

## Perspective

# Prospects and problems of implementation research on soil transmitted helminths infection in Bangladesh

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## Abstract

Soil-transmitted helminths are responsible for diseases that thrive where there is poverty and disadvantage. Although rarely fatal, it is recognized as a leading global cause of lifelong disability. To achieve the target set by World Health Assembly, efforts must be intensified to eliminate STH as a public-health problem. Accumulated scientific knowledge and the availability of safe anthelmintics such as mebendazole and albendazole laid the foundation for a global strategy to control STH. However, there are several foreseeable challenges and risks to the success of an MDA-based transmission interruption strategy for STH. Continued progress toward global STH elimination will require solutions to potential obstacles in the most challenging— that is, the poorest—endemic settings like Bangladesh.

**Keywords:** Soil transmitted helminths; Mass Drug Administration; Bangladesh

## New government commitment

Populations in different parts of the world face diverse parasitic challenges. Human societies have always been challenged by infectious diseases, some of which are caused by helminths and protozoan parasites. In fact, one fourth of the known human infectious diseases are caused by the helminths or protozoan group. In recent history, this relationship has been influenced by global changes in the human socio-cultural spectrum. In the modern world, parasitic diseases are conveniently associated with under- developed countries, and the developed world has conventionally viewed itself as “an island free of parasites” (1). However, with the emergence of immunocompromised populations, combined with an increase in life expectancy, parasitic infections have started to reappear on the

infectious disease in the developed world. The diversity of parasites endemic in any area is influenced by a variety of factors. These factors can be divided into social, cultural, economic, and environmental factors and the life cycle features of parasites, such as the nature of the environmental stage. Transmission and spread of these parasites is influenced by the availability of clean water, socio-economic conditions, education, personal and public hygiene practices, temperature, humidity, and survival of the environmental stages of the parasites (2).

Bangladesh have committed themselves to achieving the Sustainable Development Goals by 2021, just five short years away. Governments have pledged to improve the quality of education; raise rural incomes and invest in economic development; increase agricultural productivity; and improve the health and nutritional status of their

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citizens, especially mothers and young children. Despite substantial improvements in health in recent years, Bangladesh faces several challenges, including limited and inequitable access to health services, lack of adequate resources to meet the demands of the population and an increasing burden of non-communicable diseases (3). While many efforts are underway to meet these pledges, a group of neglected diseases are afflicting vulnerable and marginalized populations, and still represent an outstanding debt with the region's development, standing as an obstacle to ultimate success.

Soil-transmitted helminthes (STHs) infections are among the most common infections worldwide and affect the poorest and most deprived communities. They are transmitted by eggs present in human feces which in turn contaminate soil in areas where sanitation is poor. At least 120 countries across the tropics and subtropics are endemic and at least 1.3 billion people are at risk of these parasitic infections. STHs infection is found mainly in areas with warm and moist climates where sanitation and hygiene are poor, including in temperate zones during warmer months. These STHs are considered Neglected Tropical Diseases (NTDs) because they inflict tremendous disability and suffering yet can be controlled or eliminated (4).

## Global support and availability of drugs

The battle between human populations and infectious agents is eternal. The Global Network for Neglected Tropical Diseases, World Health Organization (WHO) along with UNDP and World Bank are prepared to support countries in developing comprehensive approaches to combat these chronic diseases. As we are intensifying our war against infectious diseases, the number of new helminthic parasites are emerging at a greater rate. Moreover, helminthic parasites should not be considered exempt from emergent drug-resistant strains of parasites, which will continue to afflict the poverty-stricken/vulnerable masses around the globe. During the last few decades, more than five drug-resistant helminthic parasites have emerged (1). Currently, a number of agencies and organizations/foundations are participating in the fight against parasitic diseases. Recently, combination therapy (use of drugs with different modes of action) has been suggested to lower the development of resistance. In the context of a high probability of re-infection, chemotherapeutic interventions can not ensure sustainable control of intestinal parasites. Vaccination could be a better choice for the sustainable control of intestinal parasites. Vaccination has been reported in the control of hookworm in animals (5).

