study indicate that the presbyopia was a common problem of the vision in Erbil.*

**Keywords:** Presbyopia, prevalence, lens flexibility, accommodation, Clinic of Optometry,

## 1. INTRODUCTION

Presbyopia is a global challenge. More than a billion individuals require near-vision aids to accomplish a broad range of near tasks such as reading and writing, sorting rice, weeding, sewing, cooking food, lighting and adjusting lamps, winnowing grain, harvesting, as well as dressing children [1]. When presbyopia (loss of accommodation of the crystalline lens with increasing age) sets in, doing near work becomes associated with headache and eye strain. Uncorrected presbyopia is a significant and increasing cause of visual disability globally. Presbyopia is the decline of the focusing ability. The World Health Organization estimates that 153

million people are blind or visually impaired from uncorrected refractive error[2]. Presbyopia is the age-related reduced accommodation and is often associated with a progressive inability to read fine print and to write[1]. Presbyopia is a natural part of the aging process of the eye in which the loss of flexibility of the crystalline lens takes place over a number of years. The onset of presbyopia depending to the near tasks but is gradual and the patient's accommodative amplitude becomes inadequate for his or her visual needs. There are substantial optical changes in the human lens with increasing age and during accommodation, since both the magnitude and the sign of the spherical aberration change with age and stretching [4]. The mechanism of accommodation has been one of the most researched in the last century and probably the biggest mystery surrounding the modern ophthalmology. Accommodation refers to the process whereby changes in the dioptric power of the crystalline lens occur so that an in-focus retinal image of an object of regard is obtained and maintained at the high-resolution fovea [5]. Good near vision is important, even among populations who use it for tasks other than reading and writing. The human lenses exhibited a distinct viscoelastic behavior and the research evidence most strongly supports a loss of elasticity of the crystalline lens, although changes in the lens's curvature result from continual growth and loss of power of the ciliary muscles. With progressive hardening and the loss of elasticity of the lens, and its ectodermal growth it will become harder and harder for the ciliary muscle to accommodate by contraction [6]. Hermann von Helmholtz, graduated in physics, studied the lifetime optics human. Based on anatomical and physiological findings, noted that during accommodation the ciliary muscle to contract and there was an increase in the thickness of the crystalline lens, causing a greater power of convergence and focusing the image on the retina, when approaching an object in the eye[7]. The prevalence of presbyopia in different countries is reported by various studies. It is estimated that there were 1.04 billion people globally with presbyopia in 2005, of whom 517 million had no spectacles or inadequate spectacles [8]. Holden et al, using multiple population-based surveys, estimated that 1.04 billion people globally have presbyopia[9]. In south India of 5587 subjects 30 years of age or older, the age-, gender-, and area-adjusted prevalence of presbyopia was 55.3% [10]. From early childhood the amplitude of accommodation is about 15 dioptres (D) and this

continues to decrease progressively to about 1D by the age of 60 years. With failing accommodation, doing near work becomes associated with headache and eye strain. Reading and writing become a challenge[11]. In terms of priority setting for provision of services for presbyopia, the World Health Organization (WHO) has recommended that if less than one-third of those affected have Near correction, the population would be ranked as a high priority for service delivery [12]. The last few years have seen a discernible rise in research investigating the epidemiology, impact on quality of life, and management of presbyopia in low- and middle-income regions. Burke et al., authors of a large populationbased study of presbyopia in Tanzania, concluded that the ‘VISION2020: The Right to Sight’ refractive error agenda should place increased emphasis on targeting presbyopia [13].

This study aimed to determine the prevalence of presbyopia in optometry clinic in Erbil Technical Medical Institute.

## 2. EXPERIMENTAL METHODS

This study was carried out in Erbil Technical Medical Institute Clinic of Optometry in Erbil -Kurdistan Region of Iraq between 2015 and 2016. All the patients diagnosed with presbyopia who consented were recruited in this study. The patients’ ages, gender, relevant past medical and ocular history was recorded. Written informed consent was obtained from each participant prior to being interviewed and examined. Near vision was tested and corrected to the nearest +0.50 diopter. Near visual acuity is defined as the ability to read at a distance of 40 cm in the participant’s usual visual state (using a logMar E chart) [14]. In the present study optometric and ophthalmologic examinations were performed on all participants. Presbyopia was defined as at least 1 line of improvement on a near visual acuity chart with an addition of a plus lens. Ocular refraction was measured using both streak retinoscope and Topcon autorefractometer. Snellen visual acuity measurements were taken using a standard projected eye chart with black letters on a white background. Subjective refraction was performed on the right and then the left eye of all eligible subjects, both without[uncorrected visual acuity] and with [presenting visual acuity] spectacles. Refraction was performed using an automatic objective (Topcon) and retinoscop (Heine) and the result was used as a starting point for the subsequent subjective refraction. Information was sought on biodata of the participants and they were subsequently examined. Distance visual acuity for each participant was determined. Anterior and posterior segments of the eyes were examined. Objective refraction with subjective refinement was done on all subjects with distant visual acuity less than 6/6. Near visual acuity was assessed at 40 cm with distant correction in place if required. Questionnaires were administered to those identified as presbyopic on source of procurement of spectacles (if they had one) and on reasons for non-procurement of presbyopic spectacles. They were also asked to rate their

