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Bilharziasis

Bilharziasis (also called schistosomiasis) is one of the most widespread human diseases caused by parasites. This entry explains in general terms what is necessary for personal protection from bilharzia and for ridding an area of the disease. Further information from the references given is needed. Cooperation with government or other programs is essential.

An estimated 150 to 250 million people suffer from the disease. It is found in much of Africa, the Tigris and Euphrates valleys, parts of Israel, northern Syria, Arabia, Iran, Iraq, parts of Puerto Rico, Venezuela, Dutch Guiana, Brazil, Lesser Antilles, Dominica, Taiwan and parts of China, the Philippines, Japan, and a few villages in southern Thailand.

THE PARASITES

A basic understanding of the life cycle of the parasites, called schistosomes, and the characteristics of each phase is the first step in preventing the disease

**(see
Figure 1) .**

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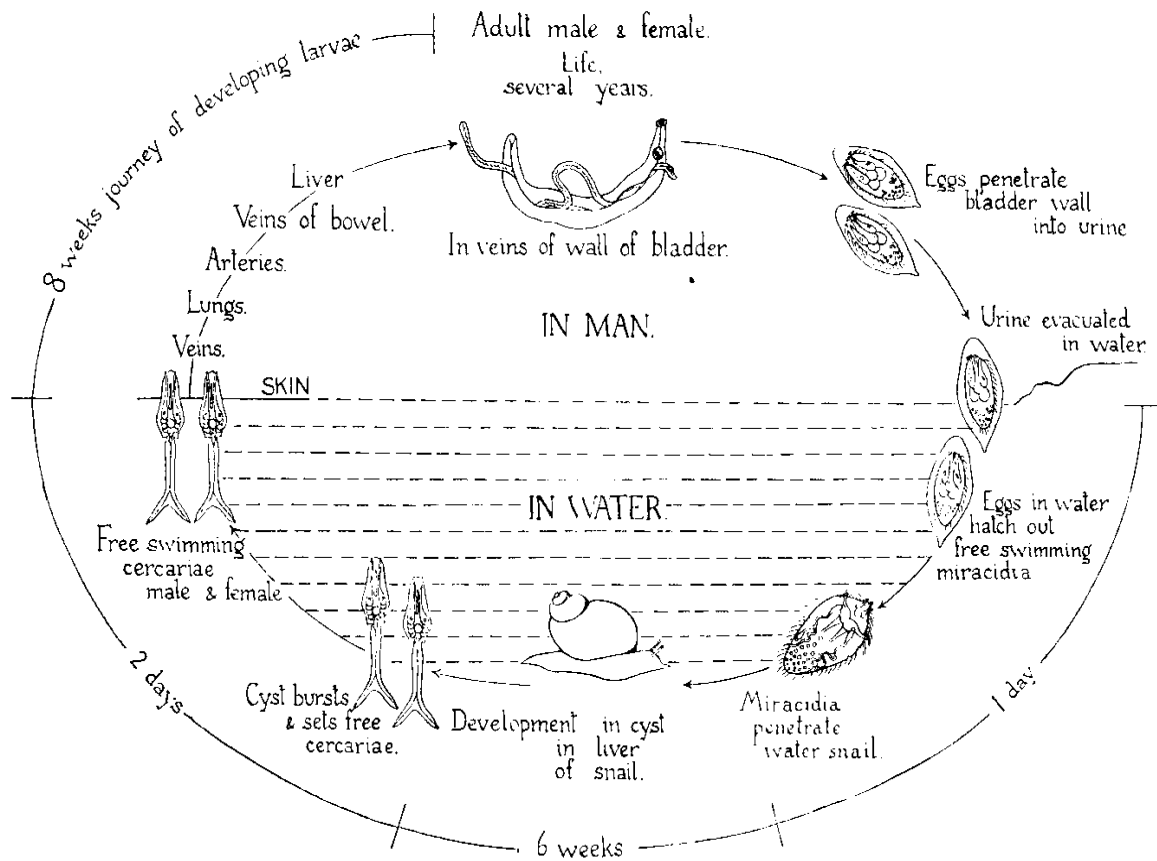


FIGURE 1 —The life cycle of *Schistosoma haematobium* (Bilharzia). A blood fluke.

