Level of visual disorders in clients referred to medical exemption commission of Alavi hospital in Ardabil

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Abstract

Aims: Visual disorders have recently become a matter of concern for World Health Organization. Since most clients of military medical ophthalmic commission are young, assessment of visual disorders is very important in this group. This study was performed in order to determine the frequency distribution of common visual disorders among people who refer to military medical ophthalmic commission of Ardabil province.

Methods: This cross-sectional descriptive study was performed on all patients of Alavi Ophthalmology Clinic of Ardabil during years 2000-5 who referred to Medical Exemption Commission. 5203 people were studied and the data registered in medical files were collected in a questionnaire and were analyzed by SPSS 13 software. Chi-square test was used for comparison of qualitative variables.

Results: 4935 (94.84%) of clients had a kind of visual disorder. 94% had refractive errors from which 33.8% were mild, 48% were moderate, and 18% were severe. 3413 (65.6%) of patients had myopia and 1479 (28.4%) had hyperopia. 4806 (92.37%) of patients had astigmatism and 35.15% had anisometropia. Corneal disease (1.07%), strabismus (0.99%) and cataract (0.78%) were other major visual disorders.

Conclusion: Special refractive errors lead to exemption from military service and most of referees despite having refractive disorders are summoned to military service; therefore, determining the prevalence of refractive errors and visual disorders may be useful in major defensive programs for military medicine authorities. Retrospective evaluation of the above results may also be useful in Amblyopia preventing programs.

Keywords: Visual Disorder, Refractive Disorders, Myopia, Hyperopia, Medical Exemption Commission

Introduction

Visual disorders are one of the health problems which have recently been of particular interest by the World Health Organization. High prevalence of visual disorders in developing countries of Africa and Asia is not due to the inability of ophthalmoscopy staff in medical diagnosis, but the major problem is inability of national health care systems in providing appropriate prevention methods and treatment [1]. About 90% of blind and low sighted people live in developing countries of Africa and Asia and 80% of these cases are preventable and curable [2]. During the past 50 years, the pattern of blindness and sightlessness has changed due to: improving living standards, personal hygiene, increasing awareness, increasing longevity and advances in treatment methods [3].

In many countries, refractive disorder is the second cause of curable blindness after cataract. Also, refractive disorder is the most common cause of visual disorder [4, 5] and therefore, it has harmful effects, especially on the young and active society. Since most clients refer to the military medical ophthalmic clinic are young, considering the visual disorders in this age range both in terms of diagnosis and prevention programs is very important. Since youth of this age range are in the beginning to meet various social environments (such as military service, universities, labor market etc.), understanding these disorders and giving information, increasing the awareness of community and professional examinations in younger ages can prevent many disorders and if treated or non-treated disorder appears, it is possible to select healthy people for different community sections with some kind of screening.

Also, if military period or his selected job is harmful for him, in order to prevent progression or probable effects of disorder, his exemption and prohibiting should be done, not only for considering his health condition, but also for prevention or minimalism of additional future costs that may be imposed on him or system. Thus the overall efficiency of society will be increased.

This study was performed in order to determine the frequency distribution of common visual disorders in military medical ophthalmic commission clients in Ardebil province.

Methods

This study was done through cross-sectional method on all 5203 subjects referred to medical exemption commission of Alavi professional eye hospital since October 2000 to September 2005 who entered the study through census sampling.

The individuals referring to professional eye hospital were examined and investigated by three expert ophthalmoscopies. All three doctors commented about the eyes being healthy or unhealthy and the results were recorded in related files in clinic. The recorded disorders were collected and desired information extracted and entered the SPSS program. To collect data, questionnaires were used. Questionnaires included information about demographic and related visual disorders. For each disorder, standard definition was presented. Refraction equals to aspheric -0.5 diopter or more was defined as myopia. For further analysis, myopia was divided into mild degree (-0.5 to -3 dioters), moderate (-3 to -6 diopters) and severe (more than -6 diopters). Hyperopia was defined as equivalent aspheric more than +0.5 diopter; thus aspheric equivalent between -0.5 to +0.5 diopters were considered as normal. Hyperopia was also divided into three categories of mild (+0.5 to +2 diopters), moderate (+2.1 to 4 diopter) and severe (more than 4.0 diopter), Astigmatism was recorded as negative cylinder and divided into three categories of the with-the-rule (15±0°), against-the-rule (90°±15) and oblique (from 20 to 70 and from 110 to 160 degrees) in terms of its axis. In a separate section, anisometropia i.e. an eyesight difference between the two eyes of one or more than one diopter was investigated [6]. The last part of study was allocated to investigate the SE of both eyes and finally, other eye non-refractive disorders.

