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### RESEARCH ARTICLE

#### DISTRIBUTION OF IOL POWER AMONG CATARACT PATIENTS ATTENDING TERTIARY CARE EYE HOSPITAL - A CLINICAL STUDY

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#### Abstract

**Objectives:** To know the distribution of IOL power among cataract patients attending tertiary care eye hospital.

**Materials and Methods:** A hospital based prospective study was conducted on 2788 cataract patients attending tertiary care eye hospital from March 2022 to November 2022. All patients were subjected to detailed history taking and ocular examination. Age, gender, operating eye and power of IOL were noted.

**Results:** A total number of 2788 cataract patients were recruited for this study. Out of 2788 patients, 1644 (59%) were females and 1144 (41%) were males. Majority of the patients were in the age group of 51-65yrs (54.9%) followed by 36-50yrs (22.2%) with female predominance. Among 2788 patients with cataracts the operating eye was right eye for 51.6% & Left eye for remaining ones. In all age groups commonest IOL power is in the range of 19 to 23D, the most common IOL Power in the age group 51-65yrs, 36-50yrs & 21-35yrs is 21.5D where as in 66-80yrs is 21D. The highest IOL Power notes of age groups 51-65yrs is 34.5D, 36-50yrs is 29D, 66-80yrs is 33D, 21-35yrs is 25D & <20yrs is 32D where as the lowest IOL Powers for the above age groups is 1D, 3D, 1D, 10D & 16D respectively. The overall mean IOL power noted is 21.2D. The median IOL power noted in >80yrs is 22D higher than the other age groups which may be due to decreasing axial length and anterior chamber depth with increasing age. The required IOL power is higher in females (mean IOL Power 21.5D) than males (mean IOL power is 21D) which may be due to shorter axial length in females. No difference noted in IOL Powers between Right & left eye.

**Conclusion:** Based on our study we conclude that the commonest age group presenting with Cataract is 51-65yrs with female preponderance. The commonest mean of IOL power noted is 21.2D. Females are requiring more IOL power than males which may be due to their shorter axial length and shallow AC depth. Highest mean IOL power

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among all is noted in age group >80yrs, which may be due to decreasing Axial length with increasing age. There is no difference noted in mean IOL power between Right & Left Eye. This study concludes that IOL power requirement varies with Age, Gender and Ethnicity. Calculation of IOL power should be done with utmost care to avoid post-operative refractive errors.

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### **Introduction:-**

According to the world health organization estimation in 2010, proclaimed in vision 2020, “Global Initiative for the Elimination of Avoidable blindness 2020”, there were 285 million visually impaired persons in the world out of them 39 million are blind. Cataract is the major cause of blindness (51%) and is responsible for one third of visual impairment (33%).<sup>1</sup> At present rapid visual rehabilitation is the main objective of the cataract surgery with optimum uncorrected visual acuity and with minimum postoperative astigmatism.<sup>2</sup> The final postoperative visual acuity is dependent on the pre-existing corneal astigmatism, accurate biometry, intraocular lens (IOL) power calculation and surgically induced astigmatism. The main determining factor to achieve the desired refractive outcome after cataract surgery is the accurate measurement of axial length (AL). The preoperative and the postoperative ultrasound biometry demonstrated that 54% of the error in predicted refraction after implantation of an IOL is attributed to axial length measurement errors, 8% to corneal power measurement errors, and 38% to errors in the estimation of the postoperative anterior chamber depth.<sup>3</sup> An error of 100  $\mu\text{m}$  in axial length measurements lead to about 0.28 diopter (D) of postoperative refractive error.<sup>4</sup> A significant amount of the clinical research consider women and men in a sex neutral form as patients, implicating thereby that the population is considered as homogenous and that the results have validity for both sexes. Even when calculating the power of the intraocular lens to be implanted during cataract surgery, different formulae are used in a unisex manner, the same for women and men.<sup>5</sup> Richards et al, found that using the same surgical procedure and the same calculation of the power of the implanted lens, the results for women were worse than for men. He recommended that special care be taken when implanting an intraocular lens in a female patient, especially in the accuracy of measurement of the axial length.<sup>6</sup> Since, the biometric indices can be influenced by gender, race and genetics, their differences across different population would help to determine the distribution of these parameters in different area. This study was undertaken focusing on power of the intraocular lens in elderly Indian patients attending Government regional eye hospital, Visakhapatnam and particularly on possible differences in IOL power among different age groups, men & women.