The disease has been found, besides in humans, in baboons, monkeys, rodents, water buffalo, horses, cattle, pigs, cats, and dogs. When water is contaminated

by

urine or feces from a victim of the disease, the eggs contained in these hatch out larvae that penetrate certain types of fresh-water snails. In the snail host, the larvae develop into cercariae, which work their way out of the snail and become free-swimming; this is the form that infects people. It can survive in water for a few days under favorable conditions.

The disease is contracted by contact with water containing cercariae. Typical ways are bathing, drinking, washing teeth, washing pots and clothes, walking through water, irrigating, and cultivating crops. Once the parasite has contacted a host, five minutes may be enough for it to penetrate the skin.

It is important to note that bilharziasis cannot be passed from human to human; it depends on the snail intermediary. A victim must live in or have visited an area where the parasite is found.

SYMPTOMS AND DIAGNOSIS

At the spot where the parasite penetrates the host, a red itching eruption lasting several days usually develops. After the host is infected, symptoms relate particularly to the large bowel, the lower urinary tract, liver, spleen, lungs, and the central nervous system. The most characteristic symptoms are bladder and colon irritation, ulceration, and bleeding. Three to 12 weeks after infection, a

victim

will likely develop fever, malaise, abdominal pain, cough, itchy skin, sweating, chills, nausea, vomiting, and sometimes mental and neurological symptoms. Later developments may include frequent painful urination with blood in the urine, dysentery with blood and pus in the stool, loss of weight, anemia, and enlargement of the liver and spleen. Numerous complications are possible.

Typically the acute phase subsides and host and parasite live together over a period of years, sometimes as long as 30, with the host suffering a variety of symptoms of intermittent and variable types. Bladder and bowel troubles are the most characteristic symptoms in this period.

The variety of vague and general symptoms is considerable and may not be very specific. Examination of urine and/or feces is very important; special concentration techniques may be necessary to reveal the eggs. Tissue tests and skin tests can be used by medically-trained personnel to identify the disease.

TREATMENT

The disease can be treated with drugs, but only well-trained persons should undertake to treat a victim. Supportive treatment, which includes good diet, nursing care, rest, and treatment of other ailments and infections, is important.

PREVENTION

The disease can be prevented by:

o Using uncontaminated water-a properly built sealed well or an improved sealed spring is safe. (See section on "Water Resources.")

o However, it is important to remember that all water used must be safe. Never bathe in or touch water you wouldn't drink. Avoid suspected water. If it is necessary to use questionable water, boil it, or treat it with iodine or chlorine. If you must enter suspected waters, wear rubber gloves and wading boots, and put repellent on your skin; insect repellent (either diethyl toluamide or dimethyl phthalate), benzyl benzoate, cedar wood oil, or tetmosol give effective protection for about eight hours if applied to the skin before contact with the water. In case of accidental contact, rub your skin immediately with a dry cloth. Once cercariae have penetrated the skin, no preventive measures are possible.

o Chlorination-Chlorine kills cercariae slowly, but properly chlorinated water systems are almost always free of the larvae. Use 2 halazone tablets in a liter (quart) of clear water; 4 tablets if the water is cloudy. In a water system, use 1 part per million chlorine. Iodine is even more lethal to cercariae. See section on "Chlorination of Polluted Water."

o Filtering-Cercariae are just big enough to be seen with the unaided eye, and can be filtered from the water. However, dependence on filtration is questionable, since improperly made or operated filters will not only allow cercariae to pass, but may even provide a place for the host snail to live. In short, filtering is a poor technique.

o Storage-Storing water at temperatures over 21C (70F) completely isolated from snail hosts for four days will allow the cercariae to die; at cooler

temperatures they may live as long as six days. This is seldom a practical approach.

