A Comparison of the Causes of Eligible Legal Blindness in a Tertiary Government Hospital among Working Age Adults (15-64 years old) in 2008 and 2014

Leo Francis Pacquing, MD, Jubaida Mangondato-Aquino, MD

DOH Eye Center
East Avenue Medical Center
East Avenue, Diliman, Quezon City, Philippines

Correspondence: Leo Francis Pacquing, MD
DOH Eye Center
East Avenue Medical Center
East Avenue, Diliman, Quezon City, Philippines
Email: jmperezmd@gmail.com

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ABSTRACT

Objective: To report the causes of legal blindness in the Department of Health (DOH) Eye Center among working age group patients (16-64 years old) in 2014 and compare these figures to data from 2008.

Methods: Data were collected from the DOH Eye Center records section. The charts of new patients seen at the general ophthalmology clinic in the years 2008 and 2014 were reviewed individually. Patients between 15 and 64 years old with best-corrected visual acuity (BCVA) of 20/200 (6/60) or less in the better-seeing eye were included as subjects in the study. Patients who improved to better than 20/200 (6/60) with BCVA and any medical or surgical means were excluded from the study. Patients whose visual acuity could not be assessed for any reason or with reversible causes of blindness were also excluded from the study.

Results: The DOH Eye Center general ophthalmology clinic had a total of 8,941 registered patients aged 15 to 64 years old during the period January 1 to December 31, 2014. Diabetic retinopathy/maculopathy together with pathologic myopia formed the largest category of irreversible legal blindness (BCVA of 20/200 or less on the better seeing eye) with a total of 26 (18%) patients for each. Retinitis pigmentosa and macular dystrophy under the hereditary retinal disorders formed the second largest cause of legal blindness with 17 (12%) followed by glaucomatous optic neuropathy from all kinds with 15 (10%). Together, these four entities comprised more than 58% of all causes of blindness in the working age group. Optic atrophy, comprised mostly of ethambutol toxic optic neuropathies (ETON), was responsible for 14 (10%) followed by congenital disorders and corneal disorders of the eye with 7 (5%) for each. Other conditions comprised of disorders of the neural cortex; this formed 6 (4%) eligible causes of legal blindness. Uveitic causes and retinal detachment also contributed 6 (4%) each to the pool of eligible cases of legal blindness. Other conditions were endophthalmitis, central retinal artery occlusion and

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clinically significant macular edema which collectively contributed 6% to the pool. In comparison, the main causes of eligible legal blindness in the DOH Eye Center in 2008 were glaucoma, which accounted for 21% and was the single leading cause of blindness, followed by diabetic retinopathy (16%), retinal detachment 11%), pathologic myopia and optic atrophy (10%).

Conclusion: The leading causes of legal blindness in 2014 were shared between diabetic retinopathy/maculopathy and pathologic myopia. In 2008, the single leading cause of legal blindness was glaucoma from all kinds, but after 6 years, it was overtaken by diabetic retinopathy and maculopathy. The decrease in blindness caused by glaucoma may be related to increased promotion of awareness of blindness due to glaucoma.

Keywords: legal blindness, severe visual impairment, visual disability, disability claim, irreversible blindness

Prevention of reversible blindness or visual impairment is a global priority agreed upon in World Health Organization (WHO) assemblies, yet many countries lack contemporary data about the causes from which priorities for prevention, treatment and management can be identified.[1]

How many ophthalmologists are aware of when and to whom to refer patients with visual disability? What is the range of visual acuity loss before a patient be called visually disabled? Are the eligible patients with visual disability aware of any benefits from the government?

