

Prevalence of Human cataract in the three coastal districts of southern Kerala

Dr. Aleyamma kuruvilla*

* HOD, Department of Zoology, St. Thomas College, Ranni-689673
Pathanamthitta, Kerala, India.

Abstract

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

Methodology:-The data's collected from registers of ophthalmology department of district hospital and two private hospitals in Thiruvananthapuram, Kollam and Alappuzha districts to access the gender prevalence and prevalence of different age groups. The total number of cataract operation carried out in these districts were collected from Directorate of Health, Thiruvananthapuram to evaluate the prevalence among the total population. Significance of cataract prevalence was analyzed using MATLAB and SPSS statistical package.

Result: Overall survey indicates that cataract prevalence among the total population increased in Thiruvananthapuram, Kollam and Alappuzha districts within six years. The prevalence increased significantly in Thiruvananthapuram, Kollam, and Alappuzha from 0.35%, 0.24%, 0.26% to 0.44% ($p=0.00015$), 0.37% ($p=0.0010$) and 0.51% ($p=0.000157$). Female gender prevalence was significantly higher in all the districts. Prevalence among females were Thiruvananthapuram (51.9%, $p=0.004$), Alappuzha (60.6%, $p=0.0000344$) and Kollam (58.2%, $p=0.000214$).

Conclusion: - 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. Cataract blindness in Kerala can be effectively controlled only if effective strategies are developed to reduce the incidence of blinding cataract.

Key words : Human cataract, Prevalence, Kollam, Thiruvananthapuram, Alappuzha

Introduction

Cataract is a public health problem in many developing countries including India. Traditionally, the cataract intervention programme is evaluated by the number of cataract operation performed per year. 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 [1]. Million's of cataract extractions are carrying out each year in India. In spite of this huge effort, evidence from recent prevalence data suggests that cataract blindness is increasing [2]. (survey conducted by the National Blindness Prevention and Control Programme, WHO). Cataract blindness in India is too massive to be solved by the surgical programme alone, particularly in view of the aging population trend which is expected substantially to increase the number of new cases of blindness from cataract [3].

It is estimated that there are about 12 million blind people due to cataract in India alone [4]. Blindness is not only a medical and personal problem, it is also a socioeconomic issue for the individual and the community. Cataract is the leading cause of blindness worldwide, and any means of delaying or preventing its onset would have enormous social and economic benefits.

The prevalence of blindness in people ≥ 50 years in Cape Town, South Africa was lower than expected probably because of high cataract surgery coverage [5]. The total prevalence of surgical cataract in Galle District of Sri Lanka is 0.32% [6]. Women have a significantly higher prevalence than men and nuclear cataract is the most common type. High prevalence of cataract continues in India [7]. Blinding eye diseases are highly prevalent in many developing countries, where the prevalence of blindness has been estimated to be 10 to 40 times higher than in industrialized countries. And most are found in the developing countries of Africa, Asia and Latin America. About 75% of this blindness is avoidable, i.e. it is either treatable or preventable [8].

Patients and methodology

This research is an epidemiological descriptive study of three districts of Kerala state of India. Study mainly focused on prevalence, gender prevalence and prevalence in different age groups.

To calculate the prevalence among the total population, the total number of cataract performed in these district in these six years (April 2005- March 2011) were collected from the Directorate of Health, Thiruvananthapuram. The data's collected from registers of Ophthalmology department of district hospital and two private hospitals used to calculate the gender prevalence and prevalence in the different age groups. The age is grouped in to eight categories, 0-15, 16-40, 41-50, 51-60, 61-70, 71-80, 81-90 and 91-100. The census of Kerala for the years 2001, 2011 and percentage of decadal growth of the population collected from the statistical department, Thiruvananthapuram was used for the population based epidemiological study. Significance of cataract prevalence was analysed using MATLAB and SPSS statistical package [9]

RESULT

A six year study was conducted to review the prevalence of cataract in southern districts of Kerala state (Thiruvananthapuram, Kollam and Alappuzha) of India. The patients aged between 3 months to 100 years admitted for cataract surgery have participated in this study.