Data was entered the computer after coding and analyzed with SPSS 13 software. For determining the relationship between qualitative variables k-square test was used. In all cases $p<0.05$ were considered significant.

Results

Of all subjects, 4935 (94.84%) were diagnosed with some kind of visual disorder. 4892 subjects(94%) had refractive disorder that moderate refractive disorder was the most observed case. From about 5203 subjects, totally 65.6% were myopic and 28.4% were hyperopic. On the other hand, myopia was much common than hyperopia and this difference was statistically significant (p=0.004, Table 1).

206 cases (96.3%) also had non-refractive disorder. Cornea disease, eye deviation (exo or iso) and cataract were the main reasons of visual disorders of clients (Table 2). Trachoma and Pterygium were among the major cause of non-refractive visual impairment (Table 3).

Table 1- Frequency distribution of refractive disorders in referred clients to specialized eye clinic regarding their severity

Degree of refractive disorder	Number of clients	Number percent	Myopia		Hyperopic	
			Number	Percent	Number	Percent
Mild	1652	33.8	1150	70	502	30
Moderate	2364	48	1760	74	604	26
Severe	876	18	503	57	373	43
Total	4892	94	3413	69.76	1479	30.24
The total out amount of the total clients	4892	94	3413	65.6	1479	28.4

Table 2- Frequency distribution of non-refractive visual disorders in referred client to specialized eye clinic

Causes of visual disorders	Number	Percent	Percent of total
Cataract	41	19.9	0.78
Retinal diseases	21	10.19	0.40
Corneal diseases	56	27.18	1.07
Glaucoma	4	1.94	0.07
Amblyopia	11	5.34	0.21
Disease of the optic nerve (except glaucoma)	9	4.37	0.17
Eye deviation(exo or iso)	52	25.24	0.99
Blindness (vision less than HM)	6	2.9	0.11
Droopy eyelids	6	2.9	0.11
Total	206	100	3.96

Table 3- The frequency distribution of non- refractive visual disorder of referred clients to specialized eye clinic by each case separately.

Disorder causes	Causes for each case separately	Number	Percent	Percent from total referred clients
Lattice degeneration	Diabetic retinopathy	6	2.91	0.11
	Retinal detachment	13	6.31	0.25
	Albinism	2	0.97	0.038
	Trachoma	16	7.76	0.31
Corneal diseases	Corneal opacity with different causes	11	5.34	0.21
	Keratoconus	6	2.91	0.11
	Corneal ulcers	4	1.94	0.07
	Keratitis	3	1.46	0.057
	Pterygiugium	16	7.76	0.31
Optic nerve diseases	Nerve atrophy	5	2.42	0.096
	Optic neuritis	4	1.94	0.07
Total		86	41.74	1.65

The highest average value of SE belonged to right eye myopia and the lowest was left eye hyperopia (Table 4).

Table 4- Average distribution of equivalent aspheric for each eye separately based on myopia and hyperopia

Eye		Average SE
Right	Myopia	-5.25±1.25
	Hyperopia	+3.75±1.5
Left	Myopia	-5±1.75
	Hyperopia	+3±0.75

Totally 4806 clients (37.92% of total clients) had with-the-rule astigmatism were more than other types of astigmatism. The result of comparison between two eyes in subjects who had with-the-rule astigmatism and subjects whose astigmatism was against-the-rule was not significant with 95% confidence. (p=0.67 Table 5).

Table 5- Astigmatism frequency distribution in clients referred to specialized eye clinic

Astigmatism type	Right eye		Left eye		Both eyes together		Total	
	Num.	Perc.	Num.	Perc.	Num.	Perc.	Num.	Perc.
Agreed	89	3.77	84	3.55	2189	92.67	2362	49.14
Opposite	39	3.11	43	3.43	1171	93.45	1253	26.07
Oblique	-	-	-	-	1191	100	1191	24.78
Total	-	-	-	-	-	-	4806	100

Approximately 15.35% of subjects had anisometropy and the number of myopic subjects who had anisometropy was more than hyperopic people who had anisometropy which was significant with %95 level of confidence (p=0.0015; Table 6).

