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Editorial: The role of diagnostics in eliminating schistosomiasis as a public health problem: trend and need

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Editorial on the Research Topic

The role of diagnostics in eliminating schistosomiasis as a public health problem: trend and need

The World Health Organization (WHO) road map for Neglected Tropical Diseases (NTDs) 2021–2030 specifically targeted the global elimination of schistosomiasis as a public health problem (1). *Schistosoma mansoni* and *S. haematobium* are the two major human schistosome species in Africa. They are often sympatric, and their concurrent chronic infection is debilitating. Schistosome infections can lead to various complications, including liver fibrosis, bladder damage, and urogenital problems in both adults and older children, thus increasing the overall burden of the disease in a community. The primary disease control intervention strategy has been Mass Drug Administration (MDA), via the only available drug Praziquantel (PZQ), commonly used to treat both above-mentioned human schistosome species. Diagnostic sensitivity is critical for the assessment of the effectiveness of MDA programs (2). WHO also emphasizes the need for diagnostic tests with high specificity and improved sensitivity (3–5).

Currently, most studies detect *S. mansoni* infection by using direct examination methods, such as Kato-Katz (KK), based on stool smears, or the stool centrifugation process, or the circulating cathodic antigen (CCA) test based on urine. For *S. haematobium*, urine filtration microscopy and haematuria (blood in urine) have traditionally been used. However, these tests are insensitive, time-consuming, and expensive, especially in low levels of infections (6, 7) because of MDA. The accurate disease burden, cure rate, and overall disease prevention could provide advocacy for the inclusion of all age groups in the

schistosomiasis MDA program, which can result in timely and effective management of the disease.

This Research Topic features articles on 1) Current innovation in diagnostic efficacy for surveillance, 2) Dual Schistosome species detection by sensitive and specific diagnostics, 3) Usage of diagnostics for present Schistosomiasis surveillance in endemic countries, and 4) Current usage of diagnostics for determination of control effort efficacy for Schistosomiasis in endemic countries.

Wallemacq et al. present a case report describing an outbreak of asymptomatic schistosomiasis among 15 Belgian students who bathed once in Lake Kivu, Rwanda. Post-exposure (18–20 months) serological tests conducted on the students showed 12 positives despite no acute or chronic symptoms being experienced, and no *Schistosoma* eggs were detected in stool samples. Only one case with eosinophilia was identified, incidentally during surgery for appendicitis, which revealed liver granulomas. This study underscores the risk of asymptomatic infection from single freshwater exposures in endemic areas and recommends routine screening for travellers regardless of symptoms. This highlights the limitations of the current diagnostics and indicates the importance of follow-up care.

Chiombola et al. evaluated the impact of three rounds of mass drug administration (MDA) using praziquantel for adult *Schistosoma mansoni* infections across 20 villages in Ukerewe Island, Tanzania. Over 100,000 adults were treated 3 times between 2021 and 2023. Treatment coverage exceeded the WHO-recommended 75% in all rounds. Results showed a significant decline in infection prevalence from 30.4% to 9.5% and a 24.1% reduction in infection intensity. The proportion of heavily infected individuals decreased by 81%. While the MDA was generally effective, some villages remained with prevalences above 10%, indicating a need for continued MDA with effective diagnostics and complementary water, sanitation, and hygiene (WASH) interventions.

Tolera et al. investigated the prevalence, intensity, and associated factors of *Schistosoma mansoni* infection among 338 primary school children in Nono District, Southwest Ethiopia. The overall infection rate determined using Kato-Katz was 21.5% and most of the cases had light to moderate intensity. Key risk factors included not wearing shoes, using river or spring water for drinking, open defecation practices, frequent bathing in open water sources, and a lack of knowledge regarding transmission. Children from households without latrines were eight times more likely to be infected. The study emphasizes the need for health education, improved sanitation, clean water access, and the detection of such moderate to low-level infection through effective diagnostics to reduce schistosomiasis transmission in endemic areas.

Tetteh et al. aimed to improve the early detection and management of Female Genital Schistosomiasis (FGS) in Ghana by addressing knowledge gaps among healthcare workers and community members. Using a five-step Implementation Mapping approach in Lower Manya-Krobo and Shai Osudoku Municipalities, the researchers conducted needs assessments involving over 1,100 participants to identify misinformation and gaps in FGS-related

knowledge and practices. With stakeholder input, they developed tailored health promotion strategies, including multilingual posters, jingles, screening tools, and training sessions. The intervention enhanced FGS awareness, diagnosis, and management, highlighting the importance of context-specific, evidence-based approaches and the need for ongoing monitoring to ensure sustainability and broader applicability.

Schistosomiasis has been a significant public health issue in Senegal for nearly four decades. Kane et al. stated that while mass drug administration (MDA) with praziquantel is the main control strategy, shortages of the drug limit its availability for all at-risk groups. In regions with permanent water bodies and constant water contact, reinfection is common, making it difficult to sustain progress after treatment. Despite nearly 10 rounds of MDA over the past 20 years, maintaining low prevalence remains a major challenge.

WHO aims to eliminate schistosomiasis as a public health problem by 2030, as outlined in its roadmap for NTDs. Achieving this goal requires highly sensitive and specific diagnostics, particularly for detecting low-level, chronic, and asymptomatic infections that commonly used methods, such as KK and urine filtration, often miss. These limitations obstruct accurate assessments of disease burden, treatment outcomes, and ongoing transmission, especially in communities undergoing MDA with praziquantel. Numerous studies emphasize the need for better diagnostics. For instance, Belgian students exposed to a single freshwater source in Rwanda tested positive months later, despite being asymptomatic, highlighting the shortcomings of standard tests. In Tanzania, repeated MDA lowered prevalence, but constant hotspots illustrated the requirement for improved surveillance using accurate diagnostic tools. In Ethiopia, most infections among children were light to moderate and would benefit from more effective detection tools. Efforts in Ghana to enhance the recognition and diagnosis of FGS demonstrated the value of community-based, targeted interventions. Senegal's challenge with reinfection despite multiple MDA rounds underscores the necessity of accurate diagnostics. Overall, improved diagnostic tools are crucial for monitoring progress, guiding interventions, and supporting the WHO's 2030 elimination target.

Author contributions

NL: Conceptualization, Writing – original draft, Writing – review & editing. JM: Writing – original draft, Conceptualization, Writing – review & editing. MC: Conceptualization, Writing – review & editing.

Conflict of interest

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