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Original Article

Prevalence of Eye Disorders in Elderly Population of Tehran, Iran

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A B S T R A C T

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Introduction: The decline of visual function with increasing age is a significant concern in elderly. Despite previous work on prevalence of specific ophthalmic pathologies, there has not been enough valid data about overall eye disorders in Tehran yet, and it is poorly defined and not underpinned by strong evidence. The purpose of this study was to investigate the common eye disorders in the elderly population of Tehran.

Methods: A total of 392 elderly community residents aged 60 to 96 were enrolled. The 278 older adults referred to Tehran's Polyclinic of 6th Region of municipality and 114 older adults referred to the health centers of 9th Region of municipality between 2013 and 2014 were examined. All participants underwent an extensive ophthalmologic screening examination including cataract, diabetic retinopathy of optic nerve, macular degeneration, and glaucoma. The prevalence of various eye disorders was calculated as percentages of the total study population and categorized by age and sex.

Results: Of the 392 participants, 152 subjects (38.8%) had no eye disease. Common visual impairments in elderly were cataract (39.3%), macular degeneration (11.5%), diabetic retinopathy of optic nerve (5.6%) and glaucoma (4.8%). It has also showed cataract prevalence increased with age from (6.3%) in the 60-64 age group to (47.6%) for the patients 85years of age and older.

Conclusion: Cataract is the most frequent eye disease in community dwelling older adults that should be considered at a younger age by health officials to provide preventive programs. Improving accessibility to surgery for the treatment of cataract among the old people will help diminish of untreated cataract that lead to visual impairment.

Keywords: Prevalence, Elderly, Eye Disorders, Vision Screening

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Introduction

Although the elderly population in many countries is increasing rapidly, the most rapid aging is taking place primarily in relatively newly industrialized or developing countries. Comparing Iran's population age in the past two decades illustrates that the present young population will incline towards aging. The most important demographic finding in the recent census in Iran is the significant change in the number of old adult which has been increased from 7.2% in 2006 to 8.2% in 2011(1).

Visual impairment is an important health care problem in elderly. Vision impairment is associated

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with a decrease ability to perform activities of daily living (such as reading, watching television, driving and interacting socially) (2, 3) and an increased risk for depression (4, 5). In addition, old adults with visual impairment are more prone to accidents, injury and falls (6-8).

Blindness is the end stage of many eye disorders. Some previous studies have shown that the most common causes of vision impairments among the elderly are cataract, macular degeneration, glaucoma and diabetic retinopathy (9, 10). The occurrence of these disorders differs markedly through the world. Various previous studies have provided estimates on the prevalence and incidence of blindness and visual impairments in Asia and western countries. The eye disease prevalence research group survey result showed cataract, macular degeneration, glaucoma are the most common causes of blindness and low vision in United States (11). It has been shown that the prevalence of cataract in developing countries and Asia is higher than that of the developed and western populations (12 - 14). Vashist et al (12) study showed that the prevalence of cataract in people aged ≥ 60 was 56% in north India and 53% in south India. A prevalence survey by Husain et al (15) in Indonesia showed that the prevalence of cataract for adults aged 21 to 29 was 1.1%, increasing to 82.8% for those aged older than 60 years. All previous studies have shown a clinically significant increase in the prevalence of visual impairment with increasing age (11-15).

International comparison of the data from large, high quality population-based surveys may help to provide insight into the risk factors associated with blinding eye disorders (11). Understanding age related vision loss is important for the elderly, their families, and professionals who work to treat older low vision patients. Thus, it is important to recognize what kinds of eye conditions threaten Iranian older adults and how to decrease their involvement chances. So, the aim of this study was to determine the prevalence of eye disorders in the elderly population of Tehran, Iran.

Methods

Procedures

The cross -sectional study carried out on 392 elderly aged 60 or older in Tehran city. The 278 older adults referred to Tehran's Polyclinic of 6th Region of municipality and 114 older adults that referred to the health centers of 9th Region of municipality between the years 2013 and 2014 underwent an extensive ophthalmologic screening examination by an experienced optometrist. Before participating in the study, all subjects signed an informed consent form approved by the human subjects committee of University of Social Welfare & Rehabilitation Sciences.

Measures

Demographic characteristics, medical history, and level of ability in daily activities were obtained. The inclusion criteria were 60 years old or more, living independently, able to follow simple instructions, absence of a neurological, musculoskeletal or cardiovascular disorders (11, 15). A screening ophthalmic examination including various ocular conditions (cataract, diabetic retinopathy of optic nerve, macular degeneration, coronal opacity and glaucoma) performed by an experienced examiner and ophthalmologist. Visual acuity was measured for each participant using the Snellen's illiterate E chart. Eye diseases diagnoses were performed using ophthalmoscope.

Statistical analysis

The prevalence's of various eye disorders were calculated as percentages of the total study population and categorized by age and sex. We presented the prevalence of various ocular conditions for males and females combined and separately. The $\chi 2$ test and fisher exact test were used to compare the prevalence for males and females'. The data was analyzed using SPSS statistical software version 20.

Results

The study population was composed of 392 persons 60 years and older (mean ages: female = 70.91 ± 7.37, male = 72.66 ± 6.61 years) that underwent ophthalmologic screening examination at two centers in Tehran. 48.7 % of participants were females, and 51.3% were males. Among the 392 screened subjects 38.8 %(n = 152) had no eye disorder, while the others (61.2%) had. The most common detected visual impairments were cataract (39.3%), macular degeneration (11.5%), diabetic retinopathy of optic nerve (5.6%) and glaucoma (4.8%). We also categorized the prevalence for each specific diagnosis into age groups (Table 1). The largest groups were 65-69 (n = 154) and 70-74 (n = 106) years old respectively. All eye disorders studied were in the least prevalent in the 60-64 age group, so that no case of macular degeneration and glaucoma was seen in this group, and only one person had cataract. The prevalence, however, was increasingly less prominent as people aged especially when samples went from the 70-74 age group to 75-79. Table 2 shows the prevalence of eye disorders among male and female subjects.

