

## Original Article

# Investigating the Causes of Visual Impairment and Legal Blindness among Patients Coming to a Referral Hospital in Tehran, Iran

Raheleh Moravej <sup>\*1</sup>, MS; Ali Mirzajani <sup>1</sup>, PhD; Saber Sahihalmasab <sup>1</sup>, MS

1. Optometry Department. Iran University of Medical Sciences.

\*Corresponding Author: Raheleh Moravej

E-mail: baranmom80@yahoo.com

### Article Notes:

Received: Nov. 1, 2016

Received in revised form:  
Nov. 29, 2016

Accepted: Dec. 15, 2016

Available Online: Jan. 21, 2017

### Keywords:

Visual  
Impairment  
Legal  
Blindness  
Iran

### Abstract

**Purpose:** To examine the causes of vision impairment and blindness in a referral medical center in Tehran, Iran.

**Patients and Methods:** The present cross-sectional study was conducted on visually impaired and legally blind patients in optometric clinic of Rasoul-e-Akram hospital, Tehran, Iran, in 2015. We used the WHO criteria to evaluate visual impairment. The visual acuity of patients was recorded in a mono-eye fashion (right eye first then the left eye) using a 6-meter Snellen chart. The refractive error was evaluated and the best corrected visual acuity (BCVA) was recorded. Patients were then referred to ophthalmology department to diagnose the main cause of reduced vision.

**Results:** This study included 77 legally blind or visually impaired patients. After examining the underlying causes of visual impairment, we found that 41.17 % of visual impairment among patients was caused by cataracts and 29.41 % was caused by retinal diseases. Corneal pathology, glaucoma and other diseases were the rarer causes of low vision among subjects. The causes of legal blindness were different; retinal diseases were the main causes of legal blindness (46.51 %) followed by cataract (30.23 %) and corneal pathology (13.95 %).

**Conclusion:** Our results from a referral hospital in Tehran indicates that retinal pathology was the most common cause of legal blindness among our patients, while the most common cause of visual impairment was cataract. Due to the natural differences of epidemiologic findings gathered from a referral center and the community, multicenter studies are recommended to better evaluate the causes of visual impairment in our community.

**How to cite this article:** Moravej R, Mirzajani A, Sahihalmasab S. Investigating the Causes of Visual Impairment and Legal Blindness among Patients Coming to a Referral Hospital in Tehran, Iran. *Journal of Ophthalmic and Optometric Sciences*. 2017;1(2):29-34.

## Introduction

Visual impairment is a very serious public health problem which imposes heavy costs on governments and healthcare systems<sup>1-3</sup>. According to the World Health Organization's (WHO), the total number of people with visual impairment around the world was estimated to be 285 million in 2014, of which 39 million were blind and 245 million were visually impaired<sup>1</sup>. Studies show that approximately 80 % of these visual impairments are preventable<sup>4</sup>.

According to recent reports by World Health Organization, the causes of visual impairment and blindness are not the same in different regions and countries around the world<sup>4</sup>. In low-income and developing countries, the most common underlying causes of poor vision and blindness are uncorrected refractory defects and cataract, but in developed and high-income countries, retinal diseases are the major cause of impaired vision<sup>5-19</sup>.

Iran is a developing country and one of the most populous countries in the Middle East. Due to the high prevalence of legal blindness and low vision in developing countries, studying the causes of visual impairment and legal blindness in Iran is very important. According to studies performed in 2004 on 4565 patients from Tehran, in 2006 on 5446 patients from Sistan-va-Baluchestan province, and in 2012 on 5190 patients from Shahroud city the main cause of visual impairment was cataract in all of these studies<sup>20-22</sup>.

In recent years, modern methods and techniques of diagnosing and treating eye disorders have been introduced in our country. These developments can lead to changes in the incidence of low vision and blindness, as well as their underlying causes. Therefore, this study examined the causes of visual impairment and legal blindness in a referral medical center in Tehran.

## Patients and Methods

The present cross-sectional study was conducted on visually impaired and legally blind patients

diagnosed in optometric clinic of Rasoul-e-Akram hospital, Tehran, Iran, in year 2015. The study was approved by the ethics committee of Iran University of Medical Sciences and written consent was obtained from all participants.