Overall survey indicates that cataract prevalence among the total population increased in Thiruvananthapuram, Kollam and Alappuzha districts within six years. Prevalence in Thiruvananthapuram, Kollam and Alappuzha were 0.48%, 0.44% and 0.37% (Table -1,5,9,13 &17). The prevalence increased significantly in Thiruvananthapuram, Kollam, and Alappuzha from 0.35%, 0.24%, 0.26% to 0.44% ($p=0.00015$), 0.37% ($p=0.0010$) and 0.51% ($p=0.000157$). Prevalence per 10,000 population has changed from 35.04 to 48.30 in Thiruvananthapuram, 23.87 to 43.88 in Kollam and 26.42 to 37.38 in Alappuzha . Cataract surgery rate in the three southern district of Kerala (Thiruvananthapuram, Kollamaand Alappuzha) increased dramatically between 2005 and 2011 according to this study.

Female gender prevalence was significantly higher in all the districts. Prevalence among females were Thiruvananthapuram (51.9%, $p=0.004$), Alappuzha (60.6%, $p=0.0000344$) and Kollam (58.2%, $p=0.000214$).

In coastal districts like Thiruvananthapuram (34.3%, $p=0.00001$), Kollam (31.4%, $p=0.00005$) and Alappuzha (40.2%, $p=0.000044$) prevalence was highest in the age group of 61-70. Congenital cataract was highest in Thiruvananthapuram (5.1%) and lowest in Alappuzha (0.6%). In all the districts the lowest prevalence observed in the age group of 91-100 and prevalence markedly increased from 51 to 80 years.

Discussion and conclusion

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 Kerala is too massive to be solved by the surgical programme alone. Cataract blindness in Kerala as well as in India can be effectively controlled only if effective strategies are developed to reduce the incidence of blinding cataract.

According to this study females have significantly higher prevalence than males. Prevalence of the low vision and the blindness were higher in females than in males ($p < 0.005$) {12} . It has been shown in Australian Blue Mountain study {13,14} that females gender is generally associated with increased age adjusted risk of cataract and the findings of this study is also similar to the Australian Study. Accordingly,

the blindness problem remains challengingly high {15}. The women who started menstruating late are at an even higher risk {16}. In the higher age groups, women tend to suffer from cataract more than do males. This appears to be true particularly in western countries {17}; in view of the well known difficulties of distinguishing between senile and diabetic cataract, it is worth recalling that at least in the U.S.A., women above about 50 years of age have significantly high blood sugar level than men. Other suggestive epidemiological correlations are found to exist. Women are almost 40 percent more likely to develop cataract than men. Women who get more lutein, zeaxanthin and vitamin E are less likely to develop cataract than women who skip on those nutrients {18}. In coastal district Alappuzha highest prevalence recorded in the age group of 61-70 years($p=000044$). Increase in blindness prevalence among people aged 50 years and above was observed compared to earlier studies.

Those aged 70 and above had a five times higher risk of being blind compared to those aged 50-59 years 8. Prevalence of blindness among people aged 50 years and above has reduced from 9.8% in the same 15 states in the 1986-89 survey, to 8.5% in the national survey. 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.{19} Incidence of cataract surgery in united state is high among those over 70 years, with an annual increase of about 14% {20} . Programs to further reduce the burden of visual impairment need to be targeted toward the correction of refractive error and surgery for cataracts in Brazilian city {21}. The trend of increasing incidence of cataract with increase age is a major public health concern with an aging population in Australia and the world{ 22}. Overall the survey indicates a high prevalence of human cataract in Alappuzha district. The high rate of cataract blindness in Alappuzha is a clear indication that the cataract blindness in Kerala is too massive to be solved by the surgical programme alone. Cataract blindness in Alappuzha as well as in Kerala can be effectively controlled only if effective strategies are developed to reduce the incidence of blinding cataract.

