Management of common eye conditions in a primary health care setting: A guide for South Sudan health workers

Wani M Gindala[a] and Karinya Lewis[b]

a Ophthalmologist, Juba Teaching Hospital Eye Department, Juba, South Sudan

b Ophthalmologist, Southampton Eye Unit, UHS NHS Foundation Trust, UK

Correspondence to Wani G Mena wanigmena@gmail.com

Prevention of blindness

South Sudan has a huge burden of blindness with an estimated prevalence in excess of 1.5% and it is a common reason for patients attending a primary care facility [1]. Seventy five percent of this blindness can be prevented or treated by properly trained middle cadre eye health worker working with simple diagnostic tools in a primary health care setting or by referring to secondary care in a timely manner. In addition to the common causes of visual loss South Sudan suffers with the burden of two infectious diseases, Trachoma predominantly to the East of the Nile and Onchocerciasis to the West of the Nile [2]. It is therefore crucial that the following simple measures are applied at a community level to prevent eye disease and avert blindness.

1. A diet rich in vitamin A and proteins: (green leafy vegetables, yellow fruits, fish, milk, beans).
2. Personal and environmental hygiene: (regular hand and face washing, proper disposal of garbage, human and animal waste and maintenance of a clean family environment).
3. Prevention of eye injuries: (education on vehicle seat belt usage and prevention of injures in the home and workplace).
4. Improve uptake of childhood immunization.
5. Reduction of neonatal infection: (routine application of tetracycline ointment immediately at birth).
6. Early referral and prompt treatment of serious eye diseases or injuries.
7. Avoidance of both traditional eye medicine and sharing of medication between people.
8. Improvement in management of chemical injury: (immediate flushing of eyes with clean cold water or milk).

Symptoms of eye disease

Some eye diseases, for example cataract, glaucoma and diabetic retinopathy may be present for a long time before symptoms develop, so patients present late with advanced disease. Population wide screening for these conditions would enable early detection, treatment and prevention of sight loss. All adults over the age of 40 years ideally should have a checkup by an eye care worker every two years.

Ophthalmic diagnosis is established firstly by listening to the details of the patient's complaint, both in terms of visual symptoms and visual function, before examination and investigation. Specific symptoms as listed in Table 1 are particularly helpful in reaching a diagnosis.

Examination of eyes

Equipment required

In a primary health care setting the following simple equipment is sufficient for examination of the front half (anterior segment) of the eye where 80% of eye problems occur:

Essential equipment

- Visual acuity chart and pinhole cover.
- Torch.
- Fluorescein dye drops or strips.

Preferable equipment

- Magnifying loupe.
- Ophthalmoscope with a blue filter.
- Local anaesthetic and dilating eye drops.

STEP 1: Assessing visual acuity – see Figure 1

Diagnosis of eye disease begins with testing distance vision (visual acuity) using the modified Snellen "Tumbling E" eye chart, or picture chart. Every health worker should know how to measure and interpret visual acuity, the single most important test in eye examination.

Table 1. Common presenting problems and some helpful questions to aid diagnosis

Pain	Is it light sensitive?	Does it feel like sand or grit?	How severe is the pain?
Itching	What makes it worse?	Any other parts of the body itchy?	Is it seasonal?
Swelling/ Lumps	How did it start?	Where is the swelling?	What makes it worse?
Discharge	What colour is it?	Is it watering or thick discharge?	
Redness	What part of the eye is red?	What makes it worse?	Is it painful?
Vision	Is the whole of the vision cloudy or just parts?	Is it worse for distance or near?	Did it occur suddenly or slowly?
Double vision or eyes movement problems	Constant or intermittent?	Does it get better when one eye is closed?	Are the images side by side or on top of each other?
Problem with children's eyes	When and how did it first start?	Do they seem to see as other children do?	Any other medical or developmental problems?
Floaters	Are new or getting worse?	Are they affecting vision?	Associated with flashing lights?