In general, definition of visual impairment is based on either the WHO criteria or the US criteria. We used the WHO criteria to evaluate our patients. Based on this scale, people with eyesight in the better eye of less than 3/60 were considered legally blind and those with eyesight in the better eye of less than 6/18 and better than 3/60 were referred to as visually impaired. It should be noted, that these values were based on the measurement of visual acuity after the best possible optical correction<sup>23</sup>. The causes of visual impairment and legal blindness in the present study were categorized based on version 10 of International Disease Control and Verification Program<sup>4</sup>.

The visual acuity of patients was recorded in a mono-eye fashion (right eye first then the left eye) using a 6-meter Snellen chart. The refractive error was evaluated and the best corrected visual acuity (BCVA) was recorded. We then used pinhole exam to distinguish pathologic defects from amblyopia. Patients were then referred to ophthalmology department and after ophthalmic, slip-lamp and if necessary other tests by an ophthalmologist, the main cause of reduced vision was diagnosed and recorded. If both eyes had visual impairment, only the cause of vision loss in the worse eye was recorded as the cause of visual impairment. It should be noted that some patients had a previous history of medical or surgical treatment.

In this study to perform manual refractometry, we used a HEINE BETA 200 (HEINE Optotechnik GmbH, Germany) retinoscope and automatic refractometry was carried on using a Topcon RM6000 (Topcon Corp., Japan) refractometer. For retinal evaluation a HEINE BETA 200 ophthalmoscope (HEINE Optotechnik GmbH, Germany) was used and to evaluate the anterior segment we used a Haag-Streit slit lamp

(Haag-Streit Diagnostics, Switzerland).

For data analysis, descriptive statistics were used. The data was analyzed using SPSS software version 21 (IBM Corp. Armonk, NY). P values less than 0.05 were considered statistically significant.

### Results

This study included 77 legally blind or visual impaired patients. The studied subjects included 32 female (41.5 %) and 45 males 58.5 %). The demographic data related to the age and gender of participants is shown in table 1.

In evaluation of patients, 39 % had retinal pathology, 35.6 % had cataracts, 16.9 % had corneal problems, 5.2 % had glaucoma, and 3.9 %, had come for other reasons (Table 2).

After examining the underlying causes of visual

impairment, we found that 41.17 % of visual impairment among patients was caused by cataracts and 29.41 % was caused by retinal diseases. Corneal pathology, glaucoma and other pathologies were the rarer causes of low vision among subjects (Table 2).

But the causes of legal blindness were different: retinal diseases were the main causes of legal blindness (46.51 %) followed by cataract (30.23 %) and corneal pathology (13.95 %).

**Table 1: Age and sex of patients entering the study.**

Age	Female	Male	Total	Percentage from total
20 to 40 years	11	4	15	19.5
40 to 60 years	10	16	26	33.8
60 to 80 years	10	19	29	37.7
Over 80 Years	1	6	7	9.1
Total	32	45	77	100

**Table 2: Underlying pathology resulting in visual impairment among patients entering the study.**

The underlying pathology of visual impairment	Visual impairment		Legal blindness		Total	
	Number of patients	Percentage	Number of patients	Percentage	Number of patients	Percentage
Retinal pathology	10	29.41	20	46.51	30	39
Corneal pathology	7	20.59	6	13.95	13	16.9
Cataract	14	41.17	13	30.23	27	35.1
Glaucoma	1	2.94	3	6.98	4	5.2
Other	2	5.88	1	2.32	3	3.9

## Discussion

Based on the results of the present study, most of visual deficits (including both visual impairment and legal blindness) in patients referred to Rasoul Akram Hospital's optometry clinic were due to retinal and cataract diseases, with retinal diseases being the most common cause of legal blindness (46.51 %) and cataract being the most common cause of visual impairment (41.17 %).

