

# Blindness and Visual Impairment Amongst Rural Malays in Kuala Selangor, Selangor

M Zainal, MS, L Masran, MS, A R Ropilah, MS, Department of Ophthalmology, Faculty of Medicine, Universiti Kebangsaan Malaysia, Jalan Raja Muda Abd Aziz, 50300, Kuala Lumpur, Malaysia

## Summary

A population-based cross-sectional study was carried out to determine the prevalence of visual impairment and blindness and its causes amongst the adult rural Malay population in the district of Kuala Selangor, Selangor. By simple random sampling 330 samples were selected for the study. All samples underwent complete ophthalmological examination. The crude prevalence of visual impairment and blindness were 0.7% and 5.6% respectively. Age was the most important factor associated with the prevalence; gender, level of education and level of income was not significantly related. Cataract was the commonest cause of visual impairment and blindness while diabetic retinopathy was the second important cause.

*Key Words:* Blindness, Visual impairment, Cataract

## Introduction

Blindness and visual impairment is a global problem. The prevalence of global blindness is 0.7%, with a range from 0.3% for developed countries to 1.4% for sub-Saharan African. The World Health Organization (WHO) has estimated that in 1990, the total world's population experiencing blindness was 38 million people and the global visually impaired (people blind or with significant visual loss) is estimated at about 148 million<sup>1</sup>.

The majority of them were from the Third World and developing countries such as in Africa and Asia. This was due among others, to lack of eye care services, poverty, malnutrition and low standard of living. It was estimated that about 80% of the total blindness in the developing countries could be prevented or overcome with adequate medical or surgical treatment<sup>2</sup>.

The higher prevalence of blindness and low vision amongst the rural population compared to the urban population can be attributed to poor sanitation, personal hygiene with a resultant increased in infective

causes of blindness<sup>3</sup> and the less readily available ophthalmic services. The prevalence of visual impairment and blindness of a rural population in Malaysia was 6% and 1.75% respectively<sup>4</sup>. The prevalence of blindness was slightly higher if compared to nearby countries like Indonesia (1.2%) and Thailand (1.1%)<sup>5</sup>.

Over the last two decade, the rise in Malaysia's economic growth has brought about a higher standard of living and a better health care in the rural areas. Medical facilities such as hospitals and health centres had been set up to provide adequate medical services. Nevertheless, specialist medical care in most of the rural areas is still lacking. Specialist care in the field of ophthalmology for example is only available in one or two general hospitals in each state, and this is far from sufficient. This perhaps could deprive the rural population from standard high quality ophthalmic care.

The problem of visual impairment and blindness is predicted to increase every year in the Third World and developing countries due to the increase of population and increase of life expectancy throughout

the world. This would mean an increase in the geriatric population, and therefore the incidence of poor vision<sup>3</sup>.

Developmental, economic, social and quality-of-life implications of blindness amongst adult population are indeed enormous. This study was carried to evaluate the ocular status of the adult Malay population in a rural area in the era of new Malaysia. The causes and factors associated with the prevalence of visual impairment and blindness were also studied.

## Materials and methods

### Research area, sampling and time

This cross-sectional study was conducted in three traditional Malay villages with a predominantly Malay population. The villages were Kampung Asam Jawa, Kampung Api-Api and Kampung Pasir Tuntong in the Api-Api subdistrict of Kuala Selangor.

An initial house-to-house survey was carried out to identify the eligible residents. Particulars of those aged 18 and above were recorded in a list and were given a number each. By simple random sampling a total of 330 residents were chosen from the prepared list. The minimum sample size was estimated using EpiInfo version 5.0 based on estimated prevalence of 6.0% (Prevalence of visual impairment in the study area in 1984), worst acceptable of 3.5% and confidence level of 95%. The data collection was carried out over two month period from November 1993 until January 1994.

### Ocular examination

The selected residents were given appointments for an ophthalmological examination, which was performed, in the village's civic hall. The letter optotype Snellen Chart, was used, meanwhile, the illiterate were tested using the "illiterate" or "tumbling" E chart. The observation distance was 6 meters. The best correctable vision of both eyes was established separately starting from the right and followed by the left eye. To ensure the occlusion of the eyes were reliable; the DaLaur occluders were used. Hand occlusion was not recommended to ensure the subjects do not peep through the fingers. The subjects were asked to read the smallest of the letters that can be seen.

Individuals who could not see the largest letter, the 6/60 letter, were brought closer to the chart until the letter could be seen. They were asked to count fingers if the vision was worse than 3/60. When they could not count fingers, the subjects were tested whether they were able to perceive hand movement. Light perception was then tested by shining a pen torch when the hand waving failed.