Republic Act 7277 or the "Magna Carta for Persons with Disability", declares all the rights and privileges of a person with disability in the Philippines, including people with visual disability. It states the principles, their rights and privileges on employment, health, education, social services, political and civil rights, and even prohibition on discrimination against people with disability.[2] At present, there is no law that provides financial support for people with visual disability or the blind. However, it is reasonable not to have these laws since the government and its programs for the disabled should not direct their actions towards increasing compensation for the disabled, but rather towards their rehabilitation and possible productivity. On the contrary, financial support through compensation to an individual that has been determined disabled can make a difference to the claimant's care and mobility arrangements, their overall standard of living, social inclusion, rehabilitation and gainful productivity.[3]

Various scales were made to address the aspects of vision loss. Early in the 20th century, the emphasis was on workers' compensation cases. For this purpose, a continuous scale was needed with the emphasis on what was lost. The importance of the remaining vision was highlighted in terms such as residual vision and partial blindness. When the social security system was developed, the emphasis shifted to eligibility, which requires a single cut-off point rather than a continuous scale. This was the context in which the term legal blindness was made.[4] In 1960, the Philippines adopted the Social Security System (SSS) from which a retiree, or a person who lost a certain percentage of his physical abilities as calculated by a formula, is entitled to compensation from the system through social security payments. The SSS is a state-run, social insurance program for non-government employees in the Philippines. It is the largest disability claiming company in the Philippines. The standards revolve around the WHO's perspective on disability.[5]

The WHO defines disability as "any restriction or lack (resulting from an impairment) of ability to perform an activity in the manner or within the range considered normal for a human being." This view implicitly considers, within the scheme of social security, that there is loss of income as a result of this restriction.[6]

Based on the Visual Standards report published by the International Council of Ophthalmology, the definition of legal blindness is a central visual acuity of 20/200 or less in the better eye on correction or BCVA. This is in accordance with the definition of the WHO and International Classification of Disease.[4] In the United States, a *visual disability* is only described as *"blindness"* in the Social Security Act, and in this law, it specifically and exclusively names *visual acuity loss* as the definitive characteristic of blindness. Visual field is included in their definition of blindness, as follows: "limitation in the fields of vision such that the widest diameter of the visual field subtends an angle no greater than 20 degrees" shall be considered as legally blind.[7]

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At the Department of Ophthalmology East Avenue Medical Center, patients are first seen and managed at the General Ophthalmology (GO) Clinic. The initial diagnosis and management are done here and, if needed, referred to the seven major subspecialty clinics (refractive and external disease, glaucoma, retina, pediatric ophthalmology, neuro-ophthalmology, orbit and oculoplasty, and low vision clinic). The center and its subspecialties are manned by resident physicians and consultants in the field of ophthalmology. Since its inauguration in 2008, the DOH Eye Center has been the premiere eye referral center under the Department of Health. In 2008, the eye center had 7,382 registered GO patients while in 2014, the center had a total of 8,941 new GO patients.

In the formulation of an effective policy, data and information are critical. Recently, the WHO released the Global Disability Action Plan 2014-2021. This document intends to help countries direct their efforts towards specific actions in order to address health concerns of persons with disabilities. One of the objectives of their action plan is to strengthen the collection of relevant and internationally comparable data on disability and to support research on disability and related services.[8]

The National Survey on Blindness, a population-based survey every 5 to 8 years, is utilized to evaluate the National Prevention of Blindness Program and Vision 20/20 Philippines of the DOH, both of which address avoidable causes of blindness.[9] The latest survey was conducted from 2001 to 2002 to determine the prevalence and major causes of visual impairment in the Philippines. The data gave a good picture of the problem in the national level, launching steps to be taken for blindness prevention. Among these was the formation of the National Committee for Sight Preservation, which coordinates blindness prevention activities and monitors cataract surgeries. The DOH also launched Vision 20/20 Philippines as part of the WHO's initiative to eliminate reversible causes of blindness by increasing the rate of cataract surgeries, providing refractive services, and planning national programs for the prevention of childhood blindness. The National Survey on Blindness is a current and active example of relevant data collection and policymaking to address issues of blindness in the country. According to the WHO's global initiatives for the elimination of avoidable blindness (Vision 20/20), reversing or treating preventable causes like cataract and errors of refraction would greatly decrease the number of patients with visual disability. Awareness on the causes of visual impairment, especially the reversible ones, is crucial to the goal of Vision 20/20. This report aims to be a public health indicator not only for the eye center but also for the government.

