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PREVALENCE OF LENS OPACITY AT QUEEN ELIZABETH CENTRAL HOSPITAL IN BLANTYRE, MALAWI

B. C. Msamati, MD, PhD, Professor, P.S. Igbigbi, MBBS, MSc, Professor, Department of Anatomy and N. H. Batumba, MD, MMed, Department of Surgery, College of Medicine, University of Malawi, Private Bag 360, Blantyre 3, Malawi.

Request for reprints to: Professor B. C. Msamati, Department of Anatomy, College of Medicine, University of Malawi, Private Bag 360, Blantyre 3, Malawi.

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B. C. MSAMATI, P.S. IGBIGBI and N. H. BATUMBA

ABSTRACT

Objective: To determine the prevalence of lens opacity in black Africans.

Design: A retrospective study.

Setting: Eye Ward, Queen Elizabeth Central Hospital (QECH), Blantyre between July and December 1997.

Subjects: Case notes of 299 patients aged six months to 84 years with cataracts were studied.

Results: Over 90% of the patients were referred from all ten district hospitals in the southern region. Of the 647 patients admitted in the Eye Ward, 299 patients (46.2%) had cataracts - 206 (68.8%) males and 93 females (31.1%). Bilateral cataracts accounted for 61.9%; 22.4% were on the left eye and 15.7% on the right eye. Senility was the leading cause of cataracts in adults, being commonest among unskilled (48.8%) compared to skilled (15.1%) patients, but in children congenital cataracts (53.7%) were the most common.

Conclusion: Cataracts accounted for nearly half the admissions in the eye ward. Laterality is reported probably for the first time in Central Africa - bilateral cataracts being more common than unilateral ones, and the leading cause of cataracts in adults was senility whereas congenital cataracts were commoner in children. The prevalence increased with age, males being affected more than females. These findings suggest cataracts as the leading cause of blindness. Community-based studies to determine the prevalence and profile of cataracts are recommended.

INTRODUCTION

Opacity of the lens is a degenerative process involving denaturation of the lens proteins, lens oedema, as well as necrosis, and it is referred to as cataract(1-4). Cataracts are usually diagnosed through an ophthalmoscope or slit lamp. They can be defined, not only in terms of abnormal morphology (opacification), but also in terms of decreased light transmission, decreased visual acuity, or all of these parameters. Morphologically, a cataract is any disturbance of the optical homogeneity of the lens and this definition includes lens vacuoles, water clefts, dense areas, and punctate microscopic dots, which decreases light transmission(5). Such reduced light transmission is accompanied by opacities that subsequently affects vision when opacities extend towards the central area of the lens, distorting or blocking the visual image(6). The term cataract carries the connotation of a visual disorder that eventually leads to surgery(7).

Several factors have been shown to promote the development of cataracts. They have in common physical or chemical disruption of the critical intra- and extra-cellular equilibrium of water and electrolytes that comes about by changes in the capsule's semi-permeability or

osmotic changes within the lens(7, 8). The commonly cited aetiological factors causing such changes include ageing, dehydration (resulting in electrolytic imbalance), trauma (disrupting the capsule), metabolic disorders (such as: diabetes mellitus, galactosaemia), ultra-violet radiation, viruses, drug toxicity, inflammation, vitamin B₁₂ deficiency and genetic disorders. The others include high body mass index, myopia, hypertension, cigarette smoking and alcohol consumption(8-10).

Available literature shows that although easily treatable by removal and replacement of the opaque lens, cataract still remains the leading cause of blindness, accounting for nearly 50% of blindness worldwide and in any given community(11,12). The World Health Organisation (WHO) estimated that there were about 38 million blind people in the world, the majority of whom live in developing countries where more than 85% of the population live in rural areas, and most of the blindness is curable and preventable(13). The commonest form of treatment for cataract is surgery, though sometimes vision may be improved with mydriatic drugs in cases where opacity is limited to the central portion of the lens(7-9). Surgery for cataract is usually indicated when: visual disturbance interferes with the individual's daily activities;

visual maturation is threatened in congenital cases; there is threat of complications, for example, glaucoma or uveitis, or when blindness has occurred. Blindness is defined as the loss of vision to a level less than the ability to count fingers at a distance of three metres in the better eye, with the best corrective spectacle(1).