The following steps should be followed:

1. Place the visual acuity chart on a wall with good lighting or hang it on a tree outside
2. Sit or stand the patient at a distance of 6 meters away from the chart. (If there is no tape measure, walk 6 steps from the chart to determine where the patient should stand)
3. Ask the patient to cover the left eye with the palm of the hand, point out the letters or symbols in each line and let the patient respond by either naming the letters or showing the direction to which the characters of the symbol are pointing. Continue this process until the patient can no longer identify the letters or pictures correctly.
4. Identify the last line of letters the patient was able to read correctly (labeled with a number e.g. 6, 9, 12, 18, 24, etc.)
5. Write the visual acuity as a fraction

   Visual acuity Fraction =

   Distance patient sits from the chart (usually 6 meters)
   The smallest line of letters patient able to read clearly

   For example 6/24

6. Repeat the test on the left eye by covering the right eye
7. The test is repeated with the patient looking at the chart through a pinhole, which may show an improvement in the acuity measurement. The pinhole only allows parallel focused light through and reveals the potential visual acuity with corrective glasses or contact lenses.
8. If the patient cannot see any letters on the chart ask if they can count the number of fingers on one hand held at about a meter away. The acuity is recorded as 'count fingers' (1/CF as measured at 1 meter)
9. If the patient cannot count your fingers but can see shadows when you wave your hand in front of them, this is recorded as Hand Movements' (1/HM).
10. If the patient cannot see hand movements then use a torch to shine a light in the eye and record the visual acuity as 'Perception of Light' (PL) or 'No Perception of Light' (NPL).

A good visual acuity is when the patient can read the 12 line or smaller (6/12, 6/9 or 6/6). Patients who can only see larger letters above the 12 line should be referred to an eye specialist. Patients with no perception of light (NPL), rarely benefit from medical or surgical intervention but (if both eyes are similarly affected) require a needs assessment for visual rehabilitation when available.

STEP 2: Inspect the eye

The eye is inspected with the help of a light and magnification when available (loupes or ophthalmoscope dialed up to +10 or +20). The eyelids should close without exposing the eyeball, the conjunctiva white or lightly pigmented and the cornea clear. The pupil should be black, round and of equal size in both eyes and constrict equally to light. From a distance of about 1 meter, with the ophthalmoscope, reflected light in the pupil ('red reflex') should be symmetrical. When asked to follow a finger, left and right, up and down the eyes should move together in parallel and the patient should not report double vision. Any abnormal findings should be documented and reported.

Figure 1. Checking visual acuity in the community

(credit Karinya Lewis)

STEP 3: Exam the cornea with fluorescein

The health of the cornea is vital to preserve vision and must be carefully inspected. Fluorescein is an orange dye that stains any defect in the surface layer (epithelium) of corneal and conjunctival cells. The epithelial defect becomes easily visible as it fluoresces luminous yellow under a blue light.

To stain the cornea:

1. Apply 2 drops of local anaesthetic drops on the conjunctival sac.
2. Wait one minute, extend the neck, ask the patient to look up and pull down the lower lid to expose the lower fornix (gap between eyelid and eyeball).
3. Take a strip of fluorescein and put the impregnated tip in the fornix to dissolve the fluorescein in the tear film (or install a fluorescein drop if available in which case anaesthetic drops are not required).
4. Remove the strip and examine the cornea with the blue filter of the ophthalmoscope.

Patients complaining of pain, photophobia, tearing, itching and red eyes often have corneal abrasions or infective ulcers. An ulcer with typical branching appearance may be due to Herpes Simplex Viral Keratitis (HSK) which must not be treated with steroids but rather antivirals to avoid permanent damage to sight (see Caution below).

STEP 4: Evert the lid and examine tarsal conjunctiva

Lid eversion is an important skill for the primary eye care worker. It permits examination of the tarsal conjunctiva under the upper eye lid and aids in the diagnosis of trachoma, follicular conjunctivitis and hidden foreign bodies which cause corneal abrasions.

To evert the lid:

1. Let the patient be seated
2. Instill fluorescein into the lower lid fornix as described above
3. Extend the neck of slightly and ask the patient to look down
4. Hold the upper lid margin (usually gripping the eye lashes) between the thumb and index finger of your right hand and pull it down gently
5. Place the index finger of the left finger or cotton tipped applicator held in the left hand on the skin crease and flip the lid to expose the inner surface of the lid exposing the tarsal plate.
6. Inspect the conjunctiva and note blood vessels and presence of follicles which appear as white yellow pin head swellings on the tarsal plate. . The presence of 5 or more follicles indicates presence of trachoma and lacerations or foreign bodies will fluoresce

Some predisposed patients may develop severe acute glaucoma following dilation of the pupils, so only appropriately trained primary case workers should complete the eye examination with digital assessment of the eye pressure and ophthalmoscopic examination of the retina and optic nerve.

