

## Blindness and Visual Impairment

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### Abstract

Blindness and vision impairment are global public health issues. Vision impairment places a significant financial burden on the entire world and does not just affect one person. Estimated annual expenses of productivity losses related to vision impairment are \$411 billion worldwide. Age-related or senile cataracts are the primary cause of visual impairment in adults globally (65%). According to the accessibility of eye care services, their price, and the population's level of eye care knowledge, there are significant differences in the causes between and within countries. In low-and middle-income countries, as opposed to high-income ones, a more significant percentage of vision impairment is related to cataracts. Glaucoma and age-related macular degeneration are more prevalent in nations with high incomes.

**Keywords:** Cataract; Blindness; Visual impairment; Glaucoma

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### Introduction

Blindness and vision impairment are global public health issues. Vision impairment places a significant financial burden on the entire world and does not just affect one person. Estimated annual expenses of productivity losses related to vision impairment are \$411 billion worldwide. People of various ages might experience vision loss. Near or farsightedness affects at least 2.2 billion people worldwide [1].

According to recent statistics, 65% of people with vision impairment and 82% of blind people are over 50. Nearly half of these cases, or at least 1 billion, involved vision damage that either might have been avoided or is still unaddressed. Cataracts (33%) and untreated refractive errors (43%) are the leading causes of visual impairment. Glaucoma, diabetic retinopathy, trachoma, and childhood blindness are some additional causes of blindness.

Due to a lack of access to eye care services, 1.1 billion individuals worldwide suffer from the effects of sight loss. These people are among the most destitute and excluded in society. The sector's long-term strategic plan is titled 2030 IN SIGHT. Incorporating eye health into more comprehensive healthcare systems, promoting patient, consumer, and market transformation, and establishing vision as a basic, economic, social, and development concern are all encouraged. All of these are essential for reaching the Sustainable Development Goals of the United Nations (<https://www.iapb.org->, 2023)

We can now end preventable sight loss, and 2030 IN SIGHT shows

how we can work even harder than before to make this goal a reality. While acknowledging that the situation has changed, 2030 IN SIGHT builds on so much excellent work that has previously been done. We must change how we operate to ensure that eyesight receives the political, health, and development priority it needs and deserves (<https://www.iapb.org->, 2023). Together, we must:

- ELEVATE vision as a critical issue for economic, social, and developmental progress;
- INTEGRATE eye health into larger healthcare systems; and
- ACTIVATE patient, consumer, and market change.

Age-related or senile cataracts are the primary cause of visual impairment in adults globally (65%). According to the accessibility of eye care services, their price, and the population's level of eye care knowledge, there are significant differences in the causes between and within countries. In low-and middle-income countries, as opposed to high-income ones, a more significant percentage of vision impairment is related to cataracts. Glaucoma and age-related macular degeneration are more prevalent in nations with high incomes.

Cataracts are the primary cause of severe vision impairment (80.7%), moderate visual impairment (70.2%), and blindness (66.2%) in India. Other significant factors contributing to blindness included corneal opacity (7.4%), complications from cataract surgery (7.2%), diseases of the posterior segment other than DR (Diabetic Retinopathy) and ARMD (Age Related

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Macular Degeneration) (5.9%), and glaucoma (5.5%). Other than cataracts, various posterior segment illnesses, excluding DR and ARMD (3.4%), were the main contributors to significant vision impairment (8.3%). Maximum prevalence of blindness was seen in the 80+ age group (11.6%), followed by the 70-79 age group (4.1%), the 60-69 age group (1.6%), and the 50-59 age group (0.5%). Bijnor in Uttar Pradesh has the highest population suffering from blindness (3.67 percent) and visual impairment (21.82 percent) (National Programme for Control of Blindness & Visual Impairment, Directorate General of Health Services, MHFW, New Delhi, 2019).

