

Prevention of Blindness in Singapore: No Room for Complacency

Kah-Guan Au Eong,^{1,4} MMed (Ophth), FRCS (Edin & Glas), FAMS (Ophth), Chee-Chew Yip^{1,2,4} MMed (Ophth), FRCSEd, FAMS (Ophth)

It is now a well-known fact that Singapore's population is greying dramatically due to the ageing of the "baby boomers" – defined as those born between 1947 and 1964. In 2005, 1 in 12 Singapore residents was 65 years or older. By 2030, this is expected to escalate to 1 in 5.¹ The healthcare needs of our rapidly ageing population will therefore increase considerably. As in some other developed countries, this is expected to disproportionately affect ophthalmology.² Four major age-related eye diseases (AREDS) – cataract, glaucoma, age-related macular degeneration (AMD) and diabetic retinopathy – are expected to pose a growing challenge for healthcare professionals in the coming decades.

Data just released by the Singapore Ministry of Health show that ophthalmology outpatient attendances by government-subsidised patients rose by 39.1% from 2002 to 2006 or a compounded average growth rate of 8.6% per year, to hit a total of 318,275 outpatient attendances in 2006 among the major public hospitals.^{3,4} At the Singapore National Eye Centre which accounted for 42% of all the outpatient attendances, the volume of attendances by patients ≥ 65 years of age increased at a compounded average growth rate of 6.3% compared to 5.1% in the general population over the same period.³

Visual impairment and blinding disorders occur with increasing frequency with age. This age-related increase in prevalence is not linear, but exponential. In fact, between 32.5% and 49% of all ophthalmology outpatient attendances by government-subsidised patients at 5 major public hospitals were made by patients ≥ 65 years old.³ If the current age-specific disease and blindness prevalence rates were to persist, the combination of increasing longevity and the growing proportion of older people would lead to a rapid increase in the number of people affected and cases of blindness. This could have serious social and economic consequences, and is a major public health concern.

As recently as about a decade ago, it was remarked that "*apart from retinal disease and congenital blindness (problems at the two extremes of life), prevention of*

blindness is not a priority health problem in Singapore."⁵ Since Singapore's independence 42 years ago, improvement in socioeconomic circumstances and advances in ophthalmic care have certainly reduced or even eliminated some previously important causes of blindness. However, we must not lose sight of emerging "new" sight-threatening conditions.

Data on visual impairment and blindness in Singapore are rather limited. Using data from the Singapore Blind Registry maintained by the Singapore Association for the Visually Handicapped (formerly known as the Singapore Association for the Blind), it was initially estimated that the prevalence of blindness in Singapore appeared to be one of the lowest in the world, at 55 per 100,000 population or 0.05%.^{5,6} This is likely to be a gross underestimation of the true prevalence rate as the registry relies mainly on the voluntary registration of patients by doctors and some patients refuse to be registered for fear of stigmatisation or other personal reasons. Furthermore, the data also cannot be extrapolated to the population in general since it is not community-based.

More recently, the prevalence of visual impairment [defined by the World Health Organisation (WHO) as visual acuity of $<6/18$ but equal to or better than $6/120$ in the better eye] and blindness (defined as visual acuity $<6/120$ in the better eye) in Singapore adults of Chinese origin aged 40 to 79 years old were reported as 1.1% and 0.5% respectively in a population-based study.⁷ This blindness prevalence is therefore similar to estimates in certain Asian countries such as Malaysia (0.3%)⁸ and Taiwan (0.6%),⁹ but lower than those in Mongolia (1.5%),¹⁰ Bangladesh (1.5%),¹¹ rural Indonesia (2.2%),¹² and India (4.3%).¹³ The prevalence of blindness in the United States (US), using the same WHO definition, is 0.5%.¹⁴

Poor visual function due to AREDS affects not just older people, but also society as a whole. It has profound functional and economic implications for both the individual and society.¹⁵ Functionally, diminished physical activity due to visual impairment may translate into decreased work

¹ Department of Ophthalmology and Visual Sciences, Alexandra Hospital, Singapore

² Jurong Medical Centre, Singapore

³ Department of Ophthalmology, Yong Loo Lin School of Medicine, National University of Singapore, Singapore

⁴ Department of Ophthalmology, Tan Tock Seng Hospital, Singapore

Address for Correspondence: Adjunct Associate Professor Kah-Guan Au Eong, Head and Senior Consultant, Department of Ophthalmology and Visual Sciences, 378 Alexandra Road, Alexandra Hospital, Singapore 159964.

Email: kah_guan_au_eong@alexhosp.com.sg

productivity and medical problems such as depression and fall-related injuries.¹⁵⁻²⁰ Prior population-based studies have also found that visual impairment is associated with an increased risk of subsequent death.²¹⁻²³ Additionally, it translates into loss of man-hours due to physical and/or visual incapacity and medical cost related to the treatment of ocular diseases and/or vision-related injuries and illnesses. These economic implications further exacerbate the problems posed by AREDs in our society.