This study determines the most common causes of blindness among working age group patients at the DOH Eye Center in the year 2014 and compares this to data from 2008. Changes in the leading causes of blindness in the working age group can be identified in this study.

Data collected from this study will be relevant to vision health and will be paramount in addressing the actions to improve the well-being of people with severe visual impairment. The data will be essential in monitoring the impact of public health initiative programs and policies aimed at reducing the burden of severe visual impairment caused by ophthalmologic disease entities.

The importance of identifying the eligibility of a person with visual impairment or disability and reminding these patients to claim disability benefits towards their rehabilitation is also a goal of this study.

We sought to determine what are the most common causes of eligible legal blindness at the Department of Health (DOH) Eye Center in the years 2008 and 2014 among the working age group. This study can be utilized to increase awareness in eye center administration, the government and other ophthalmologists on the causes of vision loss, and to review public health ophthalmology programs' effectivity in preventing reversible causes of blindness and rehabilitating irreversible entities in the Philippines.

METHODS

Data were collected from the DOH Eye Center records section. The charts of new patients seen at the GO clinic in 2008 and 2014 were reviewed individually. Inclusion and exclusion criteria were as follows:

INCLUSION CRITERIA

1. Patients aged 15-64 years old (Labor code of the

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Philippines)
2. Patients with visual acuity of 20/200 or less in the better-seeing eye with best conventional correction (regular glasses or contact lenses)
3. Patients whose vision remained 20/200 or worse in the better-seeing eye in spite of best efforts to improve visual acuity to better than 20/200.

EXCLUSION CRITERIA

1. Patients with age less than 15 years old or older than 64 years old
2. Patients with visual acuity of better than 20/200 in the better eye
3. Patients who improved to better than 20/200 after surgery or with correcting spectacles or contact lenses (subspecialty follow-ups)
4. Patients with visual acuity that cannot be assessed for any reason
5. Patients with reversible cause of vision loss

Data gathered from charts reviewed were tallied including the general ophthalmology number, subspecialty number, name, age, sex, initial working impression, initial visual acuity, subspecialty referral, latest visual acuity, and interventions done.

All patients who satisfied the inclusion and exclusion criteria were followed up in their respective subspecialty referral. Subspecialty charts were reviewed for BCVA, medical and surgical interventions done, and postoperative visual acuity and subsequent plans. All patients who had improved visual acuity defined as better than 20/200 on the better eye after intervention were excluded. Patients whose vision remained at 20/200 or worse in the better eye despite all medical and surgical interventions were the main outcome of the study. Subspecialty consultants verified the prognosis of the patients.

Last working impressions from the subspecialty clinic were used for the tally of the most common causes of visual impairment. The prognoses were also considered in the final inclusion of patients. In patients with more than one cause of visual loss, the more severe cause was used for the tally. The final tally of all identified legally blind patients (severe visual impairment, BCVA of 20/200 or worse, 6/60) were checked for eligibility of permanent partial disability claim by a Social Security System representative.

STATISTICAL ANALYSIS

Data regarding the main causes of legal blindness were taken from the GO charts and subspecialty referral forms and grouped into disease categories. Pie and bar charts were used to graphically show the distribution of the primary causes of legal blindness. Proportions of these identified cases of legal blindness due to each cause are presented rather than adjusted incidence rates in order to indicate the comparative contribution of each condition to the pool of legally blind patients (20/200; 6/60 or less). Chi-square test was performed to test differences in proportions.

RESULTS

In 2014, the GO Clinic received 8,941 newly registered patients, with 146 patients between 15 and 64 years old identified to be legally blind. The charts of these patients were followed up at their respective subspecialty referrals for the final BCVA of 20/200 (6/60) in the better eye, and final diagnoses were noted. This was compared to the 7,382 GO patients in 2008 and the 61 legally blind patients from that year. Table 1 shows the number of patients that were eligibly 20/200 (6/60) or worse in their better eye in their final BCVA for each of the disease categories.