References

1. Foster, A., Renikoff, S. (2005). The impact of vision 2020 on global blindness. *Eye*. **19**: 1133-1135.
2. 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.
3. Nirmalan, et al. (2002). A population based eye survey of older adults in Thirunelveli districts of south India: Blindness cataract surgery and visual outcome. *Br.J. Opthal.* **86**: 505-512.
4. Jha, K.N. (2008). Spectrum of ocular diseases at a military hospital in Ladakh, North India. *Journal of clinical and diagnostic Research*. **2(3)**: 843-846.
5. World Health Organization. (2000). Preventing Blindness in Children: report of WHO/IAPB scientific meeting.
6. Finger RP.(2007) Cataracts in India: current situation, access, and barriers to services over time.

- Ophthalmol . 14:112-118.
7. Dandona L, Dandona R, Srinivas M, et al. (2001) Blindness in the Indian state of Andhra Pradesh. *Invest Ophthalmol Vis Sci.*;42: 908–916.
 8. Venkata G, Murthy S, Gupta SK, et al.(2005). Current estimates of blindness in India. *Br J Ophthalmol.* 89:257-260.
 9. Thylefors B, N'egrel A-D, Pararajasegaram R, Dadzie KY.(1995) Global data on blindness. *Bull World Health Organ.* 73:115-121.
 10. Dandona L, Dandona R, Srinivas M, et al. (2002). Moderate visual impairment in India: the Andhra Pradesh Eye Disease Study. *Br J Ophthalmol*; 86: 373-377.
 11. Brilliant GE, Lepkowski JM, Zurita B, Thulasiraj RD, the Operations Research Group. (1991). Social determinants of cataract surgery utilization in South India. *Arch Ophthalmol* . 109: 584- 589
 12. Zhu S., Xu J., Yu Q., Liu Q. (1996). the etiology of vision impairment in target population. *Yan Ke Xue Bao.* 12 (3). 118- 120.
 13. Cummings, R.G., Mitchell, P. (1997). Alcohol, smoking and cataract: the blue mountain eye study. *Arch Ophthalmol.* 115: 1296-1303.
 14. Michel p, Cumming RG, Attebo K, panchapakesan J. Prevalence of cataract in Australia. The Blue Mount Eye Study. *Ophthalmology.* 1997: 104: 581-8.
 15. Pokharel, GP., Shrestha, SK., Negrel, AD., Ellwein, LB. (1998). Prevalence of blindness and cataract surgery in Nepal. *Br. J. Ophthalmol.* 82(6) : 600-605.
 16. Mac carty, C.A., Nanjan, M.B., Tylor, H.R.(1999). Attributable risk estimates of cataract to prioritize medical and public health action. *Invest.Ophthalmol. Vis. Sci.* 41: 3720-3725.
 17. Weale, R.A. (1980). *Br. J. Ophthal.* 604: 311-314.
 18. Miranda Hitti. (2008). Nutrients may cut cataract risk. *Web MD Health News.*
 19. 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.
 20. Erie, J.C., Baratz, K.H., et al. (2007). Incidence of cataract surgery from 1980 through 2004 : 25- year population based Study. *J. cataract refract. Surg.* 33: 1273- 1277.
 21. Silvana Artioli Schellini, Shane R Durkin, Erika Hoyama, Flavio Hirai, Ricardo Cordeiro, Robert J Casson, Dinesh Selva, Carlos Roberto Padovani. (2009). Prevalence and Causes of Visual Impairment in a Brazilian Population: The Botucatu Eye Study. *BMC Ophthalmology.* 9:8
 22. Bickol N Mukesh (2006). Development of cataract and associated risk factors. *Arch ophthalmol.* 124: 79-85.