difficulty with various listed near work. Visual acuity (VA) with and without pinhole was tested using Snellen’s chart at 6 m. Anterior segment examination was done with torch light and head loupe. The posterior segment was examined with a direct ophthalmoscope. The best corrected visual acuity (BCVA) was recorded. Near visual acuity was measured binocularly using the N notation illiterate E chart at a distance of 40 cm from the eyes. An inextensible string was attached to the near vision chart and the other end placed against the subject’s forehead and held firmly to ensure a distance of 40 cm from the eye. Subjects with VAs of 6/6 were assumed emmetropic and tested for near vision as described above. Subjects with reduced vision that could not be improved by refraction and those with additional ocular pathology were referred to the tertiary eye care centres in the state. Simple ocular conditions like bacterial and allergic conjunctivitis were treated on site at no cost to the subjects. Presbyopic correction coverage were calculated and the results were analyzed using excel Program.

## 3. RESULTS

Seven hundred and fifty participants were included in our study. All of them were evaluated. Of the 750 subjects enumerated, 225 took part in the study (30% participation rate).

A total of 750 participants' records were evaluated. Of those, 450 (60%) cases were female and 300 (40%) case were male.

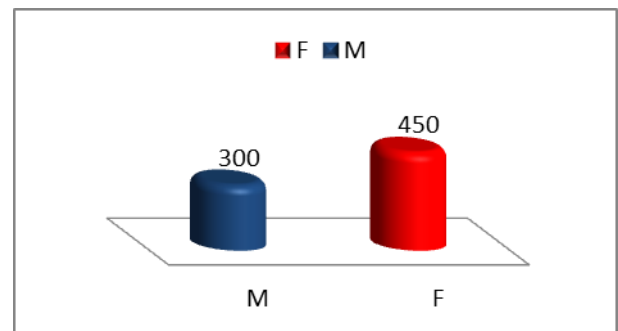
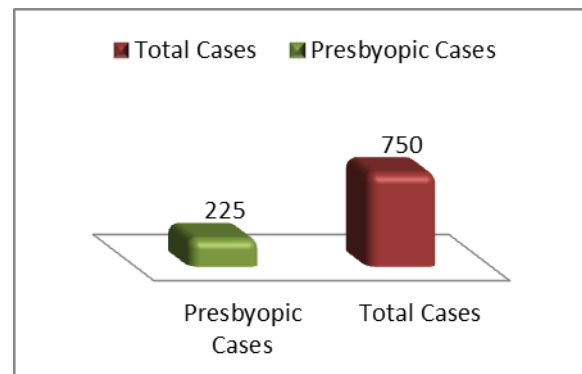


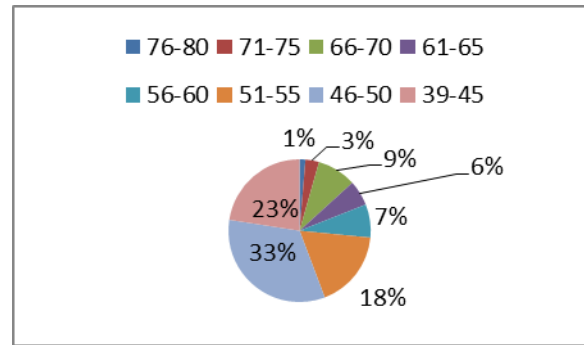
Figure 1. Gender

Two hundred-twenty-five (225) (30 %) of patients were presbyopia. Of those, 125 (55.55%) cases were female and 100 (44.45%) case were male.



