

Causes of Unilateral Blindness in Adults Attending A Tertiary Care Hospital Outpatient Department

Imran Ali, Naresh Kumar, Rabia Chaudhry, Wejai Kumar, Nasar Qamar Khan and Gaintry Roopchand

ABSTRACT

Objective: To determine the frequency of various causes of unilateral blindness in adults attending a tertiary care center.

Study Design: Cross-sectional study.

Place and Duration of Study: This study was conducted at the Department of Ophthalmology, Jinnah Postgraduate Medical Centre Karachi for six months from December 2017 to June 2018.

Materials and Methods: In our study 138 patients of unilateral blindness of either gender attending outpatient department of ophthalmology underwent a complete ophthalmic examination to evaluate various causes of unilateral blindness including cataract, glaucoma, corneal opacity and ocular trauma.

Results: The average age of the patients was 39.37 ± 14.78 years. (95%CI: 36.88 to 41.86). Out of 138 patients, 94 (68.1%) patients were male and 44 (31.9%) were female with male to female ratio of (2.1:1). The most common cause was trauma observed in 49 (35.5%) cases. cataract were observed in 31(22.5%), glaucoma 26 (18.8%) and corneal opacity was observed in 32 (23.2%) cases.

Highest number of various causes of unilateral blindness 32(23.2%) was found in the age group of 21 to 30 years and 31 to 40 years.

Conclusion: The various causes of unilateral blindness in adults in order of highest to lowest frequency were trauma, cataract, glaucoma and corneal opacity.

Key Words: unilateral blindness, trauma, cataract, glaucoma, corneal opacity.

Citation of article: Ali I, Kumar N, Chaudhry R, Kumar W, Khan NQ, Roopchand G. Causes of Unilateral Blindness in Adults Attending A Tertiary Care Hospital Outpatient Department. Med Forum 2020;31(2):47-51.

INTRODUCTION

Blindness is defined by the world health organization (WHO) as visual acuity of less than 3/60 or a visual field of less than 10 degrees in the better eye with the best available correction.¹

The terms low vision and visual impairment are often used interchangeably. Visual impairment is a global public health problem.¹ As per WHO, category 1 is moderate visual impairment, less than 6/18 to 6/60 and category 2 severe visual impairment, less than 6/60 to 3/60.²

There are estimated 50 million blind people blind in the world² whereas according to world health organization

an estimated 45 million people are blind and an additional 135 million are severely visually impaired.³ Another report by WHO estimates that 285 million people are visually impaired worldwide; 39 million among these are blind.⁴

The major causes of blindness in the affected eye as reported in surveys are cataract, central corneal opacity, glaucoma and phthisical / disorganized or absent globe. In a study conducted in Bangladesh in which prevalence of unilateral blindness was found to be 2.69%, among patients aged 30 and above. Major causes of unilateral blindness were cataract 62.24%, corneal opacity 9.18%, phthisical / disorganized or absent globe 6.12%.⁵ In a Nigerian study, the unilateral blindness was seen in 20% glaucomatous patients.⁶

Tajimi in his study found that the causes of low vision according to WHO criteria were cataract (40%), glaucoma (20%), myopic macular degeneration, corneal opacity, amblyopia, and optic atrophy (10%) each and those according to U.S criteria were cataract (44%), glaucoma (12%), myopic macular degeneration, chorioretinal degeneration, corneal opacity, diabetic retinopathy (8%) each, amblyopia, optic atrophy, and uveitis (4%) each.⁷ Other studies just like Pakistan national blindness and visual impairment survey¹, prevalence of visual impairment in adults in the rural area of coastal Karnataka and Pakistan National

Department of Ophthalmology, Jinnah Postgraduate Medical Centre Karachi.

Correspondence: Imran Ali, Department of Ophthalmology, Jinnah Postgraduate Medical Centre Karachi.

