Graefe's Arch Clin Exp Ophthalmol (1982) 218:25–27

Graefe's Archive
for Clinical and Experimental
Ophthalmology

Incidence of Cataracts in the Mobile Eye Hospitals of Nepal

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Abstract. The incidence of cataract in Nepal was determined from data collected in 14 mobile eye hospitals (called 'eye camps'). Of a total of 12,217 patients examined in the out-patient department (OPD), cataract surgery was performed on 2,163. The percentage of cataract patients in the OPD was less in the mountains (13.8%) than in the Tarai plains (19.8%). In the inhabitants of the mountains, the majority of whom belong to the Tibeto-Birman race, cataracts appeared at a significantly later age in both males and females compared to the people of the plains, who are mostly Indo-Aryan. Cataracts were discovered in both groups at a younger age in women than in men.

Introduction

Cataracts are not only the most common cause of blindness in Asia, but are also a common cause in Europe and America (Duke-Elder 1972). Although there are many established methods in the treatment of cataracts, none has been discovered that can delay or prevent the onset of cataract formation. Pokharel's study in Nepal (1979) showed that cataracts were the most common cause of blindness in that country at a prevelance of about 1%. During the dry season (November–January) operations are successfully performed on cataract patients in mobile eye hospitals ('eye camps') in different parts of the country, some of which are reached with great difficulty. Generally, an operation is performed only when vision is reduced to such an extent that the fingers cannot be counted from 1 m away. It is important to note that the facilities to operate on those patients are restricted by the very limited number of certified ophthalmologists and hospital facilities in that country (Brandt 1978).

Almost every Nepalese ophthalmologist has observed that the inhabitants of the Himalayan regions as a rule show an incidence of cataract later in life than those of the Tarai, the plains region in the south of Nepal. The purpose of this study is to compare the age of cataract patients in these two different parts of Nepal.

Material and Methods

Included are data obtained at seven mobile eye hospitals in the mountains of the Himalayas (more than 2,000 feet above sea level) and at seven in the Tarai region (less than 2,000 feet above sea level). Immature cataracts and patients with aphakia or complicated cataracts were excluded from the study. In the present series, only the cataracts were included that sufficiently interfered with vision and the red fundus reflex and impaired visual acuity to an extent that fingers could not be counted at 1 m.

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Results

The number of patients in the outpatient department (OPD) and the number on whom cataract operations were performed are shown in Table 1. The distribution of cataract patients by age and sex in both regions is compared in Table 2.

Of the 4,172 patients examined in the OPD of the 'eye camps' in the Himalayas, 574 (13.8%) underwent cataract surgery; 317 male patients (55.2%) outnumbered 257 female patients (44.8%). The development of cataracts is significantly later in males than in females ($P < 0.005$), as evaluated by the chi-square test.

In the Tarai plains region, cataract operations were performed on 1,589 (19.8%) of the 8,045 patients seen in the OPD. Of this group, 747 (47%) were male and 842 (53%) female. Cataract development was significantly later in men ($P < 0.001$). Males from the mountain region showed cataract occurrence at a much later age than those in the Tarai ($P < 0.001$). Females from the mountain region also showed later occurrence of cataract compared to the plains women ($P < 0.005$). A comparison of the total number of patients (male and female) in both regions showed that cataracts occur at a later age in life among the mountain inhabitants ($P < 0.001$). The average age of cataract patients in the 'eye camps' of the mountain region was 63.2 years (males: 64.8; females: 61.2), while that of the Tarai inhabitants was 60.2 years (males: 62.0; females: 58.7).

Discussion

Our survey is made up of two different groups within Nepal: the majority of mountain inhabitants belong to the Tibeto-Burman race, the majority of plains inhabitants to the Indiro-Aryan. Chatterjee et al. (1968) found that cataract was the cause of blindness in 70% of the blind inhabitants of the high Himalayas of India (over 10,000 feet above sea level) where the population is akin to Tibetans in custom and diet. However, the prevalence of cataract among the total number of inhabitants of the mountains was less than that of the Aryan inhabitants of the Punjab (Chatterjee 1973). We found that in Nepal cataracts appeared

0721-832X/82/0218/0025/$01.00

Table 1. Distribution of the mobile eye hospitals, the number of patients in the out-patient department (OPD), the number of patients operated on for cataracts, and the investigator/surgeon.

