Title: Evaluation of surveillance-response interventions for *Schistosoma haematobium* elimination on Pemba Island, Tanzania: A 4-year intervention study with repeated cross-sectional surveys

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Abstract

Background: The WHO aims to eliminate schistosomiasis as a public health problem worldwide by 2030. Pemba Island, Tanzania, achieved this goal in 2017 and is now targeting interruption of transmission. In most parts of Pemba, the *Schistosoma haematobium* prevalence is below 3%. Mass drug administration of praziquantel no longer seems justified. Instead, we implemented a surveillance-response approach with targeted interventions in low-prevalence areas. Here, we assessed the sensitivity of the surveillance-response approach to identify and treat all infected individuals in the area and its impact for elimination.

Methods: In the 4-year SchistoBreak project, annual cross-sectional surveys in schools and communities were conducted to identify low-prevalence and hotspot areas and implement interventions accordingly. In low-prevalence areas, a surveillance-response approach was implemented, where, in a first step, children in primary and Islamic schools were screened for *S. haematobium* infection. Subsequently, positive-tested children were treated with praziquantel and accompanied to their homes and the water bodies they used. Testing for *S. haematobium* was offered to household members and individuals at water bodies, and treatment to those who tested positive. Snail surveys were conducted at the water bodies to search for *Bulinus*, and if found, niclosamide was applied. To assess the sensitivity of the surveillance-response approach, the number of positive-tested individuals in the interventions was divided by the estimated number of infected individuals in the whole study area, as determined by cross-sectional surveys and population census data.

Results: In 2021, the baseline *S. haematobium* prevalence in 15 low-prevalence areas was 0.5% (7/1552) in schoolchildren. After one year of surveillance-response interventions, the prevalence decreased to 0.4% (6/1653). In 2022, the prevalence of schoolchildren in 16 low-prevalence areas was 0.6% (12/2123) and changed to 0.7% (15/2240) in 2023 after the interventions. In 2023, the prevalence in 17 low-prevalence areas was 0.4% (8/2287) and changed to 0.8% (9/1103) in 2024. In 2021, the baseline *S. haematobium* prevalence in 15 low-prevalence areas was 0.5% (14/2969) in community members. After one year of surveillance-response interventions, the prevalence changed to 0.7% (19/2928). In 2022, the prevalence of *S. haematobium* in 16 low-prevalence areas was 0.6% (18/3175) and dropped to 0.3% (10/2979) in 2023 after the interventions. In 2023, the prevalence in 17 low-prevalence areas was 0.4% (12/3255) and changed to 0.7% (22/3014) in 2024. The sensitivity of the surveillance-response approach to identify and treat all individuals estimated to be infected with *S. haematobium* in the population of the study area was 96.3% for schoolchildren, 3.7% for adults, and 56.0% overall. In 26.2% of the water bodies that were surveyed based on children's use, *Bulinus* were found and niclosamide was applied.

Conclusion: The surveillance-response interventions showed a very high sensitivity in identifying and infected children but not adults. Many water bodies were discovered and treated with niclosamide that serve as habitats for *Bulinus*. However, while surveillance-response interventions maintained the low *S. haematobium* prevalence in the study area, they did not result in transmission interruption within three years.