Contact No: 0334-3164100

Email: virgobeen@gmail.com

Received: October, 2019

Accepted: December, 2019

Printed: February, 2020

Blindness and Visual Impairment Survey suggests refractive error (39%) as the main cause of reduced vision in eyes that had visual acuity of less than 6/12, cataract (21%) being the next most common cause, followed by uncorrected aphakia (10%) and age related macular degeneration (5%).^{8,9}

In a study at Peshawar, cataract was the leading cause of severe visual impairment¹⁰ whereas a study conducted by Negrel AD et al states that the ocular trauma is the leading cause of visual loss and is known to be the most common cause of unocular loss of vision. It accounts for blindness in more than one million people¹¹ about 87% of the worlds visually impaired live in developing countries. The number of people blinded by infectious diseases has been greatly reduced, but age related impairment is increasing¹² Cataract remains the leading cause of blindness globally, except in the most developed countries. Correction of refractive error could give normal vision to more than 12 million patients. About 85% of all visual impairment is avoidable globally.¹²

Pakistan is a developing country and very few studies have been done so far. In a study during 1987-1990, the estimated prevalence of blindness in adults was 1.78%.¹³ while in another study of Baluchistan, it was found that unocular injuries were 46.5% in age group of 16-70 years and ocular trauma was found to be the major cause affecting people on the most productive time of their working career.¹⁴

It is important to understand the causes of unocular blindness in adults in Pakistan to see if these differ from those in other countries, hence, the current study is undertaken to have data on causes of unocular blindness amongst adult patients attending a tertiary care referral center hospital outpatient department. So that, appropriate measures could be taken by the policy decision makers to address these causes in order to minimize the morbidity.

MATERIALS AND METHODS

Study was conducted at the Department of Ophthalmology, JPMC Karachi. Duration of study was six months from 16th December 2017 to 16th June 2018. It was a Cross - sectional study. Sample size was calculated by taking Prevalence (p) As 6.124, margin of error (d) 4% and Confidence level 95%. The required sample size came out to be 138 patients. Non-probability purposive sampling was done.

Inclusion Criteria:

Adults of either gender: Age ranging from 16-70 years complaining of loss of vision confirmed by criteria given in operational definition to be suffering from severe visual impairment.

Exclusion Criteria:

Patients attending for follow up.

Non-consenting patients.

Data Collection Procedure: The patients with visual acuity of less than 3/60 or a visual field of less than 10 degrees in the better eye with best available correction fulfilling the inclusion criteria were recruited in the study. After taking informed consent by the patient, a detailed history and examination of each patient covering all ophthalmic problems to reach a correct diagnosis was carried out.

Among the causes of unocular blindness in adults cataract was diagnosed on the basis of visual acuity less than 3/60 recorded by Snellen's chart and loss of red reflex was noted on direct distant ophthalmoscopy. If found it was labeled as cataract.

Glaucoma was diagnosed on the basis of IOP more than 21mmhg measured with applanation tonometer, optic disc atrophy seen on direct ophthalmoscopy and presence of glaucomatous visual field defects.

Corneal Opacity was diagnosed on the basis of history of infection, contact lens or trauma; visual acuity less than 3/60 and presence of corneal opacity on Slit lamp examination.

Ocular trauma was labeled as positive in the presence of history of trauma, visual acuity less than 3/60 and phthisical / disorganized globe is seen on slit lamp examination.

All the data of variables like cataract, glaucoma, corneal opacity and trauma was entered in a specially designed proforma attached as annexure by the researcher.

Data analysis: The collected data was analyzed by using SPSS version 21.0 on computer, percentage was computed for qualitative variables like gender and causes of unocular blindness like cataract, glaucoma, corneal opacity and trauma. Mean \pm Standard Deviation was calculated for age of the patient. In order to control confounders or effect modifiers, separate data will be presented for male and female of different age groups.

RESULTS

A total of 138 patients with unocular blindness confirmed by W.H.O criteria, were included in this study. The average age of the patients was 39.37 ± 14.78 years. (95%CI: 36.88 to 41.86) as shown in table 1. Most of the patients were between 21 to 30 years of age (23.2%) and 31 to 40years (23.2%) as shown in figure 1.

