

Prevalence of Preventable Causes of Low Vision in Different Ages and Genders

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Article information	Abstract
<p>Article history: Received: 16 Aug 2012 Accepted: 14 Sep 2012 Available online: 20 May 2013 ZJRMS 2014; 16(1): 83-85</p> <p>Keywords: Diabetic retinopathy Age related macular degeneration Glaucoma Preventable cause of low vision</p>	<p>Background: Much of the vision loss from age-related eye disease can be prevented. The purpose of this study is to determine the prevalence of preventable causes of low vision.</p> <p>Materials and Methods: In this study, files of 204 patients were evaluated. Low vision was defined as best-corrected visual acuity in the better eye between 20/70 to 20/200. Diagnosis of anterior and posterior segment disease was based on the eye examination that performed with Topcon slit-lamp biomicroscope and direct and indirect ophthalmoscope examination.</p> <p>Results: The prevalence of preventable causes of low was respectively: diabetic retinopathy, in 33 patients (16.18%), glaucoma in 6 patients (2.94%), and amblyopia in 2 patients (1%).</p> <p>Conclusion: The majority of cases have treatable and/or preventable causes; reduction of low vision or blindness can be achieved by appropriate screening strategies.</p> <p>Copyright © 2014 Zahedan University of Medical Sciences. All rights reserved.</p>

Introduction

Much of the vision loss from age-related eye disease can be prevented. Early detection of glaucoma and diabetic retinopathy can prompt follow-up treatment to preserve vision [1]. The most frequent cause of visual impairment in people ages under than 75 years old is pathological myopia and age related macular degeneration (ARMD) is the most common cause of blindness in people older than 75 years old [2]. Low vision is those who suffer visual acuity between 20/70 to 20/200 (Snellen) in the better eye after the best possible correction or a field of vision between 20 to 30 degrees [3, 4]. Albinism is a non-preventable cause of low vision [4]. Some causes of low vision, such as glaucoma, diabetes mellitus [5, 6] and amblyopia [7] is preventable. In ARMD and cataracts, factors such as sun exposure and smoking are changeable [5, 6]. In these conditions a reduction in disease severity or time of onset of low vision can be changed.

In the elderly, the prevalence of systemic diseases such as diabetic retinopathy and eye diseases such as glaucoma and cataracts are common. These diseases can lead to blindness and low vision. The early detection of these diseases can be prevented low vision or blindness due such diseases. Thus, determine the prevalence of preventable causes of low vision is very important. The purpose of this study is a small step in this direction.

Materials and Methods

This cross-sectional study was performed in December 2010 in low vision clinic of rehabilitation faculty of Shahid Beheshti Medical University. In this study all files

of patients examined at low vision clinic of rehabilitation faculty of Shahid Beheshti Medical University from March 2008 to March 2009, were evaluated. The patients divided two groups: those with preventable and those with non-preventable causes of low vision. The patients were divided in nine different age groups. Low vision was defined as best-corrected visual acuity (BCVA) in the better eye after the best possible correction between 20/70 to 20/200. In the first stage objective refraction with the use of auto refractometer and after that subjective refraction performed for all subjects. The BCVA in each eye was measured with Lighthouse distance acuity chart. In this study, required information included: age, gender, cause of vision impairment, and BCVA in each eye. This information was obtained from the files of patients and was recorded in the research form. Complete eye examinations were performed for all patients to detect causes of low vision. Diagnosis of anterior and posterior segment disease was based on the eye examination that performed with Topcon slit-lamp biomicroscope and direct and indirect ophthalmoscope examination. Statistical analysis was performed (SPSS-18 software) using contingency tables and χ^2 test ($\alpha=0.05$).

