

## Human cataract prevalence in Thiruvananthapuram district of Kerala state

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### ABSTRACT:

**Aim:**-Hospital based study from April 2005 to March 2011 conducted among the population to determine the prevalence of cataract in Thiruvananthapuram district of Kerala state of India.

**Methodology:**-The data's collected from registers of ophthalmology department of district hospital Regional Institute of Ophthalmology and private hospital in Thiruvananthapuram district to access the gender prevalence and prevalence of different age groups. The total number of cataract operation carried in Thiruvananthapuram district was collected from Directorate of Health, Thiruvananthapuram to evaluate the prevalence among the total population. Significance of cataract prevalence was analysed using MATLAB and SPSS statistical package.

**Result:-** Among the total population cataract prevalence in Thiruvananthapuram district was increased from 0.35 % to 0.48% ( $p = 0.001$ ). Gender prevalence is significantly higher in females (51.9%, 0.004) than in males, suggest that females are more cataract patients. A significantly highest prevalence recorded in the age group of 61-70 years (34.3%, 0.00001) compared with other age groups between 0-100 years.

**Conclusion:-**The present studies of cataract prevalence in Thiruvananthapuram district may to some extent throw light on the gravity of cataract incidence in Kerala state. The present study has shown that Kerala has been able to arrest the increasing prevalence of blindness by improving the general health conditions of individuals and by decreasing the population growth. Kerala still has a problem of treatable blindness, despite being a state with total literacy and good health infrastructure. So a community based programme is also a good strategy for decreasing the cataract prevalence.

**KEY WORDS:** Human cataract, Prevalence

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### I. INTRODUCTION

According to World Health Organization's (2011) global estimate, there are 285 million people worldwide who are visually disabled, of whom 246 million have low vision and 39 million are blind, and the number is steadily increasing because of population growth and aging. Approximately 80% of visually impaired people live in the low-resource developing countries of Africa and Asia, mostly in rural areas with few or underutilized eye-care facilities and that more than two-thirds of all blindness is avoidable ie. either preventable or curable. Nearly a fifth of them are in India. Evidence from prevalence data suggest that cataract blindness is increasing, particularly in view of aging population trend which is expected substantially to increase the new cases of blindness from cataract (Minassian, D.C and Mehra,V., 1990).

Health inequities are related to social determinants based on gender, socioeconomic status and ethnicity, race, living in a specific geographic region, or having a specific health condition. Such inequities were reviewed for blindness and visual impairment by searching for studies on the subject in Pub-Med from 2000 to 2011 in the English and Spanish languages (Ulldemolins *et al.*, 2012).Cataract is the leading cause of visual impairment worldwide, and any means of delaying or preventing its onset would have enormous social and economic benefits. The prevalence of blindness and low vision in the Nantong, area in China was lower than that in northern, southern and western China and the prevalence of blindness and low vision increased with age and females and illiteracy were more likely to have blindness and low vision than that of males and literate (Li L *et al.*, 2006). An epidemiological survey of blindness and low vision was carried out in Hebei Province in China showed a prevalence of 0.37% (Song X J, 1992). Blindness due to cataract in India is estimated to have a prevalence of 0.8-1% (Finger R.P, 2007., Dandona, 2001) causing 62% of bilateral blindness in persons aged 50 years or more (Finger R.P, 2007., Venkata, G, *et al.*, 2005).

## **II. PATIENTS AND METHODOLOGY**

This research is an epidemiological descriptive study of Thiruvananthapuram districts of Kerala state of India. Study mainly focused on prevalence among the total population, gender prevalence and prevalence in different age groups. Thiruvananthapuram is the state capital of Kerala. Previously the name of the district was Trivandrum. The district lies in the southern part of the state. The area of Thiruvananthapuram is 2,192 sq km. The total population of the district is 33,07,284, out of which 15,84,200 are males and 17,23,084 are females as per the census of 2011.

The data's collected from the registers of ophthalmology departments of district hospital Regional Institute of Ophthalmology and private hospital in Thiruvananthapuram district used for gender prevalence and prevalence in the different age groups. Prevalence among the total population calculated from the data's collected from the Directorate of Health, Thiruvananthapuram. The period of study was from April 2005- March 2011 i.e about the six financial years. . The census of Kerala for the years 2001 & 2011 along with the percentage of decadal growth of the population was used for population based epidemiological study. Significance of cataract prevalence was analysed using MATLAB and SPSS statistical package.

