

Technical Brief N° 25/Eye and skin diseases

Introduction

One of the transmission mechanisms for water-related diseases is water-washing. It is specific to those diseases dependent on water quantity but excludes those that are faecal-orally transmitted. (Technical Briefs 17 and 19, 1988 and 1989, respectively). As the majority of water-washed diseases affect the skin and eyes, this Technical Brief considers the effects of both hygiene practices and the availability of water on skin and eye disease. Two notable diseases not in this group, Onchocerciasis (river blindness) and Xerophthalmia (nutritional blindness), are included because of their impact on numbers of blind people.

In tropical and subtropical developing countries skin and eye diseases are common causes for visiting a health clinic. Reduced incidence would, therefore, be beneficial to patients and staff. Some pathogenic skin and eye diseases are given in Table 1.

Table 1. Pathogenic and parasitic skin and eye diseases	
Organism type	Examples of diseases/infections caused
Bacteria	Conjunctivitis (<i>Haemophilus aegyptius</i> ; <i>Streptococcus pneumoniae</i>) trachoma (<i>Chlamydia trachomatis</i>) yaws (<i>Treponema pertenue</i>) Staphylococcal infections such as impetigo, cellulitis, boils, carbuncles etc: tropical ulcers (Vincenti's organisms)
Fungi	Ringworm (tinea or dermatophytosis) - athlete's foot (tinea pedis) - scalp ringworm (tinea capitis)
Viruses	Warts (human papilloma virus) cold sores (herpes simplex virus) conjunctivitis (picorna and adenovirus)
Parasites mites fleas worms	Allergic reaction at site of bite scabies (<i>Sarcoptes scabiei</i>) chiggers (<i>Tunga penetrans</i>) onchocerciasis (<i>Onchocerca volvulus</i>)

Eye disease

Two-thirds of the 28 million blind people in the world live in the developing countries, where blindness rates can be 10-20 times the rates in developed countries. People and particularly children under five years old living in a poor environment, with inadequate housing, sanitary facilities, food intake and health care are most at risk. By improving services and hygiene practices in these areas, up to 80% of blindness could be prevented.

The eye has its own protective mechanisms, some of which are shown in Figure 1. These are weakened by illness, poor diet, hygiene and chemical or physical damage.

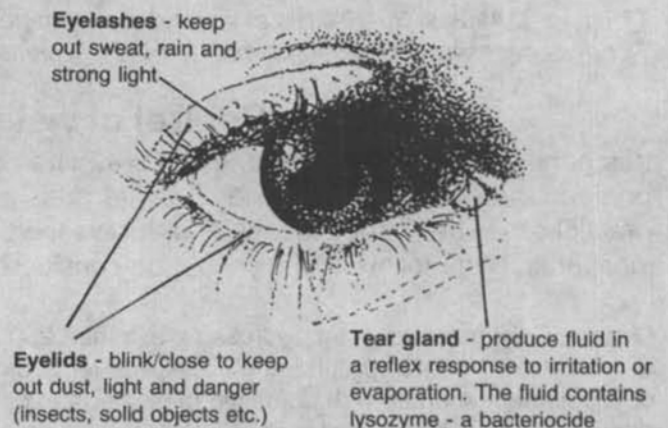


Figure 1: The eye and its protective mechanisms

Technical Brief N° 25/Eye and skin diseases

Conjunctivitis and trachoma, common water-washed eye diseases, are transmitted by dirty hands and towels and sometimes by flies. Trachoma affects over 500 million people, blinding seven to nine million of them through scarring of the conjunctiva, distortion of the eyelids and opacification of the cornea.

Onchocerciasis (African river blindness) results from infestation with worms *Onchocerca volvulus* which are transmitted by blackflies (*Simulium* species) when they bite. Microfilariae can cause irritation and repeated scratching damages the skin but for one million of the 20-30 million people affected microfilariae reach the eye causing permanent blindness. Because prevention through widespread use of drugs is difficult, control of the vector, by insecticide spraying is often preferred. As flies are widespread and the worm is long lived, control programmes are long-term and expensive. They are proving successful in West Africa.

