



Opinion Article

Causes of Blindness in Thammasat Eye Center

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Abstract

Blindness is a significant public health issue worldwide and understanding its causes is crucial for effective management and prevention. This study aims to investigate the causes of blindness at the Thammasat Eye Center, a tertiary care facility within Thammasat Hospital in Thailand. As a tertiary care center, the Thammasat Eye Center provides advanced ophthalmic services, including education, diagnosis and treatment for patients with visual impairment and blindness. Data were collected through a pilot retrospective chart review, focusing on patients aged 15 years and older who had visual impairment worse than 20/400 in one or both eyes during the period from January to December 2563.

Patients with incomplete documentation or non-cooperation in visual acuity assessment were excluded. Given its role as a tertiary care center, the Thammasat Eye Center is committed to adhering to ethical guidelines, with patient data anonymized to ensure confidentiality. Data analysis will be conducted using the Stata program and Microsoft Excel. The findings from this study will contribute valuable insights into the causes of blindness at the Thammasat Eye Center, aiding in developing effective interventions and improving eye health services, particularly in the context of a tertiary care facility.

Keywords: Blindness; Thailand; Thammasat Eye Center

Introduction

Studying the causes of blindness is crucial for reducing the number of visually impaired individuals in the future [1,2]. It is especially important for planning a comprehensive eye health service system at Thammasat Hospital, a tertiary care center in Thailand, encompassing both treatment and prevention of eye conditions. The Ophthalmology Center, a part of Thammasat Hospital, plays a significant role in providing specialized ophthalmic services and is particularly important in caring for patients with visual impairment and blindness. The center offers a range of services, including eye health education, accurate diagnosis of the causes of visual loss and advice on the best treatment and care for patients with visual problems or correctable conditions. Furthermore, it plays a vital role in advising on preventive measures for eye diseases and promoting an environment that safeguards visual health. Understanding the causes of blindness is an essential tool in managing eye health, reducing potential eye damage and mitigating the risks posed to the population's sight-threatening conditions in the future.

Background

The World Health Organization (WHO) defines blindness as a visual acuity of less than 3/60 (20/400 Snellen) in the better eye with the best possible correction or a visual field of less than 10 degrees from the point of fixation, even with the best possible vision in the eye [3]. In simpler terms, a person with blindness has severely impaired vision, making it challenging to see objects clearly or with a limited field of vision.

The World Health Organization (WHO) identifies several major causes of blindness globally, encompassing cataracts, glaucoma, Age-Related Macular Degeneration (AMD), diabetic retinopathy, trachoma, onchocerciasis (river blindness) and childhood blindness [4-10]. Cataracts are the leading cause of blindness worldwide, resulting from a clouding of the eye's lens. Glaucoma damages the optic nerve, leading to visual loss and is often associated with increased intraocular pressure [11,12]. AMD affects the macula, causing a significant loss of central vision in older adults [13]. Diabetic retinopathy results from high blood sugar levels damaging retinal blood vessels, leading to visual problems and blindness in severe cases [14]. Trachoma is an infectious eye disease that can cause corneal damage and blindness, particularly in areas with limited access to healthcare [15]. Onchocerciasis is caused by parasitic worm infection and transmitted through blackfly bites, leading to severe itching, skin changes and blindness [16]. Childhood blindness can result from congenital conditions, infections, trauma and malnutrition [17].

It is crucial to understand that the prevalence of these causes may vary across different regions worldwide. Studies such as "The First Rapid Assessment of Avoidable Blindness (RAAB) in Thailand" [18]. have provided valuable insights into the prevalence of avoidable blindness in specific regions. As a tertiary care center in Thailand, the Thammasat Eye Center plays a pivotal role in addressing avoidable blindness and targeted interventions to reduce visual impairment and blindness in the region. The study conducted by Teekhasaenee, et al., utilized the Rapid Assessment of Avoidable Blindness (RAAB) methodology, which provides rapid and reliable data on the prevalence and causes of blindness and visual impairment.

In addition to regional assessments like RAAB in Thailand, global efforts have been made to understand the magnitude and trends of blindness and visual impairment. The systematic review and meta-analysis by Bourne, et al., examined the global prevalence of blindness and distance and near visual impairment, offering comprehensive insights into the worldwide burden of visual impairment [19]. Understanding global trends is essential for Thammasat Eye Center as a tertiary care facility, as it enables the development of evidence-based strategies and programs to prevent and treat the major causes of blindness worldwide.