Eliminating the snail intermediate host is at present the most effective single method of controlling bilharziasis. The following methods are recommended:

- o Use a sealed, covered well or properly developed spring for a water supply. Make sure it is covered; this prevents access of organic matter that snails eat, cuts out light that would allow plants to grow for snail food, and prevents infected people from bathing in or contaminating the water.
- o If surface water must be used, put long-lasting (copper) screens on the intake; draw lake water far from vegetated shorelines, and preferably 2.4m (8') deep; take stream water from a fast moving spot.
- o Be sure filters and reservoir tanks are kept covered and dark and keep them clean.
- o Since snails prefer the stagnant water of canals, irrigation ditches, and dams, control has been possible where the water level in ditches has been varied, where it has been turned off completely for periods, and where canals have been lined with cement or pipes have been used. Although the latter is initially expensive, it pays dividends not only in better health, but also in less water evaporation.
- o Poison the snails with copper sulfate, copper chromate, or other copper salts. Use a dose of 15-30 parts per million by weight of copper and try to hold the copper-treated water over the snails for 24 hours. All or most of the aquatic vegetation should be stripped from the stream bed or pool before

treatment. Results for other than small controlled pools have been poor. Before attempting to treat streams, lakes, or other natural waters, study the reference material and seek experienced help.

RIDDING AN AREA OF BILHARZIASIS

Education is a major step in a continuing campaign against bilharziasis. Basic steps involved in improving your local waters so they will not spread the disease are as follows:

- o Inform yourself. Study this article, locate reference material cited below, consult any available health officials.
- o Learn to identify dangerous snails; for Africa, Professor Mozley's book is very helpful. To find the percentage of snails harboring schistosomes, collect a large sample of suspects (use rubber gloves, repellent, and snail scoop), put individually in test tubes or glass jars of water. Those shedding cercariae are readily detected, as the cercariae (0.5mm long and easily visible to the naked eye) are released in clouds. This test reveals only the snails harboring mature cercariae. Observe precautions at all times when collecting and handling snails!
- o Find dangerous snails locally, collect (again using rubber gloves, repellent, and snail scoop) and kill them. Mail empty shells to an expert to confirm your identification. Visit the expert if possible. Find out about government or other programs and participate in these.
- o Make a personal survey on foot (wearing boots) of local waters, using maps

and keeping exact records to locate all dangerous snails. Local people can often help here. Aerial photographs are also helpful.

o Survey types and intensity of bilharzia present in populace. Differences may help localize infection points. Keep special records for three- to six-year-olds, who are the most recently infected; these records will show most accurately the incidence of new infections.

o Educate the public as much as possible, and get them to participate in the program. Better sanitation facilities, medical care, and improved nutrition are critical, but improved sanitary facilities are worthless if nobody uses them. Encourage people to live in villages away from infected waters, and to construct culverts or bridges at places where paths cross streams. The number of such crossings should be reduced. Any improvement should cater to local customs or offer an attractive alternative.

o Personally supervise, participate in, and measure the effectiveness of poisoning the snails.

o Take continuing steps to destroy the natural breeding places of snails, particularly at sites where humans and snails congregate. For example, the place where a stream crosses a road is a focal point: people stop to drink and bathe; they cook and wash out pots, providing food for snails. The culvert and embankments slow and impound the water, making ideal breeding conditions. Finally, a favorite sheltered place to defecate is under a bridge. Filling in places where water stands, changing drainage patterns, and eliminating snail food sources are possible techniques.

o Maintain a continuing surveillance of focal spots and repeat poisoning periodically when necessary.

Sources:

Mozley, Alan. The Snail Hosts of Bilharzia in Africa: Their Occurrence and Destruction. London: H. K. Lewis & Co. Ltd.

Schistosomiasis, Bulletin No. 6. London: The Ross Institute, The London School of Hygiene and Tropical Medicine.

Acknowledgements:

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In addition, up-to-date information can be obtained from the World Health Organization, Geneva, Switzerland.