### **Aims And Objectives Of The Study:**

- 1) To know the distribution of IOL power among patients attending tertiary eye hospital for cataract surgery.
- 2) To know the commonest IOL power among them.

### **Materials and Methods:-**

A hospital-based Prospective study was carried out in the Department of Ophthalmology, Government regional eye hospital, Visakhapatnam, from March 2022 to November 2022. We reviewed medical data on patients admitted for routine cataract surgery from 2788 patients. Routine cataracts were defined as cataracts occurring with no associated pathology which could possibly affect the measurements or distort the anatomy of the eye. Patients with corneal disease, extensive pterygium, previous ocular surgeries, high myopia with posterior staphyloma, glaucoma and previous ocular trauma were excluded from the study. All the patients had undergone complete ophthalmologic examination including visual acuity, refraction, slit-lamp examination, tonometry, keratometry, ultrasound A-scan and B-scan if required. Axial length was measured using A-scan (Palmscam AP200). Keratometric data were collected using Bausch and Lomb keratometer (AppaSamy). The Sanders-Retzlaff-Kraff (SRK/II) linear regression formula was used for IOL power calculation in all cases and ‘A’ constant of 118.5 was used.

### **Results:-**

A total number of 2788 cataract patients were recruited for this study. Out of 2788 patients, 1644 (59%) were females and 1144 (41%) were males (Figure 1). Majority of the patients were in the age group of 51-65 yrs (54.9%) followed by 36-50yrs (22.2%) and %. There is female dominance seen in all age groups. Among 2788 patients with cataracts the operating eye was right eye for 51.6% & Left eye for 48.4%. In all age groups the commonest range of IOL Power noted is 19 to 23D. The most common IOL Power in the age group of 21-65yrs is 21.5D where as in 66-

80yrs is 21D. The highest IOL Power noted among age group 51-65yrs is 34.5, 36-50yrs is 29D, 66-80 yrs is 33D, 21-35 yrs is 25D & <20yrs is 32D. The lowest IOL Powers for the age group 51-65yrs is 1D,36-50yrs is 3D,66-80yrs is 1D, 21-35yrs is 10D & <20yrs is 16D. The mean IOL power noted is 21.2D. The median IOL power noted in >80yrs is 22D which is higher than the other age groups may be due to decreasing axial length and anterior chamber depth with increasing age. The requirement of IOL power is higher in females (mean IOL Power 21.5D) than males (mean IOL power is 21D) which may be due to shorter axial length in females. Difference in IOL Powers noted between Right & left eyes any be due to difference in ocular biometric parameters between the eyes.