**Figure2. Ratio between total cases and presbyopic cases**

The age range was 39–80 years. Fifty-one patients of presbyopic patients (22.66%) were with ages between 39-45 year, seventy-five patients (33.33%) were with ages between 46-50 year, forty patients (17.77%) were with ages between 51-55 year, seventeen patients (7.55%) were with ages between 56-60 , thirteen patients (5.77%) were with ages between 61-65 year, twenty patients (8.88%) were with ages between 66-70 year, six patients (2.66%) were with ages between 71-76 year, three patients (1.33%) were with ages between 76-80 year.



**Figure 3. Age groups in presbyopic cases**

According to the table 1 it shows frequency of refractive errors in presbyopic eyes for far and also it shows the all cases had or no had spectacles in the present study.

**Table 1. Frequency of refractive errors in presbyopic eyes for far**

Age Groups	39-45	46-50	51-55	56-60	61-65	66-70	71-75	76-80
Total Case No.	51	75	40	17	13	20	6	3
Total Eyes	102	150	80	34	26	40	12	6
*Types of RE: Far	PLANO:45	PLANO: 50	PLANO: 21	PLANO: 8	PLANO: 1	PLANO: 6	PLANO: 1	PLANO: 0
	M:3	M: 5	M: 4	M: 1	M: 2	M: 3	M: 0	M: 0
	H:3	H:10	H: 20	H: 3	H: 4	H: 6	H: 4	H: 1
	SMA:6	SMA: 6	SMA: 7	SMA: 6	SMA: 3	SMA: 3	SMA: 0	SMA: 0
	SHA:7	SHA: 6	SHA: 6	SHA: 7	SHA: 4	SHA: 6	SHA: 2	SHA: 1
	CMA:11	CMA:21	CMA: 5	CMA: 3	CMA: 3	CMA: 5	CMA: 1	CMA: 1
	CHA: 10	CHA: 32	CHA: 10	CHA: 5	CHA: 6	CHA: 6	CHA: 2	CHA: 2
	MIX A: 7	MIX A:20	MIX A: 6	MIX A: 1	MIX A: 3	MIX A: 5	MIX A: 2	MIX A: 1
Had Spectacle	24	30	25	10	7	9	4	1
No had Spectacle	27	45	15	7	6	11	2	2

\*RE: Refractive Errors, Plano=0.00 D (In the present study plano was according to the subjective test), M: Myopia, H: Hypermetropia, SMA: Simple Myopic Astigmatism, SHA: Simple Hypermetropic Astigmatism, CMS: Compound Myopic Astigmatism, CHA: Compound Hypermetropic Astigmatism, Miexd Astigmatism. (Far refractive errors only in the presbyopic eyes).

#### 4. DISCUSSION

The finding in this study evaluated prevalence of presbyopia in a clinic of optometry in Kurdistan Region. The prevalence of presbyopia in this study was 30%. This study estimated that the onset of presbyopia about 39-40 years. The mean severity of presbyopia in the present series was higher in females aged less than 59.5 years Patel and West found that more than half of adults over the age of 30 have presbyopia [1]. Nwosu, who also

worked in south-eastern Nigeria, examined young adults 18–49 years and found a prevalence of 33% [15]. Marmamula et al found a prevalence of 63.7%, which is similar to the finding in this study [16]. Duarte et al., in Brazil estimated the prevalence of presbyopia in 3,000 adults of 30 years and older at 54.7 percent [17]. Although some studies reported the prevalence of presbyopia over the age of 30 years but it appears that the highest incidence of presbyopia is among 40 years of age and older [18]. Some studies examined for

functional presbyopia while others examined for objective presbyopia [19]. The varying differences in prevalence of presbyopia in studies from low- and middle-income countries may arise from different definitions of presbyopia, different minimum age of study subjects and different examination conditions (outdoors or indoors). A limitation of this study was that some of the participants were not sure of their date of birth. Historic events were used to estimate their age.

## 5. CONCLUSION

Our study is the first study of presbyopia in Kurdistan Region of Iraq, with the aim of determining the prevalence of presbyopia in optometry clinic. The results of this study indicate that the presbyopia is a more common problems in clinics of optometry. The prevalence of presbyopia in this study was high. In conclusion, this study indicated a strong association between age and the development of presbyopia. The evaluation and management of presbyopia are important because significant functional deficits can occur when the condition is left untreated. Undercorrected or uncorrected presbyopia can cause significant visual disability and have a negative impact on the patient's quality of life. Increasing the met presbyopic need should involve screening those over 40 years of age, distribution of economically friendly spectacles, and follow-up of recipients of spectacles.

## 6. ACKNOWLEDGMENT

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