

Childhood blindness

Overview

- This presentation covers the following topics:
- Definitions
- Epidemiology of childhood blindness
- The magnitude and prevention strategies for :
 - Corneal blindness
 - Childhood cataract
 - Retinopathy of prematurity
 - Refractive error and low vision
- Conclusion

Notes section – a more detailed explanation is provided in the notes along with key references.

Definitions

- Childhood: from 0 to 15 years old (UNICEF)
- Blindness defined as :
 - corrected visual acuity $< 3/60$ better eye
 - or
 - central visual field each eye < 10 degrees

Magnitude of childhood blindness .

MJC1

- Estimated prevalence (using under-5 mortality rate as country categories):
 - Low income countries 1.5/1000.
 - High income countries 0.3/1000.
- 3/4 in poorest regions of Africa and Asia
- Estimated 1.4 million blind children globally
- Estimated incidence 500,000 children /year

Slide 4

MJC1

Changed this to make it clearer

Marissa Carter, 7/13/2011

Magnitude of blindness in children per 10 million population in different regions*

	Affluent	Middle income	Poor	Very poor
% children in the population	20	30	40	50
Number children/10 million total population	2 million	3 million	4 million	5 million
Prevalence of Childhood blindness	0.3/1000	0.6/1000	0.9/1000	1.2/1000
Number blind children/10 million total population	600	1800	3600	6000

Causes of childhood blindness

- Poor countries: corneal scarring (vit A deficiency, measles, ophthalmia neonatorum, harmful traditional practices).
- Middle income countries: retinal conditions mainly hereditary, retinal dystrophies and ROP.
- High income countries: CNS disorders and retinal conditions.

WHO classification of causes of childhood blindness

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graph TD; A[WHO classification of causes of childhood blindness] --> B[Anatomical classification]; A --> C[Aetiological classification];
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**Anatomical
classification**

**Aetiological
classification**

WHO **anatomical** classification of causes of childhood blindness

- Whole globe (e.g. ano/ micro phthalmos,
- Cornea (e.g. corneal scarring, keratoconus)
- Lens (e.g. cataract, aphakia)
- Uvea (e.g. aniridia)
- Retina (e.g. retinal dystrophies)
- Optic nerve (e.g. atrophy)
- Glaucoma
- conditions where the eye appears normal (e.g. refractive errors, cortical blindness, amblyopia).

WHO aetiological classification of causes of childhood blindness

- Hereditary (at conception), e.g. genetic , chromosomal abnormalities)
- Intrauterine (during pregnancy, e.g. rubella
- Perinatal (e.g. retinopathy of prematurity, birth injury, neonatal conjunctivitis/ ophthalmia neonatorum)
- Childhood (e.g. measles, trauma vitamin A ,deficiency)
- unknown/cannot be determined

Causes of blindness in children per 10 million population in different regions

No of children blind by:	Affluent	Middle income	Poor	Very poor
Corneal scar	0	0	720	2000
Cataract or glaucoma	60	360	720	1000
ROP	60	450	0	0
Others	480	990	2160	3000

Adapted from Gogate and Gilbert. (1)

Avoidable causes of childhood blindness

Preventable

Corneal scarring due to:

- Vit A deficiency
- measles
- ophthalmia neonatorum
- traditional practices
- infective corneal ulcers

Intrauterine factors:

- rubella
- toxoplasmosis
- other teratogens: alcohol

Perinatal factors:

- ROP
- birth hypoxia

Hereditary diseases (consanguinous / genetic)

Treatable

- Cataract
- Glaucoma
- ROP
- Uveitis
- Corneal disease (corneal ulcers and opacity)

Magnitude and control strategies for priority causes of CHB

- Public health approach used to control the conditions:
 - Primary prevention – to stop the disease from occurring
 - Secondary prevention - to prevent the blindness from occurring due the disease
 - Tertiary prevention – to treat the blindness caused by the diseases where possible .

