



Causes of Blindness in Adults in Southern Turkey According to Health Committee Reports

✉ Mine Karahan, ✉ Atılım Armağan Demirtaş

University of Health Sciences Turkey, Gazi Yaşargil Training and Research Hospital, Clinic of Ophthalmology, Diyarbakır, Turkey

Abstract

Objectives: To reveal the causes of blindness in patients who applied to the medical board of a hospital serving the Southeastern Anatolian region of Turkey.

Materials and Methods: We retrospectively reviewed the records of 340 bilaterally blind patients who were among 3,234 patients referred to our hospital's medical board between March 2016 and November 2018 for disability evaluation and rating report.

Results: One-hundred sixty (48.8%) were female, 174 (51.2%) were male, and the mean patient age was 64.3 ± 25.4 years. The most common cause of blindness was cataract in 158 eyes (23.2%), followed by corneal opacities in 114 eyes (16.8%), retinal dystrophy in 92 eyes (13.5%), optic atrophy in 73 eyes (10.7%), glaucoma in 65 eyes (9.6%), and phthisis bulbi in 59 eyes (8.7%).

Conclusion: Avoidable causes of blindness such as cataract and corneal opacity (secondary to trachoma) were detected at high rates. Therefore, we believe that more awareness and effort might be required in our region to reduce avoidable blindness due to these causes.

Keywords: Visual impairment, epidemiology of visual impairment, blindness, low vision

Introduction

Visual impairment is one of the greatest public health problems worldwide, especially in developing countries. The World Health Organization (WHO) World Report on Vision, prepared in 2019, states that at least 2.2 billion people have vision impairment globally.¹ Among the 1 billion of these individuals with an impairment that could have been prevented or has yet to be addressed, uncorrected presbyopia tops the list, affecting 826 million people. Next highest is unaddressed refractive error (123.7 million), followed by cataract (65.2 million), glaucoma (6.9 million), corneal opacities (4.2 million), diabetic retinopathy (3 million), and trachoma (2 million). The WHO report

notes that 1 billion is almost certainly an underestimation, as potentially preventable cases of age-related macular degeneration (AMD) are unknown and data on childhood visual impairment is hard to come by. The report does estimate a visually impaired AMD population of 10.4 million among the 2.2 billion overall cases. Cataract, uncorrected refractive error, and AMD are the major causes of visual impairment.² However, the prevalence and etiology of blindness may differ between different geographical regions and ethnic groups.^{3,4,5,6} The WHO report also points out that the burden of eye conditions and vision impairment is often far greater in people living in rural areas, those with low incomes, women, older people, people with disabilities, ethnic minorities, and indigenous populations.¹

Address for Correspondence: Atılım Armağan Demirtaş, University of Health Sciences Turkey, Gazi Yaşargil Training and Research Hospital, Clinic of Ophthalmology, Diyarbakır, Turkey

E-mail: atilimdemirtas77@gmail.com **ORCID-ID:** orcid.org/0000-0002-6504-8385

Received: 13.11.2019 **Accepted:** 17.08.2020

Cite this article as: Karahan M, Demirtaş AA. Causes of Blindness in Adults in Southern Turkey According to Health Committee Reports. Turk J Ophthalmol 2021;51:146-150

©Copyright 2021 by Turkish Ophthalmological Association
Turkish Journal of Ophthalmology, published by Galenos Publishing House.

Visual impairment does not only concern health and rehabilitation services but is also a concern in the areas of education, employment, and social security. Ophthalmologists play an important role in the application of most suitable rehabilitation methods for people with visual loss and helping them to receive the social security benefits they deserve. The single most important way to achieve these goals is to determine the clinical features of visual impairment. Epidemiological evaluation of visual impairment helps improve preventive and therapeutic health services.

A disability report is a document issued by hospital medical boards that describes and measures disability and health. It allows persons with disabilities to exercise their social rights and also serves as a medical certificate for employment. Turkish law defines “blind eye” as functionally blind eye ($BCVA \leq 0.02$) or anatomically blind eye (no eyeball). A bilaterally blind patient’s visual system impairment rating is calculated as 100%, which means the patient has a whole-body impairment rating of 90%.⁷

The aim of this study was to determine the underlying ocular diseases in people who had a disability report with 90% whole-body impairment rating due to their visual system impairment rating.

