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# The Hong Kong Adult Vision Study: a cross-sectional epidemiological pilot study of eye diseases in the population aged 40 years and over in Hong Kong

## Key Messages

1. Visual disability is common in Hong Kong, with 14.7% of adults aged 40 years and above sustaining visual disability to the level of 6/18 (World Health Organization definition) in one eye.
2. The commonest cause of unilateral and bilateral visual disability was cataract, its primary associated risk factor being increasing age.

## Introduction

This is the first study of its type in Hong Kong adults. Previous epidemiological studies of eye disease have been carried out in the United States and in Australia<sup>1,2</sup> The Baltimore Eye Survey, perhaps the prototype ocular epidemiology study, examined 5300 subjects.<sup>1</sup> However, the principal aspects of the Australian protocol were used as a model in the present study because of its effectiveness in Melbourne and our professional relationship with those investigators. No previous work of this type has been performed in Hong Kong. We performed a pilot study to determine the prevalence of visual disability and its causes in Hong Kong adults. Our goals were to: (1) measure the prevalence of visual disability in those aged 40 years and above, (2) assess the main causes of visual disability in Hong Kong, (3) identify risk factors for visual disability, if any, (4) measure visual functioning and its impact on quality of life for those with visual disability, and (5) assess knowledge of common eye diseases and attitudes towards visual disability. This pilot study set out to test the feasibility of our methods for collecting data in the Hong Kong community, to enable a more definitive future study with a larger sample size.

## Methods

This study was conducted from December 1996 to September 1998. We analysed 1270 adults aged 40 years and over in Shatin, New Territories with complete, dilated eye examinations. Subjects were chosen randomly from census data, to accurately represent the adult population of Hong Kong. Visual disability was defined as inability to read the 6/18 line on an Early Treatment Diabetic Retinopathy Study (ETDRS) visual acuity chart with best-corrected vision, with either the subject's usual spectacle correction or pinhole-aided (in accordance with a modified World Health Organization [WHO] definition).

Because the eye is a paired organ, prevalence of visual disability (defined by the WHO as visual acuity <6/18) was measured in three ways: (1) total number of eyes with visual disability, (2) number of persons with bilateral visual disability, and (3) number of persons with at least one eye with visual disability.

## Results and discussion

### Prevalence of visual disability

The prevalence data revealed a strong association between age and visual disability (Fig 1). Using the 40-59 age-group as the reference, the odds ratio for eyes with visual disability was 3.7 for those aged between 60-69 years and 15.9 for those aged 70 years and over. The odds ratio for bilateral visual disability was 8.8 for those aged 60-69 years, and 41.4 for those aged 70 and over. The odds ratio for having at least one eye with visual disability was 3.3 for those aged 60-69 years and 15.1 for those aged 70 and over.

### Causes of visual disability

A total of 248 (9.8%) of eyes assessed had visual disability; the commonest

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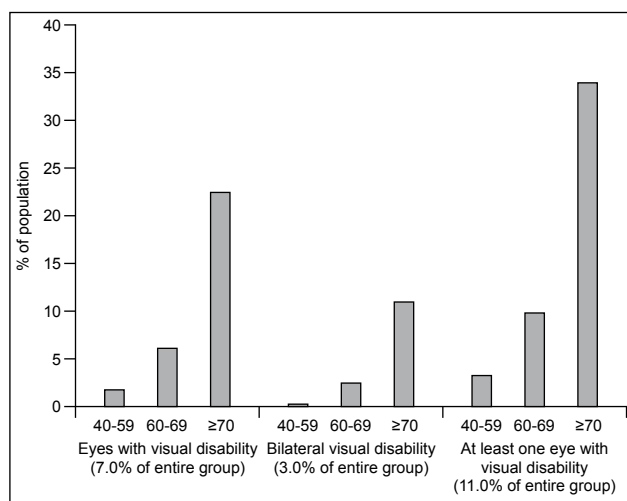


Fig 1. Prevalence of visual disability

Table 1. Causes of visual disability in persons aged  $\geq 40$  years

Causes of visual disability	No. (%) of eyes
Cataract	86 (51)
Amblyopia	14 (8)
Age-related macular degeneration	12 (7)
Glaucoma	7 (4)
Corneal disease	7 (4)
Vascular retinopathy	7 (4)
Others	37 (22)
Total	170

Table 2. Odds ratio of visual disability according to age

Age-group (years)	Odds ratio
40-64*	1.0
65-69	4.7
70-74	6.5
75-79	13.8
$\geq 80$	32.5

\* Reference group

causes were: cataract, amblyopia, and age-related macular degeneration (ARMD) [Table 1].

Bilateral visual disability was measured as the acuity in the better-seeing eye, and affected 61 subjects; the leading cause, cataract (which is treatable) affected 41 of these individuals. When stratified by age, cataract was the cause of bilateral visual disability in neither of the two participants aged 59 years or below, 12 (67%) of the 18 aged 60-69 years, and 29 (71%) of the 41 aged 70 years or above.

#### Risk factors associated with visual disability

Older subjects have a higher likelihood for visual disability in at least one eye. Using the 40-64 age-group as a reference, the odds ratios were 4.7, 6.5, 13.8, and 32.5 for those aged 65-69, 70-74, 75-79, and  $\geq 80$  years, respectively (Table 2;  $P < 0.001$ ). Female gender was not significantly associated with visual disability after adjusting for age (odds ratio=1.1).