Table 1. Number of working age adults (15-64 years old) with severe visual impairment (legally blind) in the DOH Eye Center in 2008 and 2014

Diagnosis	Total (%) 2014 N = 146	Total (%) 2008 N=61
Diabetic retinopathy/ maculopathy	26 (18%)	10 (16%)
Myopia (pathologic)	26 (18%)	6 (10)
Hereditary retinal disorders	17 (12%)	4 (7%)
Glaucoma	15 (10%)	13 (21%)
Optic atrophy	14 (10%)	6 (10%)
Congenital abnormalities of the eye	7 (5%)	5 (8%)
Corneal disorders	7 (5%)	1 (2%)
Disorders of the neural cortex	6 (4%)	1 (2%)
Uveitis	6 (4%)	3 (5%)
Retinal detachment	6 (4%)	7 (11%)
Others	16 (10%)	5 (8%)
Total	100%	100%

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Diabetic retinopathy/maculopathy and myopic error of refraction formed the largest categories, each contributing 26 patients (18%). Retinitis pigmentosa and macular dystrophy under the hereditary retinal disorders formed the second largest cause of legal blindness with 17 (12%) followed by glaucomatous optic neuropathy from all kinds with 15 (10%). Together, these four entities comprise more than 58% of all causes of blindness in the working age group. Optic atrophy, comprised mostly by ethambutol toxic optic neuropathies (ETON), was responsible for 14 (10%) followed by congenital disorders and corneal disorders of the eye with 7 (5%) for each. Disorders of the neural cortex, such as an intracranial mass that disturbs the visual pathway, formed 6 (4%) eligible causes of blindness. Uveitic causes and retinal detachment also contributed to the pool each contributing 6 (4%) eligible cases of legal blindness. Other conditions included endophthalmitis, central retinal artery occlusion and clinically significant macular edema which collectively contributed 6% to the pool.

The graphs comparing the causes of eligible legal blindness in 2008 and 2014 are shown in Figures 1 and 2. In 2008, the single leading cause of blindness in the DOH Eye Center was glaucoma, which accounted for 21%. By the end of 2014, this figure decreased to 10% making glaucoma the fourth leading cause of blindness. This difference was statistically significant (p=0.000). In contrast, the figures for diabetic retinopathy almost tripled from 10 (16%) in 2008 to 26 (18%) in 2014. From being the second leading cause of legal blindness in 2008, it became the leading cause of eligible blindness in the working age group at the institution in 2014, together with myopia (pathologic). Myopic error of refraction with BCVA of 20/200 or worse in a better eye ranked fourth in 2008 and was one of the leading causes of blindness in 2014 together with DR/maculopathy with 26 patients each (18%). Optic atrophy, which was tied with myopia at 4th in 2008, ranked third in 2014. It is notable that hereditary retinal disorders increased from 4 (7%) in 2008 to 17 cases (12%) in 2014 as a cause of irreversible blindness. In this review, as causes of blindness in the working age adults, degeneration of the macula and posterior pole contributed only 1 case in 2008 and 3 cases in 2014.

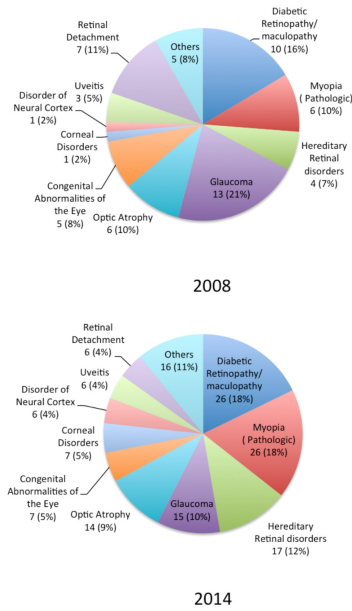

Figure 1. Main causes of legal blindness in the DOH Eye Center in working age adults (15-64 y/o): 2008 and 2014.

