Rapid assessment of cataract surgical coverage in rural Zululand

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Objective. Cataract surgical coverage (CSC) is a useful indicator of the degree of success of a cataract intervention programme. However, because previously described methods are time-consuming and labour-intensive, they are rarely performed. This study describes a simple and inexpensive assessment of CSC based on screening of pensioners at pension delivery sites in a rural district.

Design. Random cluster-based cross-sectional survey.

Setting. State pension distribution sites in Hlabisa, a rural district in KwaZulu-Natal, South Africa.

Subjects. 562 old-age pensioners.

Method. Subjects found to be blind (visual acuity < 3/60) and those reporting a history of eye surgery were examined using a torch and direct ophthalmoscope by an ophthalmologist.

Outcome measures. Cases of blindness due to operable cataract and post-cataract surgical subjects were identified.

Results. CSC was found to be 38.5% (95% confidence interval 29.1 - 47.9%). Blindness prevalence was 10.3%, with 69.0% due to cataract.

S Afr Med J 2000; **90:** 1030-1032.

Age-related cataract is the leading cause of blindness, especially in the developing world, where it remains a major public health concern.[1] It is likely that with an ageing population the number of people who become blind as a result of cataracts will increase unless surgical services are developed further.[2]

An important aspect of improving cataract intervention programmes is evaluation of the impact of existing services. The total number of cataract operations performed per year in the area is a useful figure but gives little information as to the impact on cataract blindness prevalence, which is the key outcome.

Cataract surgical coverage (CSC) is a population-based index describing the proportion of a population needing cataract

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surgical intervention that has received it.[3,4] It is defined as the number of people who have had cataract surgery in one or both eyes as a percentage of those who have had or still require cataract surgery (Fig. 1), and so describes how much of the local need has been met.

Cataract surgical coverage (CSC) is defined as follows:

$$CSC = \frac{A}{A + B}$$

where:

A = persons with unilateral or bilateral aphakia or pseudophakia.

B = persons with binocular visual acuity < 3/60 with operable cataract as the primary aetiology in at least one eye.

Fig. 1. Definition of cataract surgical coverage rate.

The CSC will vary depending on the level of visual acuity at which the local cataract intervention programme determines that surgery is required, which is < 6/60 or < 3/60 in most countries in the developing world.

Surgical coverage can be measured by performing a community-based survey using random sampling of an elderly age group.[5,6] However, this is time-consuming and expensive to perform in a developing country where the elderly constitute a small proportion of the population and there is no reliable census. As a result there are very scanty data available for South Africa.

We describe a method of examining a large number of randomly selected elderly people quickly and inexpensively at local pension delivery points in Hlabisa district, a rural health ward serving a population of 200 000 in northern KwaZulu-Natal, South Africa.

In South Africa state pensions are payable to all women over 60 years of age and men over 65 years and are distributed at fixed points, usually a local store, on a given day on a monthly basis. State disability allowances are distributed via the same mechanism. Since the state pension cannot be collected by proxy and is often the major source of income for a family, attendance rates are very high. Hlabisa district has 74 pension payment points and on any given day payments are made at between one and seven neighbouring points so that each is visited once over the course of a month.

Method

Eleven pension points chosen at random from the list supplied by the pension service were visited during 1998. The team consisted of one ophthalmologist, an ophthalmic nurse, a nursing assistant and a clerical assistant from the hospital eye service. All pensioners were arranged in line with the help of members of the local pension committee (selected from prominent local pensioners). Age (from identity documents) and gender were recorded by the clerical assistant. The line was divided into two groups by the ophthalmic nurse. The first group included those who were able to count fingers at 6 metres (binocularly and wearing distance correction if present). They were discharged from further study. The second group comprised those unable to count fingers at 6 metres and anyone who had had eye surgery. This second group had their visual acuity assessed by the nursing assistant using a modified Snellen 'E' chart using the 6/60 optotypes.

Binocular visual acuity was recorded as 6/60 or better, between 3/60 and 6/60, or worse than 3/60 (i.e. blind).[7,8] Pensioners with vision worse than 6/60 or with a past ophthalmic surgical history were examined by the ophthalmologist using a torch and direct ophthalmoscope. Where appropriate, pensioners were advised to attend the local eye clinic or hospital eye service for treatment.

Any pensioner unable to stand in line was seen separately wherever he or she happened to be sitting; consequently a high proportion of the elderly in each locality were seen.

For purposes of comparison, the CSC was also calculated for a group of old-age pensioners randomly selected from the district using a cluster-based sampling method. This 'gold standard' group was part of a larger sample of over 40-year-old subjects examined as part of a glaucoma survey in Hlabisa during 1998 (A P Rotchford, G J Johnson — unpublished data).

Statistical methods

Proportions were compared using the χ^2-test, and means were calculated using the *t*-distribution. Confidence intervals (CIs) were calculated taking into account the design effect.

Results

A total of 648 pensioners were assessed at 11 pension points in 5 areas of the district. Of these, 562 were of pensionable age, i.e. women 60 years or older and men 65 years or older, while the remaining 86 were younger than these respective ages and were therefore excluded from analysis. Details of age and gender for the 562 old-age pensioners are given in Table I.