In a retrospective study on patients referred to a rehabilitation center in Germany, retinal disease was the main cause of 40 percent of visual deficits<sup>24</sup>. In another retrospective study of 573 patients referred to a rehabilitation center in Malaysia the most important cause of visual impairment in the age group of under 30 was congenital diseases, while the main cause of visual deficits in the age group of 30 - 60 years, was retinitis pigmentosa and in patients over 60 years of age, retinal diseases were the most common cause of low vision and blindness<sup>25</sup>. In 2012, the causes of visual impairment among patients referred to a rehabilitation center in Iran were evaluated, and it was observed that 74.5 % of visual impairment and legal blindness was caused by retinal and choroid diseases<sup>26</sup>.

Due to the fact that more than half of patients in the present study were over 40 years of age, and because retinal diseases such as age related macular degeneration and macular hemorrhage increase with age, therefore the results of the present study indicating retinal diseases as the most common cause of legal blindness, were not far from expected. Also, due to the advancement of technology and the use of successful cataract surgery techniques in recent years the results of cataract surgery has improved, while the treatment for retinal disease has remained somehow less improved, which might partly explain the higher role of retinal diseases in causation of visual impairment in recent years. It should also be considered that Rasoul-Akram

Hospital is a referral center, with many ophthalmologists and optometrists referring their more complex and challenging cases to this center, which might partly explain the high prevalence of retinal disease as the cause of legal blindness among our patients.

It should be noted that the results of studies conducted at referral centers are not always universally applicable to the entire community and we should be very cautious in this regard. But in general, the results of the present study and similar studies<sup>27</sup>, can provide useful information about referral clinics and allow for better and more accurate planning for achieving optimal and effective therapies, as well as providing needed equipment in these hospitals.

## Conclusion

Our results from a referral hospital in Tehran indicates that retinal pathology was the most common cause of legal blindness among our patients, while the most common cause of visual impairment was cataract. Due to the natural differences of epidemiologic findings gathered from a referral center and the community, multicenter studies are recommended to better evaluate the causes of visual impairment in our community.

## References

1. Taylor HR, Pezzullo ML, Keeffe JE. The economic impact and cost of visual impairment in Australia. *Br J Ophthalmol*. 2006;90(3):272-5.
2. Frick KD, Kymes SM, Lee PP, Matchar DB, Pezzullo ML, Rein DB, et al. The cost of visual impairment: purposes, perspectives, and guidance. *Invest Ophthalmol Vis Sci*. 2010;51(4):1801-5.
3. Roberts CB, Hiratsuka Y, Yamada M, Pezzullo ML, Yates K, Takano S, Miyake K, Taylor HR (2010). Economic cost of visual impairment in Japan. *Arch Ophthalmol*, 128(6):766-71.
4. Pascolini D, Mariotti SP. Global estimates of visual impairment: 2010. *Br J Ophthalmol*. 2012;96(5):614-8.
5. Freeman EE, Roy-Gagnon MH, Samson E, Haddad S, Aubin MJ, Vela C, et al. The global burden of visual difficulty in low, middle, and high income countries. *PLoS One*. 2013;8(5):e63315.
6. Pokharel GP, Regmi G, Shrestha SK, Negrel AD, Ellwein LB. Prevalence of blindness and cataract surgery in Nepal. *Br J Ophthalmol*. 1998;82(6):600-5.
7. See JL, Wong TY, Yeo KT. Trends in the pattern of blindness and major ocular diseases in Singapore and Asia. *Ann Acad Med Singapore*. 1998;27(4):540-6.
8. Nirmalan PK, Thulasiraj RD, Maneksha V, Rahmathullah R, Ramakrishnan R, Padmavathi A, et al. A population based eye survey of older adults in Tirunelveli district of south India: blindness, cataract surgery, and visual outcomes. *Br J Ophthalmol*. 2002;86(5):505-12.
9. Zhao J, Jia L, Sui R, Ellwein LB. Prevalence of blindness and cataract surgery in Shunyi County, China. *Am J Ophthalmol*. 1998;126(4):506-14.
10. Michon JJ, Lau J, Chan WS, Ellwein LB. Prevalence of visual impairment, blindness, and cataract surgery in the Hong Kong elderly. *Br J Ophthalmol*. 2002;86(2):133-9.
11. Oye JE, Kuper H. Prevalence and causes of blindness and visual impairment in Limbe urban area, South West Province, Cameroon. *Br J Ophthalmol*. 2007;91(11):1435-9.
12. Baasanhu J, Johnson GJ, Burendei G, Minassian DC. Prevalence and causes of blindness and visual impairment in Mongolia: a survey of population-aged 40 years and older. *Bull World Health Organ*. 1994;72(5):771-6.
13. Amansakhatov S, Volokhovskaya ZP, Afanasyeva AN, Limburg H. Cataract blindness in Turkmenistan: results of a national survey. *Br J Ophthalmol*. 2002;86(11):1207-10.
14. Tsai SY, Hsu WM, Cheng CY, Liu JH, Chou P. Epidemiologic study of age-related cataracts among an elderly Chinese population in Shih-Pai, Taiwan. *Ophthalmology*. 2003;110(6):1089-95.
15. Saw SM, Foster PJ, Gazzard G, Seah S. Causes of blindness, low vision, and questionnaire-assessed poor visual function in Singaporean Chinese adults: The Tanjong Pagar Survey. *Ophthalmology*. 2004;111(6):1161-8.
16. Zainal M, Ismail SM, Ropilah AR, Elias H, Arumugam G, Alias D, et al. Prevalence of blindness and low vision in Malaysian population: results from the National Eye Survey 1996. *Br J Ophthalmol*. 2002;86(9):951-6.
17. Nirmalan PK, Thulasiraj RD, Maneksha V, Rahmathullah R, Ramakrishnan R, Padmavathi A, et al. A population based eye survey of older adults in Tirunelveli district of south India: blindness, cataract surgery, and visual outcomes. *Br J Ophthalmol*. 2002;86(5):505-12.
18. Hashemi H, Rezvan F, Yekta A, Ostadimoghaddam H, Soroush S, Dadbin N, et al. The Prevalence and Causes of Visual Impairment and Blindness in a Rural Population in the North of Iran. *Iran J Public Health*. 2015;44(6):855-64.
19. Dana MR, Tielsch JM, Enger C, Joyce E, Santoli JM, Taylor HR. Visual impairment in a rural Appalachian community. Prevalence and causes. *JAMA*. 1990;264(18):2400-5.
20. Fotouhi A, Hashemi H, Mohammad K, Jalali KH; Tehran Eye Study. The prevalence and causes of visual impairment in Tehran: the Tehran Eye Study. *Br J Ophthalmol*. 2004;88(6):740-5.
21. Shahriari HA, Izadi S, Rouhani MR, Ghasemza-