Materials and Methods

In this retrospective study, the medical records of 3,234 patients who had appealed to the hospital medical board for evaluation of their disability status between March 2016 to November 2018 were evaluated. Institutional review board approval was obtained from the local ethics committee and the study was conducted in accordance with the Declaration of Helsinki. No informed consent was obtained since this was a retrospective study. Patient information that is available through the hospital information system and the health board reports were reviewed.

Patients who appealed to the medical board for disability reports were included in this study. Other health report applications for gun license, medication, medical certificate, invalidity retirement, and special education were excluded from the study. All cases were evaluated by the medical board based on the “Regulation on Disability Criteria, Classification, and Medical Board Reports for Disabled People” published in Official Gazette number 28603, dated 30.03.2013.⁸ According to this regulation, an individual’s rated disability (loss of whole body function) is expressed as a percentage (0-100%). As described above, blindness was defined as functional ($BCVA \leq 0.02$) or anatomical (no eyeball). Bilaterally blindness (whether functional or anatomical) is rated as 100% visual impairment and results in a whole-body impairment rating of 90%. Patients who had a disability report with 90% whole-body impairment due to a visual impairment rating of 100% were included.

In the previous disability regulation (2013), a disabled person, congenital or acquired, refers to a person who has difficulties in adapting to social life and meeting their daily needs and needs protection, care, or rehabilitation, counseling,

and support services due to loss of their physical, mental, spiritual, sensory, and social abilities to various degrees. Severely disabled persons, those whose disability rate is determined to be 50% or higher, are those who have been evaluated by the health committee as unable to perform their daily life activities without the help of others. In the current disability regulation (2019), individuals who are judged to be unable to perform their daily living activities on their own despite receiving help are defined as “fully dependent disabled individuals” based on the evaluation of reasoning ability in connection with disability due to tissue, organ and/or function loss and/or psychiatry diagnosis. People who have a corrected visual acuity of 20/200 or less in the better-seeing eye and field of view of 20 degrees or less in the better-seeing eye are called legally blind. In the regulation text, the fully dependent disabled person is described on the basis of body functions in necessary daily activities. According to this regulation, a legally blind person may not be defined as a fully dependent disabled person if otherwise healthy. This study included subjects defined as severely disability according to the previous regulation.

The patients’ age, gender, best corrected visual acuity (BCVA), and anterior and posterior segment examination records were obtained.

Statistical Analysis

Statistical analyses were performed using SPSS 22.0 (IBM Corp, Armonk, NY, USA). Continuous variables were presented as mean \pm standard deviation, whereas categorical variables were presented as frequencies and percentages.

Results

Of the total 340 patients, 166 (48.8%) patients were female and 174 (51.2%) patients were male. The mean patient age was 64.3 ± 25.4 years. When both eyes of the 340 patients were reviewed, the most common cause of blindness was cataract in 158 eyes (23.2%). This was followed by corneal opacities in 114 eyes (16.8%), retinal dystrophy in 92 eyes (13.5%), optic atrophy in 73 eyes (10.7%), glaucoma in 65 eyes (9.6%), phthisis bulbi in 59 eyes (8.7%), proliferative diabetic retinopathy in 32 eyes (4.7%), AMD in 22 eyes (3.2%) eyes, bullous keratopathy 18 eyes (2.6%), retinal detachment in 18 eyes (2.6%), degenerative myopia in 13 eyes (1.9%), microphthalmus in 6 eyes (0.9%), anophthalmus in 3 eyes (0.4%), corneal dystrophy in 2 eyes (0.3%), nystagmus in 2 eyes (0.3%), uveitis in 2 eyes (0.3%), and aphakia in 1 eye (0.1%). Table 1 shows the causes of blindness in right and left eyes.

Cataract (24.7%) was the most common cause of vision loss in female patients. Corneal opacity (19.9%) and retinal dystrophy (12%) were other common causes. Similarly, in males the most common cause was cataract (19.5%), followed by optic atrophy (16.1%) and retinal dystrophy (14.9%) (Table 2). The male group was younger than the female group (60.1 ± 24.1 years and 68.6 ± 24.1 years, respectively). The difference in mean age between the two groups was statistically significant ($p=0.002$).