Forty subjects were blind as a result of cataract, i.e. unoperated cataract was considered to be the primary cause of

Table I. Age and gender details in 562 old-age pensioners

	Mean age (yrs) (SD)
562 old-age pensioners	71.8 (7.8)
138 men ≥ 65 years	74.4 (6.3)
424 women ≥ 60 years	70.9 (8.1)

Table II. Blindness, cataract surgery and surgical coverage at pension points

Pension point	Total seen	Blind* (cataract)	Blind* (total)	Post-op cataract subjects†	Cataract surgical coverage‡
1	44	3	5	2	0.40
2	52	3	4	3	0.50
3	35	2	5	3	0.60
4	24	3	3	3	0.50
5	65	5	5	3	0.38
6	21	1	2	1	0.50
7	71	3	3	4	0.57
8	40	4	4	1	0.20
9	65	6	8	1	0.14
10	83	6	15	3	0.33
11	62	4	4	1	0.20
Total	562	40	58	25	0.38

* Visual acuity < 3/60.
† Number of aphakic or pseudophakic subjects.
‡ Cataract surgical coverage rate = column 5/(column 3 + column 5).

visual acuity < 3/60 in at least one eye of the blind person irrespective of the aetiology in the fellow eye (Table II). The prevalence of cataract blindness was therefore 7.1%. All those with cataract blindness were of pensionable age (mean age 74.9 years; range 60 - 97 years).

Cataract surgery was found to have been performed on one or both eyes of 25 subjects, 6 men and 19 women (mean age 78.4 years). Intra-ocular lenses had been inserted in 9 cases, and the remaining 16 were aphakic. All the aphakic patients were wearing appropriate spectacles so that uncorrected aphakia did not appear to be an important cause of blindness, as has been reported in a study in the Northern Transvaal.[9]

Cataract surgical coverage for the 562 old-age pensioners was 38.5% (95% CI 29.1 - 47.9%). Assuming that all the individuals operated on for cataract were previously blind, surgery has contributed to a 30% reduction in the prevalence of blindness from 14.8% to 10.3%.

The small differences in cataract blindness prevalence and cataract surgical coverage according to gender did not approach clinical significance. However, as expected, the mean ages of cataract-blind subjects (74.9 years) and postoperative cataract subjects (78.4 years) were significantly higher than the mean age of the remainder (71.2 years) ($P = 0.012$ and $P < 0.0001$, respectively).

In the 562 old-age pensioners the total prevalence of blindness from all causes was 10.3% (58 subjects). Cataract was the leading cause (69.0%), followed by glaucoma (12.1%).

The 'gold standard' group randomly selected from the population yielded a cataract surgical coverage rate of 42.2% (95% CI 25.4 - 60.9%) (A P Rotchford, G J Johnson — unpublished data).

CONCLUSION

Cataract surgical coverage can yield useful information about the impact of a surgical eye care programme in an area. When changes of strategy are implemented, for instance the attempt in South Africa to provide cataract surgical services at district secondary level facilities, the effects should be monitored. Ideally CSC should be estimated regularly and a rapid, simple method is required.

South African pension delivery points provide an ideal setting for examining large numbers of cataract patients quickly, and the method described here can be performed by local staff with few extra resources.

The similar figures for CSC in the pension point population and the randomly selected glaucoma survey population (38.5% and 42.2% respectively) lends support to this method.

Additional benefits of this procedure are high profile advertising of the cataract service, case detection and recruitment, all of which are important aspects in many rural areas where the uptake of surgery is low and the service is therefore under-utilised.

In 1997 the cataract surgery rate for the 80% of South Africa's population that is dependent on the government health sector was 861/million (compared with 2 600/million in India) (Blindness Prevention: Statistics and Principles of Control. Community Ophthalmology Meeting, Bloemfontein, 1997 — unpublished report). At this level the prevalence of cataract blindness in the country, estimated at 180 000,[9,10] is a figure that will continue to increase rapidly, with the greatest burden in areas such as rural KwaZulu-Natal where provision and utilisation of services are poor.

Monitoring the results of attempts to prevent this epidemic will help to direct efforts and resources in more effective ways.

The authors thank the district ophthalmic nursing staff for their assistance and Drs P Becker and I Kleinschmidt of the South African Medical Research Council for their statistical expertise.

References

1. Thylefors B. Global data on blindness: an update: Geneva: WHO/PBL, 1994.
2. Johnson G, Minassian D, Weale R. *The Epidemiology of Eye Disease.* London: Chapman & Hall Medical, 1998.
3. Foster A. A simple method for evaluating surgical cataract services in prevention of blindness programmes. *Journal of Community Eye Health* 1992; **10:** 2-5.
4. Limburg H, Foster A. Cataract surgical coverage: an indicator to measure the impact of cataract intervention programmes. *Journal of Cummunity Eye Health* 1998; **11:** 3-6.
5. Limburg H, Kumar R, Indrayan A, Sundaram KR. Rapid assessment of prevalence of cataract blindness at district level. *Int J Epidemiol* 1997; **26:** 1049-1054.
6. Limburg H, Kumar R. Follow-up study of blindness attributed to cataract in Karnataka State, India [In Process Citation]. *Ophthalmic Epidemiol* 1998; **5:** 211-223.
7. World Health Organisation. International Classification of Diseases. 9th revision. Geneva: WHO, 1975.
8. World Health Organisation Study Group on the Prevention of Blindness. Classification of Severity of Visual Impairment. Geneva: WHO, 1972.
9. Bucher PJ, Ijsselmuiden CB. Prevalence and causes of blindness in the northern Transvaal. *Br J Ophthalmol* 1988; **72:** 721-726.
10. Cook CD, Knight SE, Crofton-Briggs I. Prevalence and causes of low vision and blindness in northern KwaZulu-Natal. *S Afr Med J* 1993; **83:** 590-593.

Accepted 3 Aug 1999.