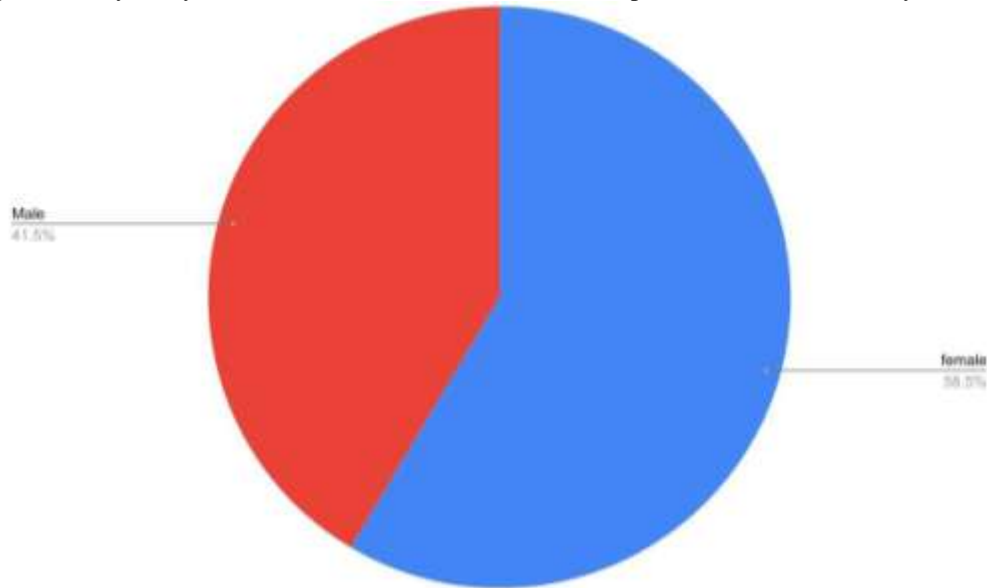


Figure 1:- Sex Distribution.

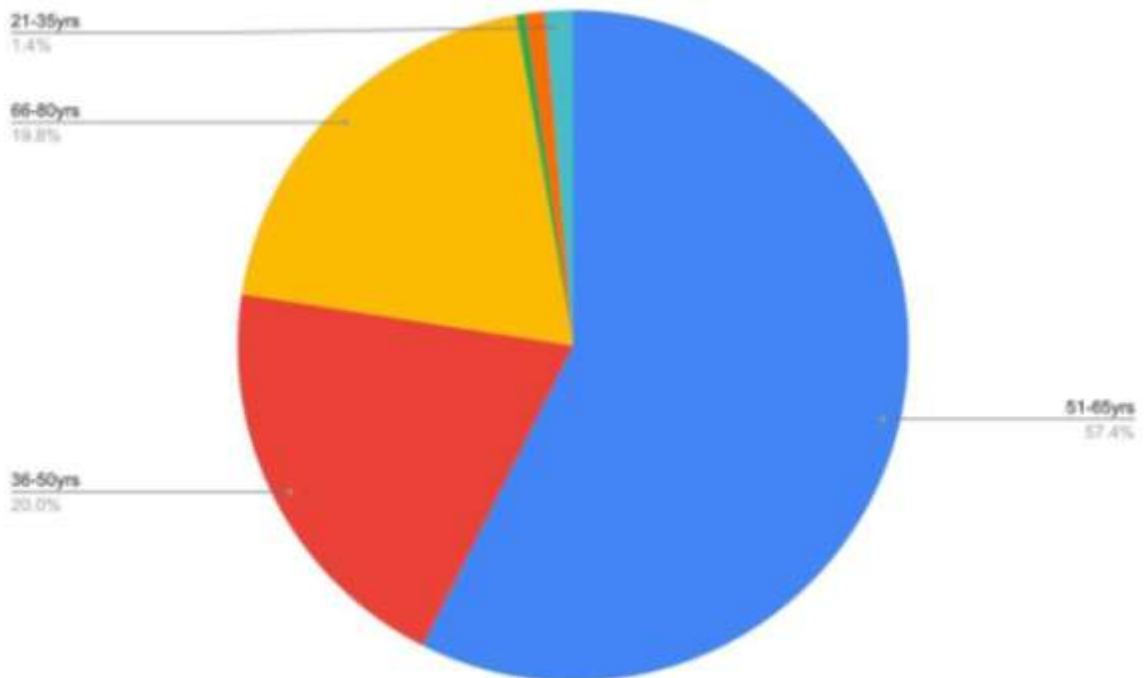
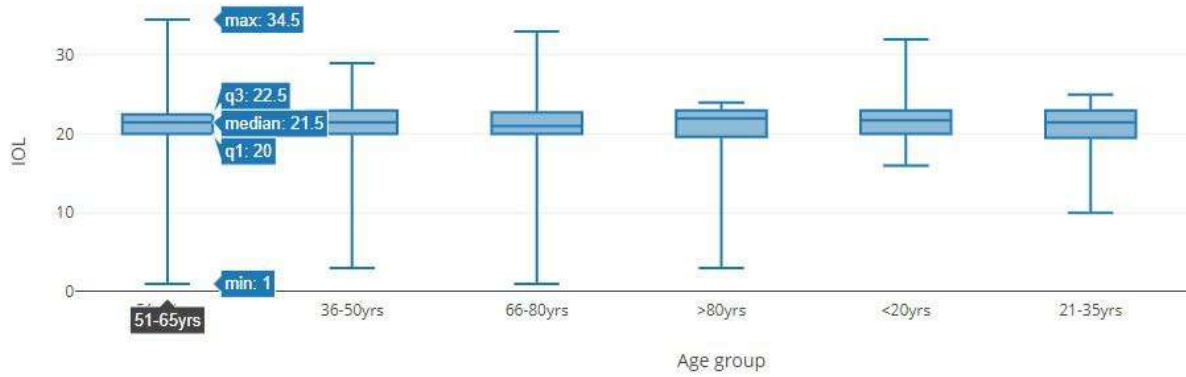