When evaluated by age group, the most common causes of blindness were retinal dystrophy in patients aged <15 years (n=9, 4.5%) and 15-40 years (n=21, 40.4%), and cataract (n=72, 27.1%) in patients aged >40 years. The highest rates of cataract (27.1%) and corneal opacity (18.4%) were observed in patients aged >40 years (Table 3).

Discussion

Even though access to health services has increased for all socioeconomic groups in Turkey recently, the high incidence of cataracts, which can be corrected by surgery, and traumatic causes of blindness such as phthisis bulbi and corneal opacities indicate that health consciousness remains low.

Cataract, followed by glaucoma, AMD, childhood blindness, corneal opacities, uncorrected refractive errors, trauma, and diabetic retinopathy were reported as the main causes of visual impairment by the WHO.⁹ Negrel et al.⁴ determined cataract (50.0%), corneal diseases (15.0%), glaucoma (12.0%), phthisis bulbi (6.0%), and optic atrophy (6.0%) as common causes of blindness in southern Turkey. Apart from our findings that are consistent with these results, we also found that retinal dystrophy was reported in 92 (13.5%) eyes. This difference in outcomes might be due to differences in study design, since our study included subjects applying to a medical board for a disability report. In a study designed similarly to ours, the most frequent causes of visual impairment were reported as

Table 1. The causes of blindness in patients

Ocular pathologies	Right eyes n (%)	Left eyes n (%)
Cataract	75 (22.1)	83 (24.4)
Corneal opacity	54 (15.9)	60 (17.6)
Retinal dystrophy	46 (13.5)	46 (13.5)
Optic atrophy	37 (10.9)	36 (10.6)
Glaucoma	34 (10.0)	31 (9.1)
Phthisis bulbi	33 (9.7)	26 (7.6)
PDR	16 (4.7)	16 (4.7)
AMD	11 (3.2)	11 (3.2)
Bullous KP	10 (2.9)	8 (2.4)
RD	10 (2.9)	8 (2.4)
Degenerative myopia	6 (1.8)	7 (2.1)
Microphthalmus	3 (0.9)	3 (0.9)
Other diseases	5 (1.5)	5 (1.5)

PDR: Proliferative diabetic retinopathy, AMD: Age-related macular degeneration, KP: Keratopathy, RD: Retinal detachment

Table 2. The causes of blindness in patients according to gender

Ocular pathologies	Female n (%)	Male n (%)
Cataract	41 (24.7)	34 (19.5)
Corneal opacity	33 (19.9)	21 (12.1)
Retinal dystrophy	20 (12)	26 (14.9)
Optic atrophy	9 (5.4)	28 (16.1)
Glaucoma	15 (9)	19 (10.9)
Phthisis	13 (7.8)	20 (11.5)
PDR	14 (8.4)	2 (1.1)
AMD	6 (3.6)	5 (2.9)
Bullous KP	4 (2.4)	6 (3.4)
RD	5 (3)	5 (2.9)
Degenerative myopia	3 (1.8)	3 (1.7)
Other diseases	3 (1.8)	5 (2.9)

PDR: Proliferative diabetic retinopathy, AMD: Age-related macular degeneration, KP: Keratopathy, RD: Retinal detachment

Table 3. The causes of blindness according to age groups

Ocular pathologies	Age (years)		
	<15 (n=22)	15-40 (n=52), n (%)	>40 (n=266), n (%)
Cataract	1 (4.5)	2 (3.8)	72 (27.1)
Corneal opacity	1 (4.5)	4 (7.7)	49 (18.4)
Retinal dystrophy	9 (4.5)	21 (40.4)	16 (6.0)
Optic atrophy	5 (22.7)	10 (19.2)	22 (8.3)
Glaucoma	1 (4.5)	4 (7.7)	29 (10.9)
Phthisis bulbi	0	6 (11.5)	27 (10.2)
PDR	1 (4.5)	0	15 (5.6)
AMD	0	0	11 (4.1)
Bullous KP	0	0	10 (3.8)
RD	2 (9.1)	1 (1.9)	7 (2.6)
Degenerative myopia	0	0	6 (2.3)
Other diseases	2 (9.1)	4 (7.7)	2 (0.8)