In this circumstances, scientific evidence and data on the burden of these conditions and the cost-effectiveness of existing interventions will encourage to do more in

the fight towards a generation of children free from parasitic infections. Models for integrating deworming with other health and social welfare programs, at low cost and with great efficiency will need to reach the goal. Local, national, and regional leadership will need if we want to meet the Sustainable Development Goals by 2025. Bangladesh has strong history of implementing successful programs to defeat polio and rubella, and now well poised to address the treatment gap of children affected by intestinal parasites. Despite successful implementation of health information and communications technologies in Bangladesh, challenges still exist – such as technical problems, definition of services and standards across organizations and financial viability. Common standards for health information and communications technologies are needed to facilitate data management and sharing among different databases. Together, with mobilized political will and the awareness of key partners and people affected, we can truly end the neglect of these diseases. So, research and innovation regarding STHs, to implementation of community practices, as well as to national and international funding will have essential contribution to the sustainable development of the region.

Chemotherapy as a rapid-impact intervention is a good strategy for immediately improving the lives of poor populations in Bangladesh. Effective chemotherapeutic drugs have been developed and extensively tested against most of STHs infection. In addition, the success of the chemotherapy program for controlling STHs infection relies on repeated and widespread administration of these drugs in endemic areas, which can lead to the emergence of drug resistance in these parasites (6). From the history of health education and sanitation interventions used for controlling neglected intestinal parasitic diseases around the world, it is obvious that while chemotherapy is the best option for rapid intervention and morbidity control, the role of hygiene interventions to sustain the long-term benefits of chemotherapy should not be overlooked. In this regard we can benefit from the lessons learned in the field of bacteriology, where the indiscriminate use of antibiotics has resulted in the emergence of a large number of bacterial strains that are resistant to a wide range of antibiotics. Currently available technical/ scientific information on hand washing practices is primarily focused on preventing the transmission of bacterial and viral infectious diseases and little information on the impact of hand-washing on the transmission of intestinal helminthes parasites is available. This is a serious scientific lapse because nematoidal ova are highly resistant in the environment and are expected to survive a long time on hands. Hands are of paramount importance in public health because they are easily contaminated in daily life and the contaminating pathogens are readily transferred to other surfaces (7).

## Integration into routine programs

The good news is many governments and other groups are already conducting deworming campaigns, yet significant coverage gaps remain in some areas of the country. Deworming interventions, however, can be easily integrated into various existing programs that many countries and their partners are already implementing in health, nutrition, immunization, education, water and sanitation, and income support (8). While the efforts to control STHs infection in Bangladesh is worthwhile, the incidence of such parasites in inner cities and rural/native communities requires closer investigation. Therefore,

un-conventional strategies are required to assess the occurrence of neglected intestinal parasites. For example, stool samples from school-aged childrens can be surveyed to investigate the extent of STHs infection. Likewise, an out-of-the-box approach is needed to control the incidence of intestinal parasites. In my opinion, it is high time that a holistic approach is adopted to combat this global menace. In order to achieve a global and sustainable STHs control program, its recommend fighting this war on multiple fronts, including: (1) mass education on hygiene practices, (2) improving personal and public health conditions, and (3) large-scale deworming campaigns, along with efforts to develop effective vaccines against major STHs.

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### Short biography of the author:

Tilak Chandra Nath currently working as an Assistant Professor in the Department of Parasitology at Sylhet Agricultural University, Bangladesh. He obtained his MPH degree from Universitas Gadjah Mada, Yogyakarta, Indonesia under WHO TDR fellowship. Before that, he pursued his MS in Parasitology degree from Sylhet Agricultural University. He has published several scientific articles in professional journals and conference proceedings. Dr. Nath's field of expertise is parasitology with focuses to implementation research and capacity building. His current research is focuses on elimination of Neglected Tropical Diseases. He received several competitive research grants.

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