Figure 2:- Age Group Distribution.

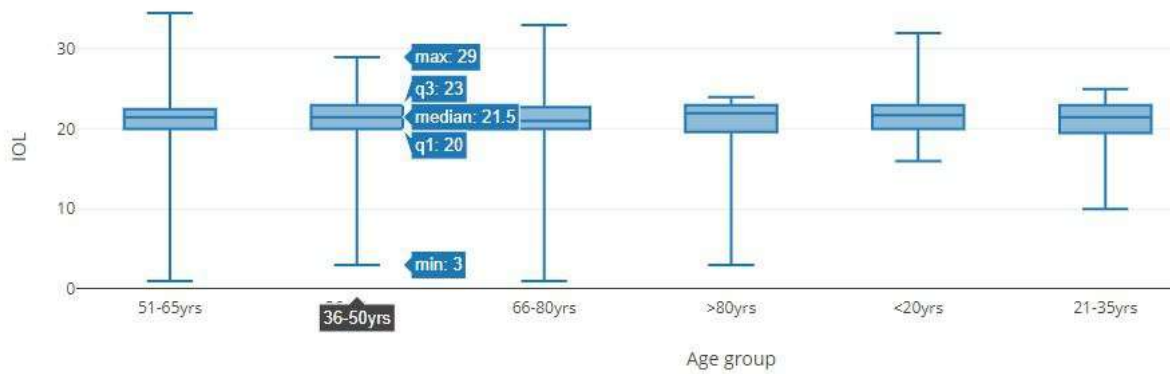


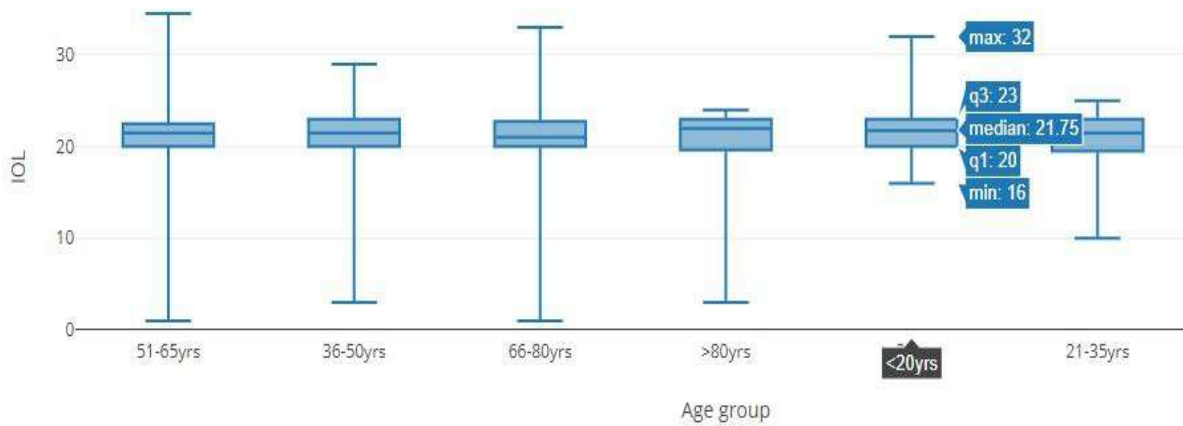
