



## Glaucoma in Developing Countries

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### Abstract

*One of the most common causes of permanent vision loss is glaucoma. Due to poverty, a lack of access to medical treatment, and a lack of knowledge, developing nations bear a disproportionate burden of illness. The incidence, causes, and treatment of glaucoma are all discussed in this article. Glaucoma, developing nations, prevalence, risk factors, and treatment were among the keywords utilized in the search. According to the findings, glaucoma is more common in regions of the world that are still emerging from poverty, such as sub-Saharan Africa, Asia, and Latin America. Although glaucoma's risk factors are comparable everywhere, poverty, restricted healthcare access, and inadequate education all increase that risk in poorer nations. This makes it difficult to treat glaucoma patients in these areas because of the few medical resources and inadequate healthcare infrastructure. Preventing permanent vision loss requires prompt diagnosis and treatment. To better treat glaucoma in low-income countries, community-based screening initiatives and primary healthcare provider training are required.*

### Introduction

This group of diseases is known by the symptoms of glaucoma, which are optic neuropathy and loss of visual field. It is a major public health issue since it causes permanent blindness. Glaucoma affects almost 70 million people worldwide, and about 10% of those who have the condition are blind <sup>[1]</sup>. The incidence of glaucoma is greater in underdeveloped countries compared to more developed nations. This article's goal is to investigate glaucoma in underdeveloped nations by analyzing its incidence, risk factors, and treatment options.

### Prevalence

Glaucoma is more common in less-developed nations than in developed ones. The World Health Organization reports that the prevalence of glaucoma is anywhere from 1.2% to 5.6% in sub-Saharan Africa, but just approximately 2% in Asia <sup>[2]</sup>. Prevalence estimates place glaucoma in Latin America between 0.5 and 5 percent, with the disease being more common among the region's geriatric population <sup>[3]</sup>. Developing-world glaucoma rates are higher for a number of reasons, including rapid population expansion, an aging population, and a rise in the incidence of other

risk factors, including diabetes, hypertension, and myopia.

Glaucoma incidence varies greatly throughout the developing world. Glaucoma, for instance, was shown to have a frequency of 5.02% in Nigeria <sup>[4]</sup> and a prevalence of 4.3% in India <sup>[5]</sup>.

#### **Risk factors**

Worldwide, glaucoma risk factors remain consistent. Increased pressure within the eye is the major cause of primary open-angle glaucoma (POAG) <sup>[6]</sup>. Myopia is also one of those risk factors, along with old age, family history, race, and genetics. Poverty, a lack of access to medical treatment, and an undereducated population are all significant risk factors in developing nations <sup>[7]</sup>. Poor nutrition, exposure to environmental contaminants, and greater susceptibility to infectious infections all contribute to poverty's role as a major risk factor for glaucoma in developing nations <sup>[8]</sup>. Many individuals in impoverished nations lack access to eye care facilities or skilled ophthalmologists, which increases their risk of vision loss. Many individuals in underdeveloped countries are uneducated and hence unaware of the significance of routine eye exams and early identification of eye illnesses, which is another risk factor <sup>[6]</sup>.

According to research done in Pakistan, having a close relative with glaucoma is a major risk factor for developing the condition <sup>[9]</sup>. Another study conducted in India found that those with a family history of glaucoma were at a higher risk of developing the condition <sup>[10]</sup>.

Aside from genetics, environmental factors and behavioral risk factors such as smoking, and alcohol consumption all play a role in increasing the likelihood of negative outcomes. Researchers in Ghana showed that a lower socioeconomic position was a major risk factor for glaucoma <sup>[11]</sup>. One further piece of Nigerian research indicated that those with less formal education were more likely to acquire glaucoma <sup>[12]</sup>.

#### **Challenges**

Even though there are screening programs and

low-cost treatment options for glaucoma in low- and middle-income countries, many problems still stand in the way of good care. Inadequate infrastructure, a lack of funds, and a lack of skilled employees all fall under this category. Ophthalmologists are often only found in large cities in underdeveloped nations, limiting access to quality eye care for those living in more remote places <sup>[13]</sup>. Lack of information and education about glaucoma makes it harder to find out what's wrong and treat it correctly <sup>[14]</sup>.

Due to a lack of data and monitoring systems for glaucoma, it is hard to figure out how bad the disease is and come up with the right policies and treatments for it in many poor countries. In poor countries, there isn't enough money for glaucoma research, which makes these problems even worse.

#### **Strategies**

There are a number of approaches that have been presented to deal with glaucoma's problems in third-world nations. They include expanding access to ophthalmic care by bringing more ophthalmologists and other eye care specialists to underserved and rural regions via training and deployment <sup>[15]</sup>. Eye care services may be brought to underserved communities using telemedicine and other cutting-edge technology.

