

Comparison of individual and pooled urine samples for estimating the presence and intensity of *Schistosoma haematobium* infections at the population level

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Statement of the problem: We lack cost-effective diagnostic strategies to evaluate whether mass drug administration (MDA) programs to control *Schistosoma haematobium* progress as anticipated. The purpose of this study is to provide a proof-of-principle for examination of pooled urine samples as a strategy for rapid assessment of presence and intensity of *Schistosoma haematobium* infections at the population level.

Methodology: A total of 640 urine samples were collected from 520 school-aged children. Individual and pooled urine samples were screened using the filtration technique to determine the number of *S. haematobium* eggs in 10 ml of urine. Samples were pooled into pools of 5 ($n = 128$), 10 ($n = 64$) and 20 ($n = 32$) individual samples. The sensitivity and urine egg counts (UECs) of a pooled examination strategy was calculated for each pool size.

Findings: The sensitivity of a pooled examination strategy was 50.6% for pools of 5, 68.6% for pools of 10 and 63.3% for pools of 20. The sensitivity of a pooled examination strategy increased as a function of increasing mean UEC of the corresponding individual urine samples. For each of the three pool sizes, there was a significant positive correlation between mean UECs of individual and those


obtained in pooled samples (correlation coefficient: 0.81–0.93). Examination of pools of 5 provided significantly lower UECs compared to the individual examination strategy (3.9 eggs/10 ml urine versus 5.0 eggs/10 ml urine). For pools of 10 (4.4 eggs/10 ml) and 20 (4.2 eggs/10 ml), no significant difference in UECs was observed.

Conclusions: Examination of pooled urine samples applying urine filtration holds promise for rapid assessment of intensity of *S. haematobium* infections, but may fail to detect presence of infections when endemicity is low. Further investigation is required to determine when and how pooling can be optimally implemented in monitoring of MDA programs.

Speaker Biography

Abraham Degarege has several years' research experience on studying the epidemiology of malaria and helminth coinfection and evaluating the performance of different techniques for the diagnosis of helminth and Plasmodium parasites. His findings help to understand the nature of interaction between helminth and Plasmodium and improve diagnosis of helminth infection. His recent research on the diagnostic performance of the pooling techniques indicated new cost effective strategy for the rapid assessment of *Schistosoma haematobium* infections at a population level. This pooling strategy will help to evaluate whether the current mass deworming programs to control *Schistosoma haematobium* progress as anticipated.

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