PDR: Proliferative diabetic retinopathy, AMD: Age-related macular degeneration, KP: Keratopathy, RD: Retinal detachment

macular diseases, evisceration and phtthis bulbi, amblyopia, optic nerve diseases, degenerative myopia, and acquired corneal and hereditary retinal diseases.¹⁰ Kivanç et. al.¹¹ also selected their study population from medical board records and studied subjects aged 64 years or over. They found that cataract, glaucoma, and AMD were the common ocular diseases causing severe disabilities in older patients. Another important point is that demographic features influence the result. For example, another study conducted in a relatively more developed socioeconomically region in Turkey revealed AMD, Stargart's disease, and myopic degeneration as the most common causes of visual impairment.¹² In our study, cataract, corneal opacity, and retinal dystrophy were detected at high rates among people with blindness. Low sociocultural development may be the reason for this outcome. In addition, the high frequency of retinal dystrophy can be explained by the high incidence of consanguineous marriages in the region. A study evaluating parental consanguineous marriage among patients with visual impairments in Turkey found choroidal and retinal diseases as the main underlying cause of visual impairment (62.7%), followed by nystagmus (23.7%), optic tract and nerve diseases (11.0%), congenital cataracts (0.8%), and glaucoma (1.7%). The authors also reported parental consanguinity in 26.3% of the patients, which was significantly more common in the 15- to 30-year age group (50%) compared to the other age groups.¹³

Uncorrected refractive errors are another important cause of visual impairment worldwide.^{14,15} However, the medical board does not take visual impairments that can be corrected by refraction into account; therefore, our study does not provide any information about frequency of refractive errors.

A large cohort study conducted by Buch et al.¹⁶ found that unilateral blindness is caused by AMD (57.0%), glaucoma (14.0%), and degenerative myopia (14.0%) in patients younger than 64 years, whereas optic nerve diseases (29.0%), retinitis pigmentosa (29.0%), and glaucoma (14.0%) were the most common causes in patients aged over 64 years. In this study, all of the subjects were bilaterally blind. When we evaluated right and left eyes separately, the results were very similar. The most common causes of blindness were cataract, corneal opacity, and retinal dystrophy in both eyes with approximately equal percentages. That means if a patient becomes blind in one eye, it will not be surprising the other eye also may become blind due to the same ocular disease. Since taking care of a disabled individual requires extra expenditure from both families and the community, taking preventive measures to protect the healthy eye is very important.

Study Limitations

Another fact is that blindness and visual impairment are not only age-related but also related to gender and socioeconomic level.¹⁷ Our study has shown that cataract was the most common cause of blindness for both sexes, whereas the second most common reason was corneal opacity for women and optic atrophy for men. This finding should be questioned because this is a

retrospective study and the etiology of optic atrophy is unknown. This an important limitation of this study. Another limitation is that we do not have the socioeconomic data of the patients and their families. To our knowledge, socioeconomic level is generally low in the region and our comments are based on this assumption.

Conclusion

In conclusion, this study found that retinal dystrophy and optic atrophy were the most common causes of blindness in the whole sample after cataract and corneal opacities. We speculate that this might be due to increased consanguineous marriage rate in southern Turkey. We would like to emphasize that since this study only included patients who appealed to a medical board in a specific geographic region, these results may not be a projection of the entire population of patients with blindness in Turkey. Still, this study contributes to efforts to identify the causes of blindness in Turkey. We believe these results are useful for the development of screening programs and vision rehabilitation services.

Ethics

Ethics Committee Approval: University of Health Sciences Turkey, Gazi Yaşargil Training and Research Hospital Clinical Research Ethics Committee (number: 269).

Informed Consent: Retrospective study.

Peer-review: Externally peer reviewed.