Table 6- Anisometropy frequency distribution (one diopter difference or more) in myopic and hyperopic subjects separately

Type of refractive disorder	Number	Total percent of anisometropy cases	Percent of the total referred clients
Myopia	1163	63.58	22.35
Hyperopia	666	36.42	12.80
Total	1829	100	35.15

Discussion

Since there was no exactly similar study to the present study or at least has not been found in searched areas, the results of present study have been compared with the studies on same age strata (not referred to military commissions) and with the only study which has been done on the diseases lead to medical exemption conscription in Shahrekord city.

The results showed that refractive errors are the most common cause of visual disorder in clients. From the 5203 participants the overall prevalence of refractive errors was 94%. Also, in most studies refractive error has been mentioned as the main reason for visual disorder which is consistent with our study [8, 9, 10, 11, 12, 13, 14, 15, 16] and it is indicative of high prevalence of refractive disorders in young age group as the most prevalent cause of visual disorders.

In this study, 65.6% of clients were myopic and 28% were hyperopic. Ganji has studied [7] the most prevalent causes lead to medical exemption, in his study, eye disorders (37.8%) have been at the first rank in which the most prevalent reasons for visual disorders have been myopia with 55.4%, hyperopia (9.3%) and lack of an eye 8.9% respectively. In the study done by Hashemi et al., the prevalence of myopia in the sample population 17.2% and the prevalence of hyperopia 56.6% has been reported [17]. In the study of Ostadi-Moghaddam et al. which has been done in elementary and secondary schools of Mashhad city, the prevalence of myopia 24.1% and hyperopia 8.4% has been reported. In other studies different prevalence has been reported.

Likewise, different prevalence has been reported in other studies. For example in the study of Fotouhi et al., 2.1% of all high school kids are myopic and 33% were hyperopic [11]. Dandona et al. in their study estimated the prevalence of myopia and hyperopia to be 4.1% and 0.8% respectively [13]. In a study by Naidoo et al, myopia and hyperopia were observed in 4% and 2.6% of subjects respectively [14]. Murthy et al. in their study reported that myopia was observed in 7.4% of subjects and hyperopia was observed in 7.7% of the subjects [16]. Likewise, in a research work by Quek et al., myopia and hyperopia were reported to be 73.9% and 1.5%, respectively [18] and in the study of Woow et al. these figures were 89.8% and 1.3% for myopia and hyperopia respectively [19]. According to these results, it is observed that in some studies, like our results, myopia is more prevalent and on the other ones hyperopia is more common.

As noted before, the prevalence of myopia and hyperopia is very varied in different studies and comparison of the results is difficult in different communities based on previous studies since different definitions of myopia and hyperopia have been set forth. Also, some studies have been conducted on the specific groups of people and some on the population, that limit the generalizability power of this type of studies. Furthermore, the prevalence of these factors is changing by time, age and sex of the study population. Even in some studies, such as Gospel et al.'s, there has been noted that the reduced socio-economic status and rural residence is accompanied by increased prevalence of visual acuity disorders [8]. This result

has been obtained in the study of Ayed et al. as well, that according their results there is a significant correlation between refraction disorders and economic failure [20]. Given that our study has been also undertaken on a population with the same sex and age, it is not exempted from this rule. So comparing our results with others' is not a reliable comparison, so it could not be generalized. Therefore, conducting other similar studies in other parts of the country seems to be necessary.

In Hashemi's study, the prevalence of myopia had a significant increase from 9.3% in the age group of 5 to 15 years to 29.3% in the age group 16 to 25 years, and the prevalence of hyperopia in the younger age groups (under 15 years) and older ones (above 45 years) was significantly higher [17]. Moreover, the study of yekta [21] and Ostadimoqaddam et al [6] showed that the prevalence and amount of myopia had increased after 20 years of age. In the Ayed study, as well, the prevalence of myopia was higher after 14 years of age [20]. Mole and Murthy, in their study on 5 to 15 year-old patients, in U.S. and India respectively, myopia showed a single increase and hyperopia showed a single decrease up to the age of 15 years old [15, 16]. Quek and Woow studies that were conducted respectively on the15 to 19 years old and 19 to 23 years old individuals show a significant increase in myopia. Also in the Cook study, reading and writing and close study habits have been mentioned to be among the myopia risk factors [18, 19]. Other studies have shown that myopia prevalence and mean is high in the age group of 16 to 20 years old, the reason of which may be environmental factors such as close visual works in this age group [18, 22, 23]. Even the relationship between increased myopia and nationality has also been reported [24]. Genetic and environmental factors also affect the prevalence of myopia and environmental factors may influence the genetic factors [22]. Given that our study has been conducted on the population with certain age, and most of them are in the military conscription ages, i.e., 18 to 20 year-old, perhaps this significant increase in myopia compared to hyperopia in our study, is justifiable by considering the age factor. Also, considering that most applicants of university entrance exam are in this age group, increased hours of study, particularly by the end of high school, may be an important environmental risk factor for remarkable increase in the myopia in this age range.