The two main mechanisms for introducing cataracts by ocular UV (Ultraviolet) light exposure are oxidative stress and the resulting inflammation [2,3]. And photo oxidation, which may involve photosensitizers [4] These may be endogenous substances, such as metabolites of inert tryptophan that become enzymatically altered with age [5] or UV-absorbing advanced glycation end products [6] or exogenous photosensitizers, such as phototoxic drugs All these mechanisms generate reactive oxygen species (singlet oxygen and superoxide) that oxidize lens proteins, gradually forming opacities that eventually develop into cataracts The most diffuse source of human UV exposure is solar radiation, including the entire spectrum of UV bands. However, UV-C and much of UV-B are absorbed in the atmosphere, mainly by ozone: current ozone depletion increases UV-B exposure. Other optical regions of the solar spectrum also have the potential to cause chronic photochemical lens damage, e.g., blue light, especially in the presence of phototoxic drugs, but their role in cataract pathogenesis is less clear [7,8].

## Global scenario

At least 2.2 billion individual's worldwide struggle with near or distance vision. The WHO estimates that 1 billion people worldwide have moderate to severe distance vision impairment or blindness as a result of untreated refractive error (88.4 million), cataracts (94 million), age-related macular degeneration (8 million), glaucoma (7.7 million), diabetic retinopathy (3.9 million), and near vision impairment brought on by untreated presbyopia (826 million) (WHO, 2022). Nearly half of these cases, or at least 1 billion, involved vision damage that either might have been avoided or is still unaddressed. Regionally, low-and middle-income regions are thought to have a four times higher prevalence of distance vision impairment than high-income regions (WHO, 2022).

Regionally, low-and middle-income regions are thought to have a four times higher prevalence of distance vision impairment than high-income regions (WHO, 2022). In western, eastern, and central sub-Saharan Africa, the rate of untreated near vision impairment is thought to be greater than 80%. Comparative rates, however, are said to be lower than 10% in high-income countries in Western Europe, North America, Australia, and Asia-Pacific. It is predicted that aging and population growth will increase the likelihood that more people may get vision impairment.

As with blindness, the percentage of moderate to severe visual impairment caused by cataracts is smallest in higher socioeconomic regions (13.0-13.8%) and largest in south and

Southeast Asia (both >20%). Across all regions, women have more blindness (35.5% versus 30.1% in men) and moderate to severe visual impairment (20.2% versus 15.9% in men) caused by cataracts than men.

## Risk factors

An adult-onset cataract is primarily age-related [9]. The most important factor associated with cataracts is age; almost everyone living long enough will develop cataracts [10]. The development of cataracts is accelerated by metabolic conditions such as diabetes mellitus [11]. Diabetic individuals develop cataracts approximately 20 years earlier. Other metabolic conditions that cause cataracts include hypocalcaemia, Wilson disease, and myotonic dystrophy [12]. There is an increased incidence of cataracts in patients with pseudo-exfoliation syndrome and atopic dermatitis [13]. Ischaemic ocular conditions such as pulseless disease, thromboangiitis obliterans, and anterior segment necrosis also lead to cataracts [14]. Other causes for cataracts include systemic, topical, or inhaled corticosteroid use. Corticosteroids lead to dose-and duration-dependent cataracts. Other cataract drugs are phenothiazines, miotics, amiodarone, and statins.

Along with blunt trauma and perforating injuries, ionizing radiation, infrared radiation (to which glassblowers are frequently exposed), and microwave radiation can also cause cataracts. Alkali burns are more likely to lead to cataracts than acid injuries. Exposure to sunlight and ultraviolet B (UVB) radiation accelerates cataract development, as do smoking and alcohol consumption. Ocular conditions causing cataracts are uveitis, retinitis Pigmentosa, essential iris atrophy, chronic hypo tony, absolute glaucoma, and high Myopia. Cataract also occurs secondary to intra-ocular surgeries glaucoma filtration surgery and vascotomy. Furthermore, epidemiological studies have demonstrated that lower socioeconomic status, lower education level, and poorer overall nutrition are associated with an increased prevalence of age-related cataracts.

