Causes of irreversible blindness in the Mettapracharak (Watraikhing) Eye Center among the elderly between 2010 and 2016

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Abstract

This cross sectional study aims to evaluate the causes of irreversible blindness among the elderly in the Mettapracharak (Watraikhing) hospital between 2010 and 2016. The sample of the study were new eye outpatients attending the hospital between 2010 and 2016. The participants aged more than 60 years old with irreversible legal blindness in accordance with the World Health Organization criteria (best corrected visual acuity less than 3/60 or visual field less than 10 degree in the better eye despite all medical and surgical interventions. The statistics used were frequency, percentage, mean and standard deviation.

The results of the study showed 8483 patients to be recruited, 5183 (61.1%) were females and 3300 (38.9%) were males. 1281 (15.1%) had legal blindness. 230 (18.0 %) were bilateral blindness. Main causes of visual loss were as follows: 220 (17.2%) glaucoma, 214 (16.7%) diabetic retinopathy, 183 (14.3%) age-related macular degeneration, 78 (6.1%) ocular vascular occlusion, 54 (4.2%) retinitis pigmentosa, 35 (2.7%) optic atrophy, 15 (1.2%) amblyopia, 150 (11.7%) combination of causes, 113 (8.8%) corneal disorder and others 219 (17.1%). The most commom cause of irreversible blindness among the elderly was glaucoma, diabetic retinopathy and age-related macular degeneration respectively.

Policy Recommendation is to know the cause of irreversible legal blindness that can initiate the government and eye care specialists in promoting more suitable strategies for the better awareness of these avoidable complications.

Keywords: Blindness, Mettapracharak (Watraikhing), Elderly

สาเหตุของภาวะตาบอดถาวรของผู้สูงอายุในโรงพยาบาลเมตตาประชารักษ์ (วัดไร่ขิง) ระหว่างปี พ.ศ. 2553 - 2559

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บทคัดย่อ

การวิจัยภาคตัดขวางนี้มีวัตถุประสงค์เพื่อประเมินสาเหตุภาวะตาบอดถาวรของผู้สูงอายุในโรงพยาบาลเมตตาประชารักษ์ (วัดไร่ขิง) ระหว่างปี 2553 พ.ศ. ถึง พ.ศ. 2559 โดยศึกษาจากผู้ป่วยนอกราย ใหม่ที่เป็นโรคตาในโรงพยาบาล กลุ่มตัวอย่างที่ศึกษาคือผู้ที่อายุมากกว่า 60 ปี ที่มีอาการตาบอดถาวรตาม เกณฑ์ขององค์การอนามัยโลก คือระดับสายตาที่แก้ไขอย่างดีที่สุดแล้วน้อยกว่า 3/60 หรือลานสายตาน้อยกว่า 10 องศาในตาข้างที่ดีกว่าที่ได้รับการรักษาและการผ่าตัดอย่างเต็มที่ สถิติที่ใช้ได้แก่ ความถี่ ร้อยละ ค่าเฉลี่ย และส่วนเบี่ยงเบนมาตรฐาน

ผลการศึกษาพบว่า ผู้ป่วยตาทั้งหมด 8483 คน เป็นหญิง 5183 (61.1%) คนและเป็นชาย 3300 คน 3300 คน (38.9%) มีตาบอดอย่างถาวรตามเกณฑ์ของกฎหมาย 1281 คน (15.1%) โดยที่ 230 คน (ร้อยละ 18.0) เป็นตาบอดทั้งสองข้าง สาเหตุหลักมาจากโรคต้อหิน 220 คน (17.2%) โรคเบาหวานขึ้นจอตา 214 คน (16.7%) โรคจอตาเสื่อมตามอายุ 183 คน (14.3%) โรคหลอดเลือดจอตาอุดตัน 78 คน (6.1%) โรคจอตาเสื่อมอื่นๆ 54 คน (4.2%) โรคประสาทตาเสื่อม 35 คน (2.7%). โรคตาขี้เกียจ 15 คน (1.2%). โรคที่มีหลายสาเหตุร่วมกัน 150 คน (11.7%)โรคของกระจกตา 113 คน (8.8%) และอื่นๆ 219 คน (17.1%) สาเหตุของการตาบอดถาวรที่มากที่สุดในผู้สูงอายุคือโรคต้อหิน โรคเบาหวานขึ้นจอตา และโรคจอตาเสื่อมตามอายุ ตามลำดับ ข้อเสนอแนะทางนโยบาย คือการรู้สาเหตุภาวะตาบอดอย่างถาวรจะเป็นการริเริ่มให้รัฐบาลและผู้เชี่ยวชาญทางตาสร้างกลยุทธ์ที่เหมาะสมในการตระหนักถึงภาวะแทรกซ้อนที่หลีกเลี่ยงได้เหล่านี้ให้ดียิ่งขึ้น