Management of common eye conditions see Figure 2

Eye conditions which should be referred immediately include:

- Perforating or penetrating eye injuries or retained vegetative matter
- Sudden or unexplained loss of vision
- A white pupil in a child
- A child whose eyes are not straight
- Protrusion of the eye ball
- Painful red eye unresponsive to initial treatment and vision rapidly deteriorating

Caution: Avoid use of topical steroid preparations in primary care settings. Some antibiotic eye preparations contain steroids and may be given for an infectious condition. Steroids cause raise in intraocular pressure which is difficult to treat and may lead to blindness. Steroids can worsen fungal or viral ulcers of the cornea and reduce the ability of wounds to heal. Conditions needing steroids should first be evaluated and confirmed by an Ophthalmologist.

Conjunctivitis

Conjunctivitis presents as redness over the white of the eye often associated with discharge. The vision is usually

Figure 2. Child with leukocria (credit Karinya Lewis)

Figure 3. Right eye blind from Trachoma, left eye dense white cataract (credit Karinya Lewis)

Table 2. Differential diagnosis of the red eye

Diagnosis	Symptoms	Signs	Treatment
Bacterial Conjunctivitis	Yellow/green discharge, swollen eye lids, mild redness, no pain	Normal vision, Conjunctiva inflammation, purulent discharge	Tetracycline/ chloramphenicol ointment
Allergic conjunctivitis	Recurrent itchy & tearing eyes with seasonal variation	Normal vision, brown discoloration of conjunctiva, limbal follicles	Lubricant eye drops, antihistamine eye drops
Trachoma	Dirty face, Foreign bodysensation, tearing eyes, discharge	Inflamed eye, follicles on tarsal conjunctiva, in-turned lashes, corneal scars, reduced vision	Hygiene, lubricant eye drops, Tetracycline ointment, azithromycin tablet, trichiasis surgery, (SAFE)
Acute angle closure glaucoma	Severe pain, halos around lights, may vomit, reduced vision, dilated fixed pupil	Peri-limbal redness, reduced vision, dilated fixed pupil, may have intumescent cataract or Uveitis	Refer to eye specialist
Iritis/Uveitis	Pain, headache, photophobia	Redness around limbus, reduced vision, small irregular pupil, secondary cataract	Refer but consider treating systemic conditions if present such as Onchocerciasis, leprosy, syphilis.
Corneal foreign body	Pain, gritty FB sensation, tearing & photophobia	Generalized redness, FB visible on cornea	Chloramphenicol and Refer
Traumatic corneal Perforation or blunt injury	History of injury, pain & photophobia	Reduced vision, laceration of cornea, iris prolapse, Blood level in the eye	Eye pad, systemic antibiotics tetanus and refer
Floaters	Are new or getting worse?	Are they affecting vision?	Associated with flashing lights?

unaffected. Conjunctivitis can be caused by bacteria, viral infection, Trachoma or allergy.

It is important to avoid rubbing the eyes as this may worsen the condition and encourage spread to other people. Promotion of regular hand and face washing of children at home and in schools by the primary eye care worker is paramount, as a dirty face in a child is the most important risk factor for transmission of trachoma. Other risk factors include unavailability of water, dusty environment and overcrowding.

Treat with Azithromycin tablets and tetracycline eye ointment, especially in areas where Trachoma is widespread. Often the long term effect of Trachoma conjunctivitis is in-turning of the eyelashes causing corneal scarring. In-growing eyelashes can be removed but for long-term management, referral for eyelid surgery is crucial. See Figures 3 and 4.

Table 3. Distinguishing features of conjunctivitis

Symptom	Bacterial	Viral	Allergic	Trachoma
Discharge	purulent	watery	mucoid	watery
Itching	none	some	severe	some
Recurrence	unusual	unusual	seasonal or in certain environments	persistent

Table 4. Treatment of newborn conjunctivitis

Drug	Dose	Frequency	Duration
Tetracycline %1 ointment		Prevention: Single application within 24hrs of birth	Treatment: once a day for 7 days
Kanamycin injection IM	25mg/kg	Once	Single dose
Erythromycin orally	16mg/kg	3 times a day	5 days

Note: Parents should also be treated for sexually transmitted disease (STD)