Discussion

Like other countries, visual impairment is highly prevalent in Iran and is projected to increase as the population ages. This study showed the prevalence of visual impairments in 6 age categories. The highest percentage of our sample was in the age groups 65-69 (39.3%) and 70-74(27%) respectively. In the age group 60-64, 75% of participants had no eye disease.

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Table 1. The prevalence of eye disorders by age groups

	Age group						Total
Eye Diseases	60-64 N = 16	65-69 N = 154	70-74 N = 106	75-79 N = 59	80-84 N = 36	≥ 85 N = 21	
Normal	12 (75%)	66 (42.9%)	37 (34.9%)	23 (39%)	10 (27.8%)	4 (19%)	152 (38.8%)
Cataract	1 (6.3%)	59 (38.3%)	43 (40.6%)	24 (40.7%)	17 (42.2%)	10 (47.6%)	154 (39.3%)
Diabetic retinopathy of optic nerve	3 (18.8%)	10 (6.5%)	8 (7.5%)	1 (1.7%)	-	-	22 (5.6%)
Macular degeneration	-	12 (7.8%)	13 (12.3%)	8 (13.6%)	7 (19.4%)	5 (23.8%)	45 (11.5%)
Glaucoma	-	7 (4.5%)	5 (4.7%)	3 (5.1%)	2 (5.6%)	2 (9.5%)	19 (4.8%)

Table 2. The comparative sex-stratified prevalence of eye disorders

Gender	Eye Diseases (N)					**Total**
	Normal	**Cataract**	**Diabetic retinopathy of optic nerve**	**Macular degeneration**	**Glaucoma**	
Female	73 (38.2)	69 (36.1)	16 (8.4)	25 (13.1)	8 (4.2)	191
Male	79 (39.3)	85 (42.3)	6 (3)	20 (10)	11 (5.5)	201
Total	152 (38.8)	154 (39.3)	22 (5.6)	45 (11.5)	19 (4.8)	392
p	0.83	0.21	0.02	0.33	0.55	

Our data showed that common visual impairments in the elderly samples were cataract (39.3%), macular degeneration (11.5%), diabetic retinopathy of optic nerve (5.6%) and glaucoma (4.8%). It has also showed cataract prevalence increased with age from (6.3%) in the 60-64 age group to (47.6%) for the patients 85years of age and older. Also, no statistically significant difference was detected between the cataract prevalence rates among males and females ($p>0.05$).

Our results are consistent with those studies demonstrating that cataract is the most common cause of vision impairment, and its prevalence increases with age (12-13,18-20). It has been shown that the prevalence of cataract in developing countries and Asia is higher than that of the developed and Western populations and visual impairment and blindness are strongly correlated with increasing age(12-14).

In our study macular degeneration was the second most common cause of visual impairment, with a progressive increasing of the prevalence from7.8% in the 60-64 age group to 23.8% for patients 85years of old and more. In Korean population, the prevalence of macular degeneration was reported 10.8% and 18.8% in 60-69 age groups and ≥ 70 respectively (21).Also, the prevalence of macular degeneration in India and China increases with age (22). It is estimated that in developed countries approximately30% of adults over 75 have some signs of age-related macular degeneration (22, 23).

The growth of elderly population in Iran will unavoidably be accompanied by an increasing number of age-related disorders, including macular degeneration. Our results were consistent with those studies in demonstrating that the prevalence of macular degeneration increases with age (24-26).

Our study consisted of only 22(5.6%) subjects with diabetic retinopathy and no subjects in the subgroups 80-84 and ≥ 85 years. Although the findings of some studies suggest a large influence of diabetes on visual loss, diabetic retinopathy was not a major cause of blindness in older population (17, 27, 28). Possible explanations for the small number of patients with this condition in our study are mortality of very old diabetic patients with severe systemic complications. Wild et al (28) showed that in developing countries, the majority of people with diabetes are at the range of 45-64 year-old, in oppose to developed countries (> 64).

It has revealed that two of the major risk factors for diabetic retinopathy are duration of hyperglycemia and degree of glycemic control. Also, it has shown that for any 5 year duration of uncontrolled diabetes, relative risk of developing diabetic retinopathy increases up to 1.89 fold (29, 30).The earlier onset of diabetes, especially for type 2, the greater, therefore, susceptibility to diabetic retinopathy and subsequent blindness .Therefore, diabetic retinopathy should be screened in young and working-age diabetic patients (30, 31).

Only 4.8 %(n=19) of the patients presented the pathology of glaucoma. Several population-based studies from Asia, have reported the prevalence of glaucoma from 2% to 5 % (32-34). The result of a

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systematic review and meta- analysis in 2014 showed that the global prevalence of glaucoma for population aged 40-80 years is 3.54%. It is expected the glaucoma increase rate be more dramatically in Asia and Africa because of increased life expectancy in these regions (35).

Conclusions

The major causes of visual impairments in Tehran elderly populations are cataract, macular degeneration, diabetic retinopathy of optic nerve and glaucoma. Cataract is most frequent eye disease in older adult that in preventive programs should be considered at younger age.

Study limitations

Some potential limitations of our study should be considered in interpreting the results. Clearly, the results of our study cannot be generalized to the Iran population with as much as confidence as results from a nationally representative study. In particular, only results from older adults referred to Tehran's Polyclinics of 6th and9th Regions of municipality were used, which may have inadequately represented the prevalence rates in other regions.

Conflict of interests

The authors declare that there is no conflict of interests.

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