financial years	Alappuzha			Kollam			Thiruvananthapuram		
	prevalence %	P value	prevalence/ 10,000 population	Prevalence %	P value	Prevalence/ 10,000 population	Prevalence %	P value	Prevalence/ 10,000 population
2005-2006	0.26		26.42	0.24		23.87	0.35		35.04
2006-2007	0.27		27.00	0.29		28.96	0.39		38.57
2007-2008	0.26		26.49	0.32		31.74	0.41		41.02
2008-2009	0.25		24.78	0.33		32.66	0.46		45.51
2009-2010	0.32	0.0011*	31.89	0.33	0.002*	33.41	0.48	0.001*	48.33
2010-2011	0.37	0.0010*	37.38	0.44	0.0001**	43.88	0.48	0.001*	48.30

** highly significant * significant

Table.1-Prevalence of cataract among the total population in coastal districts.

Table. 2 – Gender distribution & prevalence percentage in Coastal districts

Sex	Cataract								
	Kollam			Thiruvananthapuram			Alappuzha		
	Total	Percentage (%)	P value	Total	Prevalence %	P value	total	percentage (%)	P Value (remarks)
Male	3,113	41.8	0.000214**	4,128	48.1	0.004*	3,772	39.4	0.0000344 ** (highly significant)
Female	4,335	58.2		4,453	51.9		5,803	60.6	
Total	7,448	100		8,581	100		9,575	100	

** highly significant * significant

Table-3: Age distribution & prevalence of cataract patients in Coastal districts.

Age group	cataract								
	Thiruvananthapuram			Kollam			Alappuzha		
	Total	Prevalence%	P value	Total	Prevalence %	P value	Total	Prevalence (%)	P value (remarks)
0-15	442	5.1	0.08	319	4.3	0.073	60	0.6	0.0878
16-40	616	7.2	0.071	483	6.5	0.087	143	1.5	0.0771
41-50	770	9.0	0.066	558	7.5	0.076	584	6.1	0.065

51-60	2,069	24.1	0.0003**	1,688	22.7	0.0009**	1,867	19.5	0.00023**
61-70	2,944	34.3	0.00001**	2,340	31.4	0.00005**	3,849	40.2	0.000044**
71-80	1,400	16.3	0.0072*	1,731	23.2	0.00042**	2,584	27.0	0.000172**
81-90	289	3.4	0.093	305	4.1	0.08	461	4.8	0.085
91-100	51	0.6	0.3	24	0.3	0.213	27	0.3	0.43
Total	8,581	100		7,448	100		9,575	100	

* Significant **highly significant

References.

- [1]. World Health Organization (2011). Visual impairment and blindness. october Annual events meetings and consultations. WHO media center. News releaser.
- [2] World Health Organization. (2000). Preventing Blindness in Children: report of WHO/IAPB scientific meeting.
- [3]. 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.
- [4]. Limburg H & Foster A. (1998). Cataract surgical coverage: An indicator to measure the impact of cataract intervention programme. *Community eye. Health.* **11(25)**: 3-6
- [5] Cockburn N., Steven D., Lecuona K., Joubert F., Rogers G., Cook C., Rolack S (2012). Prevalence, causes, and socio-economic determinants of vision loss in Cape Town, South Africa. PLoS ONE 7(2); e 30718. doi: 10. 1371/ journal. Pone.0030718.
- [6] .Saman Wimalasundera.(2008). Is gender a risk factor for cataract? Galle Medical Journal. 13(1): 44-47.
- [7]. Boyle E and Alersitz K. (2008). Study: High prevalence of cataract continues. Ocular surgery news India edition. September
- [8]. Kupfer C.(1983) Worldwide prevention of blindness. *American journal of ophthalmology*, **96**: 543-5. Leske M. C., Connell A. M., Wu S. Y., Hyman L., and Schachat. (1997) A. Lens opacities, demographic factors and nutritional supplements in the Barbados Eye Study. *Intern. J. Epidem.* 26:

1314-1322.

