

Priority eye diseases

Main causes of visual impairment

Some of these diseases, such as trachoma and river blindness, are prevalent primarily in less developed areas of the world where there are also specific environmental hazards.

In many middle income and industrialized countries, three other eye conditions have emerged as potential threats to the status of sight of their populations. The increase of diabetes among many population groups has caused diabetic retinopathy to be added to the priority list, while glaucoma, an eye disease known for centuries, remains on the public health agenda due to difficulties in its early diagnosis and frequent necessity of life long treatment. Age-related macular degeneration (AMD) ranks third among the global causes of visual impairment with a blindness prevalence of 8,7%. It is the primary cause of visual deficiency in industrialized countries. An emerging important cause of visual impairment are uncorrected refractive errors.

Cataract

Definition

Cataract is clouding of the lens of the eye which impedes the passage of light. Although most cases of cataract are related to the ageing process, occasionally children can be born with the condition, or a cataract may develop after eye injuries, inflammation, and some other eye diseases.

Magnitude

According to the latest assessment, age related cataract is responsible for 48% of world blindness, which represents about 18 million people. Although cataracts can be surgically removed, in many countries surgical services are inadequate, and cataract remains the leading cause of blindness. As people in the world live longer, the number of people with cataract is growing. Cataract is also an important cause of low vision in both developed and developing countries. Even where surgical services are available, low vision associated with cataract may still be prevalent, as a result of the long period spent waiting for operations and barriers to surgical uptake, such as cost, lack of information, and transportation problems.

Prevention and treatment

Comprehensive prevention of cataract development is not known yet. Reduction of cigarette smoking, ultraviolet light exposure, and alcohol consumption may prevent or rather delay the development of cataract. diabetes mellitus, hypertension and high body mass index are identified as additional risk factors.

The treatment of cataract is an operation, which is very successful in restoring sight. The opaque lens is removed and replaced by an artificial intraocular lens. In many remote parts of the developing world, people remain blind from cataract, due to a lack of access to quality eye care at an affordable cost. Among the first 5 most cost-effective health intervention.

:: [Strategies for the prevention of blindness in national programmes](#)

:: [Cataract Surgical Rate \(CSR\) in WHO Regions \(maps\)](#)

:: [Cataract blindness – challenges for the 21st century \[pdf 256kb\]](#)

:: [International Council of Ophthalmology](#)

VISION 2020 role

VISION 2020 through its member organisations facilitates the availability of affordable and high quality cataract surgical services. In countries of Africa and Asia cataract accounts for at least half of all blindness, despite the known technology that can restore vision at an extremely low cost. Reducing the backlog of cataract-blind mainly requires training ophthalmic personnel, strengthening the existing health care infrastructure, affordable pricing, and the availability of surgical supplies.

Trachoma

Definition

Trachoma is one of the oldest infectious diseases known to mankind. It is caused by *Chlamydia trachomatis* – a microorganism which spreads through contact with eye discharge from the infected person (on towels, handkerchiefs, fingers, etc.) and through transmission by eye-seeking flies. After years of repeated infection, the inside of the eyelid may be scarred so severely that the eyelid turns inward and the lashes rub on the eyeball, scarring the cornea (the front of the eye). If untreated, this condition leads to the formation of irreversible corneal opacities and blindness.

Magnitude

Trachoma affects about 84 million people of whom about 8 million are visually impaired. It was once endemic in most countries. It is responsible, at present, for more than 3% of the world's blindness but the number keeps changing due to the effect of socio-economic development and current control programmes for this disease. In spite of this, trachoma continues to be hyperendemic in many of the poorest and most remote poor rural areas of Africa, Asia, Central and South America, Australia and the Middle East. The sequelae of active trachoma appear in young adulthood and in middle-aged persons. In hyperendemic areas active disease is most common in pre-school children with prevalence rates as high as 60-90%. It often strikes the most vulnerable members of communities--women and children. Adult women are at much greater risk of developing the blinding complication of trachoma than are adult men. This increased risk has been explained by the fact that women generally spend a greater time in close contact with small children, who are the main reservoir of infection.