Table 5. Management of traumatic eye conditions

Condition	Symptoms and signs	Treatment	Comment
Conjunctival hemorrhage	Red spot on the white of the eye, no pain or visual loss, history of blunt trauma, or may be spontaneous.	Reassurance that it will heal without danger to the eye.	If there is pain or loss of vision, refer immediately. Check for high blood pressure.
Conjunctival foreign body (FB)	Scratchy or FB sensation with lid movement. Watery eye Eversion of eye lid may reveal a FB on tarsal conjunctiva.	Apply anaesthetic drops. Remove FB with cotton tipped applicator and apply tetracycline ointment twice daily for 3 days.	Corneal staining with fluorescein may reveal scratch lines suggesting foreign body embedded in the tarsal plate.
Corneal foreign body (FB)	Often due to FB hitting eye during grinding or welding.	Apply topical anesthesia and attempt removal with cotton tipped applicator	If unsuccessful, pad the eye and refer to eye unit for removal using Slit lamp.
Corneal abrasion	History of trauma, pain and tearing. Fluorescein staining shows linear epithelial abrasion	Exclude FB under eyelids. Reassure, pad and tetracycline ointment for 3 days.	If not improving on antibiotics after 2 days then REFER
Corneal perforation	Laceration of the cornea with iris prolapsed out of the wound. Cloudy cornea. Blood in the anterior chamber (hyphema). Cataract.	REFER after Tetanus toxoid 0.5ml, systemic antibiotics, tetracycline eye ointment and eye shield.	Urgent referral if blood fills the whole anterior chamber to avoid corneal staining and loss of vision.
Chemical burns	History of splashed household detergent, aerosol or petrol. Severe pain, photophobia and blurred vision	Copious irrigation with copious amount of water, milk and REFER	Do not use human breast milk often expressed into the eye in these situations. HIV transmission is a particular risk.
Corneal ulcer	Pain, photophobia, reduced vision, redness of the eye and grey patch on the cornea	REFER	Educate about the danger of using traditional eye medicine for treating any eye condition

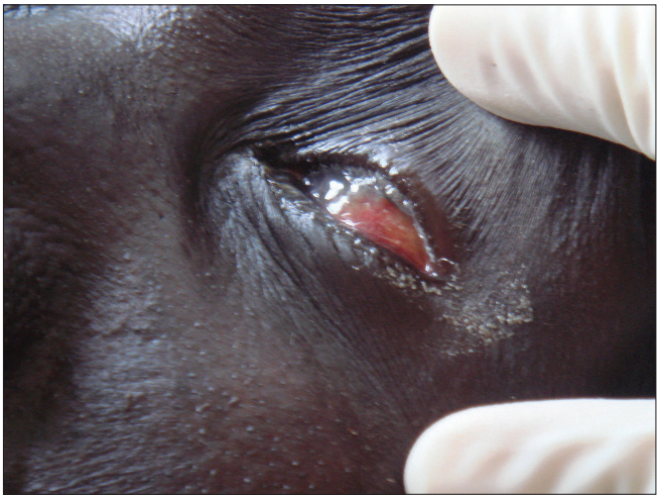

Figure 4. Advanced trachoma- ingrowing lashes causing a red eye and blindness from scarring (credit Karinya Lewis)

New born conjunctivitis

New born (neonatal) conjunctivitis occurs within 28 days of birth and is usually due to gonococcal or chlamydial infection. It is a common cause of ocular disease and blindness in children.

Prevention may be achieved by good antenatal care, prevention of sexually transmitted infection in pregnant mothers and ensuring that delivery occurs in hospital under the supervision of a qualified midwife. Immediately after birth Tetracycline ointment should be applied to the baby's eyes by the attending nurse. Established infection may be treated as in Table 4

Traumatic eye conditions

Trauma is an important cause of ocular injury and sometimes blindness in rural farming communities and in all areas due to accidents. Vegetative injury with thorns, grass and brooms predisposes to fungal infections. Community education in the prevention of injury is an important activity of the primary eye worker. Common traumatic conditions of the eye are presented in Table 5 along with suggested treatment and action.

Sight impairment is a huge burden on an individual and their family. In many cases correct management and early referral for eye problems can result in prevention of blindness. Where this is not possible, visual rehabilitation so that a person may function independently is possible with the right help. It is advisable to know where your nearest specialist eye care worker is located and how to contact them. As a primary health care worker it is imperative to develop the skills of history taking and examination of eyes, in order to communicate effectively with the specialist eye care worker who may be able give appropriate advice over the phone and improve the outcome for the patient.

Location of eye units in South Sudan

1. Juba Teaching Hospital, Unity Avenue, Box 88 Juba
2. Martha Clinic, Anglican Diocese of Yei, Yei
3. Wau Teaching Hospital Eye Department, Wau State, Wau
4. Malakal Teaching Hospital Eye Unit, Upper Nile State, Malakal

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Additional Reading

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