Out of 138 patients, 94 (68.1%) patients were male and 44 (31.9%) were female with male to female ratio of (2.1:1) as shown in figure 2.

Among causes of unocular blindness in adults attending our tertiary care hospital as outpatients, the most common cause was trauma observed in 49 (35.5%) cases. cataract were observed in 31(22.5%), glaucoma 26 (18.8%) and corneal opacity was observed in 32 (23.2%) cases as shown in figure 3.

Age wise distribution of causes of unocular blindness is shown in table 2. Highest number of various causes

of uniocular blindness 32(23.2%) found in the age group of 21 to 30 years and 31 to 40 years. Gender wise distribution of causes of uniocular blindness is shown in table 3. Male patients suffered more as compared to the females.

Table No.1: Age of the patients n=92

Variable	Mean ± SD	95%CI	Max-Min
Age (Years)	39.37±14.775	36.88 to 41.86	65 – 35

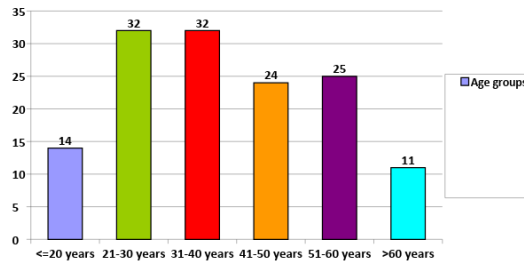


Figure No.1: Age distribution of the patients n=138

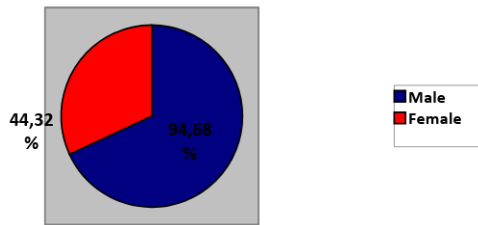


Figure No.2: Gender distribution n=138

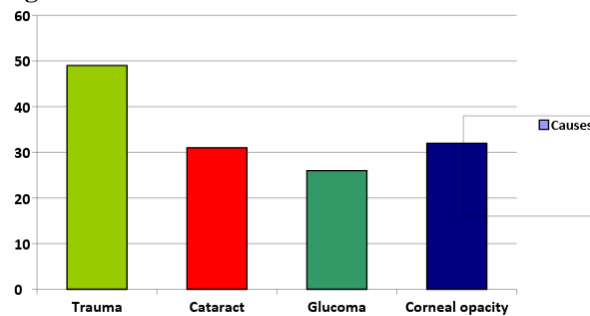


Figure No.3: Causes of uniocular blindness

Table No.2: Age wise causes of uniocular blindness n=138

Age groups	Trauma	Cataract	Glaucoma	Corneal opacity	Total
≤20 years	13 (26.5)	1 (3.2)	0	0	14 (10.1)
21-30 years	16 (32.7)	5 (16.1)	1(3.8)	10(31.3)	32 (23.2)
31-40 years	15 (30.6)	5 (16.1)	2 (7.7)	10 (31.3)	32 (23.2)
41-50 years	2 (4.1)	10 (32.3)	7 (26.9)	5 (15.6)	24 (17.4)
51-60 years	2 (4.1)	5 (16.1)	11 (42.3)	7 (21.9)	25 (18.1)
>60 years	1 (2.0)	5 (16.1)	5 (19.2)	0	11 (8.0)
Total	49	31	26	32	138 (100)

Key: n=number, (%)

Table No.3: Gender wise causes of uniocular blindness n=138

Causes	Gender		Total
	Male	Female	
Trauma	30 (61.2)	19 (38.8)	49
Cataract	19 (61.3)	12 (38.7)	31
Glucoma	21 (80.8)	5 (19.2)	26
Corneal opacity	24 (75.0)	8 (25.0)	32
Total	94	44	138

Key: n=number, (%)

DISCUSSION

Worldwide, about 135 million people are severely visually impaired. Major causes of severe visual impairment according to W.H.O were cataract, glaucoma, myopic macular degeneration, corneal opacity, amblyopia, and optic atrophy.