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Background and Significance of the Study

The increasing group of older persons in Thai population is one of the most socioeconomic infrastructural change (Knodel, Prachuabmoh, & Chayovan, 2013). With a rapidly ageing population and increasing life expectancy, interventions directed to improve the quality of life of the older population is also extremely important (Homer & Hirsh, 2006). This critical concern trends to initiate the government to implement the national policies development for the prevention and treatment of the non-communicable diseases associated with old age. To our knowledge, visual impairment increases with aging. It is expected that the incidence of age-related vision loss will exponentially increase in the next decades (Wong, Loon, & Saw, 2006). Vision generally plays an important role in almost all activities of daily living so visual loss is a difficult condition with which to percept and to cope in daily life (Ferris & Tielsh, 2004). Vision disability influences negative impacts the patient's quality of life, increased risk of multiple falls with highly morbidity and mortality, decrease dependence and well being, socioeconomical and commu-nication handicaps, increased need for patient caregivers, emotional reaction with sense of hopelessness, depression and suicidal attempt (Brézin, Lafuma, Fagnani, Mesbah & Berdeaux, 2004). Therefore, visual loss is critical to be a major health concern all over the world. This information could also be partially applied to assess future workforce requirements and project demand for eye services and human resources training in vision rehabilitation (O'Connor et al., 2012).

Objective

To identify the main causes of irreversible blindness among the elderly in the Mettapracharak (Watraikhing) hospital between 2010 and 2016.

Definition of Terms

Bilateral blindness was defined as best-corrected Snellen visual acuity worse than 3/60 in the better eye or constriction of the visual field to within 10° of fixation at the widest diameter in the better eye with best possible correction based on the International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10 visual impairment categories 3, 4, and 5 (World Health Organization [WHO], 2017).

Unilateral blindness was defined as blindness according to the WHO criteria in one eye and normal vision in the other eye (WHO, 2017).

Visual impairment included low vision as well as blindness (ICD-10 visual impairment categories 1 to 5 (WHO, 1992).

The primary causes of the irreversible vision loss were determined by the study ophthalmologists according to standardised definitions as the following:

• Clinical lens opacity grading using the slit lamp was performed according to the Lens Opacification Classification System (LOCS) III grading scheme using standard photographs for comparison (WHO, 1988).

• The presence of glaucoma was determined based on a schematic developed by Foster et al, whereby glaucoma is diagnosed if the vertical cup-disc ratio (VCDR) is >99.5

percentile for the local population (assuming a non-dysplastic disc and no significant anisometropia) or, if the disc cannot be seen, visual acuity is <3/60 and intraocular pressure is >21 mm Hg. 12 Since these data are not available for the Thai population, they were assumed to be similar to the Chinese Singaporean population, that is, the VCDR 99.5 percentile is 0.81 and the 99.5 percentile for VCDR asymmetry is 0.32 (Foster, Wong, Chen, Machin, & Chew, 2000).

• Diabetic retinopathy was classified due to International Clinical Diabetic Retinopathy Disease Severity Scale (Wilkinson et al., 2003).

• Age-related macular degeneration (AMD) and retinal diseases were diagnosed by fundus examination performed using an indirect ophthalmoscope and fundus photograph.

• Ocular vascular occlusion refers to retinal artery or retinal vein occlusion.

o Retinal branch vein occlusion was defined as oedematous and haemorrhagic changes or partially occluded vessels with or without collaterals in one of the horizontal fundus hemispheres. Central retinal vein occlusion was characterised by oedematous and haemorrhagic changes in the entire fundus, with dilated and engorged retinal veins.

o Retinal artery occlusion was defined as a blockage in one of the small arteries that carry blood to the retina:central retinal artery occlusion and branch retinal artery occlusion (Furashova & Matthe, 2017).

• Retinitis pigmentosa refers to a group of inherited disorders that slowly lead to blindness due to abnormalities of the photoreceptors (primarily the rods) in the retina (Fredrick, 2017).