Locality	OPD	Cataract patients			Investigator/Surgeon
		Male	Female	Total	
Altitude above sea level >2000 feet					
Palpa	1,070	34	22	56	Dr. O.K. Malla
Dhankuta	515	32	15	47	Dr. O.K. Malla
Pokhara	580	39	37	76	Dr. Y.M. Pradhan
Syangja	966	116	92	208	Dr. O.K. Malla
Sindhuli	121	20	14	34	Dr. O.K. Malla
Bajhang	509	64	65	129	Dr. O.K. Malla
Guturi	411	12	12	24	Dr. S. Lakhe
Total	4,172	317	257	574	
<2000 feet					
Janakpur	1,600	180	268	448	Dr. L.N. Prasad
Janakpur	995	136	165	301	Dr. L.N. Prasad
Nepalganj	1,335	80	94	174	Dr. Y.M. Pradhan
Mahendra-Nagar	664	167	120	287	Dr. R.P. Pokharel
Bharatpur	1,800	76	82	158	Dr. Y.M. Pradhan
Dhangarhi	930	31	23	54	Dr. N.C. Rai
Bhairawa	726	77	90	167	Dr. N.C. Rai
Total	8,045	747	842	1,589	

Table 2. Distribution of cataract patients sex and age in different altitudes

Sex	Age (years)							Average age (years)
	30–39	40–49	50–59	60–69	70–79	80	Total	
Altitude above sea level >2000 feet								
Male	5	25	64	116	91	16	317	64.8
Female	9	29	71	97	44	7	257	61.2
Total	14 (2.4%)	54 (9.4%)	135 (23.5%)	213 (37.1%)	135 (23.5%)	23 (4%)	574 (100%)	63.2
<2000 feet								
Male	20	80	193	296	126	32	747	62.0
Female	41	167	223	295	85	31	842	58.7
Total	61 (3.8%)	247 (15.5%)	416 (26.2%)	591 (37.2%)	211 (13.3%)	63 (4%)	1,589 (100%)	60.2

at a younger age in the plains population than in the mountain people.

Since there is a huge amount in the literature dealing with cataract-causing factors, we only want to discuss a few aspects. Endocrine factors like diabetes mellitus and metabolic disorders such as galacturia are well-known causes for the early onset of cataracts. Since these factors are rare and probably of equal prevalence within both groups in our study, they do not interfere with our results.

Exogenous factors are also included in the discussion of the origin of cataracts. Hall et al. (1948) reported that cataracts were induced in rats by a diet of amino acid-free food. Possibly the acute lack of protein causing hungerdystrophy in adults or kwashiorkor in children does not cause cataract, but chronic protein deficiency over the years may do so (Zuidema 1955). The hard economic situation in the Himalayan region as well as in the Tarai leads to difficulties in providing meat in both regions, but it does not explain why cataracts cause blindness at different ages.

Lack of certain vitamins could also play a role in cataract development, although this has not been verified (Duke-Elder 1976). It is unlikely that the vegetarian inhabitants of the Tarai suffered more vitamin deficiency than the people of the mountains.

Yoly (1977) introduced drinking water and its fluoridation into the discussion and Chatterjee (1973) its mineral content.

Boergen and Richert (1973) have suggested the importance of the electrolyte changes occurring in hemodialysis. We have no comment on findings for Nepal, however.

The influence of light, especially infrared and ultraviolet rays, also plays a very important role in this discussion (Hiller et al. 1977). Wright (1951) was not certain of its influence, but he found a lower incidence of cataract in regions where light was brighter than in those where there were weaker rays. Heat-exposure is more intense in the plains, which may have a bearing on the early onset of cataract (Thorpe 1957) but, on the other hand, the percentage of ultraviolet rays in the sunlight increases from 1%–2% at sea leavel to 5%–8% at high altitudes (Duke-Elder 1972), and after ultraviolet radiation cataract may develop (Lehrman et al. 1978). Our findings contradict the effects of ultraviolet light, however. Women and men are equally exposed to heat and other radiation for in the average household, both are equally engaged in agriculture work in the plains as well as in the hills.