Pakistan, a developing country situated in the World Health Organization’s (WHO) Eastern Mediterranean Region is bordered by India, China, Iran, and Afghanistan. The geography and climate of Pakistan are diverse, consisting of hot arid areas, fertile regions, and the cold, snow-covered Himalayas.

Few studies on blindness and visual impairment had been conducted in Pakistan. One study (1987–1990), consisting of numerous sub surveys in different areas of the country, estimated the all-age prevalence of blindness to be 1.8%.¹⁵ After this initial study, a National Committee for the Prevention of Blindness (NCPB) was formed, which produced a Five-Year National Plan for the Prevention of Blindness (1994–1999). The purpose of this second survey was to provide more detailed information on the prevalence and causes of visual impairment and blindness particularly that due to posterior segment disorders, which become increasingly important as life expectancy increases and cataract blindness declines as a result of improved service delivery. The survey used a diagnostically rigorous methodology, as was used in the surveys in Bangladesh.⁵

As in similar surveys in South Asia, socioeconomic indicators were strongly associated with visual acuity status.^{5,16–17} Illiterate subjects were significantly more likely to have a presenting visual acuity of <6/60. Subjects with primary level schooling were 60% (40%–80%) less likely to present with a visual acuity of <6/60 than were subjects who had never attended school, and subjects who had a higher education were even less likely to have SVI/BL (OR, 0.3; 95% CI, 0.2– 0.4). Blindness was less prevalent in households with a nonmanual work status than in those with a manual work status. A significantly higher blindness prevalence was found in districts with a higher deprivation index (P<0.001).

According to Pakistan National Blindness and visual impairment survey, refractive error followed by

cataract, uncorrected aphakia and age related macular degeneration are the main causes of severe visual impairment.²

Unilateral blindness is a common ocular problem which affects all ages and gender.¹⁷ It leads to loss of binocular single vision with all its advantages including stereopsis, field overlap, exteroception of form and colour, and enhanced performance of visuomotor tasks.¹⁸⁻¹⁹ A unilaterally blind person is at risk of developing bilateral visual impairment and therefore needs special care to prevent or treat visual disabilities in the fellow eye.²⁰

In our study we selected 138 patients from ophthalmic outpatients department at JPMC, Karachi. From amongst the 138 patients, 79 were male and 41 females. The causes of unilateral blindness were cataract, glaucoma, corneal opacity and trauma.

In our study, cataract was found to be 31(22.5%) patients while according to a study of Bangladesh it was 62.24%.⁵ A study took place in the Eye clinic of the Niger Delta University Teaching Hospital over a period of one year (March 2008 – February, 2009), the prevalence of cataract was the highest among the various causes of unilateral blindness and it was 41.5%.²¹ About fifty four percent of the cases were cataract and it was the leading cause of blindness in Ethiopia.²² Unilateral low vision affected 71 (40.8%), caused predominantly by cataract (25 cases, 15.5%). Age-related cataract was the major type of cataract causing visual impairment in this study (69/174 cases, 39.6%).²³

The low incidence in our study could be due to the bias of hospital based population or due to small numbers.

In our study, 26 (18.8%) patients presented with glaucoma, while in another study glaucoma was responsible for 10.7% of blindness and is the third leading cause of unilateral blindness.²¹ In eastern and western Nigeria as well as in the Central African Republic, glaucoma was the second leading cause of monocular blindness, constituting 21%, 20%, and 10% of blindness, respectively. In Yemen,²⁴ glaucoma was found to be the fifth leading cause of monocular blindness. Among the main causes of unilateral blindness glaucoma was found in (22.58%) of patients.²⁵

In our study corneal opacity was observed in 32 (23.2%) cases.

