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Prevalence of Refractive Errors in the people of south kashmir visiting a tertiary care hospital.

Dr.Mohd. Yousuf Dar, Dr.Mudasir Zahoor Bhat
Associate professor, department of ophthalmology, govt. Medical college,anantnag.
Senior resident,department of ophthalmology, govt. Medical college,anantnag.

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ABSTRACT :
Aim: To report the prevalence of refractive errorsin persons 40 years and older visiting a tertiary care hospital in south kashmir.
Method and Material: The present study was a hospital based prospective study. The sample studied consisted of 1500consecutive patients aged 40 and above. The refractive status of the participants was measured with an auto refractometer and then the final prescription was tested with subjective refraction using a Snellen test chart in order to achieve 6/6 visual acuity. Aphakic eyes or eyes undergone cataract surgery, were excluded from analysis. Also eyes found to be < ± 0.50 Ds or having mixed astigmatism ± 0.25 Dc were considered to be emmetropic having 6/6 or 6/6 (-) visual acuity.
Results: Prevelance rates were determined for myopia 45.4%, hypermetropia 19.8%, and emmetropia 34.8%. Myopia was categorized as low myopia (-0.50 D to -3.00 D) with 31.6% prevalence, as moderate myopia (-3.00 D to -6.00 D) with 12.6% prevalence and high myopia (>-6.00 D) with 1.2% prevalence. Hypermetropia categorized as low hypermetropia (+0.50 D to +2.00 D) with 12.4% prevalence, as moderate hypermetropia (+2.00 D to +4.00 D) with 5.9% prevalence and high hypermetropia (> +4.00 D) with 1.5%.
Conclusions: Refractive errors affect approximately 65% of the population (40 years or older) in the people of south kashmir visiting a tertiary care hospital.
Keywords: Refractive errors, myopia, hypermetropia, emmetropia, prevalence

I. INTRODUCTION

Blindness is one of the most significant social problems in India with uncorrected refractive errors as the second major cause of blindness and low vision. Refractive error may be defined as a state in which the optical system of the non-accommodating eye fails to bring parallel rays of light to focus on the fovea. In myopia the optical system of the eye brings parallel rays of light into focus anterior to the fovea while in hyperopia the optical system of the eye brings parallel rays of light into focus posterior to the fovea, both resulting in blurred vision.
It should be noticed that in mild to moderate hyperopia, blurred vision can be overcome by accommodation in youth and early adulthood, with the result that low degrees of hyperopia often are not noticed until the onset of presbyopia in middle adulthood. Myopia results in blurred vision at all ages. Most usually all types of ametropias can be corrected with spectacles, contact lenses, or refractive surgery.

AIMS AND OBJECTIVES: The study was conducted in the department of ophthalmology GMC Anantnagto estimate the prevalence of refractive errorsin persons 40 years and older.

II. MATERIALS AND METHODS:

The present study was a hospital basedprospective study conducted in the department of ophthalmology GMC Anantnag during the period January 2019 to January 2020. A total of 1500 participants (633 men 42% and 867 women 58%) took part in the study. As part of our standardized examination, an automated objective refraction test was performed on each participant with an AutoRefractometer. Visual acuity was then measured with a Snellen test chart at 6 meters under standard lighting conditions, and measured initially using any corrective spectacles the participants were currently using. The study was conducted between January 2019 to july 2019. All subjects underwent acomplete ophthalmic examination, including detailed history of ophthalmicand systemic problems, best corrected visual acuity accordingto the modified Early Treatment Diabetic Retinopathy Study (ETDRS)chart ,applanationtonometry, gonioscopy, grading of lens opacities using the Lens OpacitiesClassification System (LOCS) II, fundus examination, and random blood sugar estimation.

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Monocular visual acuity was determined with current spectacleprescription if any. The best corrected visual acuity was ascertained and recorded.Refraction data are based on subjective refractions. Only the right eye of each subject was considered.