• Optic atropy was diagnosed if the appearance of the optic disc was pale and flat with no evidence of glaucomatous cupping (Osaguona, 2016).

• Amblyopia was defined as corrected visual acuity worse than 20/40 in the affected eye not attributable to any underlying structural abnormality of the eye or visual pathway, together with 2 lines difference between the 2 eyes (Chen, Otero-Millan, Kumar, Shaikh, & Ghasia, 2013).

The diagnosis of corneal opacity and other diseases as causes of low vision and blindness followed standard clinical diagnostic criteria.

If a clinical diagnosis could not be clearly made during the ophthalmic examination, participants were scheduled for further diagnostic tests. In eyes with 2 or more pathologic conditions that might account for vision loss, the disease with the greatest clinically significant effect on visual acuity was assigned as the major cause on the basis of the participant's ophthalmic history.

Conceptual Framework

The increasing prevalence of vision loss with advancing age is supported by World Health Organization (WHO) data. By 2030, approximately one-quarter of the population will be older than 65 years. In 1990, there were an estimated 148 million people who were visually impaired, of whom 38 million were blind. In 2002, the estimated number of visually impaired people was 161 million, of whom 37 million were blind. In 2002, there was a reduction in the number of people who were blind from conditions related to longer life spans compared with previous data.

Visual impairment is also unequally distributed across age groups, being largely confined to adults aged 50 years and older. The challenges of preventing blindness vary between countries. Most people who are referred to as blind are not completely blind; this population retains some usable vision, enhanced by rehabilitation services that improves their quality of life (QOL) (Horowitz, 1994). Therefore, an accurate assessment of the burden of blindness is needed for improvement of QOL, prevention planning for programme development, and resource allocation. Most surveys have used the WHO simplified population-based assessment methods for visual impairment and causes, with some adaptations. Owing to the rapid economic development of Thailand in the past decade and the paucity of data for blindness, resources to address eyecare problems are likely to become available. National surveys are essential for making a good strategic plan and to forecast resource requirements for effective prevention and control programmes. However, they are extensive and time-consuming activities. Mettapracharak (Watraikhing) hospital launched this project to work on alleviating vision loss and updating the visual impairment data. Rapid assessment with simple and inexpensive methods of quantification for avoidable, preventable or treatable causes will help to achieve this goal. This study was performed to identify the main causes of blindness among Thai patients attending the hospital during 2010 and 2016.

Research Methodology

The ethical approval involving human subjects was granted by the Mettapracharak (Watraikhing) hospital, Nakhon Pathom research ethics committee to carry out the present study. As this was a population-based study conducted, consent for participation was obtained before commencement of the study. Informed consent was obtained from all participants. This cross sectional study was conducted on the irreversible blindness among the Thai elderly between 2010 and 2016.

Population study

1. New eyeoutpatient attending in the hospital.

2. The participants aged more than 60 years old.

3. Irreversible legal blindness (according to the World Health Organization classification.)

Exclusion criteria

1. Uncomplicated refractive error (Refractive error can normally be corrected by eyeglasses, contact lenses or refractive surgery)

2. Cataract (Cataract, with the possibility of surgery, was considered as reversible blindness)

3. Unwilling to participate

Statistical Analysis

Univariate analyses of frequencies (%), means with standard deviations (SD), and range were performed to describe patients' characteristics

Ophthalmic examination included visual acuity at 6 m with the Snellen chart in adequate natural light, anterior segment evaluation by slit-lamp biomicroscopy, tonometry, kinetic visual fields (Goldmann perimetry), refractive error screening and detailed fundoscopy. The presence of refractive error was confirmed when improvement in visual acuity was observed by pinhole examination using autorefraction.

Results

Demographic information such as age, gender was completed. A total of 8483 patients were recruited, 5183 (61.1%) were females, 3300 (38.9%) were males. The female to male ratio was 1.57:1. Their age ranged was 67±6.98 years. Participants with blindness was subdivided into those with bilateral or unilateral blindness (Table 2). The amount of 1281 (15.1%) had legal blindness, 230 (18.0 %) bilateral blindness and 1051 (82.0%) unilateral blindness. Main causes of visual loss were as follows: 220 (17.2%) glaucoma, 214 (16.7%) diabetic retinopathy, 183 (14.3%) age-related macular degeneration, 78 (6.1%) ocular vascular occlusion, 54 (4.2%) retinitis pigmentosa, 150 (11.7%) combination of causes, 113 (8.8%) corneal disorder and 219 (17.1%) others.