Epidemiological research on cataract has been invaluable in assessing the extent of cataract problem in the community for planning purposes(8, 9). It enables a country to estimate the cost of primary and secondary eye health needs, and to determine the risk factors that influence the social and economic burden associated with the disease. Reports on cataract in Malawi are, however, scarce or lacking. In an effort to fill this gap and in an attempt to establish baseline data, a retrospective study on the epidemiology of cataracts was carried out to determine the prevalence of lens opacities on patients admitted in the eye ward at Queen Elizabeth Central Hospital (QECH), a hospital that is both a referral and a university teaching hospital.

MATERIALS AND METHODS

The study was carried out on 647 patients admitted between July 1997 and December 1997 in the eye ward at QECH. Of these, 299 patients aged between six months and 84 years were admitted for cataracts and included in the study. The age, sex, occupation, and causes of cataract, laterality of the affected eye and the district of residence and/or origin of each patient were recorded. Cataract diagnoses and grading from the records were based on the history, visual impairment and morphological changes as evidenced by the slit-lamp and ophthalmoscopic examination. Patients with incomplete records and those with doubtful diagnoses were excluded.

RESULTS

Six hundred and forty seven patients comprising 428 males (66%) and 219 females (34%) were admitted at QECH eye ward between July 1997 and December 1997. Of these, 299 patients (46.2%) had cataracts consisting of 206 males (68.8%) and 93 females (31.1%), giving a male:female ratio of 2.2:1. There were 258 adults and 41 children. Laterality of the affected eye showed statistically significant differences ($p < 0.001$) between the sexes and in both sexes bilateral cataracts accounted for 185 61.9%.

When unilateral, 22.4% ($n = 67$) of the cataracts were on the left eye and 15.7% ($n = 47$) on the right eye (Table 1).

Table 1

Distribution of cataracts in eyes within the sample

Affected eye	Male	Female	Total	%	P
Left	51	16	67	22.4	<0.001
Right	36	11	47	15.7	<0.001
Both	119	66	185	61.9	<0.001
Total	206	93	299	100	<0.001

The distribution of cataracts in different age groups of adults showed statistically significant ($p < 0.001$) differences between the sexes except in the age group above eighty one years where only males were represented (Table 2). The commonest cause of cataract was senility accounting for 54.6% ($n = 141$) and 48.4% ($n = 112$) for patients aged more than 50 years. The other causes of cataracts were trauma 27.9% ($n = 72$), congenital cataracts 2.7% ($n = 7$), diabetes mellitus 1.5% ($n = 4$), secondary cataracts (complicated uveitis caused by herpes zoster) 2.7% ($n = 7$) and unspecified conditions contributed 16.2% ($n = 42$) (Table 3). There were more cataracts among unskilled labourers (48.84%, $n = 126$) and peasant farmers ((36.04%, $n = 93$) than in skilled patients (15.12%, $n = 42$).

Table 2

Distribution of cataracts in adults in different age groups

Age group in years	Male	Female	Total	%	P
16-20	9	2	11	4.26	<0.001
21-30	11	3	14	5.43	<0.001
31-40	13	3	16	6.20	<0.001
41-50	17	4	21	8.14	<0.001
51-60	47	29	76	29.46	<0.001
61-70	58	27	85	32.95	<0.001
71-80	21	11	32	12.40	<0.001
81+	3	0	3	1.16	ns
Total	179	79	258	100	<0.001

Table 3

Causes of cataracts in adults in different age groups

Age group in years	Congenital	Diabetes mellitus	Secondary to H. zoster ophthalmitis	Trauma	Senility	Other	Total
16-20	5	–	–	1	–	–	6
21-30	2	–	–	14	–	6	22
31-40	–	1	–	7	5	1	14
41-50	–	–	1	6	11	2	20
51-60	–	2	1	15	50	8	76
61-70	–	1	2	24	50	8	85
71-80	–	–	3	5	22	2	32
81+	–	–	–	–	3	–	3
Total	7	4	7	72	141	27	258

Table 4*Distribution of cataracts in children in different age groups*

Age group in years	Male	Female	Total	%	P
0-4	6	6	12	29.27	ns
5-9	4	1	5	12.20	<0.05
10-14	14	4	18	43.90	<0.001
15	5	1	6	14.63	<0.01
Total	29	12	41	100	<0.001