- [Trachoma maps \(Global Atlas\)](#)
- [Mapping the global distribution of trachoma \[pdf 151kb\]](#)

Prevention and treatment

Environmental risk factors are water shortage, flies, poor hygiene conditions, and crowded households. A prolonged exposure to infection throughout childhood and young adulthood appears to be necessary to produce the complications seen in later life. A single episode of acute Chlamydial conjunctivitis is not considered sight threatening as there is virtually no risk of prolonged inflammation or blinding complications.

A Global Partnership for Trachoma Elimination

A global initiative to eliminate trachoma as a blinding disease, entitled GET 2020 (Global Elimination of Trachoma), was launched under WHO's leadership in 1997. Through this initiative control activities are instituted through primary health care approaches that follow the evidence-based "SAFE" strategy. This consists of lid surgery (S), antibiotics to treat the community pool of infection (A), facial cleanliness (F); and environmental changes (E). VISION

2020 national plans that address trachoma are written in line with the GET2020 "SAFE" strategy and recommendations.

:: [More information on GET 2020](#)

:: [The Alliance for the Global Elimination of Blinding Trachoma documents](#)

:: [SAFE manuals](#)

Onchocerciasis (river blindness)

Definition

Onchocerciasis is an insect-borne disease caused by a parasite *Onchocerca volvulus* and transmitted by blackflies of the species *Simulium damnosum*. Onchocerciasis is often called “river blindness” because the blackfly which transmits the disease abounds in fertile riverside areas, that frequently remain uninhabited for fear of infection. *O. volvulus* is almost exclusively a parasite of man. Adult worms live in nodules in a human body where the female worms produce high numbers of first-stage larvae known as microfilariae. They migrate from the nodules to the sub-epidermal layer of the skin where they can be ingested by blackflies. They further develop in the body of the insect from which more people can be infected. Eye lesions in humans are caused by microfilariae. They can be found in all internal tissues of the eye -- except the lens -- where they cause eye inflammation, bleeding, and other complications that ultimately lead to blindness.

Magnitude

Onchocerciasis is a major cause of blindness in many African countries. As a public health problem, the disease is most closely associated with West and Central Africa, but it is also prevalent in Yemen and six countries in Latin America. Onchocerciasis has in the past greatly reduced the economic productivity in infected areas and left vast tracts of arable land abandoned. It is estimated that there are about half a million blind people due to river blindness.

Prevention and treatment

Much progress has been made in fighting the disease in several countries through control of the blackfly, however, the disease can now also be treated with an annual dose of the drug ivermectine, Mectizan®, which also relieves the severe skin itching caused by the disease.

VISION 2020 role

Although river blindness was put on the priority disease list of VISION 2020, global initiatives had already been taken for onchocerciasis control. Beginning in 1974, effective vector control was implemented in West Africa through the Onchocerciasis Control Programme (OCP). Since 1996 mass community-based ivermectin treatment control programmes have been introduced by the African Programme for Onchocerciasis Control (APOC) in many other African countries and by the Onchocerciasis Elimination Programme in the Americas (OEPA) in the affected Latin American Countries. In 1992 an NGDO (Non-Governmental Development Organization) group, now called the Nongovernmental Development Organizations Coordination Group for Onchocerciasis Control, was formed to help promote worldwide interest and support for the use of ivermectin in endemic countries to eliminate onchocerciasis as a public health problem. Currently consisting of 9 international and 1 national partner NGDOs, the Group's activities are coordinated via its secretariat at WHO/HQ. Onchocerciasis control is not only an ongoing success story of disease control but also demonstrates, the value of the synergy that comes from

working together in partnership, and the economic return and social development that results from investments made in a disease control programme.