Table1: Demographic data of the participants (n=8483)

Characteristic	Number	Percent (%)
Age 67± 6.98 years (range 60-75)		
Sex		
Female	5183	61.1
Male	3300	38.9
Blindness eye condition (n=1281)		
Glaucoma	220	17.2
Diabetic retinopathy	214	16.7
Age related macular degeneration	183	14.3
Ocular vascular occlusion	78	6.1
Retinitis pigmentosa	54	4.2
Optic atrophy	35	2.7
Amblyopia	15	1.2
Combination of causes	150	11.7
Corneal disorder	113	8.8
Others	219	17.1
Total	1281	100.0

Table 2   Blindness among Thai people (n=1281)

Finding	Blindness	Percent (%)
Bilateral blindness	230	18.0
Unilateral blindness	1051	82.0
Total	1281	100.0

Discussion and Recommendation

The burden of the irreversible blindness is one of the major public health concerns. In 2015, 253 million people are visually impaired, 36 million are blind and 217 million have moderate to severe visual impairment (WHO, 2018). Increasing blindness due to aging population also corresponds to long life expectancy (Khaw,1997). The epidemiology of blindness and low vision in developed countries is well established, but information is limited in the developing world, including Thailand (Cunningham, 2001). The prevalence of visual loss varies among studies. Due to a lack in data, it was not possible to project the prevalence of eye conditions and demographic change among the elderly although the prevalence survey indicated reliable estimate of visual impairment. Visual acuity remains the most important clinical test of vision. The six leading causes of blindness in Taipei are glaucoma, optic neuropathy, diabetic retinopathy, retinitis pigmentosa, AMD, and myopic macular degeneration (Tsai, Woung, & Tsai, 2008). The proportion of new registrations in the world in this study by the rising incidence of the age related vision loss. (ldil, & Altinbay, 2019). due to ageing population. people in Thailand (Ho, & Schwab, 2001). As expected, the level of dissatisfaction with visual functioning increases as visual acuity worsens (El-Gasim, Munoz, West, & Scott, 2013). Visual impairment impacts dramatically on activities of daily living and has economic consequences for families (Horowitz, Reinhardt, McInerney, & Balistreri, 1994). The Tanjong Pagar Study is the first investigation to show an association between visual acuity and mortality in an Asian population (Michon, Lau, Chan, & Ellwein , 2002). Visual impairment is associated with considerable morbidity and mortality, resulting in important economic and social consequences. It is important for planning for low vision rehabilitation to know what are the most common causes of visual loss and what they may be in the future because vision rehabilitation was aimed to the patients who were visual impairment. Severe vision loss is related to increased risk of falls, hip fractures, medication errors, poor nutrition, reduced physical activity, social isolation, clinical depression, longer hospitalizations, and mortality. The purpose of this study was to evaluate and update the causes of blindness in Thai patients. Therefore, other factors

Limitations of this study, first, this study was conducted in only the Mettapracharak (Watraikhing) hospital; thus this research results would not be generalisable to the whole population as the cross-sectional design

limitation. As participants in focus groups may provide unrepresentative views of the population, the estimates of the number of people with diagnosed or otherwise identified eye conditions in this study underestimate the true overall prevalence, but can serve as a lower boundary. Second, different criteria in diagnosing the eye condition occurred in different researches. For the last 20 years, a great amount of evidence has accumulated through the studies that most of the disease encountered in different technologies. Third, the number of the participants with eye diseases was small, therefore it can not be considered to be representative of the visually impaired population. However, one of the strengthening of this study was that data has been collected from several thousands of patients with various levels of many characteristics. Finally it would also be of interest to include the involved eye care demand service project in the study. While new technology which makes eye care more accessible and available in the universal health insurance in Thailand, awareness and availability of eye care professions infrastructure should be projected for the blind to alleviate the blinding condition. The increase demand for eye care services is also important to provide healthcare more widely accessible and affordable for the elderly.

Conclusion

The most commom cause of irreversible blindness among the elderly was glaucoma and diabetic retinopathy, respectively. Knowing the cause of irreversible legal blindness will initiate the government and eye care specialists in promoting more suitable strategies for the better awareness of these avoidable complications.

Acknowledgment

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