Authorship Contributions

Concept: M.K., A.A.D., Design: M.K., A.A.D., Data Collection or Processing: M.K., Analysis or Interpretation: A.A.D., Literature Search: A.A.D., Writing: A.A.D.,

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

References

1. The World Health Organization. World report on vision. Published online October 8, 2019. <https://www.who.int/publications-detail/world-report-on-vision>
2. Bourne RR, Stevens GA, White RA, Smith JL, Flaxman SR, Price H, Jonas JB, Keeffe J, Leasher J, Naidoo K, Pesudovs K, Resnikoff S, Taylor HR; Vision Loss Expert Group. Causes of vision loss worldwide, 1990-2010: a systematic analysis. *Lancet Glob Health*. 2013;1:339-349.
3. Zerihun N, Mabey D. Blindness and low vision in Jimma Zone, Ethiopia: results of a population-based survey. *Ophthalmic Epidemiol*. 1997;4:19-26.
4. Negrel AD, Minassian DC, Sayek F. Blindness and low vision in southeast Turkey. *Ophthalmic Epidemiol*. 1996;3:127-134.
5. Erdem S. Causes of Blindness among Syrian Refugees Living in Southeastern Turkey. *Ophthalmic Epidemiol*. 2019;26:416-419.
6. Liang YB, Friedman DS, Wong TY, Zhan SY, Sun LP, Wang JJ, Duan XR, Yang XH, Wang FH, Zhou Q, Wang NL; Handan Eye Study Group. Prevalence and causes of low vision and blindness in a rural Chinese adult population: the Handan Eye Study. *Ophthalmology*. 2008;115:1965-1972.
7. Özürlülük Ölçütü, Sınıflandırması ve Özürlülere Verilecek Sağlık Kurulu Raporları Hakkında Yönetmelik. Kurum ve Kuruluş Yönetmeliği (Özürlüler İdaresi Başkanlığı) Resmi Gazete Tarihi: 20.02.2019 Sayısı: 30692.

8. Özürlülük Ölçütü, Sınıflandırması ve Özürlülere Verilecek Sağlık Kurulu Raporları Hakkında Yönetmelik. Kurum ve Kuruluş Yönetmeliği (Özürlüler İdaresi Başkanlığı) Resmi Gazete Tarihi: 30.03.2013 Sayısı: 28603.
9. Pasolini D, Mariotti SP. Global estimates of visual impairment: 2010. *Br J Ophthalmol*. 2012;96:614-618.
10. Ceyhan D, Yaşar T, Demirok A, Çınal A, Esmer O, Batur M. Sağlık Kurulu Raporlarına Göre Van Bölgesinde Görme Özürlülük Nedenleri. *Turk J Ophthalmol*. 2012; 42;131-134.
11. Kıvanç SA, Akova-Budak B, Olcaysü OO, Çevik SG. Sociodemographic status of severely disabled and visually impaired elderly people in Turkey. *Arq Bras Oftalmol*. 2016;79:24-29.
12. Temel A. Low vision aids (evaluation of 185 patients). *Ophthalmic Physiol Opt*. 1989;9:327-331.
13. Akkaya S. Rate of Parental Consanguineous Marriage among Patients with Visual Impairments in Turkey. *Med Hypothesis Discov Innov Ophthalmol*. 2016;5:115-120.
14. Huang S, Zheng Y, Foster P, Huang W, He M, Liwan Eye S. Prevalence and causes of visual impairment in Chinese adults in urban southern China. *Arch Ophthalmol*. 2009;127:1362-1367.
15. Salomao S, Mitsuhiro MRKH, Jr Belfort R. Visual impairment and blindness: an overview of prevalence and causes in Brazil. *An Acad Bras Cienc*. 2009;81: 539-549.
16. Buch H, Vinding T, La Cour M, Appleyard M, Jensen GB, Nielsen NV. Prevalence and causes of visual impairment and blindness among 9980 Scandinavian adults: the Copenhagen City Eye Study. *Ophthalmology*. 2004;111:53-61.
17. Zhu R, Shi J, Yang M, Guan HJ. Prevalences and causes of vision impairment in elderly Chinese: a socioeconomic perspective of a comparative report nested in Jiangsu Eye Study. *Int J Ophthalmol*. 2016;9:1051-1056.