:: [More information on onchocerciasis \(river blindness\)](#)

Childhood blindness

Definition

Childhood blindness refers to a group of diseases and conditions occurring in childhood or early adolescence, which, if left untreated, result in blindness or severe visual impairment that are likely to be untreatable later in life. The major causes of blindness in children vary widely from region to region, being largely determined by socioeconomic development, and the availability of primary health care and eye care services. In high-income countries, lesions of the optic nerve and higher visual pathways predominate as the cause of blindness, while corneal scarring from measles, vitamin A deficiency, the use of harmful traditional eye remedies, ophthalmia neonatorum, and rubella cataract are the major causes in low-income countries. Retinopathy of prematurity is an important cause in middle-income countries. Other significant causes in all countries are congenital abnormalities, such as cataract, glaucoma, and hereditary retinal dystrophies

Magnitude

According to Gilbert and Foster, the prevalence of blindness in children varies according to socioeconomic development and under-5 mortality rates. In low-income countries with high under-5 mortality rates, the prevalence may be as high as 1.5 per 1000 children, while in high-income countries with low under-5 mortality rates, the prevalence is around 0.3 per 1000 children. Using this correlation to estimate the prevalence of blindness in children, the number of blind children in the world is approximately 1.4 million. Approximately three-quarters of the world's blind children live in the poorest regions of Africa and Asia.

Prevention and treatment

Prevention and treatment of childhood blindness is disease specific. For Vitamin A deficiency, at a cost of only 5 US cents a dose, vitamin A supplements reduce child mortality by up to 34% in areas where Vitamin A deficiency is a public health problem. As vitamin A deficiency manifests often during an outbreak of measles, properly planned and implemented national vaccination programmes against measles has reduced the prevalence of eye complications. In middle income countries, retinopathy of prematurity (ROP) is among the leading causes of blindness, the incidence of which can be reduced through availability and affordability of screening and curative services. Early treatment of cataract and glaucoma can be beneficial, while low vision devices are helpful in children with residual vision.

VISION 2020 role

On an annual basis VISION 2020 partners have been actively involved in distributing millions of vitamin A capsules to those in need. They have also been involved in the development of pediatric eye care services. The Lions Clubs International Foundation, through their "SightFirst" Initiative is one of the major partners with WHO/VISION 2020 in addressing the causes of childhood blindness. Because of its extensive social and emotional burdens, prevention of

childhood blindness is generally high on the agenda when countries develop a national VISION 2020 Action Plan. The causes of childhood blindness, amenable to prevention and treatment, receive attention, not only because there are interventions available to handle these conditions, but also devastating consequences if not addressed.

:: [Childhood blindness in the context of VISION 2020—The Right to Sight \[pdf 256kb\]](#)

:: [Lions Club SightFirst Initiative](#)

Refractive errors and low vision

Definition

Refractive errors include myopia (short-sightedness), and hyperopia (long-sightedness) with or without astigmatism (when the eye can sharply image a straight line lying only in one meridian).

For low vision, the following two definitions are in use:

- (WHO) Low vision is visual acuity less than 6/18 and equal to or better than 3/60 in the better eye with best correction.
- (Low Vision Services or Care) a person with low vision is one who has impairment of visual functioning even after treatment and/or standard refractive correction, and has a visual acuity of less than 6/18 to light perception, or a visual field less than 10 degrees from the point of fixation, but who uses, or is potentially able to use, vision for the planning and/or execution of a task for which vision is essential.

Magnitude

Recent studies have confirmed the existence of a large burden of uncorrected refractive errors, although the interventions required are significantly cost effective, and have an important impact on economic development and quality of life. Severe refractive errors have been estimated to account for about 5 million blind people. According to the most recent data available to WHO, there are an estimated 124 million people in the world with low vision. About a fourth of these would benefit from low vision services.

Prevention and treatment

Refractive errors can be rectified with appropriate optical correction while people with low vision may be helped with low vision devices.