With the increasing demands of contemporary life, the elderly population of tomorrow will require higher levels of physical performance, including visual function. With the Singapore government's plan to introduce a re-employment law which will require employers to offer re-employment to people reaching the retirement age of 62 years to 65 years by 2012, and to 67 years subsequently, many more older people are expected to remain in the workforce.²⁴ Additionally, the elderly population is increasingly becoming more mobile, travelling frequently and actively engaging in various recreational activities, which further heighten the demand for better visual acuity to meet their daily and recreational needs.

Patient-reported visual disability is an important consideration in the management of ocular disorders. In recognition of the importance of this in determining the need for cataract surgery, the American Academy of Ophthalmology changed its preferred practice guidelines from solely a visual acuity cut-off criterion to reliance on patient-perceived functional limitations as well.²⁵ Increasingly, functional limitations are defined by the inability to perform visually demanding tasks. Reading, computer skills, interpersonal interactions and driving are examples of visually intensive tasks that have assumed greater importance in modern-day Singapore. For the success of our future communities, the goal must be the prevention of avoidable visual loss at better visual acuity levels in order to maintain the functional capacity and employability of people afflicted with eye diseases. These lifestyle and work demands, coupled with increased patient expectation, will therefore place a greater demand on the healthcare system to preserve and restore vision in our population. There is therefore a need to marshal and allocate adequate resources for preventive measures and treatment to deal with visual problems at an earlier stage – prior to any loss of economic productivity and subsequent dependency.

The rise in AREDs is due not only to the demographic shift, but also to our success in combating ocular conditions due to infectious diseases and malnutrition that typically affect younger people. These diseases have in common an aetiology that is largely external and therefore lend themselves well to control via a public health approach. A number of previously identified chief culprits of blindness

such as keratomalacia, ophthalmia neonatorum, corneal ulceration, interstitial keratitis and trachoma have now been eradicated or are rarely seen.^{26,27} In their place, we are witnessing an onslaught from a heterogeneous group of AREDs due to our rapidly ageing population.

Unlike ocular conditions that are due to infectious diseases and malnutrition, AREDs do not have known external factors as their primary aetiology. Instead, genetic constitution, interacting with certain environmental and other factors, is likely to determine the risk of developing sight-threatening AREDs. Therefore, they do not lend themselves to traditional public health control strategies in the same way as infectious diseases and malnutrition do. In addition, they are relatively more expensive to manage. At the moment, the management of visual impairment due to AREDs relies on treatment to restore sight (for cataract) or prevent further visual loss (for glaucoma, AMD and diabetic retinopathy), often at considerable costs.

While recent medical breakthroughs have improved the outlook for some of the more visually debilitating AREDs, the cost of care has also escalated considerably. For example, although the recently US Food and Drug Administration-approved intravitreal ranibizumab injection is now the new “gold standard” for the treatment of wet AMD,^{28,29} its treatment cost is prohibitive and beyond the reach of the average Singaporean. The rising healthcare costs therefore presents a major challenge in the delivery of healthcare to older Singaporeans.

The unique challenges in providing and financing healthcare services for older Singaporeans require a targeted approach and research focus. Health services research can provide answers to key questions about treatment outcomes, effectiveness, cost, use and access, as well as quality measurement and improvement in older people. Gaps exist in our knowledge base with respect to how best to organise, finance and deliver care for older people. The overarching question is, “*What are the most effective and efficient means to provide healthcare to older Singaporeans so that the end result is a measurable improvement in the health of this population?*” The answer to this question could very well come from research in key focus areas such as studies to improve clinical practice, healthcare organisation and delivery; to align financial incentives and benefit decisions with desired medical outcomes; and to improve access to care. There is also a need to encourage professional best practices such as that being done as part of the National Healthcare Group Chronic Disease Registry³⁰ and to prepare adequate services for the volumes of cases that healthcare providers will need to cover.

Although ways to completely prevent the onset of AREDs do not yet exist, modification of known at-risk behaviours can go a long way to reducing the risk of developing these

diseases. We need to support and promote protective behaviour such as smoking cessation, ultraviolet light exposure reduction and taking a diet rich in green leafy vegetables and fruits.³¹⁻³³ We need to study what can be done to increase the awareness of AREDs and eye care. Programmes such as the annual Age-related Macular Degeneration Awareness Week and the National Eye Care Day can help build public awareness to encourage people to care for their eyes and have regular appropriate eye examinations. These programmes and their potential impact should be constantly evaluated and, if necessary, refined to improve their effectiveness.

For those who have lost vision, optimal rehabilitation and support should be provided. In this regard, it is heartening to note that a small network of support is slowly growing, thanks to patient support and self-help groups such as the Macular Degeneration Society, Guide Dogs Foundation of the Blind, Glaucoma Society of Singapore and Glaucoma Patients Association (Singapore).

In summary, Singapore's rapidly ageing population will bring with it a higher prevalence of AREDs which are costly to treat, threaten the ability of older people to live independently and increase the risks for accidents and falls. To prevent vision loss and support rehabilitative services for people with low vision, it is imperative for the health community to address this emerging challenge through surveillance, public education, and the co-ordination of screening, examination and treatment. A long-term, multifaceted, systematic strategy to tackle these issues is therefore needed. There is no room for complacency.

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