## **III. RESULT**

### **1) Prevalence among the total population**

Data of cataract cases of all the private and government eye hospitals in Thiruvananthapuram district were collected to find out the cataract prevalence on the basis of total population. Within six years the prevalence among the total population increased significantly ( $p=0.001$ ) from 0.35% to 0.48% and the prevalence per 10,000 population was increased from 35.04 to 48.30.

During the financial year 2005-06 a total of 11462 patients were treated in Thiruvananthapuram district showing the prevalence of 0.35%. Then it increased to 12643, 13476, 14985 and 15949 in consequent four financial years with a prevalence of 0.39, 0.41, 0.46 and 0.48% respectively. Percentage of cataract prevalence has increased from 0.35% in the year of 2005-2006 to a high percentage of 0.48% in the year 2010-2011 with 15973 patients as shown in the table.1. There was no decrease in between the six financial years. The prevalence was steady in 2009-10(0.48%) and in 2010-11(0.48%) and prevalence among 10,000 populations was slightly decreased from 48.33 to 48.30. Cataract prevalence increased significantly high ( $p=0.001$ ) in Thiruvananthapuram district within six years as shown in the Fig.1.

### **2) Gender prevalence**

The study was carried out on eight thousand five hundred and eighty one patients, comprising 4,128 males (48.1%) and 4,453 females (51.9%) between April 2005 and March 2011, admitted in the eye ward at one private and two government hospitals in Thiruvananthapuram district (Table-2). The female (51.9%) gender has shown a significantly ( $p=0.004$ ) more prevalence in Thiruvananthapuram district (Fig.2a & b).

### **3) Prevalence in different age groups**

A total of 8,581 patient's case history was collected from the operation registers of one private hospital, Regional Institute of Ophthalmology and district hospital in Thiruvananthapuram district. The patients aged between three months and 99 years have participated in Thiruvananthapuram district for the study. A significantly high prevalence ( $p=0.00001$ ) was found in the age group 61-70 ie. 34.3% ( $n= 2944$ ) in this coastal district. Congenital cataract or age group bellow 16 years (0-15) has a prevalence of 5.1% (Fig.3). Prevalence of 74.7% is between the age group of 51-80 and the prevalence of all the other age groups are not significant (table-3). Less prevalence noticed in the age group of 91 years and above (0.6%).

## **IV. DISCUSSION & CONCLUSION**

In this study cataract prevalence in Thiruvananthapuram district was significantly increased from 0.35% to 0.48% within six years. In Shandong Province, prevalence of binocular blindness was 0.34%, that of unilateral blindness 0.65%,(Yu X M,1992). A statistical analysis of a national sample survey of blindness and low vision in China among the whole population, the prevalence being 0.46% (Zhang S,1999). Saman Wimalasundera,(2008) reported that total prevalence of surgical cataract in Galle District is 0.32%.

Gender prevalence is significantly higher in females than males in Thiruvananthapuram (51.9%), suggest that cataract is more prevalent in females. Most of the studies have shown that cataracts are more prevalent in females than in males (Vaughan&Ausbury,1994., Kanski J.J Thelens, 1995). In another study from South East Asia, Xu et al.,1996 found that the prevalence of all types of lens opacities was higher in females than in males. In yet another demographic study on nutritional supplements and other factors that influence lens opacities in West Indies, Leske et al (1991) reported that women had an increased risk of cortical opacities. The view that cataracts

were more prevalent in females was again supported by findings of other workers (Brown et al., 1996, Livingtom et al., 1995, Javitt et al., 1996).

Women have a significantly higher prevalence than men, and nuclear cataract is the most common type (Erin&Katrina., 2008). It has been shown in Australian Blue Mountain study (Cumming & Michel.,1997 and Michel et al, 1997) that females gender is generally associated with increased age adjusted risk of cataract and the findings of the study is also similar to the Australian Study. Another study from Maharastra, Sharma et al, 2009 demonstrated that cataract is more common in females (48.8%) than males(31.9%), but another study from Hans et al.1996 was 67.3% males and 76.6% females. Thus result of two different studies (Hans et al, 1996) from same state differ as far as the sex difference of cataract prevalence is concerned. This in consistency in findings decrease the validity of results and shows that a disease can present differently even in close geographical areas and reflects a need of continuous and frequent surveillance in all areas.