VISION 2020 role

A large number of persons, including schoolchildren, require correction of refractive errors such as short sightedness and long sightedness. VISION 2020 partners develop models to provide affordable optical correction and low vision aids to persons in need worldwide, specifically those from poor urban and rural areas with limited available services. The availability of these services helps ensure a better future for visually impaired children and adults. Appropriate correction prevents the development of childhood amblyopia and enables better performance at school. Children with low vision can be integrated into regular schools rather than having to be taught in special schools for the blind. In adults, appropriate optical correction facilitates accomplishment of their job tasks and their development of knowledge and skills.

Diabetic retinopathy

Definition

Diabetic retinopathy is composed of a characteristic group of lesions found in the retina of individuals having had diabetes mellitus for several years. The abnormalities that characterise diabetic retinopathy occur in predictable progression with minor variations in the order of their appearance. Diabetic retinopathy is considered to be the result of vascular changes in the retinal circulation. In the early stages vascular occlusion and dilations occur. It progresses into a proliferative retinopathy with the growth of new blood vessels. Macular oedema (the thickening of the central part of the retina) can significantly decrease visual acuity.

Magnitude

There are important differences over the past few decades in diagnosis, medical care, socioeconomic factors and other risk factors that influence the prevalence and geographic distribution of diabetes and retinopathy as well. It is estimated that in 2002 diabetic retinopathy accounted for about 5% of world blindness, representing almost 5 million blind. As the incidence of diabetes gradually increases, there is the possibility that more individuals will suffer from eye complications which, if not properly managed, may lead to permanent eye damage.

Prevention and treatment

Risk factors for diabetic retinopathy include duration of diabetes, level of glycemia, presence of high blood pressure, dependence on insulin, pregnancy, levels of selected serum lipids, nutritional and genetic factors. Medical interventions can decrease some of the risk to vision caused by diabetic retinopathy. The control of glycemia decreases the risk of the incidence and the progression of the retinopathy. If sight threatening retinopathy is present, timely laser photocoagulation of the retina decreases the risk of a subsequent severe visual lesion.

:: [Prevention of diabetes mellitus](#)

VISION 2020 role

Diabetic retinopathy is on the priority list of eye conditions which can be partly prevented and treated. It is recommended that eye care services for diabetic patients be incorporated into strategic VISION 2020 national plans. In diabetic patients, regular examination of the fundus is essential, followed by appropriate laser treatment if required. Well tested international guidelines for management of diabetic retinopathy should be followed.

:: [More information about the WHO diabetes programme](#)

Glaucoma

Definition

Glaucoma can be regarded as a group of diseases that have as a common end point a characteristic optic neuropathy which is determined by both structural change and functional deficit. The medical understanding of the nature of glaucoma has changed profoundly in the past few years and a precise comprehensive definition and diagnostic criteria are yet to be finalised. There are several types of glaucoma, however, the two most common are primary open angle glaucoma (POAG), having a slow and insidious onset, and angle closure glaucoma (ACG), which is less common and tends to be more acute.

Magnitude

The number of persons estimated to be blind as a result of primary glaucoma is 4.5 million, accounting for slightly more than twelve per cent of all global blindness. Risk factors are those limited to the onset of disease and those associated with progressive worsening in already established disease. The primary risk factors that are linked to the individual and the onset of the disease are age and genetic predisposition. The incidence of POAG rises with age and its progression is more frequent in people of African origin. ACG is the common form of glaucoma in people of Asian origin.

Prevention and treatment

There is little known about primary prevention of glaucoma; however, there are effective methods of medical and surgical treatment if the disease is diagnosed in its early stage. Through appropriate treatment, sight may be maintained; otherwise the progression of the condition leads eventually to severe restriction of the visual field and irreversible blindness.

VISION 2020 role

As the majority of cases of glaucoma can be effectively managed, it is desirable to include this condition in VISION 2020 national plans. This is particularly appropriate in countries and regions where some of the 5 principally targeted eye conditions are not a public health problem, and more resources and attention can be dedicated to this eye disease.

