# Schistosomiasis

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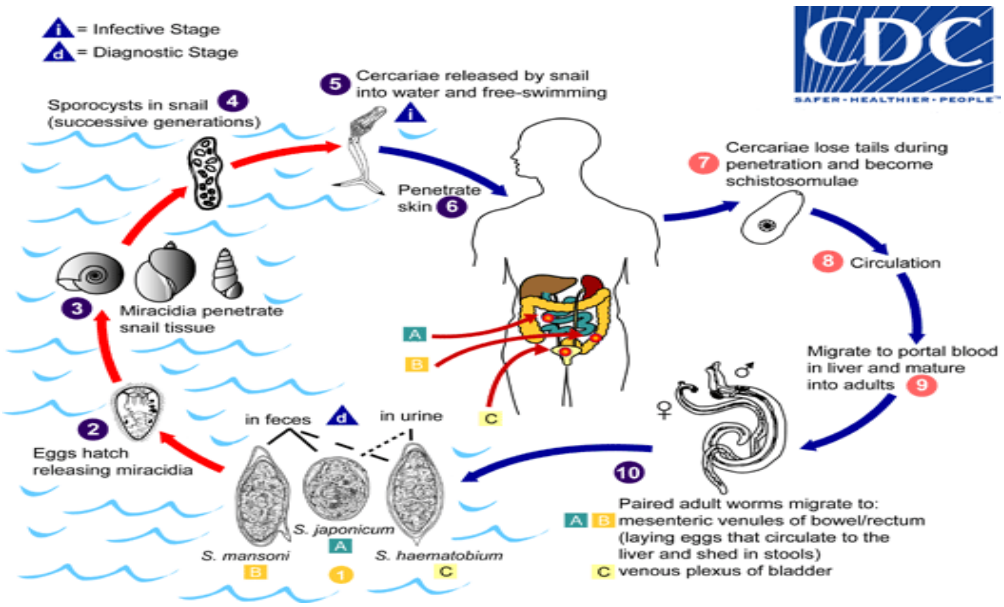
**What you need to know**
Schistosomiasis is an infection by a parasitic trematode, or fluke. The parasite has a complex life-cycle involving at least two hosts, a snail, the intermediate host, and a vertebrate, the primary host. The parasite takes many forms as it matures from eggs to larva to adult form. The disease is also known as Bilharzia named after Dr. Theodor Bilharz a German pathologist who first described it in 1851.

Five species of this parasitic worm have been identified. The three most common are: S. mansoni (the most widespread), S.haematobuim, both of which are mainly in Africa and the Middle East, and S. japonicum in Asia. S.haematobuim affects the urinary tract, kidney and the reproductive systems whilst the other two cause chronic liver and bowel disease.

Once widespread, nowadays 90% of the 230 million affected persons are confined to sub-Saharan Africa. Only half of the affected will be symptomatic and 10% of them will have severe symptoms. However it is a chronic, debilitating disease as the worms can live on average 6-7 years. It is estimated that there are 12,000 direct deaths annually, and 200,000 indirect attributable to Schistosomiasis.




**What causes Schistosomiasis?**
The main pathology of schistosomiasis is not due to the worms, but due to the overwhelming inflammatory local and systemic host response to retained parasite eggs leading to granulomas formation, tissue destruction and fibrosis(scarring). This reaction is the cause of organ damage in the intestinal, bladder, liver, spleen and lung and brain, spinal cord and other tissues. Eggs are produced to be excreted in urine and stool to complete the life cycle of the parasite. Those that are retained in the body attract our cellular immune system agents.

The parasite's eggs are excreted in faeces or urine, and if deposited in fresh water, will hatch into swimming miracidia and penetrate the soft bodies of the aquatic snail to multiply and mature into cercariae, which can penetrate intact human or animal skin once they are released into fresh water.

**Signs and symptoms of infection.**
Most are asymptomatic. Cercarial penetration in most people causes no symptoms. 10% of those affected, will develop an itchy (pruritic) rash termed "swimmers itch". The rash can appear a few hours to a week after the expoure. It is more severe in those with previous contact. In the subcutaneous tissue, the cercariae mature to schistosomes and head for the lung and liver.