In the present study cataract prevalence was highest in age groups of 61-70 years in Thiruvananthapuram (34.3 %). In this study prevalence of congenital cataract (0-15) is 5.1% in Thiruvananthapuram comparatively less than other age groups. This study has demonstrated that cataract affects all the age groups but adults are affected more than children. In adults the study showed that the number of cataract patients increased with age and cataract were more prevalent after 50 years. Xu J et al (1996), a population-based study of lens opacities, the proportion of population who have undergone cataract surgery has a marked increase in the decades after 40 yrs and sudden increase of after 50 years is higher. The changes were expected as a part of aging process and all the opacifications increased with age.

Study in Chandigarh among elderly population Sharma et al, 2009 shows that the proportion of persons with cataract was observed to increase from 69.9% in the age group of 65-74 years to 78.0% in the age group of 75 years and above. A study (Hans et al,1996) amongst individuals aged more than 40 years in the Maharastra (India) demonstrated that Cataract prevalence increased with age; it was just 0.4% in age group of 40-44 years and 24.9% in the age group of 70 years and above . Another study (Bachani et al, 2000) from seven high blindness prevalence states showed an overall 43.3% prevalence of cataract amongst 50 years and older individuals demonstrated that cataract prevalence was 25.5% among individuals aged 50-59 years and 63% among those age 70 years and above. The study from Punjab,India (Chaterjee,1982) covering elderly aged more than 75 years showed a 82% prevalence of cataract. All these studies taken individually and as a group demonstrate that cataract increases with age. The study covering seven states of Maharashtra,India demonstrated 25% prevalence in the age group of 70 years and above and no sexual predilection of cataract (prevalence in males 43.4% and in females 43.3%).

In India, nearly 74% of adult 60 years and older have cataract or have undergone cataract surgery according to a population based study. Prevalence of visual impairment of children in China is 1.1 per 1000. The prevalence of blindness is 0.33 per thousand and is close the level of developed country (Fu p et al. 2004). Childhood blindness is one of the priorities in vision 2020: the sight to sight. It is estimated that there are 1.4 million blind children in the world, two third of whom lives in the

developing countries (W.H.O, 1997 &2000) and that the cause of blindness in children varies according to region and socioeconomic development (W.H.O, 2000 & Gilbert et al, 1999). The prevalence of blindness in children is much lower than in adult. Dandona & Dandona(2003), reports the data on the blindness in children, defined as presenting visual acuity of <6/60 in the better eye, the definition of blindness used in India (Dandona et al, 2001), obtained as a part of two population based study in the Indian state of Andhra Pradesh. Blindness has been recognized as an important public health problem in India, a country that is now home to a billion inhabitants. India was the first country in the world to launch a 100% public funded programme for the control of blindness.

Skaat *et al.*, (2012), reported that a decline in the incidence of blindness from all treatable or potentially preventable causes (glaucoma, diabetic retinopathy, age-related macular degeneration and cataract) in Israel over the last decade, declining from 33.8 per 100 000 in 1999 to 16.6 per 100 000 in 2008.

Overall the survey indicates a slight increasing prevalence of cataract in the district and age and gender is the main risk factor of cataract. The high rate of cataract blindness in India and the aging population trend, which is expected substantially to increase new cases of blindness from cataract is a clear indication that the cataract blindness in India is too massive to be solved by the surgical programme alone. Cataract blindness in India can be effectively controlled only if effective strategies are developed to reduce the incidence of blinding cataract.