- [9]. Rao K V (1996). Biostatistics. Jaypee Brothers, India. Chapter: 13, Pp-153-60, 687.
- [10] Finger RP.(2007) Cataracts in India: current situation, access, and barriers to services over time. *Ophthal Epidemiol* . 14:112-118.
- [11] Dandona L, Dandona R, Srinivas M, et al. (2001) Blindness in the Indian state of Andhra Pradesh. *Invest Ophthalmol Vis Sci.*;42: 908–916.
- [12]. Venkata G, Murthy S, Gupta SK, *et al.*(2005). Current estimates of blindness in India. *Br J Ophthalmol*. 89:257-260.
- [13] Thylefors B., N'egrel A-D., Pararajasegaram R., Dadzie KY (1995). Global data on blindness. *Bull World Health Organ*; **73**:115-121.
- [14]. Dandona L, Dandona R, Srinivas M, *et al.* (2002). Moderate visual impairment in India: the Andhra Pradesh Eye Disease Study. *Br J Ophthalmol*; **86**: 373-377.
- [15] Brilliant GE, Lepkowski JM, Zurita B, Thulasiraj RD, the Operations Research Group. (1991). Social determinants of cataract surgery utilization in South India. *Arch Ophthalmol* . **109**: 584-589.
- [16] Sun L., Willes JR., Liang DS., Duan X., Yang X., Wang N., Friedman DS (2012). Inequities in Cataract Surgery and Postsurgical Quality-of-Life Outcomes in Handan, China. *Asia-Pacific J Ophthalmol.*; **1** (3): 147–151.
- [17] Yu XM.(1992). An epidemiological survey of blindness and low vision in Shandong Province. *Zhonghua Yan Ke Za Zhi*. 28(6):363-6.
- [18] Zhang S.(1999). Data analysis on epidemiologic survey of cataract in China. *Zhonghua Yan Ke Za Zhi*.35(5):336-40.
- [19] Cummings, R.G., Mitchell, P. (1997). Alcohol, smoking and cataract: the blue mountain eye study. *Arch Ophthalmol*. *115*: 1296-1303.
- [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] Weale, R.A. (1980). *Br. J. Ophthal*. 604: 311-314.
- [22] Miranda Hitti. (2008). Nutrients may cut cataract risk. Web MD Health News.

- [23] Vaughan, D & Asbury, T. (1994). General ophthalmology 10th edn. Lamage Medical. Publication, Los Atlas, California. 427.
- [24] Kanski J. J. *The lens*. In: Clinical Ophthalmology. Butterworth: Heinemann Ltd., London. Ed 2. 1995. Pp. 234-259.
- [25] Xu J., Yu .Q, Zhu S., Liu Q (1996). A population-based study of lens opacities. *Yan Ke Xue Bao.*; **12(3)**:115-7.
- [26] 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.
- [27] Brown N. P. and Bron A. J.(1996). Lens disorders. In: A clinical manual of cataract diagnosis.
- [28] 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.
- [29] Javitt J. C., Wang F., and West S. K. (1996).Blindness due to cataract: epidemiology and prevention. *Ann. Rev. Publ. Hlth.* ; 17: 159 - 177.
- [30] 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.
- [31] Schaumberg D. A., Deane M. R., Christen W. G., and Glynn R J.(1998). A systematic overview of the incidence of opacification. *Ophthalmology*; 105:1213 -1221.
- [32] Bachani D, Murthy GV, Gupta KS. (2000). *Indian J Public Health.* Rapid assessment of cataract blindness in India. 44(3): 82-9.
- [33] 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.
- [34] World Health Organization (1997). Global Initiative for the elimination of avoidable blindness and Deafness. Geneva; (WHO/PBL/97.61).
- [35] 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.
- [36] Mohan M., Sperduto RD., Angra SK., Milton RC., Mathur RL., Underwood BA.,Jeffery N., pandya CB.,Chhabra VK., Vajpayee RB (1989). India-US case-control study of age-related cataracts. *Arch Ophthalmol*, **107**: 670-676.