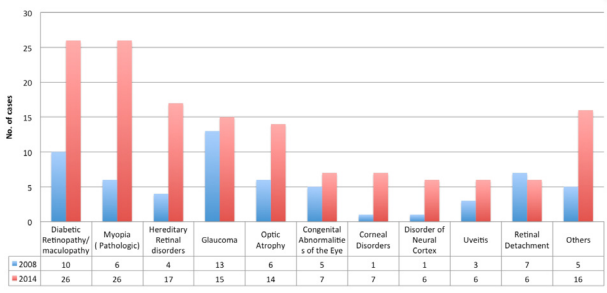

Figure 2. Six years change in cause of legal blindness in the DOH Eye Center in working age adults (15-64 y/o): 2008 and 2014.

DISCUSSION

The economic burden resulting from the loss of the working age population in the country and the cost of social services makes the irreversible causes of blindness a public health concern. There has been no study to document the economic burden of blindness in the Philippines, but as a developing country, it is expected to contribute greatly to workforce productivity. This report delivers a succinct picture of the causes of legal blindness or severe visual impairment at a tertiary eye referral

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center in the Philippines. Four main disease entities were responsible for half of all the cases of legal blindness in the working age group in 2014. These were diabetic retinopathy and maculopathy with 26 cases (18%) each, myopic error of refraction with 26 (18%), hereditary retinal disorders with 17 (12%) and glaucoma with 15 (10%). Comparing the results from 2008, marked changes include an increase in the number of cases of severe visual impairment caused by diabetic retinopathy and a decrease in the number of cases of severe visual impairment from glaucoma.

The leading causes of legal blindness in this study have a common denominator of being asymptomatic until they are in an advanced and irreversible stage. This report does not aim to discuss the reasons behind these changes, especially the incidence of blindness caused by diabetes. There is limited published literature at present to determine the exact prevalence of blindness caused by diabetes in the country. The prevalence of diabetes is expected to increase substantially in nearly all regions of the globe. Consequently, diabetic retinopathy (DR) and potential diabetes-related blindness will similarly be expected to increase.[10] In 2014, the estimated prevalence of diabetes in the adult population (20-79 years old) in the country was about 3.2 million.[11] In a study by Uy in 2005, a high prevalence of diabetic retinopathy was seen among diabetic patients in a tertiary government hospital. In this study, the elevated serum creatinine and longer duration of diabetes were associated with retinopathy.[12]

The lack of awareness among patients and even among health care providers of the unseen threat of blindness is possibly playing a major role in the increase of DR. Although physician and patient knowledge of diabetic retinal complications has increased as a result of global information campaigns, studies from Indonesia, Myanmar, Malaysia and Singapore have shown that patient and physician awareness regarding appropriate recommendations for care and patient awareness of the presence of retinopathy are markedly inadequate.[13] In the Philippines, there is no study that evaluates the awareness of the community regarding diabetic retinopathy as a complication of diabetes. It is more often that we catch patients with diabetic retinopathy in advanced, irreversible stages, thus with more severe visual impairment at the onset, and it is no different in this study. Endocrinologists, ophthalmologists and primary care providers all must have common knowledge on the appropriate recommendation on diabetes eye care.

Comprehensive initiatives to increase education and awareness among the patients and medical providers that allow an effective referral system to an eye care specialist have been stressed, set among different subspecialties concerned. Glycemic control is the cornerstone of management of diabetic retinopathy, and patient education and partnership among health care providers play an increasingly important role. Partnerships between the Philippine Society of Endocrinology, Diabetes and Metabolism (PSEDM) and the Vitreoretinal Society of the Philippines (VRSP) have continued to encourage its members to educate their patients on the importance of proper diabetes screening and follow-up. Diabetes Awareness Week and Sight Saving Month activities have been held annually in the Philippines to raise public awareness. In response to the need for patients to continue therapy for diabetic macular edema, the partnership of VRSP and PSEDM with a pharmaceutical company has reduced the price of an anti-vascular endothelial growth factor (anti-VEGF) to be more affordable for Filipinos. These steps, with their common goal to decrease the incidence and prevalence of diabetes and diabetic retinopathy and improve the quality of care of diabetic eye care, can be evaluated by studies and serve as indicator of their effectiveness.