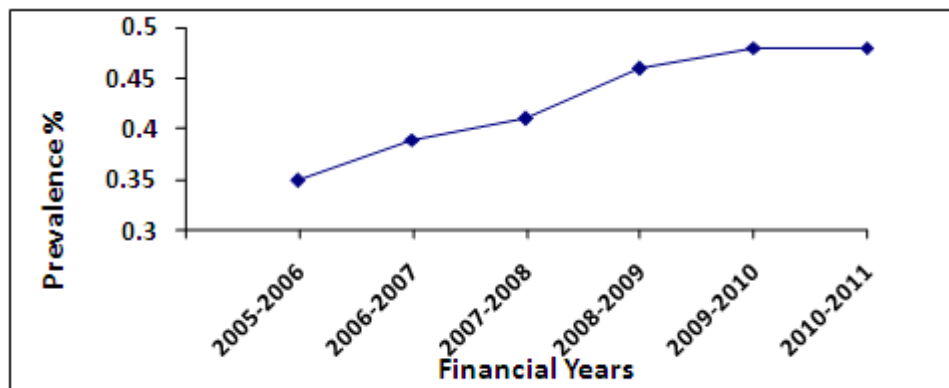
## REFERENCES

- [1]. Bachani D, Murthy GV, Gupta KS. (2000). Indian J Public Health. Rapid assessment of cataract blindness in India. 44(3): 82-9.
- [2]. Brown N. P. and Bron A. J. Lens disorders. (1996) In: A clinical manual of cataract diagnosis. Butterworth, Heinemann Ltd., London. Ed. 1. Pp. 91-132.
- [3]. Chatterjee A, Milton RC, Thyle S (1982) Cataract prevalence and aetiology in Punjab. Br J of Ophthalmol, **66**: 35-42.
- [4]. Cummings, R.G., Mitchell, P. (1997). Alcohol, smoking and cataract: the blue mountain eye study. Arch Ophthalmol. **115** : 1296-1303.
- [5]. Dandona, R & Dandona, L. (2003). Childhood blindness in India: a population based perspective. Br. J. Ophthalmol. **87**: 263-265.
- [6]. Dandona L, Dandona R, Srinivas M, et al. (2001) Blindness in the Indian state of Andhra Pradesh. Invest Ophthalmol Vis Sci.; **42**: 908–916.
- [7]. Finger RP.(2007) Cataracts in India: current situation, access, and barriers to services over time. Ophthal. Epidemiol. **14**: 112-118.
- [8]. Fu P, Yang L, Bo SY, Na X. (2004). A national survey on low vision and blindness of 0 - 6 years old children in China. *Zhonghua Yi Xue Za Zhi*. Sep17; **84(18)**:1545-8.
- [9]. Erin Boyle and Katrina Alersitz. (2008). Study: High prevalence of cataract continues. Ocular surgery news India edition. Sep.
- [10]. Gibert, C.E., Anderton, L., Dandona, L, et al. (1999). Prevalence of visual impairment in children: a review of the Available data. Ophthalmic. Epidemiol. **6**: 73-82
- [11]. Hans Limburg & Allen Foster. (1998). Cataract surgical coverage: An indicator to measure the impact of cataract intervention programme. Community eye. Health. **11(25)**: 3-6
- [12]. Hans Limburg, Vaidyanathan K and Pampattiwar KN (1996) Cataract Blindness on the rise? Result of a Door-to-Door Examination in Mohadi. Indian J Ophthal, **44(4)**:241-244.
- [13]. Javitt J. C., Wang F., and West S. K. (1996). Blindness due to cataract: epidemiology and prevention. Ann. Rev. Publ. Hlth.; **17**: 159 - 177.
- [14]. Kanski J. J. Thelens. (1995).In: Clinical Ophthalmology. Butterworth: Heinemann Ltd., London. Ed 2.:Pp. 234-259.
- [15]. Li L, Guan HJ, Zhou JB, Shi HH, Xun PC, Gu HY, Xie ZG, Chen QJ, Sun JQ. (2006)A cross-sectional survey of blindness and low vision among adults aged 60 years and above in Xinchengqiao
- [16]. Blocks, Nantong. *Zhonghua Yan Ke Za Zhi*.; **42(9)**: 802-7.
- [17]. Leske M. C., Connell A. M., Wu S. Y., Hyman L., and Schachat T A. (1997). Prevalence of lens opacities in the Barbados Eye Study. Arch. Ophthal. **115**:105 -111.
- [18]. Leske MC, Chylack LT Jr, Wu S-Y (1991) The lens opacities case control study group. The lens opacities case control study. Risk factors for cataract. Arch Ophthalmol, **109**: 244-251.
- [19]. Livingtom P. M., Carson C. A., and Taylor H. R(1995) The epidemiology of cataract: a review of the literature. Ophthal. Epidem.; **2**:151-164.
