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Glaucoma

Worldwide glaucoma through the looking glass

R R A Bourne

Reflecting on prevalence and a vision of 2020

How often do we read "Glaucoma is the second leading cause of vision loss in the world" in the opening sentence of a paper on glaucoma? This is often followed by a reference to Quigley's report entitled "Number of people with glaucoma worldwide" published in 1996.¹ This seminal report examined all published reports of the prevalence of glaucoma in populations worldwide and estimated that 66.8 million people would have primary glaucoma by the year 2000, with 6.7 million suffering from bilateral blindness. These figures exceeded those predicted by previous surveys which had based glaucoma prevalence on the later stages of the disease when visual acuity is affected.²

The report by Quigley and Broman in this issue of the *BJO* (p 262) is an important and timely addition to our knowledge in this area. They have estimated the worldwide prevalence of glaucoma for 2010 and 2020. Since Quigley's original report there have been many more population based surveys of glaucoma conducted, particularly among Asian, Indian and African derived groups where data were sparse until 1995. This is illustrated by their finding that 23 studies published after 1995 satisfied their criteria for inclusion in their model, whereas only 11 studies could be included from all publications up to this date. Population based surveys were chosen to reduce selection bias. One of the greatest problems encountered when comparing the prevalence of glaucoma in different populations is the definition used for glaucoma. This was neatly summarised by Wolfs and colleagues,³ who reported that their prevalence figures (for the Rotterdam Study) could differ by a factor of up to 12 when applying a variety of diagnostic criteria used in other population based glaucoma studies. Critically, in the current paper by Quigley and Broman, both the optic disc and the visual field (where possible) had to be tested to define glaucoma and the definition of open angle glaucoma had to be independent of intraocular pressure.⁴ Of the various definitions that

can be used, this is a more conservative approach yet there is still likely to be considerable variation between the selected studies in the optic disc and visual field classifications.

The lack of a simple and precise screening tool means that glaucoma does not currently satisfy the criteria for general population screening

Any update on the prevalence of glaucoma worldwide would be timely, yet these projections based on additional recent data are of great benefit in the light of the Vision 2020 initiative which was launched in 1999.⁵ This followed the publication of "The Global Initiative to Eliminate Avoidable Blindness" by the World Health Organization (WHO; in partnership with international non-governmental organisations) in 1997. In 2003, all UN member states signed the resolution to implement Vision 2020. A further systematic review of all population based surveys on blindness and low vision by the WHO in 2002 estimated 37 million people blind worldwide, with 12.3% (4.4 million) attributable to glaucoma, second only to cataract (48%).⁶ In this issue, Quigley and Broman project that 8.4 million people will be blind from primary glaucoma by 2010, rising to 11.1 million by 2020. The numbers blind are a fraction of those with the disease, the authors estimating that the combined number of people with primary glaucomas to be 60.5 million by 2010, increasing by 20 million over the subsequent decade. Their report also contributes useful information on regional differences in the prevalence of open angle and angle closure glaucoma. By 2010, China will have the largest number with primary glaucoma and Africa, the highest ratio of glaucoma to adult population. The greatest number with angle closure glaucoma in 2010 is predicted to be in China and an estimated 86.5% of those affected by angle closure glaucoma will live in Asia. Many of the recent population based surveys from which these figures are derived

also have useful demographic information relating to the prevalence of glaucoma and its subtypes and the percentage of those previously diagnosed with the disease.

The WHO review in 2002⁶ has reported a reduction in blindness due to ocular infections and, encouragingly, the numbers blind from cataract appear to be less than predicted, yet the long term management of chronic eye diseases (diabetic retinopathy, glaucoma, and age related macular degeneration) remains a major and growing problem. As a result, this is one of the priorities of the Vision 2020 programme as it enters its second 5 year phase. This will involve consideration of screening strategies for early identification of these conditions with emphasis on emerging and good income populations.

Quigley and Broman do remark on the considerable difference between their predictions of glaucoma blind in 2010 and the previous estimates based on blindness prevalence surveys available in 2002.⁶ This is an issue worth highlighting. Blindness surveys tend to assign the "most treatable" disease as the primary cause of blindness which results in an underestimation of glaucoma blindness in favour of more "treatable" diseases such as cataract. For this reason it is important that all causes of reduced vision are recorded and reported in these types of survey and that, if possible, these surveys make a serious attempt to detect glaucoma. Future studies that investigate glaucoma prevalence in populations should ensure that the methodology used enables categorisation of the glaucoma cases found according to an internationally accepted scheme such as that by Foster and colleagues,⁴ that allows comparison with other studies. Collection of normative data on optic disc characteristics such as cup/disc ratio and disc size⁷ are also important as these may differ between populations. Unlike intraocular pressure, cup/disc ratio has been shown to be well conserved between different ethnic groups.