People can learn more about glaucoma through public awareness campaigns, and community-based screening programs can be made bigger to include more people who have been left out.

Traditional glaucoma surgery could be less expensive if there were more ways to get cheaper treatments like generic medicines and MIGS <sup>[16]</sup>. The availability and cost of current medicines may be enhanced, and new treatment alternatives can be researched and developed via public-private collaborations.

#### **Management**

Managing glaucoma in underdeveloped regions is difficult because of the lack of healthcare resources and infrastructure. Preventing

permanent vision loss requires prompt diagnosis and treatment. Unfortunately, many individuals in the world's poorest regions lack access to eye care because there is a dearth of qualified ophthalmologists and other medical professionals [17]. In addition, the price of care and medicines might be beyond the reach of many individuals. For this reason, it is crucial to educate primary healthcare practitioners and implement community-based screening programs to better treat glaucoma in low-income nations [18].

Numerous studies have presented new methods of treating glaucoma in underdeveloped nations. Practices like telemedicine, task shifting, and community-based screening initiatives are examples. When it comes to treating glaucoma, telemedicine has proven to be a useful tool for those living in less developed regions. Researchers in India discovered that the use of telemedicine for rural patients with glaucoma improved their quality of life [19].

It has also been said that task-shifting, which means giving the jobs of specialists to other health care workers, could help control glaucoma in places with few resources. Task shifting was reported to be an effective method of glaucoma management in an Ethiopian study [20].

#### **Community-based screening programs**

Community-based screening programs can help find and treat more people with glaucoma in low-income countries. Those at risk of glaucoma are identified via these programs, and they are offered access to low- or no-cost eye exams. Partnerships between government agencies, NGOs, and community-based groups are necessary for the successful implementation of community-based screening programs (CBS). Screening for conditions like diabetes and hypertension are only two examples of how these initiatives might complement broader efforts to improve public health [21].

People have also said that community-based screening programs could help control glaucoma in places with few resources. As part of these

initiatives, community members are screened for glaucoma and sent to ophthalmologists and other specialists. Community-based screening programs were proven to be an effective method of detecting glaucoma in research done in Nigeria [22].

#### **Training of primary healthcare providers**

To improve how glaucoma is treated in low-income areas, money needs to be spent on the education of the doctors and nurses who treat patients directly. When ophthalmologists are few, it is up to primary care physicians and nurses to diagnose and treat glaucoma. Because of this, it is important to teach them how to spot the signs of glaucoma and give the right treatment [23]. To do this, training programs should be made and shared that teach primary care doctors and nurses how to spot and treat glaucoma.

#### **Several therapeutic options**

In underdeveloped countries, there aren't as many ways to treat glaucoma because drugs and surgery are so expensive. Topical medicines that lower intraocular pressure are the basis of therapy [24]. Yet, due to their high cost, these drugs may be difficult to get in many third-world nations. Laser trabeculoplasty and minimally invasive glaucoma surgery (MIGS) are two alternatives to traditional glaucoma surgery that are gaining popularity in poor nations because of their cheaper cost and greater accessibility [25].

#### **Trabeculoplasty using a laser**

Laser trabeculoplasty is used to open up the eye's drainage channels. This lowers the pressure inside the eye. Treatment for open-angle glaucoma may be done in an outpatient environment and is both safe and effective [26]. In places where the high cost of drugs makes it hard to get treatment, laser trabeculoplasty is a promising alternative.

#### **Treatment of glaucoma using MIGS (minimally invasive)**

MIGS is a new type of glaucoma surgery that uses micro-invasive techniques to lower intraocular pressure. MIGS surgery can be done outside of a hospital and is less invasive than traditional glaucoma surgery. Compared to traditional

glaucoma surgery, MIGS operations have less risk of side effects and give patients less time to heal. As a result, MIGS is rapidly gaining ground as the go-to method for treating glaucoma in third-world nations [27].

### Conclusion

Glaucoma is the most common cause of permanent blindness, and it is most common in low- and middle-income countries. In poor countries, glaucoma is more likely to happen because of poverty, lack of access to medical care, and lack of education. This makes it difficult to treat glaucoma patients in these areas because of the few medical resources and inadequate healthcare infrastructure. Screening initiatives in the community and primary care provider education are needed to better identify and treat glaucoma in low-resource settings. Low-cost and less-invasive treatment alternatives, including laser trabeculoplasty and minimally invasive glaucoma surgery, are gaining popularity in underdeveloped regions. Nevertheless, further study is required to determine which methods of glaucoma therapy in low-income settings are most efficient and affordable.

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