The Thammasat Eye Center's status as a tertiary care facility underscores its role in providing advanced eye care services, including specialized treatments and interventions. As a tertiary care center, it plays a crucial role in the management of complex cases, offering a multidisciplinary approach to address challenging visual impairments and blindness. The budget allocated for patient care reflects the center's commitment to providing state-of-the-art treatments, advanced technology and specialized medical expertise to improve patient outcomes.

Together, the findings from studies like RAAB in Thailand and global analyses, including Bourne, et al., meta-analysis, contribute to a better understanding of the causes and prevalence of blindness [18]. These insights are instrumental in formulating effective public health policies, enhancing eye care services and allocating resources to reduce the burden of visual impairment and improve overall eye health worldwide. The current study on the causes of blindness at the Thammasat Eye Center adds to this body of knowledge, providing valuable information specific to the region and aiding in the development of targeted interventions to address visual impairment and blindness in the studied population.

Method

Study Design: Pilot Retrospective Chart Review (Table 1)

Sample Size: Patients aged 15 years and older at Thammasat Hospital with visual impairment (VA worse than 20/400) in one or both eyes.

Exclusion Criteria: Patients who did not cooperate in VA assessment or had incomplete electronic OPD records.

Data Collection: Patient data were extracted from electronic OPD records and recorded on a case record form.

Data Analysis: Data were analyzed using the Stata program and Microsoft Excel.

Ethical Considerations: The study protocol was approved by the institutional review board and all patient data were anonymized to ensure confidentiality.

Categories	Number	Average
Gender		
- Male	4495	41.16%
- Female	6465	58.84%
Age		
- 15-30 years	721	6.58%
- 31-45 years	919	8.38%
- 46-60 years	2704	24.67%
- 61-75 years	4846	44.22%
- More than 75 years	1768	16.13%
Ocular Disease (eyes)		
- Normal eyes	12669	57.81%
- Age-related macular degeneration (AMD)	291	1.33%
- All other globe/CNS	303	1.38%
Abnormalities		
- Complicated cataract surgery	52	0.24%
- Congenital eye diseases	54	0.25%
- Corneal opacity	312	1.42%
- Diabetic retinopathy	823	3.76%
- Glaucoma	563	2.57%
- Other acquired posterior	900	4.11%
Segment Diseases		
- Phthisis bulbi	52	0.24%
- Refractive error	4626	21.11%
- Uncorrected aphakia	20	0.09%
- Untreated cataract	1251	5.71%

Table 1: Demographic data.

This paper “Other acquired posterior segment diseases” encompass a range of ocular conditions affecting the back part of the eye. These include retinal detachment, macular hole, epiretinal membrane, retinitis pigmentosa, retinal vascular diseases, central serous chorioretinopathy and posterior uveitis. On the other hand, a separate category comprises “All other globe/CNS abnormalities”. These encompass optic nerve hypoplasia, papilledema, nystagmus, strabismus, ocular motor disorders, Horner’s syndrome, ocular myasthenia gravis, cranial nerve palsies, Cerebral Visual Impairment (CVI) and cortical blindness (Table 2,3).

Causes of Blindness RE														
		Age-related macular degeneration	All other globe/CNS abnormalities	Complicated cataract surgery	Congenital eye diseases	Corneal opacity	Diabetic retinopathy		Other acquired posterior segment diseases		Refractive error	Uncorrected aphakia	Untreated cataract	
Degree of Blindness	ตาบอด							Glaucoma		Phthisis bulbi				Grand Total
Blindness		6.51%	12.47%	0.94%	1.88%	11.33%	12.01%	18.71%	22.20%	3.49%	0.67%	0.94%	8.85%	1
		97	186	14	28	169	179	279	331	52	10	14	132	1,491
Mild vision impairment	0.21%	1.16%	0.44%	0.21%		0.56%	4.01%	1.75%	2.91%		80.70%	0.08%	7.96%	1
	10	56	21	10		27	193	84	140		3,881	4	383	4,809
Moderate vision impairment	0.12%	4.00%	2.83%	0.81%	0.53%	3.20%	14.24%	6.67%	12.54%		28.48%	0.04%	26.54%	1
	3	99	70	20	13	79	352	165	310		704	1	656	2,472
Normal	99.94%							0.01%			0.05%		0.01%	1

	12,653							1			6		1	12,661
Severe vision impairment	0.62%	8.07%	5.38%	1.66%	2.69%	7.66%	20.50%	7.04%	24.64%		5.18%	0.21%	16.36%	1
	3	39	26	8	13	37	99	34	119		25	1	79	483
Grand Total	57.81%	1.33%	1.38%	0.24%	0.25%	1.42%	3.76%	2.57%	4.11%	0.24%	21.11%	0.09%	5.71%	1
	12,669	291	303	52	54	312	823	563	900	52	4,626	20	1,251	21,916

Table 2: Causes of blindness RE.