- deh F, Maleki AR. Prevalence and causes of visual impairment and blindness in Sistan-va-Baluchestan Province, Iran: Zahedan Eye Study. *Br J Ophthalmol*. 2007;91(5):579-84.
22. Hashemi H, Khabazkhoob M, Emamian MH, Shariati M, Fotouhi A. Visual impairment in the 40- to 64-year-old population of Shahroud, Iran. *Eye (Lond)*. 2012;26(8):1071-7.
23. World health organization (WHO). Prevention of Blindness and Visual Impairment. Priority eye diseases. Available at:<http://www.who.int/blindness/causes/priority/en/index5.html>. Last Accessed: 12-8-2016.
24. Nguyen NX, Weismann M, Trauzettel-Klosinski S. Spectrum of ophthalmologic and social rehabilitation at the Tübinger Low-Vision Clinic : a retrospective analysis for 1999-2005. *Ophthalmologie*. 2008;105(6):563-9. (Article in German)
25. Weih LM, VanNewkirk MR, McCarty CA, Taylor HR. Age-specific causes of bilateral visual impairment. *Arch Ophthalmol*. 2000;118(2):264-9.
26. Ramezani A, Pardis M, Rafati N, Kazemi-Moghaddam M, Katibeh M, Rostami P, et al. Causes of visual impairment among patients referred to a visual rehabilitation clinic in Iran. *Korean J Ophthalmol*. 2012;26(2):80-3.
27. Al-Shaalan FF, Bakrman MA, Ibrahim AM, Aljou-di AS. Prevalence and causes of visual impairment among Saudi adults attending primary health care-centers in northern Saudi Arabia. *Ann Saudi Med*. 2011;31(5):473-80.

### Footnotes and Financial Disclosures

#### Conflict of Interest:

The authors declare no conflict of interest with the subject matter of the present manuscript.