Schistosomiasis: A Neglected Tropical Parasitic Disease of Public Health Concern

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To the Editor

The neglected diseases, which involve diverse etiological agents, such as viruses (chikungunya, dengue, rabies), bacteria (anthrax, bovine tuberculosis, brucellosis, leprosy, leptospirosis, plague), fungi (chromoblastomycosis), protozoa (leishmaniasis, malaria, trypanosomiasis), helminthes (dracunculiasis, echinococcosis, lymphatic filariasis, onchocerciasis, schistosomiasis, taeniasis/cysticercosis), and ectoparasites (scabies) are important diseases from public health and economic point of view (1,2). These diseases are seen in both sexes, all age groups, and in all seasons. In addition, they are responsible for morbidity and mortality worldwide, especially in tropical and sub-tropical regions. According to the World Health Organization (WHO), about one billion people in 198 countries are affected with neglected tropical diseases (1). Neglected diseases are primarily reported in the underprivileged people of the society living in developing nations with insufficient medical facilities and poor environmental sanitation (1,2). Among these, schistosomiasis (bilharziasis and snail fever) is an acute and chronic tropical disease and a neglected helminthic zoonosis of global distribution. The recorded history of schistosomiasis goes back to the year 1851 when the German physician Theodor Bilharz first described it following an autopsy in Egypt (1). Since then, schistosomiasis has been reported from Brazil, Burundi, Cambodia, China, Ghana, Iran, Japan, Jordan, India, Kenya, Laos, Mauritius, Middle East, Niger, Nigeria, Oman, Philippines, Puerto Rico, Rwanda, Saudi Arabia, Sierra Leone, Suriname, Tanzania, Thailand, Tunisia, Venezuela, and Yemen (1,3-6). Over 250 million people are estimated to have contracted the disease globally, with up to 779 million still at risk of infection (1,4). Among African countries, Nigeria has the maximum number of schistosomiasis cases with about 29 million infected people, among which 16 million are children, and about 101 million people are at risk of getting infected (1). Schistosomiasis is an important public health problem in rural Egypt affecting about six million people (3).

Schistosomiasis is a highly debilitating parasitic zoonosis that can lead to chronic illness; it is caused by trematode worms of the genus *Schistosoma* that has several species, including *Schistosoma guineensis, Schistosoma intercalatum, Schistosoma japonicum, Schistosoma haematobium, Schistosoma mansoni,* and *Schistosoma mekongi* (1,5). Out of these species, three species of *Schistosoma,* namely *S. haematobium*, *S. japonicum,* and *S. mansoni* are commonly implicated in the etiology of human schistosomiasis (3).

Natural infection due to *Schistosoma* is recorded in humans and many species of animals, which include cattle, buffalo, antelope, goat, horse, pig, monkey, cat, dog, gerbil, pig and wild ruminants (5). Transmission of infection in humans occurs when cercaria (larvae)
released by fresh water snails penetrate through the skin following contact with infested water (5,6). Cercaria develops in snails that remain in water (5). It is important to cite that children, adolescents, and adults are at risk of getting infected if they are exposed to contaminated water bodies (1). Women who are doing domestic jobs in infested water, such as washing the clothes, are also at risk and can develop female genital schistosomiasis (6).

The incubation period for patients with acute schistosomiasis is generally 14-84 days (1). The disease is characterized by intestinal, hepato-splenic, urogenital, and central nervous system manifestations (1). Clinical spectrum in humans includes fever, loss of appetite, headache, weight loss, weakness, chill, diarrhea, abdominal pain, coughing, dyspnoea, vomiting, anemia, ascites, visual impairment, epileptic seizures, ataxia, hydrencephrosis, eosinophilia, hepatosplenomegaly, haematuria, dysuria, painful urination, and purpuric dermatitis (3,5,6). The fever may last for 1-7 days in mild and 8-30 days in severe cases. Blood in the urine is the main clinical manifestation of urinary schistosomiasis. The enlargement of the liver is frequently observed in advanced cases of schistosomiasis (1). Chronic infection may affect the ability of people to work, and in some cases death can occur (6). Genital schistosomiasis has been linked with increased risk of HIV infection (1,6).

The affected animals may show anorexia, diarrhea, dysentery, anemia, splenomegaly, dehydration, weight loss, and emaciation besides eosinophilia and liver fibrosis (1).

Diagnosis of the disease requires both clinical and laboratory tests. Computed tomography (CT), and particularly magnetic resonance imaging (MRI), are useful in neuroschistosomiasis. Ultrasonography is a precious device for monitoring the direct effect of interventions on schistosomiasis morbidity (1). Proctoscopic examination may reveal the nodules and ulcerations. Characteristic eggs of Schistosoma spp. can be demonstrated in the feces, urine, and biopsy specimens. Immunological tests, such as compliment fixation, flocculation, precipitation haemagglutination, indirect fluorescent antibody test, and enzyme-linked immunosorbent assays (ELISAs) may be applied to diagnose the disease. Intradermal tests show immediate hypersensitivity (5). Recently, PCR-based methods to detect parasite DNA in stool or urine are being employed for diagnosis of the disease (1).

Microscopic detection of eggs in the feces is considered the simple and low cost diagnostic method that can be routinely employed at the primary health care centre where the facilities for immunological and molecular techniques are not available in the laboratory (1).

A number of drugs including metrifonate, oxamniquine, praziquantel, and niridazole are used to treat schistosomiasis cases (3,5). Presently, praziquantel is considered the main treatment. The drug is considered safe and effective against adult worms of all the six species of Schistosoma that infect humans. However, this anti-schistosomal drug fails to prevent re-infection, and there is also a concern of emergence of drug resistance (1). Moreover, about 90% of people in need of schistosomiasis treatment live in African countries (6).

Further research should be conducted to find a chemotherapeutic agent that may not develop drug resistance against this parasite.

Currently, no vaccine is commercially available to immunize the susceptible population. Several measures, which include proper disposal of urine and feces, provision of safe and wholesome drinking water, avoidance of contact with contaminated water, application of molluscicides in snail breeding areas, mass chemotherapy of affected individuals in endemic areas, and health education of people about the severity of disease, mode of transmission, and environmental sanitation will certainly mitigate the prevalence and incidence of this helminthic zoonosis (5). Children should avoid swimming in the contaminated water. Travelers visiting endemic area are advised not to engage in activities involving direct contact with water. Schistosomiasis control has been successfully implemented over the past 40 years in several countries (6).

There is a need to develop potent, safe, and low cost vaccines that can be easily affordable by low-income countries to immunize the communities at risk. Moreover, a multifaceted approach is required to control this neglected helminthic disease.

Conflict of Interests
None declared.

Ethical Issues
Not applicable.

References