Percentage of Disease in Each Visual Range														
Degree of Blindness	ตาปกติ	Age-related macular degeneration	All other globe/CNS abnormalities	Complicated cataract surgery	Congenital eye diseases	Corneal opacity	Diabetic retinopathy	Glaucoma	Other acquired posterior segment diseases	Phthisis bulbi	Refractive error	Uncorrected aphakia	Untreated cataract	Grand Total
Mild vision impairment	0	1.166667	0.4375	0.2083333	0	0.5625	4.0208333	1.77083	2.91666667	0	80.85417	0.0833333	7.979167	100%
Moderate vision impairment	0	3.99838449	2.82714055	0.80775444	0.52504039	3.1906	14.216478	6.66397	12.5201939	0	28.67528	0.04028772	26.53473	100%
Normal	100%	0	0	0	0	0	0	0	0	0	0	0	0	100%
Severe vision impairment	0	8.125	5.4166667	1.666667	2.7083333	7.7083	20.625	7.08333	24.79166667	0	5.208333	0.20833333	16.45833	100%
Grand Total	57.80708	1.32779704	1.38255156	0.23726957	0.24639533	1.4236	3.7662473	2.5689	4.10658879	0.23726957	21.10787	0.09125753	5.708158	100%

Table 3: Percentage of disease in each visual range.

Results

A total of 21,916 eyes were included in the analysis. The mean age of participants was 61 years. Among the participants, 58.84% were female. Visual impairment was categorized into four degrees: normal vision, mild visual impairment, moderate visual impairment, severe visual impairment and blindness. The percentage distribution among these categories was 57.81%, 21.90%, 11.30%, 2.19% and 6.8%, respectively. The most common etiology of visual impairment was "Refractive error," accounting for 21.11% of cases, followed by "untreated cataract" (5.71%), "Other acquired posterior segment diseases" (4.11%), "Diabetic retinopathy" (3.76%), "Glaucoma" (2.57%) and "Corneal opacity" (1.42%). Other causes contributed to smaller percentages of cases.

Among participants with blindness, the highest percentage of visual loss was attributed to "Other acquired posterior segment diseases" (22.2%), followed by "Glaucoma" (18.71%), "All other globe/CNS abnormalities" (12.47%) and "Diabetic retinopathy" (12.01%). In contrast, for participants with mild visual impairment, the main cause of visual loss was "Refractive error" (80.7%), while in cases of moderate visual impairment, "Refractive error" also dominated as the primary cause (28.48%). Notably, "Other acquired posterior segment diseases" was identified as the main cause of severe visual impairment (24.64%). Additionally, the study observed that medical blindness in both the right and left eyes was rare, affecting only 0.14% of the total participants, while the vast majority had no medical blindness (98.34%).

Conclusion

This comprehensive analysis of the causes of visual impairment and blindness within the population served by the Thammasat Eye Center offers critical insights into addressing preventable and treatable conditions. The predominant causes identified—namely "Refractive error," "Diabetic retinopathy," "Glaucoma," and "Age-related macular degeneration"—highlight key areas for targeted interventions and public health initiatives. Early detection and management of these conditions emerge as paramount strategies for alleviating the burden of visual impairment. The Thammasat Eye Center, functioning as a tertiary care facility, plays a pivotal role in this endeavor. Its commitment to advanced treatments, access to cutting-edge technology and specialized medical expertise, as reflected in the allocated budget for patient care, underscores its dedication to optimizing patient outcomes and visual health.

The major cause of blindness within the population served by the Thammasat Eye Center is “Other acquired posterior segment diseases” which are unpreventable cause. Notably, the rarity of medical blindness in both eyes, affecting only a minuscule percentage of participants, underscores the Center's efficacy in preventing and managing conditions that may lead to severe visual loss or blindness. The insights gleaned from this study hold significant implications for healthcare providers and policymakers alike. They inform the development of strategies to enhance eye care services, promote eye health awareness and ensure equitable access to vision screening-especially crucial in a tertiary care setting like the Thammasat Eye Center. This body of work not only advances our understanding of the causes and prevalence of visual impairment and blindness but also serves as a foundational resource for shaping evidence-based policies and interventions to improve eye health on a global scale.

Conflict of Interest

The authors declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

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