There is no doubt that glaucoma suffers from an "image problem." As can be seen from this paper by Quigley and Broman it is certainly a major cause of blindness and is classified as "avoidable" by the WHO, but the fact that it is irreversible, difficult to detect, and difficult to treat means that it is often viewed as less of an urgent issue, particularly in developing nations where other more remediable disease such as cataract are more prevalent. Rotchford⁸ recently summarised the practicalities of glaucoma management. The lack of a simple and precise screening tool means that glaucoma does not currently satisfy the criteria for general population

screening. Yet optic disc assessment and tonometry require little specialist skill or sophisticated equipment, and have reasonably high specificity in the detection of advanced glaucoma, these patients being the most likely to go blind, to present, and to comply with treatment. Efforts need to be made to train general medical and ophthalmic personnel in the recognition of this disease and to highlight awareness of glaucoma in both the medical community and the general population.

In conclusion, this report and the population based surveys that contributed to it, have provided estimates of current and predicted morbidity from glaucoma. Additionally, the contributions of the different types of glaucoma are predicted for which there are differing approaches in terms of diagnosis and therapy. It has been noted before that each glaucoma subtype (either open angle or angle closure) is a greater cause of visual morbidity individually than any other ocular disease, except cataract and trachoma.⁹ The predictions

from this paper are of great importance in planning health policy from both a global and also a region specific perspective. Many of these surveys have already been used as advocacy for the planning of health policy within their respective countries and regionally. The Arab-American philosopher Kahlil Gibran (1883–1931) once said “A little knowledge that acts is worth infinitely more than much knowledge that is idle.” Even within developed countries, less than half of those with glaucoma are aware of their disease. There is no doubt that more prevalence data would be useful, yet there is a need to act using the available data by improving awareness, case detection, and treatment of glaucoma worldwide.

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Retinopathy of prematurity

Retinopathy of prematurity

W V Good, S M Carden

An old problem comes calling again

That retinopathy of prematurity (ROP) is occurring with increasing frequency in transitional economies is no longer debatable. Recognising this fact, the World Health Organization has identified ROP as a leading cause of vision impairment in children in the developing world.¹ Others have identified ROP as an important, increasingly common, and potentially treatable condition in emerging economies.^{2,3} No doubt, improvements in neonatal care in various regions of the world are allowing smaller infants to survive. The question is, what constitutes a low birthweight infant in an emerging economy? To answer this question requires information on the demographics of ROP in these regions.

But demographics of ROP in transitional economies are hard to ascertain. Without this knowledge, it will be difficult to identify those infants who should be screened and treated. Reports of the disease occurring in larger than expected birthweight infants, in

increasing frequency, in more mature infants, are alarming. These reports are well designed and carefully conducted but they are hampered by the chaos that exists in medical care delivery in the developing world. This must be especially true when premature infants are considered. Nothing should be left to chance in evaluating premature infant disease in the developing world, and no demographic data should be considered entirely reliable unless directly observed.

Consider the following. Many premature infants in transitional economies do not have access to hospital care ever, let alone early in their lives. They are born outside the hospital, often in rural environments. Scales for weighing children are absent or poorly calibrated, and estimates of gestational age may be based on guesswork, the lunar cycle, or nothing at all. Families are often caught by surprise by the premature arrival of their child, and may not know that medical care could improve survival. The healthcare delivery system is

fragmented, unless the infant's family has resources to allow hospitalisation. Even so, the family would need to live near an urban centre to gain access to more modern types of treatment. Thus we may not know the number of premature infants in a given region. We know of some infants observed to have the disease, but cannot effectively estimate how many premature infants die or are not evaluated in the first months after birth.

Important obstacles stand in the way of better understanding the epidemiology of ROP in emerging economies. Some obstacles are obvious, such as insufficient medical resources to allow identification of premature infant demographics. Improved organisation of healthcare delivery will allow better characterisation of premature infants. A significant shortage of full time, geographically based specialists in ROP poses an additional obstacle. Visiting experts to the developing world help diagnose and treat ROP, with resulting transfer of skills. On the other hand, it is difficult for a visitor to reliably appreciate the extent of the problem of ROP in these developing regions. Consultants to developing regions are shown or told of cases. Increasingly, we hear that these cases are atypical, at least by western standards. We must assume the worst; that ROP is increasing, and that paradigms for screening and treatment may need modification for emerging economies.