**Acute Infection**
Katayama fever may occur 4-12 weeks after infection. It is a severe febrile illness with headaches, chills, cough and myalgia. It is a reaction to the presence of the maturing worms as they migrate from the lungs to the liver.
After 1-2 months in the liver, the schistosomes become sexually mature ready to migrate to their preferred site: veins and venules around the large and small bowel for S. mansoni. Their eggs secrete enzymes that allow them to burrow through the gut epithelium into faeces. For S.haematobuim, they will settle in the bladder venules around the GU tract and there the eggs pass through the bladder epithelium.

**Chronic Disease**
S. masoni causes abdominal pain, diarrhoea mainly in children, sometimes blood in the stools. If the egg fails to exit the ensuing host reaction will trap it. More fibrosis will prevent the eggs from exiting. 20% of chronically infected persons do not pass eggs in the stool. Granulomas and Fibrosis can lead to Polyp formation, ulceration, constipation and obstruction. Liver granulomas cause liver enlargement. This is common in chronic cases and associated with hypertension of the abdominal vessels (portal hypertension), fluid in the peritoneal cavity (ascites), possibly an enlarged spleen. In all cirrhosis will develop in 4-8% of those chronically infected. S. haematobium causes urogenital disease. Here, blood in the urine, haematuria, is the hallmark especially in children. In advanced cases, fibrosis leading to obstruction of kidney outflow will cause kidney damage. Other outcomes are changes in the Bladder epithelium leading to cancer. 1/3 of infected women will have genital disease. The long term consequences may include infertility.

**Embolic disease.**
The eggs can also embolise to other organs through the veins, liver, spleen, lungs, brain or spinal cord. In these locations eggs cannot be shed to the outside. Rarely cases of S. haematobuim and mansoni egg embolism to the spinal cord leading to paraplegia have been recorded.

**Diagnosis**
The mainstay of diagnosis was the microscopic identification of schistosome eggs,in faeces, urine or biopsy. The passage of eggs in urine fluctuates diurnally peaking at noon. Samples of urine are collected between 10-2:00 pm on 3 different occasions. Stool samples are taken on 3 different occasions. In Ghana, most infections are mixed S. Haematobium and Mansoni. Now there are other methods available such as Antibody (serological) tests for cercariae and adult worms. Antibodies are detected 4-8 weeks after infection. However antibodies persist for months and are not useful in the differentiation between a new, persistent or recurrent infections.

Antigen tests have been developed to test for viable parasites products that circulate in blood and are found in urine. A circulating Cathodic Antigen found in urine has a low sensitivity of 85% and becomes negative 5-10 days after treatment. It can be useful for fieldwork.

Molecular or PCR genetic tests: Parasites slough nuclear DNA material into blood. This crosses the kidney barrier and is deposited in the urine as well. Probes for schistosome DNA in urine and blood have produced highly sensitive tests. Studies using PCR tests show that the prevalence of schistosomiasis has been greatly underestimated. The downside is the high cost of the test at present.

**Treatment**
Mono therapy with praziquantel is used worldwide and cures 60-90% (usually 85% is cited) of cases. The drug is effective against the adult worm only. Therefore for an early or low burden of infection it may be prudent to repeat the treatment 2-4 weeks later.

**Prevention**
1) The key is sanitation. Stop the cycle of urinating and defaecating in rivers.
2) Avoid wadding, swimming in all fresh water bodies in Sub-Sahara Africa.
3) Ocean swimming and chlorinated swimming pools are fine. However in Ghana, some hoteliers are using water from rivers and lakes. The type of filters used are not inspected. Chlorine levels on hot days may fluctuate.
4) Bathing water from an untreated source should be boiled and cooled.
5) Drinking water must be boiled or filtered. Iodine tablets are ineffective and although stomach acid would destroy the cercariae, one's lips and mouth are vulnerable.

In conclusion, schistosomiasis causes a great deal of morbidity with the potential for multi system disease. Chronic infection, often asymptomatic, or repeated reinfection is deleterious.