In our study 92.3% of subjects referred with astigmatism. In Ganji study, astigmatism has formed 4.6% of visual disturbances in conscripted subjects [7]. In Hashemi et al. study, the prevalence of astigmatism has been reported to be 30.3% [17]. In a study by Ostadimoqaddam et al. [6] in elementary and secondary schools, the astigmatism prevalence was 9.8% and that of high schools was 11.8%, that in the above studies, the prevalence of astigmatism has been less than ours. However, given that astigmatism criteria in most studies is 0.75 and above, and in in our study has been 0.25 and higher, the difference in prevalence is explainable. In Quek and Woow studies, too, the prevalence of astigmatism has been respectively 58.7% and 82.2% respectively [19, 20] that the results of this study are similar to our findings, showing high rates of astigmatism. Here, there should also be noted that comparing the results of various studies in astigmatism, as for myopia and hyperopia, is difficult due to the different definitions and effects of various factors.

In our study, the frequency of with-the-rule astigmatism was 49.14% that is higher than against-the-rule astigmatism (7.26%) and oblique astigmatism (24.78%). In the study of Hashemi et al. against-the-rule astigmatism have been reported to be higher than against-the-rule and oblique astigmatism [17] that support the results of study and other studies [16, 17] that stress the high prevalence of with-the-rule astigmatism at a young age and against-the-rule astigmatism in old ages. In this study, all cases of astigmatism were bilateral oblique which is statistically significant and worth noting and require further investigation in this field.

According to our study findings, 35.15% of referred individuals had anisometropy (one or more diopters difference). Other studies show the different value so that the prevalence of anisometropy in previous reports has fluctuated between 7% and 31% [25]. Hashemi et al. in their study have reported the prevalence of anisometropy 6.1% [17]. In the study of Ostadimoqaddam et al. [6] anisometropy prevalence in primary schools and junior high school group has been 3% and 5.6%, respectively. In the Quek study the prevalence of anisometropy has been reported to be 11.2% [19]. However, it seems that high frequency of anisometropy in our study has been again due to the study on a specific group because those who are drafted for military service, in the case of having more impairment in one eye and the probability of amblyopia, are more motivated to go to the military commission. In our study, the number of people with myopia suffering from anisometropy is significantly higher than hyperopic ones. In similar studies, the relationship between amyotrophy (especially myopia) with anisometropy has been noted [6, 25] that is supported by the results of this study. It is necessary to

point out that anisometropy will result in amblyopia and could disturb the soldiers' performance in their duties.

Although the survey on the causes of visual non-refractive disorders has not been our priority in our research, but for an overview, statistics has been extracted and recorded in the relevant tables that can be used for comparing the results of similar research done in the future. In our study, corneal diseases, cataract and eye deviation are the most common causes of visual non-refractive disorder in the subjects. In some studies, these factors have been also mentioned as a common cause of visual non-refractive disorder but the order of values is different in different studies [7, 9, 26]. Here again the cause for this difference is studying a specific population and the effect of different factors.

Considering the results of this study and given that the large number of the individuals who are referring to the military ophthalmic commission are called to attend in the conscription despite visual disorders (due to the failing to obtain necessary conditions for military exemption), and considering the tensions in the military working environment, in some cases these tensions are likely to lead to the consequences such as leaving work environment, suicide and even killing others [7]. Therefore, to prevent such incidents in the military environments and also to increase their combat and job power [7], it is suggested that all who are drafted for military service be periodically examined and, if necessary, some diagnostic and therapeutic measures should be done for them.

Conclusion

Refractive defects are the most common cause of visual disorder in the references. Among all references, the overall frequency of refractive impairments is 94%, that the refractive impairment has been mostly observed with the average grade. Corneal diseases, cataract and eye deviation are the most common causes of visual impairment in the referred clients. 65.6% of subjects are myopic and 28.4% are hyperopic. 92.3% of them suffer from astigmatism that the number of cases with with-the-rule astigmatism is more than the other types of astigmatism. 35.15% of clients have anisometropy (one or more diopter difference) and number of people suffering anisometropy is higher than hyperopic individuals which is statistically significant.

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