Pin-hole test was performed when the individual had a vision of worse than 6/18. This would determine whether the decrease in vision was due to a refractive error. Thus the best-corrected vision was defined as the corrected acuity through a pin-hole. The DaLaur occluder has a built-in pin-hole disc that can be flipped into place. The pin-hole was placed in front of the eye and the opposite eye was occluded. The subjects were instructed to peep through the pin-hole and read the letters on the chart.

Slit-lamp biomicroscopic examination was carried out and the intraocular pressure was measured using a Goldman's applanation tonometer. The pupil was dilated using single drop of gutt penylephrine 10% and gutt tropicamide 1% in subjects with visual acuity of 6/18 or less. Fundal examination was carried out using direct ophthalmoscope, 78-D lens and indirect ophthalmoscope. All the findings were recorded and the diagnosis of the cause of visual impairment or blindness if present was made. The subjects that needed further treatment or surgical intervention were referred to the Universiti Kebangsaan Malaysia ophthalmology clinic.

### Data analysis

Chi-square test was used to determine the association between the prevalence and the study factors. The data was analyzed using Epiinfo Version 5.

### Definition

**Visual impairment and blindness :** World Health Organization (WHO) defined visual impairment as a situation where visual acuity is less than 6/18 while blindness happens when the visual acuity of the better eye is less than 3/60.

**Cataract :** the presence of opacity in the lens which causes reduced in visual acuity to less than 6/12.

**Refractive error** : improvement in distant acuity of greater than one Snellen line with pinhole is an indication of presence of refractive error.

## Results

### General

A total of 282 residents from 330 residents identified attended the ophthalmological examination. The overall response rate was 85.5%. Most of them were involved in the agricultural and industrial sectors. The mean income of the subjects was RM 460.00 per month. The majority of the subjects had education up to the primary school level. One hundred and twenty seven (45.0%) were men and 155 (55.0%) were women. The mean age  $51.63 \pm 14.59$  years and  $43.38 \pm 15.6$  years for men and women respectively.

### Prevalence of blindness and visual impairment

The overall crude prevalences of visual impairment and blindness were 0.7% and 5.6% respectively. In this study, 16 subjects had visual impairment and two were blind from a total of 282 subjects. Although the prevalence were higher amongst men (prevalence of blindness :7.1%; prevalence of visual impairment: 0.8%) as compared to women (prevalence of blindness :4.5%; prevalence of visual impairment: 0.6%) the differences were not statistically significant ( $p > 0.05$ ).

The prevalence of defective vision (visual impairment and blindness) showed a very strong relationship with age. The distribution of defective vision according to age is shown in Figure 1. The rate increased from 2.13% amongst the age of 30-39 to 25.9%, (more than 10 times higher) amongst the age of 70 years and above. This difference was statistically significant ( $p < 0.05$ ).

With regard to the level of education, it was observed that the prevalence was higher amongst the uneducated. However this difference was not statistically significant ( $p > 0.05$ ). The data analysis did not show any significant relationship between level of income and visual impairment and blindness.

### Causes of blindness and visual impairment

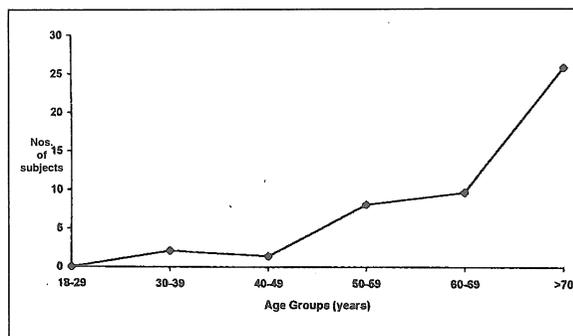
Two subjects were blind, one of them due to cataract

and another one was due to diabetic retinopathy. Regarding the causes of visual impairment, cataract was responsible for 13 cases (79%) and the other three were each due to diabetic retinopathy, senile macular degeneration and refractive error.

## Discussion

The reported prevalence of visual impairment and blindness varies from country to country. This was due to the differences in methodology, definition, geographical area and sampling. However, according to the World Health Organisation the burden of blindness and low vision is borne by many developing countries in Asia and Africa. Most of them live in rural areas and many of them are poor.

The prevalence of visual impairment and blindness in an urban community in America, for example, were 5.2% and 0.5% respectively<sup>8</sup>; whereas the prevalence of visual impairment and blindness in Kenya were 2.5% and 0.7% respectively<sup>9</sup>. In Tanzania, the



**Fig. 1: Distribution of subjects with visual impairment and blindness according to age**

prevalence of visual impairment was 4.3% and 1.2% of the samples were legally blind<sup>10</sup>. It is said that the prevalence of blindness increase by a factor of two as one travels from the western world to the urban developing world and it triples in the rural area of developing countries<sup>3</sup>.