None of the known cataract-causing factors, except for Vogt's theory (1938) of genetic determination, explains why cataract blindness should occur earlier in women than in men. Caird (1973) reported a higher incidence of cataract in women in England. Jain (1967) reported similar findings in India. Chatterjee (1973) found exactly the opposite, however. Based on our present data, we can make no definitive statement about this phenomenon, but we would like to introduce the possibility that menstruation as monthly protein-loss as well as the number of pregnancies might be cataract-causing cofactors.

The differences observed in the incidence of cataracts by sex and altitude might be due to the prevalence of women in the total population and to varying patterns of population in the Himalayan region and in the Tarai. To rule out this possibility, we used the 1971 population census to determine the percentage of the different age groups in the districts in which 'eye camps' were located.

According to this census, in the mountains 25.7% of the males and 25.6% of the females are 30–59 years of age. In the Tarai region, 28.3% of the males and 28.4% of the females belong to this age group. The figures for males and females are nearly equal for both regions and do not explain the age difference of cataract development between the sexes.

In the mountains 4.3% of the total male population and 5.3% of the total female population belong to the 'over 60 years' age group. In the Tarai region, the figures are 4.4% and 5.8%, respectively. Even though in this age group the percentage of men is less in both regions, a higher percentage of the cataracts appears in this age group in men than in women.

Acknowledgement. We thank Mrs. G. Schubert of the Institute for Medical Statistics and Biomathematics of the Ludwig Maximilian University of Munich for her friendly assistance in the evaluation of the data included in our results.

References

Boergen K-P, Richert H (1973) Cataractbildung durch Haemodialyse. Klin Mbl Augenheilk 162:394–398

Brandt F (1978) Als Augenarzt in Nepal. Der Augenarzt 12:387–393

Caird in: The Human Lens in Relation to Cataract, Ciba Foundation Symposium Elsevier, Excerpta Medica, North-Holland Publisher, Amsterdam p. 271–272

Chatterjee A (1973) Cataract in Punjab. In: The Human Lens in Relation to Cataract Ciba Foundation Symposium Elsevier, Excerpta Medica, North-Holland Publisher, Amsterdam

Chatterjee A, Rambo VC, Franken S (1968) Vision Survey in Himalaya Area. Am J Ophthalmol 66:113–116

Duke-Elder EW (1976) System of Ophthalmology. London, Kinpton Bd XIV p 918 (1972), Bd XI p 155

Hiller R, Giacometti L, Yuen K (1977) Sunlight and Cataract: An Epidemicologic Investigation. Am J Epidemiol 105:450–459

Hall WK, Bowles LL, Sydenstricker VR, Schmidt HL (1948) Cataracts due to Deficiency of Phenylamine, Histidine and Tryptophan in Diets of Rats. J Nutr 36:277–295

Jain IS (1967) Blindness and Ocular Morbidity on Two Rural Blocks of Punjab and Haryana. Prabhaker Printers, Chandigarh

Lehrmann S, Borkman R (1978) Ultraviolet Radiation in the Aging and Cataractous Lens. A Survey, Acta Ophthal 56:139–149

Population Census – 1971, HMG National Planning Commission Secretariat, Central Bureau of Statistics, Ramshah Path. Katmandu, Nepal

Pokharel RP, March 1–4 (1979) Preliminary Survey of Eye Diseases in Nepal. In: 9th All Nepal Medical Conference, Janakpur Dham

Thorpe HE (1957) In: Symposium on Diseases and Surgery of the Lens. St. Louis, p 202

Vogt A (1938) Weitere Augenstudien an eineiigen Zwillingen höheren Alters über die Vererbung der Altersmerkmale. Klin Mbl Augenheilk 100:497–544

Wright (1951) Cited in Sauter: Die Trübungen der menschlichen Linse. Thieme, Stuttgart, p 68

Yolly SS, Singh BM, Mathur OC (1977) Endemic Flurosis in Punjab (India), Am J Med 47:553–563

Zuidema PJ (1955) Calcification and Cirrhosis of the Pancreas in Patients with Deficient Nutrition. Doc Med Geogr Trop 7:229–251

Received July 18, 1981