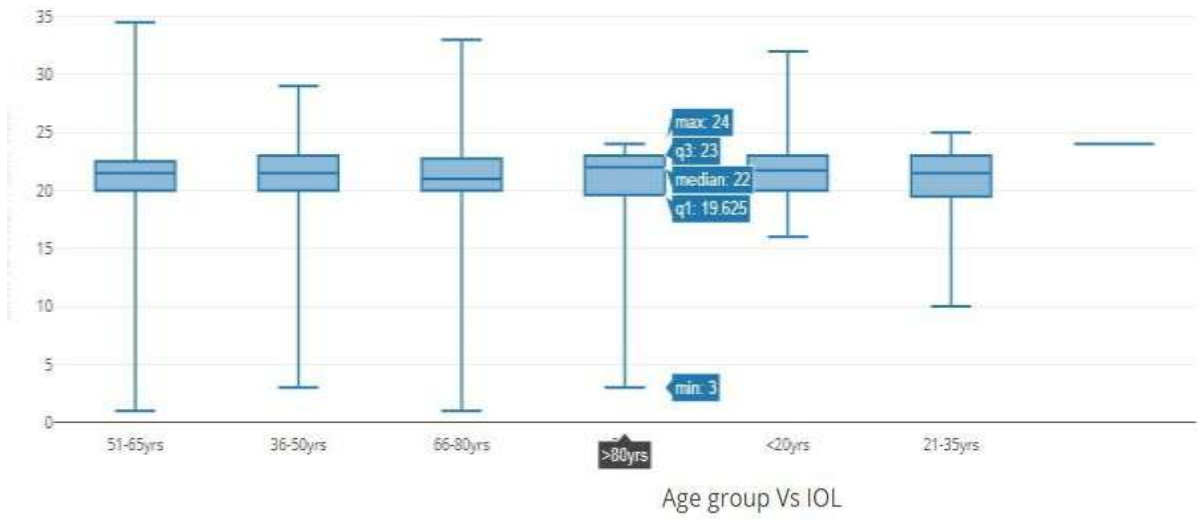
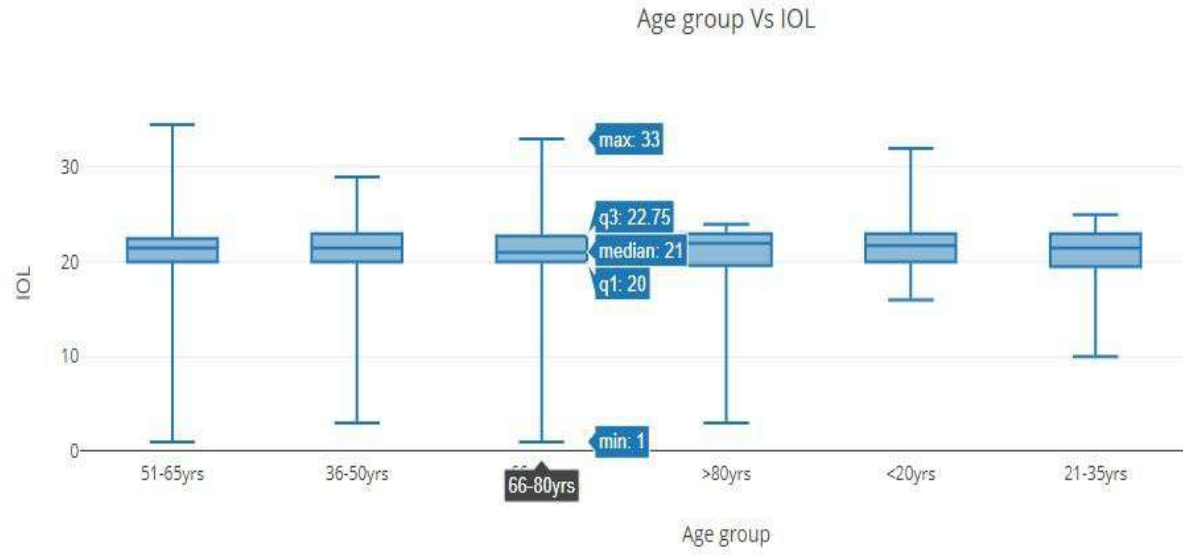
Figure 3:- Operating Eye.