Emmetropia was defined as a spherical equivalent between –0.25and +0.25 diopter sphere [DS]. Myopia was defined as a sphericalequivalent less than –0.50 DS and a spherical equivalent less than –6.00 DS was classified as high myopia. Hyperopia was definedas a spherical equivalent greater than +0.50 DS. Astigmaticcorrection was prescribed in the minus cylinder format, and astigmatismwas defined as a cylindrical error less than –0.50 diopter cylinder(DC) in any axis. Astigmatism was defined as with the rule if theaxis lay between 15° on either side of the horizontal meridian, againstthe rule if the axis lay between 15° on either side of the verticalmeridian, and oblique if the axis lay between 15° and 75° or between 105° and 165°. Significance was assigned at $P < 0.05$ level for all parameters.

III. RESULTS:

Among the randomly selected 1500 subjects, all were residents of south Kashmir. The gender ratio (men to women) was 633/867 (42% men and 58% women) for participants. The mean age of the participants was 53.1±10.2 years. The age distribution amongst the sample-population was 40-49 years 37%, 50-59 years 31%, 60-69 years 25%, >70 years 7% (Figure 1). The age distribution amongst men of the sample-population was 40-49 years 38%, 50-59 years 33%, 60-69 years 24%, >70 years 5% (Figure 1). The age distribution amongst the women of the sample-population was 40-49 years 37%, 50-59 years 31%, 60-69 years 25%, >70 years 7% (Figure 1).

Age	Men	Women	Total
40-49	241	321	562(37%)
50-59	209	269	478(31%)
60-69	152	217	369(25%)
>70	31	60	91(7%)

Figure1.Distribution of age and gender amongst the sample population .

Taking in to account the results for the entire sample-population, the mean refractive error (Spherical Equivalent) in the right and left eyes averaged – 0.6907 D ± 1.9369 and - 0.7458 D ± 1.9855, respectively.

The distribution curve of spherical refractive error was normally distributed but was slightly skewed to the myopic end. Because the spherical equivalent was highly correlated between the right and left eyes, only the results from the right eyes are taking into account and presented to the rest of the statistical analysis.

In the entire study population prevalence rates were determined for myopia 45.4%, hypermetropia19.8%, and emmetropia34.8%. (Figure 2.)

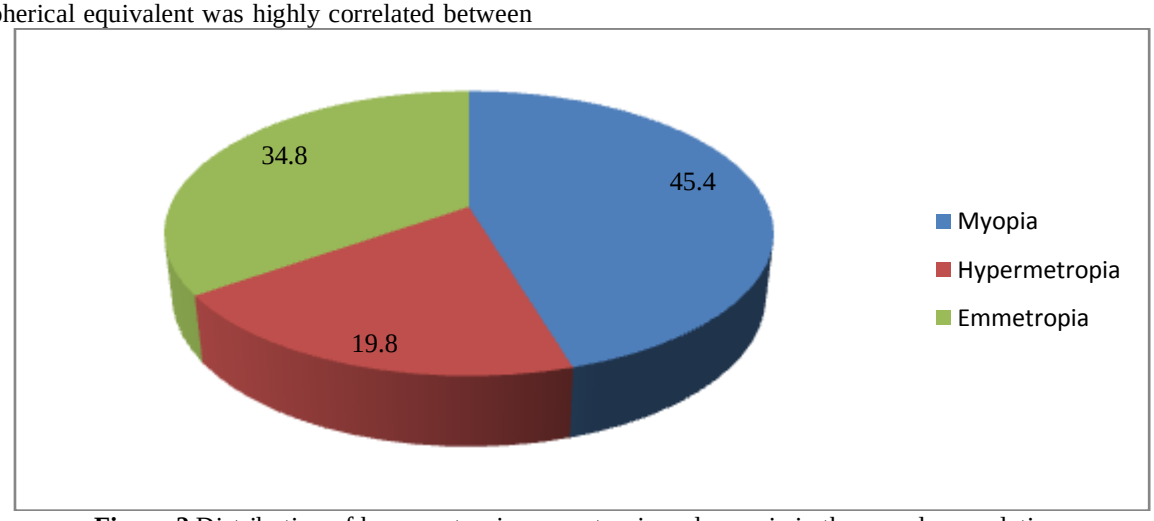

Figure 2. Distribution of hypermetropia, emmetropia and myopia in the sample-population.