Corneal disease was responsible for 8.7% of monocular blindness in one study.⁵⁶ In Kano, northern Nigeria,²⁶ corneal diseases was responsible for 10% of unilateral blindness while in Yemen,²⁴ it was responsible for 11.5% of monocular blindness, in Dubai it was 10.08% in patients with unilateral blindness.²³ The prevalence of monocular blindness was 1.89% and the Corneal blindness accounted for 36.7% of the cases.²²

Corneal blindness which was 20.8% of the blindness in patients with unilateral blindness.²² The structural and functional integrity of the cornea is of paramount importance for normal visual function. Its external location makes it vulnerable to a variety of insults, each of which can lead to sight-threatening sequelae. Infections, injuries, malnutrition, congenital or hereditary problems and iatrogenic diseases constitute the gamut of etiologic factors leading to corneal blindness. Cornea diseases are caused by microbial and non-microbial factors. The effects of these agents on the eye depend on the time of presentation to eye care facilities as well as the availability of good medical services. Thus the impact of cornea disease on blindness is likely to vary from place to place.

Ocular trauma is the major cause of unilateral blindness and visual impairment throughout the world, although little is known about its epidemiology and associated visual outcome in developing countries. The national population based survey of blindness in Nepal (1981) found the prevalence of blindness as 0.84% with trauma responsible for 7.9% of monocular blindness. Since ocular injury causes severe disability and economic loss, several countries have estimated eye injury registries that serve to collect information regarding the serious ocular injury.

In our study trauma was observed in 49 (35.5%) cases whereas in a study at Goro district, Gurage zone, southern Ethiopia it was found in 31.6%.²²

The main causes of unilateral blindness in Benin-city, Nigeria were cataract (23.79%), glaucoma (22.58%) and trauma (11.69%).²⁵ In Sana, Yemen, the trauma in unilateral blindness was found to be in 60(20.3%) patients.²⁴ It was responsible for 8.0% of blindness in Bayelsa state Nigeria.²¹ trauma was found to be the second leading cause of blindness in Indonesia while in northern Nigeria²⁵ it was the third leading cause of unilateral blindness.

There were more blind males than females. This may be because more males attended the clinic than females. This is in agreement with an earlier hospital based study at Ibadan and Nigeria.²⁵

CONCLUSION

The various causes of unilateral blindness in adults in order of highest to lowest frequency found in our study were trauma, cataract, glaucoma and corneal opacity. The most vulnerable age groups for trauma were 21 to 30 years and 31 to 40 years.

Author's Contribution:

Concept & Design of Study:	Imran Ali
Drafting:	Naresh Kumar, Rabia Chaudhry
Data Analysis:	Wejai Kumar, Nasar Qamar Khan, Gaintry Roopchand

Revisiting Critically: Imran Ali,
Naresh Kumar
Final Approval of version: Imran Ali

Conflict of Interest: The study has no conflict of interest to declare by any author.