Xerophthalmia (nutritional blindness), eye lesions that can result in blindness, is due to vitamin A deficiency, caused by a deficient diet or losses in repeated diarrhoeal attacks or severe illness. In Asia it affects over five million children annually, blinding 500,000; many die because of lowered resistance to other diseases. Sight is saved by early treatment with vitamin A in food (green leafy vegetables) or as supplements. Education on nutrition, therefore, is essential.

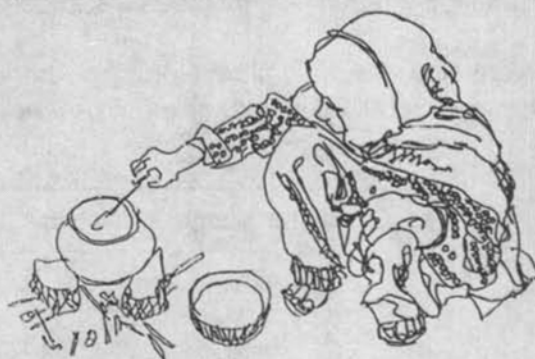


Figure 2: Education on nutrition is essential



Figure 3: At least 30-40 litres of water per person per day is necessary for personal and domestic hygiene

Skin disease

Skin provides an almost continuous, waterproof and protective barrier to harmful agents, chemical and pathogenic. It assists in the control of body temperature, moisture content and waste disposal but also gives food, protection, warmth and moisture to many micro-organisms and larger parasites such as fleas and lice. Even clean, healthy skin has around five million bacteria per square centimetre, that is about 100,000,000,000 bacteria on an adult. Most of these bacteria are not harmful, in fact they may help to keep the skin clear of dead cells, sweat and, by producing acids and other chemicals, fungi. Yet, if hygiene is poor and the skin is broken or punctured (cuts, insect bites etc.), harmful agents that come into contact with it can cause disease. Resistance to disease is reduced further by illness, malnutrition or stress.

Control of water-washed diseases

It is generally accepted that at least 30-40 litres of water per person per day is necessary for adequate personal and domestic hygiene. Even at rates greater than this, education on the benefits of hygiene practices may be needed to reduce water-washed disease. To reach this level of water availability and use, measures in the following list should be considered:

- reduce distances to water sources to less than 250 metres
- improve or increase ground and surface water sources
- supplement sources with domestic rainwater harvesting
- reduce losses by good operation and maintenance
- build washing slabs and showers
- provide soap, especially in schools
- provide hygiene education in schools, clinics, community centres
- initiate environmental improvement projects, including housing

To reduce the incidence of water-washed diseases good personal hygiene practices are vital. Some of the problem areas and solutions are illustrated below.

A guide to personal hygiene

Problem areas

Hair - dirt sticks more easily to greasy hair combs and brushes.

Nose - outer skin is greasy and can collect grease, blocking pores.

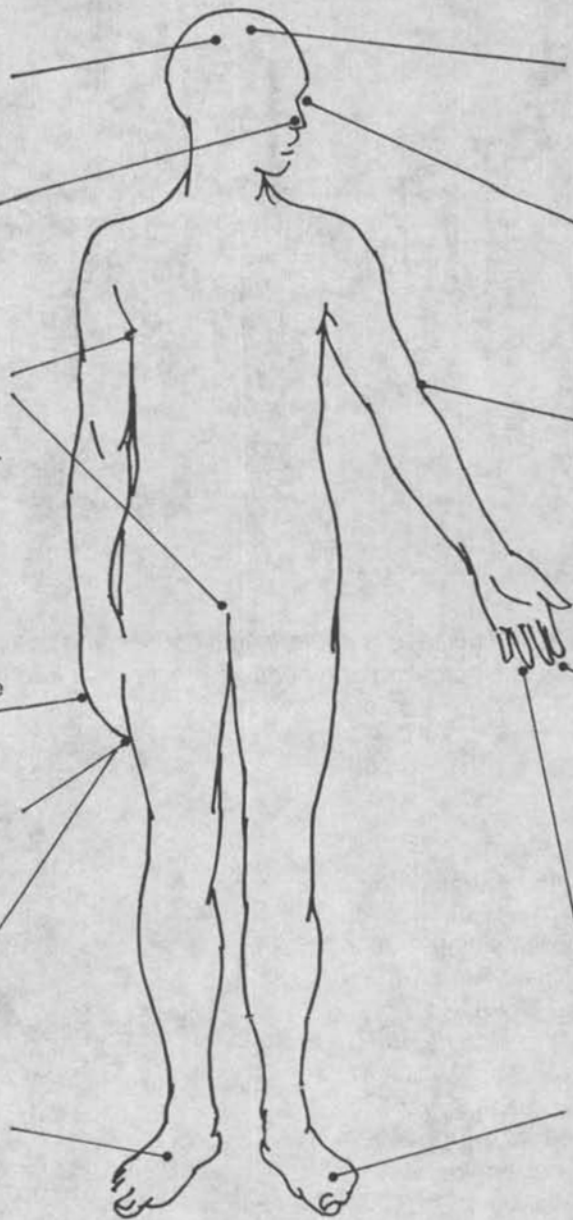
Armpits and genital areas - sweat collects here, encouraging growth of bacteria. Stale sweat smells and can favour growth of pathogens.