According to the accessibility of eye care services, their price, and the population's level of eye care knowledge, there are significant differences in the causes between and within countries. For instance, compared to high-income countries, the share of vision impairment owing to cataracts is higher in low-and middle-income nations. Glaucoma and age-related macular degeneration are more prevalent in nations with high incomes.

## Indian scenario

In India, cataract is the principal cause of curable blindness (66.2%), with visual impairment (80.7%) and moderate visual impairment (70.2%).

The other important causes of blindness include Glaucoma (5.5%), posterior segment abnormalities excluding DR and ARMD (5.9%), corneal opacity (7.4%), and complications from cataract surgery (7.2%). Other posterior segment illnesses excluding DR and ARMD (3.4%) and cataract surgical complications (8.3%), were the main causes of severe vision impairment (Table 2.1). The maximum prevalence of blindness has been in the 80+ age group (11.6%), followed by the 70-79 age group (4.1%), the 60-69

**Table 1.** Causes of Blindness & Visual Impairment In Population Aged ≥ 50 Years (Pva) Blindness And Vision Impairment.

Principal cause	Blindness	SVI	MVI	MSVI	EVI	VI <
	(%)	< 6/60-	< 6/18-	< 6/18-	< 6/12-	Jun-18
		Mar-60	Jun-60	Mar-60	Jun-18	(%)
		(%)	(%)	(%)	(%)	
Refractive error	0.1	1.5	18.8	15.8	70.6	13.4
Aphakia uncorrected	1.7	1.4	0.8	0.9	0.6	1
Cataract untreated	66.2	80.7	70.2	72	23.9	71.2
Cataract surgical complications	7.2	8.3	5.2	5.7	2.9	5.9
Trachomatous corneal opacity	0.8	0.1	0	0.1	0	0.2
Non trachomatous corneal opacity	7.4	1.7	0.6	0.8	0.3	1.8
Phthisis	2.8	0.1	0	0	0	0.4
Glaucoma	5.5	0.8	0.7	0.8	0.3	1.4
Diabetic retinopathy	1.2	1.1	0.7	0.7	0.3	0.8
ARMD	0.7	0.7	0.8	0.8	0.3	0.8
Other posterior segment disease	5.9	3.4	2	2.2	0.7	2.8
All other globe/CNS abnormalities	0.5	0.2	0.2	0.2	0.1	0.3
Total	100	100	100	100	100	100

age group (1.6%), and the 50-59 age group (0.5%). Blindness is higher among illiterates (3.23%) than the literate population. It was only 0.43% among the 10th pass and above.

Blindness is more prevalent in rural than urban populations (2.14% vs 1.80%). Most blindness and visual impairment are due to avoidable causes (92.9% and 96.2%, respectively). Among avoidable causes, treatable causes of blindness and VI were 68.1% and 85.7%, respectively. In a study conducted by the National Programme for Control of Blindness & Visual Impairment (2019), the prevalence of bilateral cataract visual impairment was 5.09%. The prevalence of cataract blind eyes was 3.19%, and that of visually impaired eyes was 9.84% (**Table 1**)

PVA-Presenting Visual Acuity, SVI-Severe Visual Impairment, MVI-Moderate

Visual Impairment, MSVI-Moderate Severe Visual Impairment, EVI-Early Visual Impairment, VI-Visual Impairment, ARMD-Age Related Macular Degeneration

### Initiatives to combat blindness

1. India was the first country to launch the NPCB in 1976.
2. In 1999, the WHO launched Vision 2020: The Right to Sight, a joint endeavor with IAPB to eliminate avoidable blindness by 2020.
3. In 2013, WHA adopted Universal Eye Health: Global Action Plan 2014-19 to reduce avoidable visual impairment by 25% by 2019 compared to the baseline prevalence in 2010

### Impact of vision impairment

Personal impact: -Young kids with early onset severe vision

impairment may face lifelong implications due to delayed motor, verbal, emotional, social, and cognitive development. Children in school who have eye problems may also perform less well academically. Among adult populations, vision impairment significantly negatively impacts the quality of life. Visually impaired adults frequently have lower rates of labor force involvement and productivity and greater rates of anxiety and depression. Vision impairment in older people can increase their risk of falling and fractures, social isolation, difficulties walking, and early admission into nursing or care facilities.