Results

In this study, files of 204 patients were evaluated. The age of the patients ranged from 7 to 90 years old. The mean and standard deviation ages of patients were 45.64 ± 24.47 . In this study 66.7% of patients were male and 33.3% were female. The prevalence of preventable cause of low vision was 20% (in 41 patients) and non-

Table 1. Frequency of preventable causes of low vision by gender

Disease	Gender		Total N(%)
	Male N(%)	Female N(%)	
Diabetic retinopathy	20 (60.6)	13 (39.4)	33 (100)
Glaucoma	4 (66.67)	2 (33.33)	6 (100)
Amblyopia	1 (50)	1 (50)	2 (100)
ARMD	22 (75.9)	7 (24.1)	29 (100)
Senile cataract	3 (75)	1 (25)	4 (100)

Table 2. Frequency of preventable causes of low vision among different age groups

Age groups	Diabetic retinopathy N(%)	Glaucoma N(%)	Amblyopia N(%)	ARMD N(%)	Senile cataract N(%)	Other causes N(%)	Total N(%)
Under 10 yr	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	11 (100)	11 (100)
10-20 yr	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	28 (100)	28 (100)
20-30 yr	0 (0)	0 (0)	1 (3.13)	0 (0)	0 (0)	31 (96.87)	32 (100)
30-40 yr	1 (8.88)	0 (0)	1 (5.88)	0 (0)	0 (0)	15 (88.24)	17 (100)
40-50 yr	4 (19.05)	0 (0)	0 (0)	0 (0)	1 (4.77)	16 (76.18)	21 (100)
50-60 yr	13 (52)	1 (4)	0 (0)	1 (4)	0 (0)	10 (40)	25 (100)
60-70 yr	5 (0)	0 (0)	0 (0)	3 (17.65)	0 (0)	9 (52.94)	17 (100)
70-80 yr	9 (24.33)	4 (10.81)	0 (0)	14 (37.84)	2 (5.4)	8 (21.62)	37 (100)
Over 80 yr	1 (6.25)	1 (6.25)	0 (0)	11 (68.75)	1 (6.25)	2 (12.5)	16 (100)
Total	33 (16.18)	6 (2.94)	2 (1)	29 (14.2)	4 (1.96)	130 (63.72)	204 (100)

preventable causes of low vision was 64% (in 130 patients), respectively. Also 33 patients (16%) had diseases that progression of these diastase or some factors that affect on these diseases are preventable. Preventable causes of low vision were respectively: diabetic retinopathy in 33 patients (16.18%), chronic open-angle glaucoma in 6 patients (2.94%) and amblyopia in 2 patients (1%). The ages of 32 diabetic patients and total glaucoma patients were older than 40 years old. The age of amblyopic patients were younger than 40 years old (Table 2). The prevalence of preventable causes of low vision in men and women was not the same. Table 1 shows these results. Prevalence of diabetic retinopathy in patients older than 40 years old was 6.27% (32 of 116 low vision patients ages older than 40 years old). Chi-square test ($\alpha=0.05$) shows that gender did not affect the prevalence of preventable causes of low vision.

The ages of the glaucoma patients were older than 40 years old. The prevalence of glaucoma in population was 2.9% (6 of 204 patients) and in patients older than 40 years old, was 5.17% (6 of 116 patients older than 40 years old). The prevalence of ARMD was 14.2% (29 of 204 patients). The frequency of this disease in patients older than 60 years old was 40% (28 of 70 patients older than 60 years old). The prevalence of ARMD in men and women was 79.5% and 24.1% respectively (Table 1) Chi-square test ($\alpha=0.05$) shows that gender affect the prevalence of ARMD ($p<0.05$). Chi-square test ($\alpha=0.05$) shows that the groups older than 60 years old affect the prevalence of ARMD ($p<0.001$). The prevalence of senile cataracts was 1.96% (4 of 204 patients). The ages of senile cataract patients was older than 40 years old (Table 2). The frequency of senile cataracts in patients older than 40 years old was 3.45% (4 of 116 patients older than 40 years old) (Table 2). The prevalence of senile cataract in men and women was 75% and 25% respectively (Table 1). Chi-square test ($\alpha=0.05$) shows that gender did not affect the prevalence of senile cataracts and ARMD.

Discussion

This study shows that gender that no effect on the prevalence of diabetic retinopathy.

Previous studies have also indicated that in diabetes, men and women are equally affected and [8] genders doing not affect the prevalence of diabetic retinopathy [8, 9]. The difference between the proportion of patients with ARMD, between men and women was significant. Previous studies indicate that the frequency of this disease is higher in men than women. In present study, we found that the highest prevalence of diabetic retinopathy and ARMD. In a study by Cotter et al., in adults Latino the leading causes of low vision were cataract, diabetic retinopathy, and age-related macular degeneration, together accounting for approximately 82% of all persons with low vision [10].