Table 5*Causes of cataracts in children in different age groups*

Age group in years	Congenital	Diabetes mellitus	Causes Secondary to H. zoster ophthalmitis	Trauma	Senility	Other	Total
0-4	11	–	–	–	–	1	12
5-9	3	–	–	2	–	–	5
10-14	5	–	–	11	–	2	18
15	3	–	–	3	–	–	6
Total	22	0	0	16	0	3	41

In children cataracts were seen in all age groups and showed statistically significant ($p < 0.001$) differences between the sexes, except in the 0-4 year age group (Table 4). Congenital cataracts were the commonest type of cataract in children (53.65%, $n = 22$), mostly seen in the younger (0 - 4 year) age group, while trauma (39.02%, $n = 16$) was mostly seen in older children (10 - 14 year) (Table 5).

Ninety two per cent of the patients ($n = 276$) were referred from all 10 district hospitals in southern region and 7.7% ($n = 23$) from other parts of the country. Machinga district hospital registered the highest number of referrals (21.40%, $n = 64$) followed in descending order by Blantyre (19.06%, $n = 57$), Mangochi (15.05%, $n = 45$), Zomba (10.36%, $n = 31$), Chiradzulu (6.68%, $n = 20$), Mulanje (5.35%, $n = 16$), Chikwawa (4.34%, $n = 13$), Nsanje (4.01%, $n = 12$), Thyolo (3.67%, $n = 11$), Phalombe (1.33%, $n = 4$) and Mwanza (1%, $n = 3$).

DISCUSSION

This study has demonstrated that cataracts affect all age groups but adults are affected more than children. In adults the study showed that the number of cataract patients increased with age and cataracts were more prevalent after 50 years. These changes were expected as part of the ageing process and reports in the literature support this observation. Xu *et al*(14) noted in South East Asia that the prevalence of lens opacities in nuclear colour, nuclear opacity, cortical opacity and subcapsular opacity was 16.1%, 28.6%, 30.3% and 8.7% respectively, but the frequency of all four types of opacities increased with age.

In a study among subjects of African descent, Leske *et al*(15) found that cortical opacities (34%) were the most prevalent, followed by nuclear (19%) and posterior subcapsular (4%) opacities. These workers also showed that the prevalence of all opacity types statistically increased significantly ($p < 0.001$) with age. The LSC Group (16) reporting in a longitudinal study found that the incidence of newly developed cortical or PSC opacities increased with age and female cataract in older age appeared on average three years later than males. On the other hand in Poland, Stanskiwicz *et al*(17), found age was the most important risk factor of cataract: 52% of patients were older than 70 years, and 43% were in the 51 - 70 year age group. Cataracts were also found to be common in age-related problems, and the incidence increased with increasing age at baseline(5,18).

The other causes of cataracts in younger adults (<50 years) in the current study, were trauma, secondary cataract due to uveitis caused by herpes zoster, congenital cataracts, diabetes mellitus, and other unspecified conditions. The present study also demonstrated significant sex differences in children except in the 0 - 4 year age group and as expected congenital cataracts were the commonest types accounting for 53.7%. Congenital cataracts were reported where mothers had rubella and syphilis. In older children (10 - 14 years), trauma was the commonest cause of cataract. Diabetes mellitus and secondary cataracts were also seen in children. A number of studies have shown that diabetes mellitus increased the concentration of fructose and accumulation of sorbitol in human lens leading to cataract formation(7,9,19).

We have demonstrated that more males had cataracts than females with a male: female ratio of 2.2:1, a finding