Glaucoma is the leading cause of irreversible blindness in the Philippines[9] and the world, similar to what was seen in this study. All patients in this study had severe visual impairment or were legally blind bilaterally. Being typically insidious and progressive, glaucoma causes irreversible visual loss that is unnoticed by patients until relatively advanced. The best chance to preserve vision is through early detection and immediate treatment. Thus, similar to diabetic retinopathy, public awareness is paramount in decreasing blindness from glaucoma. In this study, we can only speculate that the decrease in blindness caused by glaucoma in a tertiary hospital may be contributed by increased public awareness. The decrease in the number of cases might also be equated to improved management of glaucoma cases in the institution.

It is also noted that the myopic error of refraction comprised some of the causes of severe visual impairment in this study in spite of BCVA. All of the patients had pathologic myopia. There was an increase in the number of hereditary retinal diseases over the last 6 years. Most of these cases were retinitis pigmentosa. The true increase in the incidence of these disorders is unclear. It may be caused by higher community awareness or the popularity of the eye

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referral center, thereby leading to increased clinical visits and registration.

The loss of income due to lost days of work among working age adults is a public health concern. Applying for disability benefits entitles the patient to a 20 percent discount on some of the basic and health commodities as mandated by the Magna Carta for the disabled person. But to date, unless you are a member of the SSS or any similar insurance company, eligible blind persons will not receive financial support. Eye care providers should play a proactive role in recommending patients with severe visual impairment so they may be entitled to disability benefits essential for their rehabilitation and eventual productivity. Aside from being enrolled in the low vision clinic of the hospital, patients are encouraged to enroll themselves for the disability benefits of the Social Security System. All the patients in this study were reviewed by a medical evaluator representative from the SSS, and based on the manual for disability, patients with severe visual impairment or who are legally blind are eligible for a significant disability financial benefit. Having a BCVA of 20/200 or worse in one eye entitles the person to a corresponding calculated benefit. Complete loss of sight in one eye entitles a patient to permanent partial disability while loss of sight in both eyes constitutes permanent total disability. Despite the rigid clinical criteria in identifying these cases, ophthalmologists should still aim to identify those with significant visual disability who may benefit from government assistance. In fact, the Social Security System interprets their criteria in the context of the patient's functional status rather than a strict cut-off.

The findings from this study may have implications for clinical care and planning of the years ahead for the eye referral center. It may also help achieve a common goal in reducing the number of irreversible causes of blindness. This study can serve as a health care indicator for policymaking in this tertiary health care facility. A larger scale study, or even one with national coverage, is recommended to better represent the true rate of severe visual impairment from different causes in the Philippines.

In summary, this report found that five clinical disorders are responsible for most of the irreversible causes of legal blindness or severe visual impairment among the working age group patients in the DOH eye center in East Avenue Medical Center in 2014. These were diabetic retinopathy/maculopathy and pathologic myopia, followed by hereditary retinal disorders, glaucoma and optic atrophy. There were marked changes in numbers between 2008 and 2014. These changes can be evaluated and reviewed, to serve as a public health indicator for eye care.

Caring for visually impaired patients does not end with giving the best-corrected visual acuity. Ophthalmologists should take a proactive role in the rehabilitation of patients with severe visual impairment or blindness, especially the irreversible entities. Enrolling these patients to a low vision clinic and making them aware of government assistance through the Social Security System disability benefits will allow them to gain back their productivity in spite of their functional limitations.

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