Hands - many materials handled are easily spread to other parts of the body, particularly the mouth and eyes.

Fingers and toes - sweat between them can soften skin and favour fungal growths.

Nails - dirt etc. under the nails provides food and shelter for many organisms, including parasite eggs.

Feet - bare feet can pick up worm larvae as well as other pathogens from the soil and latrine floor.



Remedial actions

Hair - wash hair, combs and brushes often; at the same time check for head lice and treat if necessary.

Eyes - wash carefully around the eyes, especially of babies, to avoid excess mucus; avoid rubbing, particularly with dirty hands or cloths.

Skin - wash frequently to remove sweat, dirt, dead skin cells and grease. Using soap helps remove this matter and clears pores, essential for skin functions; in the absence of soap, ash can be used.

Hands - wash well, particularly before preparing food; before eating; after excreting; after gardening; after handling dirty clothes; before and after cleaning and treating sores and wounds; after handling animals and after handling chemicals at work or in the home.

Nails - keep clean and trim.

Feet - wash dirt and sweat from between toes and dry well afterwards to discourage growth of fungi (athlete's foot).

Using natural fibres, such as wool and cotton in clothes and bedding is better than using man-made fibres, such as nylon and polyesters, as they allow the skin to breathe and sweat to evaporate. Care must be taken to avoid transmission from clothes to skin of eggs laid by bot flies, such as the tumbu fly (*Cordylobia anthropophaga*). The eggs hatch and fly larvae penetrate the skin producing large painful lesions from which the mature larvae emerge and fall to the ground. Sepsis often occurs at these exit sites. The practice of drying clothes on the ground increases transmission; ironing clothes kills the eggs.

Technical Brief N° 25/Eye and skin diseases

Cleaning and washing are essential for good health, good skin and good eyes



Figure 4. Transmission of water-washed disease is decreased if houses and surrounding areas are kept clean and if bodies, hair, clothing and bedding are washed frequently.

References and further information:

- Anderson, A. *World Health*, pp. 14-15, March 1986,
Oncho: a concerted effort.
- Technical Briefs, *Waterlines*, IT Publications (address below),
No. 8, *Making soap*, Vol.4, No.4.
No. 11, *Rainwater Harvesting*, Vol.5, No.3.
No. 14, *Above-ground rainwater storage*, Vol.6, No.2.
No. 17, *Health, water and sanitation I*, Vol.7, No.1.
No. 19, *Health, water and sanitation II*, Vol.7, No.3.
- Thylefors, B. *WHO Chronicle*, Vol.39, No. 4, pp149-54, 1985,
Prevention of blindness: the current focus.
- Truswell, A. S. *British Medical Journal* Vol.291, pp587-89, 1985,
Malnutrition in the Third World II.
- World Health*,
A decade of oncho control, October 1985.
Health for all - all for health, January-February 1988.



Text: Dr Margaret Ince Illustrations and design: Rod Shaw
WEDC, Loughborough University of Technology, Loughborough, Leicestershire LE11 3TU, UK.

Twenty-fifth in a series of Technical Briefs for field-workers. Further copies are available from IT Publications, 103-105 Southampton Row, London WC1B 4HH, UK, as follows: 1-4 copies £0.50 each, 5-49 copies £0.25 each, 50+ copies £0.12 each. They will be sent by air-speeded post where available.