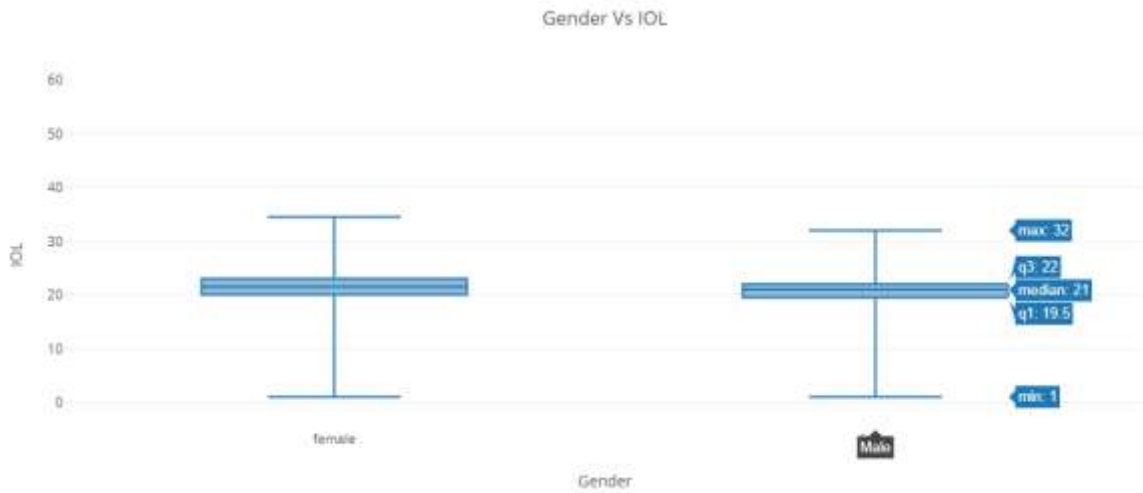
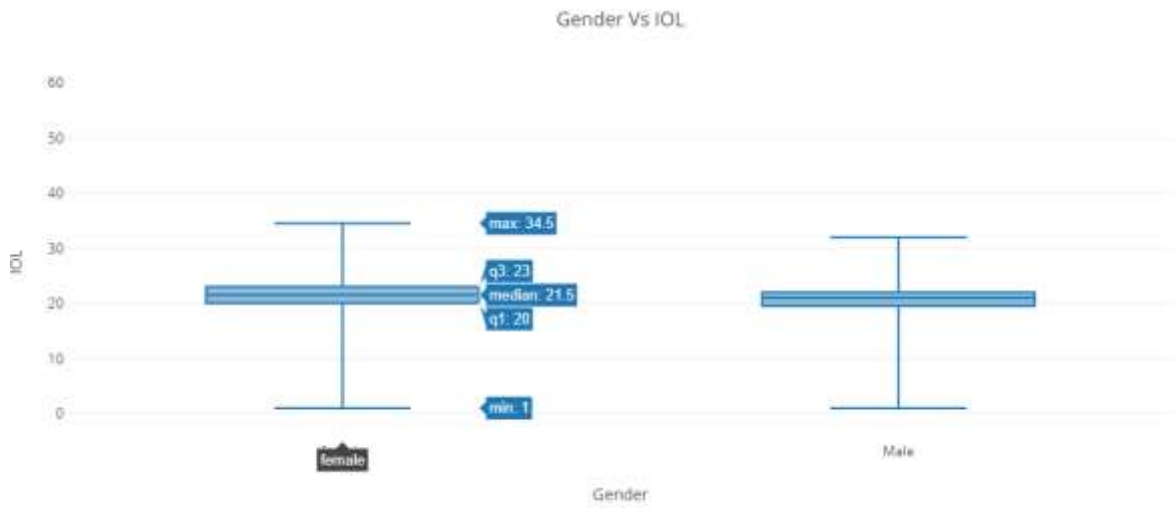
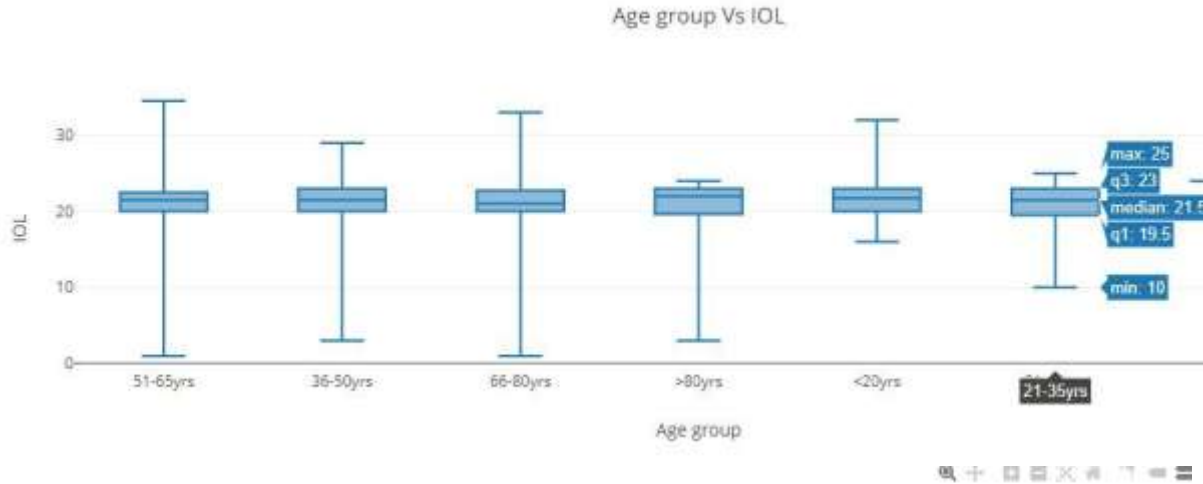
Age group Vs IOL