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In the entire study population prevalence rates of astigmatism were determined in 61.60% of the population(Figure 3), the mean astigmatic error in the right eye averaged 0.7297 D ±0.4172. It is understood that refractive errors prevalence differs as age increases where participants become more hyperopic especially after 70 years old.

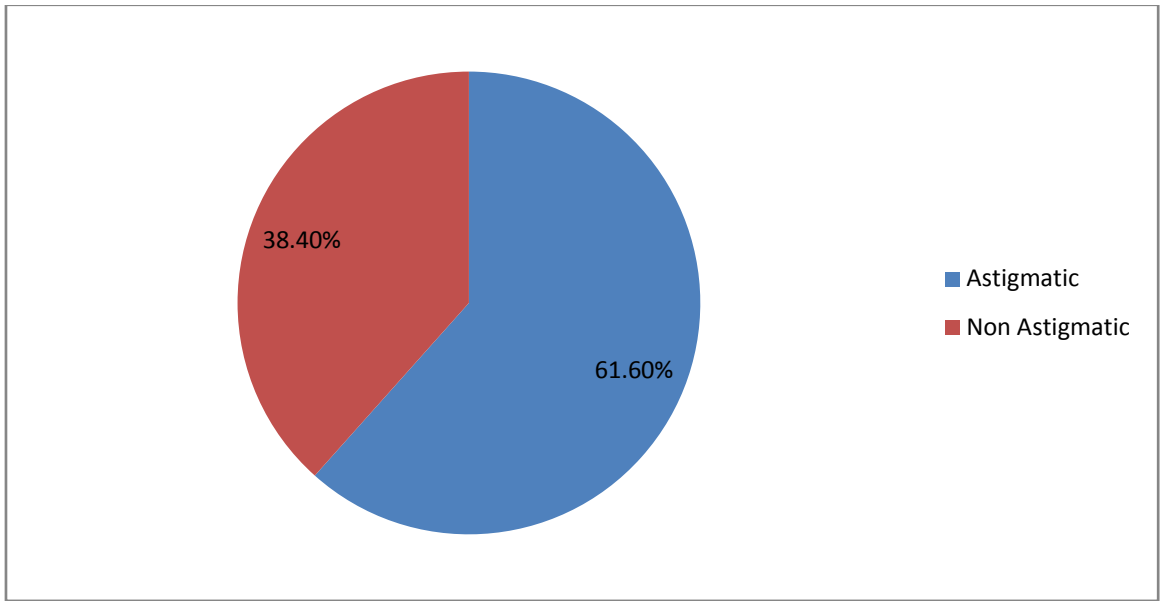

Figure 3. Prevalence of astigmatism in the entire population-study.

Myopia was categorized as low myopia (-0.50 D to -3.00 D) with 31.6% prevalence, as moderate myopia (-3.00 D to -6.00 D) with 12.6% prevalence and high myopia (>-6.00 D) with 1.2% prevalence. Hypermetropia categorized as low hypermetropia (+0.50 D to +2.00 D) with 12.4% prevalence, as moderate hypermetropia (+2.00 D to +4.00 D) with 5.9% prevalence and high hypermetropia (> +4.00 D) with 1.5%. (Figure 4.)