This study provided information regarding prevalence of visual impairment and blindness amongst the adult Malay population in a rural area. The prevalence of visual impairment and blindness were 5.6% and 0.7%

respectively. It was observed in this study that the prevalence of visual impairment and blindness were slightly higher amongst men however the difference was not statistically significant. In other studies the trend was more towards women<sup>4,8,11</sup>. The higher prevalence of visual impairment in men in this study may be due to more older men. The prevalence of visual defect was 2.1% amongst the subjects of age group 30-39 and increased to 25.9% in the age group 70 years and above. This high prevalence of visual defect in the elderly is expected because the eye diseases such as cataract, glaucoma and macular degeneration are more common in this age group<sup>12</sup>.

From this study, it seems that the level of formal education did not influence the prevalence of visual impairment and blindness. Therefore what is more important to be measured is the level of knowledge regarding eye diseases amongst the subjects. The information regarding basic health and eye care including preventive measures that are readily available through various mass media would have increase awareness.

With regard the causes of visual impairment and blindness, cataract was the major cause. About 79% of the visual impairment in this study were due to

cataracts. Cataracts were the main cause of blindness and low vision<sup>13</sup>. Studies done by Brilliant *et al* concerning blindness epidemiology in Nepal between 1978 to 1980 have shown that the rate of blindness is 0.84% and cataract was the main factor for blindness<sup>14</sup>.

An important observation in this study was diabetic blindness<sup>15</sup>. It was another cause of low vision and blindness after cataract. As blindness from diabetic retinopathy is avoidable, if detected early, primary prevention is important. Health education on the importance of eye screening amongst diabetics may be able to prevent blindness from diabetic retinopathy. No infective causes were seen in this study.

### Conclusions

The prevalence of visual impairment and blindness amongst the adult Malay population in a rural area was 5.6% and 0.7% respectively. Age was the only factor significantly associated with visual impairment and blindness amongst the subjects. Gender, level of education and income did not affect this prevalence rate. The major cause of visual impairment and blindness was cataract.

### References

1. Thylefors B, Negrel AD, Parajasegaram R, Dadzie KY. Global data on blindness. WHO/PBL/94.40. Geneva, Switzerland. pg 1-24
2. Thylefors B. The World Health Organization's programme for the prevention of blindness. *Int Ophthalmol* 1990;14 : 211-9
3. Foster A. Pattern of blindness. In Tasman W, Jaeger EA (Eds). *Duane's clinical ophthalmology*. Lippincott Co, Philadelphia. 1992;5(53): 1-7.
4. Osman A, Ramphal KG. Prevalens kecacatan penglihatan di Kuala Selangor. *Med J Malaysia*, 1988;43 : 235-6.
5. Foster A, Johnson GJ. Magnitude and causes of blindness in the developing world. *Int Ophthalmol*, 1990;14 : 135-40.
6. Simons K. Visual acuity and the functional definition of blindness. In Tasman W, Jaeger EA (Eds). *Duane's clinical ophthalmology*. Lippincott Co, Philadelphia, 1992;5(51) : 1-21.
7. Hu TS, Zhen Q, Sperduto RD, Zhao JL, Milton RD, Nakajima A. Age-related cataract in the Tibet Eye Study. *Arch Ophthalmol* 1989;107 : 665-9.
8. Tielsch JM, Sommer A, Witt K, Katz J, Royall RM. The Baltimore Eye Survey. Blindness and visual impairment in an American urban population. *Arch Ophthalmol*, 1990;108 : 286-90.
9. Whitfield R, Schwab L, Degnan DR, Steinkuller P, Swartwood J. Blindness and eye disease in Kenya: ocular status survey results from the Kenya rural blindness prevention project. *Br J Ophthalmol*, 1990;74 : 333-40.

## ORIGINAL ARTICLE

10. Rapoza PA, West SK, Katala SJ, Taylor HR. Prevalence and causes of vision loss in central Tanzania. *Int Ophthalmol*, 1991; 15 : 123-9
11. Ghafour IM, Allan D, Foulds WS. Common causes of blindness and visual handicap in the west of Scotland. *Br J Ophthalmol* 1983;67 : 209-13.
12. Wormald RPL, Wright LA, Courtney P, Beaumont B, Haines AP. Visual problems in the elderly population and implication for services. *BMJ*, 1992;304 : 1226-9.
13. Klein BE, Klein R. Cataract and macular degeneration in older America. *Arch Ophthalmol* 1982; 100: 571-3.
14. Brilliant LB, Pokhrel RP, Grasset NC, Lepkowski JM, Kolstad A, Pararajasegaram R, Brilliant GE, Gilbert S, Shresta SR, Kuo J. Epidemiology of blindness in Nepal. *Bulletin of the World Health Organization*, 1985;63 : 375-86.
15. Khebir BV, Osman A, Khalid BAK. Changing prevalence of diabetes mellitus amongst rural Malays in Kuala Selangor over a 10 year period. *Med J Malaysia* 1996;51 : 41-7.