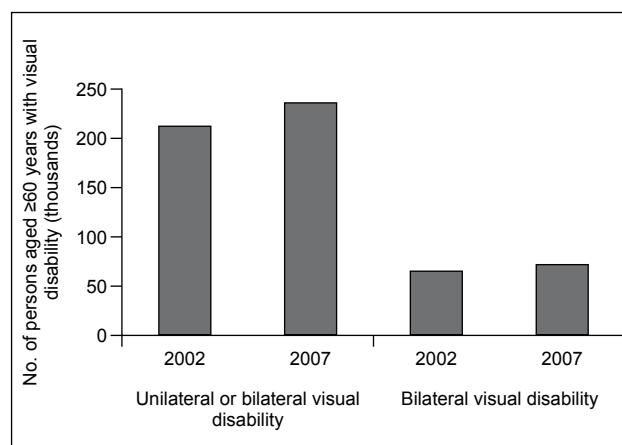


Fig 2. Projection of numbers of visually disabled aged 60+ in years 2002 and 2007

The following variables were significantly associated with visual disability by univariate analysis: educational level, employment status, income, housing type, medical history of heart disease or diabetes, family history of glaucoma or cataract, and alcohol consumption, all of which were confounded by age (and sex); they all become non-significant after adjustment by means of logistic regression.

#### Visual functioning and quality of life

The average visual function (VF) score decreased absolutely with increasing levels of visual disability for the total score and for each sub-scale. For example, the average total VF score for individuals with normal vision status was 93.5, compared to 85.1 for those with unilateral visual disability and 68.7 for those with bilateral visual disability (data not shown).

Among the four quality of life (QOL) sub-scale measures, bilateral visual disability depressed the mean mental QOL score the most (down to 75.3) and self-care QOL the least (to 91.7). This may indicate a greater ability for the visually disabled in Hong Kong to cope with tasks such as dressing and grooming, but lesser ability to adapt to the relative isolation that reduced visual functioning imposes.

Subjects were queried about the importance of vision in comparison to other severe disabilities, including deafness, loss of speech, loss of arms or legs, dementia, and paralysis caused by stroke. Paralysis by stroke was the most-feared physical disability, followed by blindness, dementia and loss of a limb, as mentioned by 47.7%, 35.7%, 8.2% and 7.5% of respondents, respectively.

#### Knowledge of eye disease

When asked about their knowledge of several common eye diseases, most (93%) subjects had heard of cataract and 78% knew about glaucoma, whereas only 9% had heard of ARMD.

Most subjects do not know about the treatment methods (or lack thereof) for glaucoma or ARMD. Approximately 77% of the subjects reported no knowledge of the treatment methods for glaucoma (eyedrops, laser, surgery) and neither did 80% of the subjects on ARMD. Only 30% of the subjects reported no knowledge of the treatment method for cataract.

Regarding knowledge about the correct treatment method for each eye disease, subjects were asked to select from the following: spectacle use, surgery, drugs, laser treatment, vitamins, dietary treatment, visit an ophthalmologist, and Chinese medicine. The correct option for cataract (which is surgery—cataract is reversible but not preventable) was selected by 59%. Surgery and/or laser treatments are among the correct treatment options for glaucoma (which is preventable but not reversible). Yet these two treatments were selected by only 7% and 3% of the subjects, respectively.

### **Population projections**

By the year 2016, those aged 60 years and over will comprise 19.6% of the Hong Kong population and those aged 70 years and above will comprise 8.2%. Assuming that the Shatin prevalence is similar to those of other districts in Hong Kong, the number of those aged 60 years and over with visual disability in at least one eye is projected to be about 213 000 in the year 2002 and 236 100 in the year 2007 (Fig 2). However, a larger-scale study is required to test the above-mentioned assumptions and refine the precision of our estimates for the age-specific prevalence of various eye diseases.

### **Conclusions**

Visual disability is common in Hong Kong—15% of adults aged  $\geq 40$  years sustain visual disability to the level of 6/18 (WHO definition) in one eye. In all, 4.8% of this age-group had bilateral visual disability; in those aged 70 years or over, the prevalence of such visual loss was 56 times that of subjects aged 40-59 years. The commonest cause of unilateral and bilateral visual disability was cataract. The primary associated risk factor for visual disability is age. Neither gender, educational level, employment status, income, or housing type were identified as risk factors. An

index of routine visual functioning was significantly lower in those with unilateral visual disability than in normal subjects, and was much lower among those with bilateral visual disability. Most subjects were knowledgeable about cataract and its correct form of therapy. Visual disability was second only to stroke as the most-feared form of disability. Preliminary estimates were made as to the prevalence of unilateral or bilateral visual disability in the years 2002 and 2007.

### **Pertinent observations and predictions**

1. As visual disability was closely associated with increasing age and Hong Kong is a rapidly ageing society, the burden of visual disability is likely to grow quickly in the future.
2. As only age was a significant predictor of visual disability, therapy and prevention need to be pursued as a universal strategy. Thus eye care planning according to the demographic composition of the community may be of primary importance.
3. As this pilot study assessed only a limited number of subjects, low case numbers for certain ocular conditions could not allow prevalence calculations with a high degree of certainty. A larger follow-up study is therefore indicated.
4. The majority of persons with visual disability in Hong Kong sustain their visual disability as a result of eye conditions that are either preventable or reversible (cataract, glaucoma, amblyopia).

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