- [20]. Michel p, Cumming RG, Attebo K, panchapakesan J. (1997). Prevalence of cataract in Australia. The Blue Mount Eye Study. Ophthalmology; **104**: 581-8.
- [21]. Minassian DC, Mehra V.(1990) Blinded by cataract: Each year projection from the first epidemiological study of incidence of cataract blindness in India. British Journal of Ophthalmology.; **74** :341 -343.
- [22]. Miranda Hitti. (2008). Nurients may cut cataract risk. Web MD Health News. Meddings D. R., Hertsman C., Barer M. L., Evans R. G., Kazanjian A., McGrail K., and Sheps S. B.(1998) Socio-economic status, mortality and development of cataract at a young age.Soc.Sci. Med.; **46**:1451 -1457.
- [23]. Saman Wimalasundera.( 2008). Is gender a risk factor for cataract? Galle Medical Journal. **13(1)**: 44-47.
- [24]. Schaumberg D. A., Deane M. R., Christen W. G., and Glynn R J.(1998) A systematic overview of the incidence of pacification. Ophthalmology; **105**:1213 -1221.
- [25]. Sharma. M K., D. Kumar., C. Mangat and V. Bhatia. (2009). An epidemiological study of correlation of cataract among elderly population aged over 65 years in Ut. Chandigrah. The internet journal of geriatrics and gerontology. **4(2)**.
- [26]. Skaat A., Chetrit A., Belkin M., Kinori M., Leibovici OK (2012). Time Trends in the Incidence and Causes of Blindness in Israel. Am J Ophthalmol.; **153**:214 –221.
- [27]. Song XJ.(1992).An epidemiological survey of blindness and low vision in Hebei Province. *Zhonghua Yan Ke Za Zhi*. **28(2)**: 105-
- [28]. Thylefors B, N'egrel A-D, Pararajasegaram R, Dadzie KY.(1995) Global data on blindness. Bull World Health Organ. **73**:115-121.
- [29]. Ulldemolins AR., Lansingh VC., Valencia LG., Carter MJ., Eckert KA (2012) Social inequalities in blindness and visual impairment: A review of social determinants. Ind J Ophthalmol.; **60**:368-75.
- [30]. Vaughan, D & Asbury, T. (1994). General ophthalmology 10<sup>th</sup> edn. Lamage Medical. Publication, Los Atlas, California. 427
- [31]. Venkata G, Murthy S, Gupta SK, et al.(2005). Current estimates of blindness in India. Br J Ophthalmol. **89**:257-260.
- [32]. Weale, R.A. (1980). Br. J. Ophthal. **60**: 311-314.
- [33]. World Health Organization.(2000). Preventing Blindness in Children: report of WHO/IAPB scientific meeting.
- [34]. World Health Organization. (1997). Global Initiative for the elimination of avoidable blindness and Deafness. Geneva; (WHO/PBL/97.61).
- [35]. Xu J, Yu Q, Zhu S, Liu Q. (1996). A population-based study of lens opacities. Yan Ke Xue Bao. Sep;12(3):115-7.
- [36]. Yu XM.(1992). An epidemiological survey of blindness and low vision in Shandong Province. *Zhonghua Yan Ke Za Zhi*. **28(6)**:363-6.
- [37]. Zhang S.(1999). Data analysis on epidemiologic survey of cataract in China. *Zhonghua Yan Ke Za Zhi*.**35(5)**:336-40.
- [38].
- [39].