that is at variance with some reports in the literature. A recent Polish study indicated that the distribution of cataract patients did not differ between the sexes(17). These workers argued that the male: female ratio in the population of a region should remain the same because both sexes are exposed to similar risks of cataract formation. This view, however, did not appear to take into account occupational hazards of jobs mainly reserved for individual sexes. On the other hand, some studies have shown that cataracts are most prevalent in females than in males(1,4). In another study from South East Asia, Xu *et al*(14) 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*(15,20) 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(2,11,12,21,22). In spite of the small sample size, the findings of the present study do not support the Polish experience or the widely held view that cataracts are more prevalent in females. The male: female ratio of 2.2:1 in our study might indicate local genetic and environmental factors peculiar to Malawi. One possible explanation could be that more men visited hospitals than women did, and for cultural reasons women visit hospitals when illnesses are very serious. If women stayed in the hospital longer as imagined after cataract surgery, the homestead would not be managed properly in this matrilineal society. On the other hand, the higher literacy levels among men in Malawi and thus the need to read could explain their health- and ophthalmic-seeking behaviour. Foster(23) observed that in developing countries more men than women reported with blindness. He attributed this observation in part to social factors that led women in developing countries to be less likely to seek ophthalmic services. In an unrelated study on maculopathies at Kenyatta National Hospital in Nairobi, Batumba(24) found a similar male to female ratio of 2: 1. Although he found no plausible explanation for this observation, he suggested that males were more active and mobile, hence more prone to risks such as trauma, ultra-violet light exposure than the females. More studies are therefore necessary to understand the sexual dimorphism that exists in different populations.

Observations on laterality revealed that cataracts were encountered more often in both eyes (61.9%), and when unilateral, the left eye was more frequently affected (22.4%) than the right one (15.7%). This is reported probably for the first time in Central Africa, as there are no recorded reports on laterality. In the current study we found no explanation for the more frequent left laterality. There could be underlining causes, which would be a subject for further research in these communities.

It was interesting to note that the most affected groups were unskilled and peasant farmers aged over 50 years, who mostly presented with senile cataracts. This low-income economic group may reflect their nutritional status rather than inability to pay for the services were provided

free. The studies by Bunce *et al*(25) had highlighted the role of a range of nutrients in cataractogenesis. This team demonstrated that riboflavin; total protein, amino acids (mainly tryptophan), vitamins E and C, calcium, zinc and other micronutrients do influence cataract formation. It has also been shown that poor diets have low levels of anti-oxidants and galactose. These substances are important in protecting the lens from radiating and ionizing molecules, which alter the lens pigmentation leading to opacity(2,7). Malfunction to the enzyme galactokinase in old age or its deficiency coupled with accumulation of denatured protein result in lens opacity(2).

The geographical distribution of cataracts in Malawi's southern region could not be determined by the present study, although there were ten districts (now twelve) at the time this study was carried out and all hospitals referred patients to QECH. The QECH is both a referral and a university teaching hospital situated in Blantyre, the commercial capital of Malawi. The population in Malawi is 89% rural peasantry and poor, and it is logical to suggest that their visual needs would be much lower than those of say an accountant or a lawyer. Apart from their lower visual needs and cultural barriers (for example, fear of surgery and city), blindness is usually painless and not life threatening, hence they seek ophthalmic help late. For these reasons the mobile outreach initiative was established in seven designated district hospitals to take these services nearer the homesteads of patients. This is done under the Malawi Ophthalmic Outreach Programme (MOOP) and most of the surgical work in southern Malawi is done during these mobile outreach sessions. The MOOP has improved case finding and fewer referrals to QECH should ideally be registered where outreach surgery is well established by MOOP. Blantyre and Machinga registered the highest referrals. Proximity to QECH was the main reason for the high referrals for Blantyre district, but for Machinga district this was due to intensive case finding activities by yet another group of health workers, the community-based rehabilitation workers (CBRW). Most patients often seen at QECH from Machinga were leftovers (not operated) from previous outreach visits in that district. The low referral numbers from Chikwawa, Nsanje and Mwanza might be explained not only by the well established outreach surgery in these districts, but also by the relatively smaller population sizes, the lower visual needs of the rural peasantry and the cost of travel expenses to Blantyre once the mobile outreach team was missed.

In conclusion, cataracts at QECH accounted for nearly half the admissions in the eye ward, being most common in older (> 50 years) unskilled subjects and peasant farmers than in skilled patients. The leading cause of cataract in adults was senility followed by trauma, and in children congenital cataracts were common in the younger (0 - 4-years) age group whereas traumatic cataracts were found in older (10 -14 years) children. Bilateral cataracts were more frequently seen, and when unilateral the left eye was affected more than the right eye. The prevalence of cataract at QECH was 46.2%, and in adults it increased with age,

males being affected more than females. These findings suggest that cataracts might be the leading cause of blindness in southern Malawi. However, since the present study was hospital-based, further studies must now be carried out to determine the prevalence of cataracts within the communities of the southern region.

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