Economic impact: The anticipated yearly global productivity loss due to vision impairment is around US\$ 411 billion in purchasing power parity. This sum substantially exceeds the predicted US\$ 25 billion cost gap to address the unmet requirement of vision impairment. It is impossible to prevent all eye disorders, even though many of them are preventable (for example, infections, trauma, harmful traditional medicines, prenatal diseases, nutrition-related diseases, improper use, or self-administration of topical treatment). Different, prompt interventions are necessary for every eye ailment. The demands related to eye disorders and vision impairment can be met with effective interventions encompassing promotion, prevention, treatment, and rehabilitation; some of these interventions rank among the most affordable and practicable healthcare solutions.

### Conclusion

As the world's population gets older, there is an expected increase in the occurrence of visual impairment and blindness caused by cataracts due to the age-related rise in cataract prevalence.

## References

- 1 Bochow TW, West SK, Azar A, Munoz B, Sommer A et al. (1989) Ultraviolet light exposure and risk of posterior sub capsular cataracts. *Archives of Opth* 107: 369-372.
- 2 Bochow TW, West SK, Azar A, Munoz B, Sommer A et al. (1989) Ultraviolet light exposure and risk of posterior sub capsular cataracts. *Arch Opth* 107: 369-372.
- 3 Chang JR, Koo E, Agron E, Hallak J, Clemons T et al. (2011) Age-Related Eye Disease Study Group. Risk factors associated with incident cataracts and cataract surgery in the Age-related Eye Disease Study (AREDS): AREDS report number 32. *Ophthalmology* 118: 2113-9.
- 4 Cumming RG, Alcohol Mitchell P (1997) smoking and cataracts: the Blue Mountains Eye Study. *Arch Ophthalmol* 115: 1296-1303.
- 5 Hiller R, Sperduto RD, Ederer F (1986) Epidemiologic associations with nuclear, cortical and posterior sub capsular cataracts. *Am J Epidemiol* 124:916-124925?
- 6 Hrwst Skrosenthal T (1988) Effect of ultraviolet radiation on cataract formation. *N Engl J Med*, 319:1429-3191433.
- 7 Klein BE, K Klein, R Lee KE (1998) Incidence of age-related cataract: the Beaver Dam Eye Study. *Arch Ophthalmol* 116:219-116225.
- 8 National Programme for Control of Blindness & Visual Impairment (2019) Directorate General of Health Services, MHFW, New Delhi.
- 9 Robert GC, Mitchel P (1303) Alcohol, smoking and cataracts. The Blue Mountains Eye Study. *Arch Ophthalmol*.
- 10 Salive ME, Guralnik J, Christen W, Glynn RJ, Colsher P (1992) Functional blindness and visual impairment in older adults from three communities. *Ophthalmology* 99: 1840-1847.
- 11 Salive ME, Guralnik J, Christen W, Glynn RJ, Colsher P (1992) Functional blindness and visual impairment in older adults from three communities. *Ophthalmology* 99: 1840-1847.
- 12 Shalini VK, Luthra M, Srinivas L, Rao SH, Basti S et al. (1994) Oxidative damage to the eye lens caused by cigarette smoke and fuel smoke condensates. *Ind J Biochem Biophys* 31: 261-266.
- 13 Taylor HR (1989) Ultraviolet radiation and the eye: an epidemiologic study. *Transactions of the Ame Ophthal Soc* 87: 802-853.
- 14 Varma SD, Kovtun S, Hegde KR (2011) Role of ultraviolet irradiation and oxidative stress in cataract formation-medical prevention by nutritional antioxidants and metabolic agonists. *Eye & Contact Lens* 37: 233-245.