Age related macular degeneration

Definition

Age-related macular degeneration (AMD) is a condition affecting people over the age of 50 and involves the loss of the person's central field of vision. It occurs when the macular (or central) retina develops degenerative lesions. It is thought that circulatory insufficiency, with reduction in the blood flow to the macular area, also plays a part. Several forms of AMD exist.

Magnitude

Globally, AMD ranks third as a cause of visual impairment with a blindness prevalence of 8.7%. It is the primary cause of visual impairment in industrialized countries. The main risk factor is ageing. Other risk factors may include the use of tobacco, genetic tendencies, the degree of pigmentation (with light coloured eyes being at higher risk), arterial hypertension, the ultraviolet rays, and consumption of a non-balanced diet.

Prevention and treatment

At present, there is neither a prevention nor a cure. Palliative treatments which seem to be able to retard the progress somewhat, include the use of lasers, dynamic phototherapy and sometimes surgery. Rehabilitative training of those with impaired vision includes the availability of bright lighting in the living and work spaces and the use of special aids for viewing and computer use.

VISION 2020 role

Primarily because there are no known easily-administered treatments nor prevention, AMD is not one of the diseases considered as a priority for VISION 2020. However, as more becomes known about this malady, it is likely to be included, as life expectancy continues to lengthen and the world transitions towards chronic noncommunicable eye diseases.

:: [International Council of Ophthalmology](#)

Corneal opacities

Definition

Corneal visual impairment encompasses a wide variety of infectious and inflammatory eye diseases that cause scarring of the cornea, the clear membrane that covers the outside of the eye. Significant scarring ultimately leads to functional vision loss.

Magnitude

The 4th cause of blindness globally (5.1%), corneal blindness is one of the major causes of visual deficiency after cataract, glaucoma and age related macular degeneration (AMD). Trachoma is responsible for nearly 4.9 million blind, mainly as a result of corneal scarring and vascularization. Ocular trauma and corneal ulcerations are significant causes of corneal blindness. They are often underreported but they are estimated at 1.5 to 2.0 million new cases of unilateral blindness every year. Among the causes of childhood blindness (approximately 1.5 million cases in the world and 5 million children with visual impairment) appear xerophthalmia (350,000 cases per year), new-born conjunctivitis, and rarer ocular infections like herpes and keratoconjunctivitis.

Even though the control of onchocerciasis and leprosy are public health success stories, these diseases are still significant causes of blindness, affecting approximately 250,000 individuals each. Traditional eye medicines have also been implicated as a major risk factor in the current epidemic of corneal ulceration in developing countries.

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Prevention and treatment

Public health prevention programmes are the most cost-effective means of decreasing the global burden of corneal blindness. Indeed, the only currently available curative treatment is the surgery, by graft of cornea. But the access to this surgery is very difficult, even in the developed countries, for lack of donors.

VISION 2020 role

Corneal opacity is not, as such, one of the VISION 2020 priorities. However corneal loss of vision is included in onchocerciasis and trachoma prevention.

:: [Corneal blindness: a global perspective \[pdf 229kb\]](#)

Genetic eye diseases

Definition

Genetic eye diseases include a large number of ocular pathologies which have in common the transmission from parents to children by their genetic inheritance. All do not cause visual impairment.

Magnitude

Knowledge about genetic eye diseases has increased dramatically during the last twenty years. Although there are no global statistics which let us know the extent of the burden of visual impairment from genetic causes, it does seem that genetic eye pathology represents a significant percentage of the causes of blindness in industrialized countries.

Prevention and treatment

The only current means of prevention of genetic eye pathology is genetic counselling. Treatment of genetic eye disorders is largely experimental, with the exception of surgeries on the cornea, lens and vitreous, which are well-documented in certain cases. The best hopes for treatment, however, lie in the use of gene therapy, growth promotion therapies for degenerative diseases, and possibly the grafting of retinal cells.

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