Corneal blindness

- 70% of childhood blindness in poor countries
- Corneal scarring by Vit A deficiency is the single largest cause of childhood blindness
- Prevention requires multi-sector collaboration

Corneal scar: public health approach 1

Major causes	Primary prevention	Secondary prevention	Tertiary prevention
Vit A	Vit A supplementation Nutrition education	Treatment of xerophthalmia with Vit A	Corneal transplantation? Not always possible / suitable
Measles	Measles immunization	Vit A treatment for children with measles Eye examination and treatment of corneal ulcers	
Ophthalmia neonatorum	Cleaning eyes of newborn at birth . Povidone Iodine prophylaxis	Treatment with intensive antibiotics for ulcers associated with traditional practices	
Traditional practices	Education of traditional practitioners and birth attendants. Primary eye care services	Intensive, appropriate and rapid treatment of neonates with conjunctivitis	
Infective corneal ulcers		Prompt recognition and treatment by ophthalmic personnel	
Other	Avoid trauma	Prompt recognition and treatment	

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This is a busy chart but I think it is very clear and would be difficult to break it down

Covadonga Bascaran, 8/15/2011

Childhood cataract

- Accounts for 10-30% of childhood blindness
- 190,000 children blind from cataract
- Management of cataract in children has changed dramatically in last 20 years
- Timely identification and case finding are essential

Childhood cataract: public health approach

Main causes of childhood cataract	Primary prevention	Secondary prevention	Tertiary prevention
Congenital rubella syndrome (25%)	Immunization (not routinely available globally to date)	Early detection and surgery	Surgery and close follow up
Genetic (20%)	Genetic counselling	Early detection and surgery	Surgery and close follow up

* Early detection is important if surgical intervention is to have an impact .
Follow up services are equally essential

Retinopathy of prematurity

- Third “epidemic” of ROP in middle income countries, accounting for up to 60% of blindness.
- Latin America, former socialist economies of central and eastern Europe, cities in Asia
- 50,000 blind from ROP globally
- Principle risk factor ROP - unmonitored supplemental oxygen

ROP public health approach

	Primary prevention	Secondary prevention	Tertiary prevention
ROP	<ul style="list-style-type: none"> • <u>Good neonatal care:</u> -systemic steroids to mothers for premature births and -O2 monitoring of neonates • <u>Reduce preterm births:</u> -Reduce number of implanted embryos in fertility clinics and health education about risks of in vitro and fertility drugs -Prevention of teenage pregnancies -Avoid unnecessary Caesarean sections 	<ul style="list-style-type: none"> -Screening and Examination of babies at risk -Laser treatment of type 1 ROP -Follow up 	<ul style="list-style-type: none"> -Surgery for stage 4 ROP -Low vision services and rehabilitation

Refractive errors in children

- Responsible for 95% of visual impairment in children.
- 12.8 million children(5-16 yrs) visually impaired from RE, global prevalence 0.96%
- Interferes with children's education affecting their future opportunities in life.

Refractive errors in children: public health approach

	Primary prevention	Secondary prevention	Tertiary prevention
Refractive errors	Not possible	Vision screening programs to detect cases early -Refraction and spectacles or contact lenses services -Refractive surgery -Health education on vision hygiene (illumination, distance etc)	-Low vision services and visual rehabilitation -Health education

Low vision

- Definition:

impairment of visual function even after treatment or refractive correction, and VA between 6/18 and light perception

or

<10 degrees from the point of fixation, but who uses or could use vision for the planning and/or execution of a task.

- Low vision is irreversible

- Global prevalence 0.3%

Low vision control strategies

- Establish the cause of visual loss
- Surgical interventions if appropriate
- Assessment of the child's various visual functions (distance vision, near vision, contrast sensitivity, and visual field)
- Refraction and provision of spectacles
- Low vision devices (magnifiers)
- Non-optical low vision devices (reading stands)
- Training in the use of devices with follow-up

Conclusion

- Obtaining reliable data in childhood blindness is very challenging.
- Causes of childhood blindness are different in poor, middle and high income countries.
- WHO's priority areas in childhood blindness are: corneal blindness, cataract, ROP, refractive errors and low vision
- 28% is due to preventable causes and 15% due to treatable causes