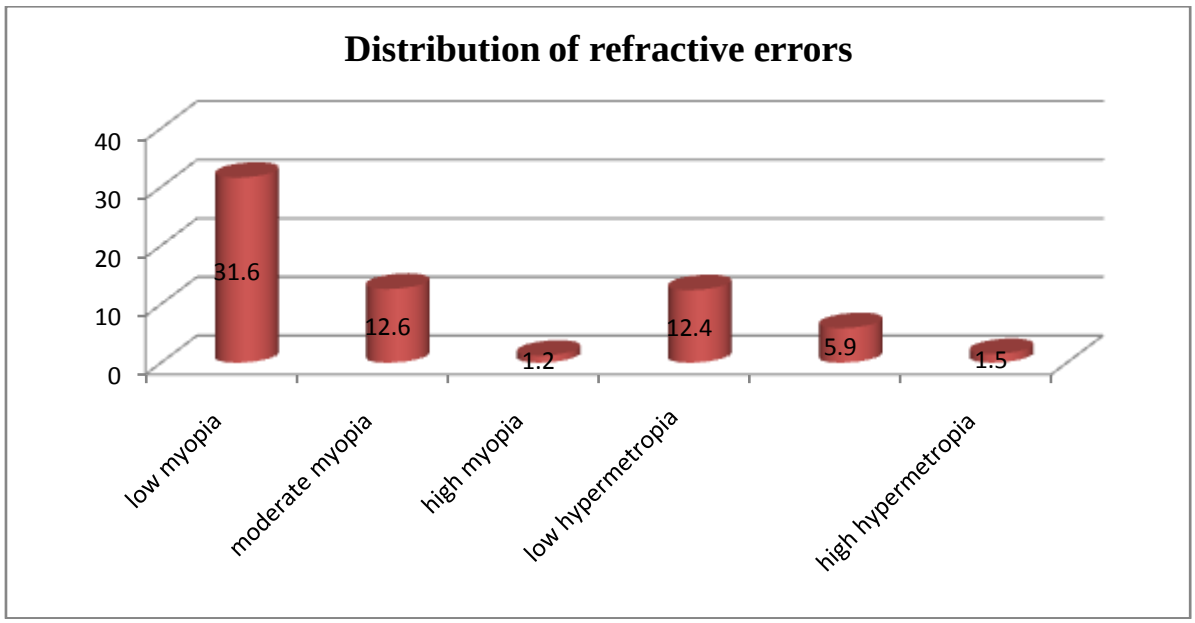

Figure 4. Distribution of the refractive error Spherical equivalent in the whole sample-population according to low myopia (-0.50 D to -2.00 D), moderate myopia (-2.00 D to -6.00 D), high myopia (> -6.00 D), low hypermetropia (+0.50 D to +2.00 D), moderate hypermetropia (+2.00 D to +4.00 D) and high hypermetropia (> +4.00 D).

IV. DISCUSSION

This study provides the first population-based data on the prevalence and distribution of refractive errors in persons 40 years and older in the people of south kashmir visiting a tertiary care hospital. Also provides an opportunity to compare the prevalence of refractive errors with other ethnic populations in similarly aged elderly groups. The mean refractive error (Spherical Equivalent) for both eyes checked averaged 0.7182 D myopic which was same as the mean astigmatic error 0.7297 D. Refractive errors affect approximately 65% of the population (40 years or older) in the people of south kashmir visiting a tertiary care hospital. The frequency for myopia was 45.4%, hypermetropia19.8%, and emmetropia34.8%, which findings aresimilar to those found in other Asian surveys. In the present study the age groups between 50 to 69 years old, for both genders, had results within the confidence limits of the entire population, while for the age group of 40 to 49 years old the participants were more myopic again for both genders (males were 2% more than women). For the elderly group of people over 70 years old the results presented a remarkable shift to the hyperopic side reducing the percentages of myopia approximately half of the result for the entire population.

The use of non-cycloplegic auto-refraction is a point in our study that someone might be against it and criticize it. Because in our study population the participants were over 40 years old, we did not expect excessive residual accommodation to become a problem and alter our results.The sample of participants is not representative for the population of India due to the fact that this study did not link refractive error with other factors such as environmental, occupational (nearwork-related), education level, living standards (income) and general health.

V. CONCLUSIONS:

The results indicate that refractive errors affect approximately more than half of the population (40 years or older) in the people of south kashmir. Myopia prevailed in 45.4%, with the majority being low (≤ - 2.00), while hypermetropia prevailed in 19.8%, also with the majority being low (≤ + 2.00) of the entire sample population. Refractive errors prevalence differs with age, where hypermetropia prevails especially after 70 years old. Also the results showed that there is no significant difference between the two genders. These data on the prevalence of refractive errors can be useful for the planning of refractive eye-care services.

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