REFERENCES

- Dineen B, Bourne RRA, Jadoon Z, Shah SP, Khan MA, foster A, Gilbert CE, et al. Causes of blindness and visual impairment in Pakistan. The Pakistan national blindness and visual impairment survey. *Br J Ophthalmol* 2007;91:1005-1010.
- Dandona L, Dandona R. Revision of visual impairment definitions in the international statistical classification of diseases. *BMC Med* 2006;4:7.
- Kusznak JR, Clark JI, Cooper KE. Biology of the lens: lens transparency as a function of embryology, anatomy and physiology. In: Albert DM, Jakobiec FA, eds. *Principles and Practice of Ophthalmology*. 2nd ed. Philadelphia: Saunders; 2000.p.1355-1408
- Varma R, Kim JS, Burkemper BS, Torres M, Hsu C, Choudhary F, et al. Prevalence and causes of visual impairment and blindness in Chinese American adults the chinese American eye study. *JAMA Ophthalmol* 2016;134(7):785-793.
- Dineen BP, Bourne RR, Ali SM, Huq DM, Johnson GJ. Prevalence and causes of blindness and visual impairment in Bangladeshi adults: results of the National Blindness and low vision survey of Bangladesh. *Br J Ophthalmol*. 2003; 87:820-8.
- Olluleye TS, Ajaiyeoba AI, Akinwale MO, Olusanya BA. Causes of blindness in Southwest Nigeria: a general hospital clinic study. *Eur J Ophthalmol* 2006;16(4):604-7.
- Olluleye TS, Ajaiyeoba AI, Akinwale MO, Olusanya BA. Causes of blindness in Southwest Nigeria: a general hospital clinic study. *Eur J Ophthalmol* 2006;16(4):604-7.
- Bourne RR, Dineen B, Jadoon Z, Lee PS, Khan A, Johnson GJ, et al. 'The Pakistan national blindness and visual impairment survey-research design, eye examination methodology and results of the pilot study'. *Ophthalm Epidemiol* 2005;12:321-33.
- Rao CR, Shetty RS, Narayanan SS, Kii S, Kamath V, Kamath A. Prevalence of visual impairment in adults aged 18 years and above in a rural area coastal Karnataka. *Int J Health & Allied Sci* 2018; 7(1):31-36.
- Ahmad K, Khan MD, Qureshi MB, Munami S, Shah RA, Rasheed H, et al. Prevalence and causes of blindness and low vision in a rural setting in Pakistan. *Ophthalm Epidemiol* 2005;12:19-2.
- Negrel AD, Thylefros B. the global impact of eye injuries. *Ophthalmic Epidemiol*. 1998;5:143-69.
- Rao GN. Vision 2020: The right to sight. *Indian J Ophthalmol* 2000; 48(1):3.
- Shahwani MA, Hameed K, Jamali B. Ocular injuries, its etiology and consequences in Baluchistan. *Pak J Ophthalmol* 2006;22(2):82-5.
- Memon MS. Prevalence and cause of blindness in Pakistan. *J Pak Med Assoc* 1992;42(8):196-8.
- Memon MS. Prevalence and cause of blindness in Pakistan. *J Pak Med Assoc* 1992;42(8):196-8.
- Murthy GV, Gupta S, Ellwein LB, Munoz SR, Bachani D, Dada VK. A population-based eye survey of older adults in a rural district of Rajasthan: I. Central vision impairment, blindness, and cataract surgery. *Ophthalmology*. 2001; 108:679-85.
- Brilliant LB, Pokhrel RP, Grasset NC, et al. Epidemiology of blindness in Nepal. *Bull World Health Organ* 1985;63:375-86.
- Friedman DS, Wolfs RC, O'Colmain BJ, Klein BE, Taylor HR, West S, et al. Prevalence of open-angle glaucoma among adults in the United States. *Arch Ophthalmol* 2004;122 (4):532-8.
- Dueker DK, Singh K, Lin SC, Fechtner RD, Minckler DS, Samples JR, et al. Corneal thickness measurement in the management of primary open-angle glaucoma: a report by the American Academy of Ophthalmology. *Ophthalmol* 2007; 114(9):1779-87.
- Bansal R. K, Khandekar R, Nagendra P, Kurup P. Prevalence and causes of unilateral absolute blindness in a region of Oman: a hospital based study. *Eur J Ophthalmol* 2007; 17(3): 418-423.
- Richard AI. Monocular blindness in Bayelsa state of Nigeria. *Pan Afr Med J* 2010;4:6.
- Negussie D, Tilahun Y. Pattern of corneal blindness in Goro district, Gurage zone, southern Ethiopia. *Ethiop J Health Dev* 2008;22(3):298-301.
- Etiology of visual impairment in the United Arab Emirates: a hospital based study. *Eastern Mediterranean Health J* 2008;14(6):1477-9
- Al-Akily Saleh, Bamashmus Manfonth. Causes of blindness among adult Yemenis: a hospital based study. *Middle East J Ophthalmol* 2008;15(1):3-6.
- Omoti AE. Aetiology of blindness in benin city, Nigeria. *Annals Afr Med* 2004;3(2):87-9.