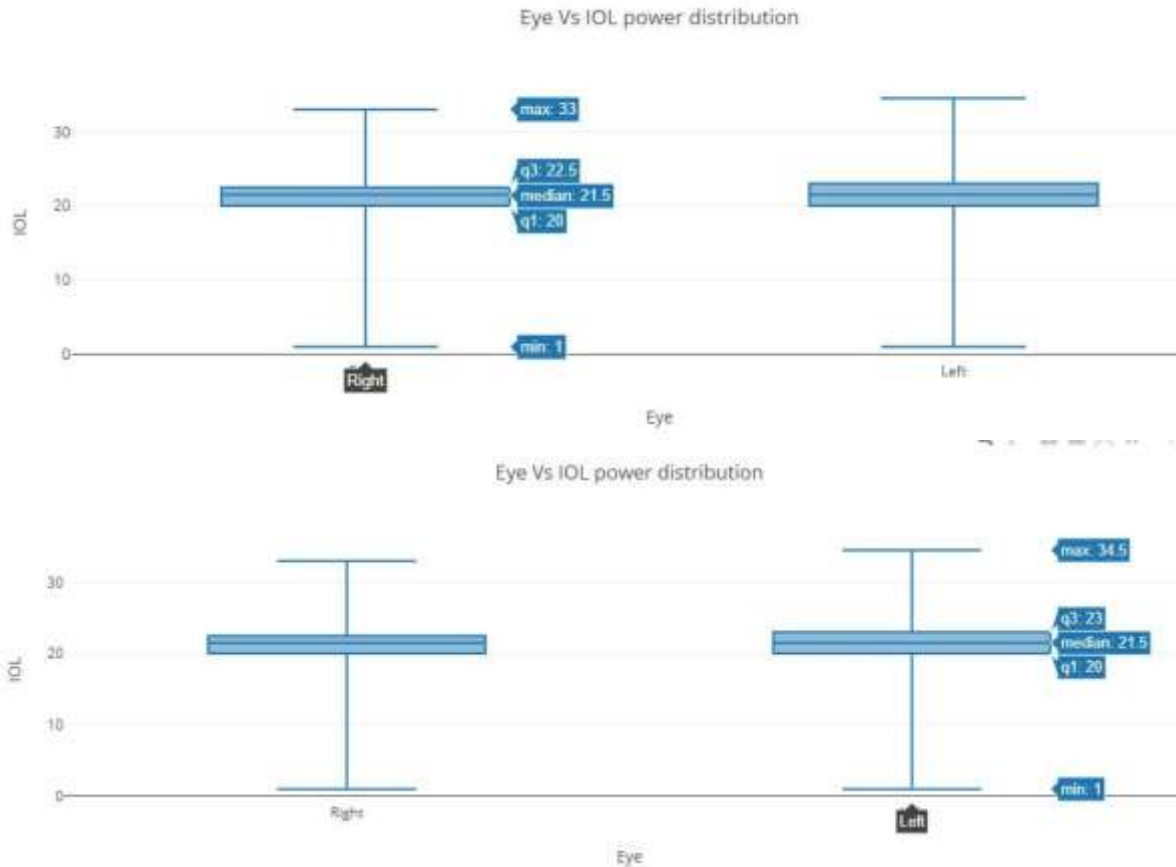


Age group Vs IOL









### Discussion:-

The aim of our study was to describe the distribution of IOL power among patients attending cataract surgery in tertiary care eye hospital & we found that the majority of patients were in the age group age of 51-65yrs(54.9%), followed by 66-80yrs (22.2%). Our findings were similar to the study performed by the Shoaib et al<sup>13</sup> who reported the mean of their studied patients is  $63.05 \pm 10.52$  yrs .This is also similar to the observation made by Shori et al, in their study where 37% of patients fell in 50-60 age group.<sup>7</sup> Age at the time of cataract operation varies from country to country example, in southern Chinese<sup>11</sup> mean age was  $70.4 \pm 10.4$  yrs. The mean age  $64.04 \pm 10.81$  yrs was reported by Natung et al.<sup>8</sup> This implies that the cataract problem increases with age. In our study the majority of the patients were females (59%) followed by males (41%). Nirmalan PK et al also reported lower number of cataract in males.<sup>9</sup> However, Shoaib et al, who reported that in their study males were 54.79% & females were 45.2%, Natung et al<sup>8</sup> and Nigam et al<sup>10</sup> also reported that males were more than the females. Seah SK et al observed that prevalence was similar for males and females. Increased incidence of cataract in females can be attributed to multiple factors like lower nutritional status, confinement to household chores which mostly require near vision and cultural insensitivity to a female's health needs.