In a study by Iwase et al., in Japanese adults, the main causes of low vision, cataracts and glaucoma has been reported [11]. In western countries the most common cause of visual impairment in older people, ARMD has been reported [1, 2]. The results of the study on prevalence of ARMD are consistent with results of other researchers. In present study, the prevalence of senile cataract in patients older than 50 years old was, 4.21%. In a study by Javadi et al. on Tehran's population, the prevalence of cataract in people older than 50 years old, 17.1% has been reported [12]. In a study by Soori et al., most frequent causes of visual impairment, including cataracts (33.9%) and amblyopia (22.7%) has been reported [13]. In present study, the prevalence of cataract and amblyopia are lower than previous studies. Different study populations might justify this difference.

Some of causes of low vision are diseases that are preventable and treatable. According to studies, the early diagnosis of diabetes mellitus and chronic open-angle glaucoma and appropriate treatment of these diseases [5, 14], in preventing of low vision and blindness caused by

these disease is effective. In people who are exposed to sunlight, ultraviolet radiation (UV) absorbers using the lens eyewear and hat with raised edges to prevent eye injuries from [15] to UV, such as age-related macular degeneration affects.

According to preset study if preventable causes of low vision are diagnosed early can be reduced by about 20% prevalence of low vision. Also, by controlling the preventable factors of low vision such as UV in age-related cataract and ARMD are about 16% of the intensity of low vision is reduced. Thus scientific information to diabetics about ophthalmic complications caused by the lack of control of the disease and informing patients and their family members, in the prevention of low vision caused by the disease. The majority of cases have treatable and/or preventable causes; reduction of low vision or blindness can be achieved by appropriate screening strategies.

References

1. Ferris FL, Tielsch JM. Blindness and visual impairment: A public health issue for the future as well as today. *Arch Ophthalmol* 2004; 122(4): 451-2.
2. Ramrattan RS, Wolfs RC, Panda-Jonas S, et al. Prevalence and causes of visual field loss in the elderly and associations with impairment in daily functioning: The rotterdam study. *Arch Ophthalmol* 2001; 119(12): 1788-94.
3. Jackson AJ, Wolffsohn JS, Bailey IL. *Low vision manual*. Philadelphia: Butterworth Heinemann Press; 2007: 12-18.
4. Eleanor EF. *Clinical low vision*. 2nd ed. New York: Little Brown Company; 1984: 257-324.
5. Houde SC. *Vision loss in older adults: Nursing assessment and care management*. New York: Springer Press; 2007: 7-11.
6. Melore GG. *Treating vision problem in the older adult*. USA: Mosby; 1997: 23-40.
7. Stuck AE, Walthert JM, Nikolaus T, et al. Risk factors for functional status decline in community-living elderly people: A systematic literature review. *Soc Sci Med* 1999; 48(4): 445-69.
8. Wissinger B, Susanne K. *Genetics in ophthalmology*. Switzerland: Karger Press; 2008: 115.
9. Correa ZMS, Freitas AM, Marcon IM. Risk factors related to the severity of diabetic retinopathy. *Arq Bras Oftalmol* 2003; 66(6): 39-43.
10. Cotter SA, Varma R, Ying-Lai M, et al. Causes of low vision and blindness in adult Latinos: The Los Angeles Latino eye study. *Ophthalmology* 2006; 113(9): 1574-82.
11. Iwase A, Araie M, Tomidokoro A, et al. Prevalence and causes of low vision and blindness in a Japanese adult population: The Tajimi study. *Ophthalmology* 2006; 113(8): 1354-62.
12. Javadi MA, Rezaei A, Karimian F, et al. [The prevalence of cataract in people over 40 years, in Tehran] *Persian. Bina J Ophthalmol* 2004; 9(4): 309-17.
13. Soori H, Javadi MA, Rafati N. Prevalence and causes of low vision and blindness in Tehran province, Iran. *J Pak Med Assoc* 2011; 61(6): 544-9.
14. Scheiman MI, Scheiman MA, Whittaker SG. *Low vision rehabilitation: A practical guide for occupational therapists*. 1st ed. New York: Slack Incorporated; 2007: 55-72.
15. North RV. *Work and the eye*. 2nd ed. Great Britain: Butterworth Heinemann; 2001: 120-1.

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Conflict of Interest

The authors declare no conflict of interest.

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