**Table.1 - Prevalence of cataract among the total population in Thiruvananthapuram district**

Financial years	Population	Cataract			
		Number	Prevalence %	P value	Prevalence/ 10,000 population
2005-2006	32,70,743	11,462	0.35		35.04
2006-2007	32,78,020	12,643	0.39		38.57
2007-2008	32,85,297	13,476	0.41		41.02
2008-2009	32,92,574	14,985	0.46		45.51
2009-2010	32,99,852	15,949	0.48	0.001 *	48.33
2010-2011	33,07,284	15,973	0.48	0.001 *	48.30

\* significant

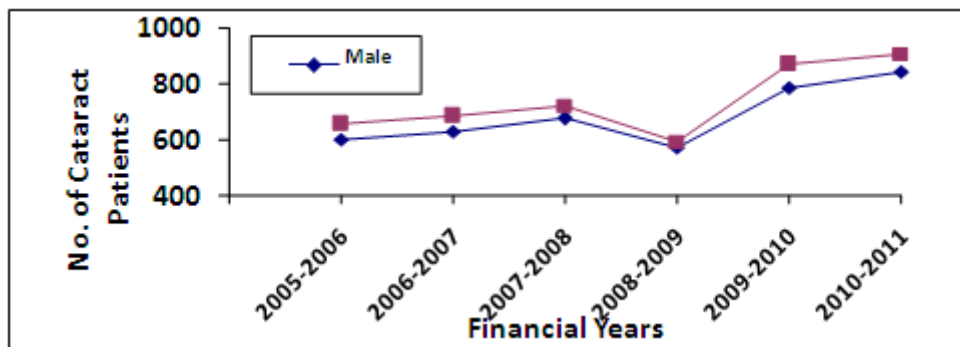


**Fig. 1 - Cataract prevalence in Thiruvananthapuram district**

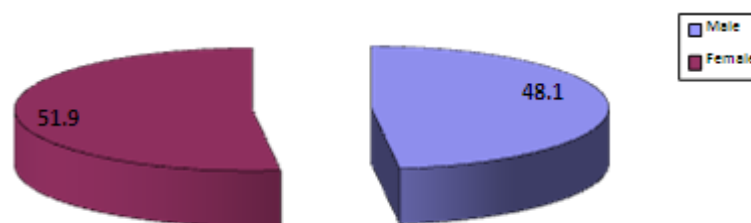
**Table.2- Gender distribution & prevalence percentage in Thiruvananthapuram district**

Sex	Financial years						Cataract		
	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	Total	Prevalence %	P value
Male	604	632	680	575	791	846	4,128	48.1	0.004 *
Female	659	688	726	598	870	912	4,453	51.9	
Total	1,263	1,320	1,406	1,173	1,661	1,758	8,581	100	

\* Significant



**Fig. 2a- Gender prevalence in Thiruvananthapuram district**

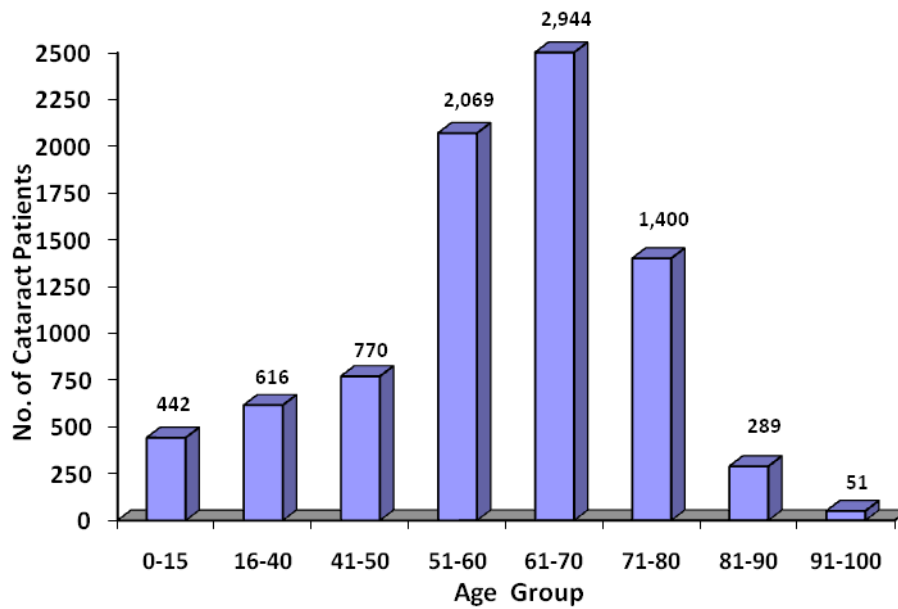


**Fig.2b- Percentage of gender prevalence in Thiruvananthapuram district**

**Table-3:** Age distribution & prevalence of cataract patients in Thiruvananthapuram district.

Age group	Financial years						Cataract		
	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	Total	Prevalence%	P value
0-15	70	80	60	66	76	90	442	5.1	0.08
16-40	89	94	110	92	104	127	616	7.2	0.071
41-50	128	132	126	106	120	158	770	9.0	0.066
51-60	308	318	327	308	384	424	2,069	24.1	0.0003**
61-70	429	448	478	368	618	603	2,944	34.3	0.00001**
71-80	192	196	248	178	300	286	1,400	16.3	0.0072*
81-90	41	44	48	50	46	60	289	3.4	0.093
91-100	6	8	9	5	13	10	51	0.6	0.3
Total	1,263	1,320	1,406	1,173	1,661	1,758	8,581	100	

\* Significant \*\*highly significant



**Figure .3** -Cataract distribution in the different age groups in Thiruvananthapuram district.