<sup>11</sup> In our study, we noted that commonest range of IOL power noted is 19D to 23D. The mean IOL power noted is 21.2D which is nearer to the one study done in Nepal & other studies.<sup>12,13,14</sup> The median IOL power noted in >80 yrs is 22D which is higher than the other age groups may be due to decreasing axial length and Anterior chamber depth with increasing age.<sup>15,16,18</sup> The requirement of IOL power is higher in females (mean IOL Power 21.5D) than males (mean IOL power is 21D) similar to one study done in NewZealand<sup>17</sup> other study<sup>18</sup>, which may be due to shorter axial length in females. No Difference noted in IOL Powers between Right & left eyes which is not similar to the study done in Newzealand.<sup>17</sup>

### Conclusion:-

Based on our study we conclude that the commonest age group presenting with Cataract is 51-65yrs with female preponderance. The commonest mean of IOL power noted is 21.2D. Females are requiring more IOL power than males which may be due to their shorter Axial length and Shallow AC depth. Highest mean IOL power among all is

noted in age group >80yrs may be due to decreasing Axial length with increasing age. There is no difference noted in mean IOL power between Right & Left Eye. This study concludes that IOL power requirement varies with Age, Gender and Ethnicity. Calculation of IOL power should be done with utmost care to avoid Post-operative refractive errors.

**Conflicts Of Interest:-**

The authors declared no conflicts of interest.

**Authors Funding:-**

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