Short Report

Comparisons of schistosome and geohelminth infection prevalences in school-aged children from selected areas of Africa: implications for rapid assessment and combined control

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School-based control programmes against schistosome and geohelminth infections have been identified as a highly cost-effective public health strategy (SAVIOLI *et al.*, 1997). The cost-effectiveness of this approach is said to be maximized by combining control of both types of infection, using 2 drugs: praziquantel and a benzimidazole derivative. Preliminary analyses (BUNDY *et al.*, 1991) demonstrated that the geographical distributions of geohelminth and schistosome infections overlap sufficiently at the national level to warrant consideration of combined control of both types of infection. However, since infections of schistosomes and geohelminths are unevenly distributed within countries, such an approach will be cost-effective only when the 2 types of infection are endemic in the same communities. The benefits from combined control will be further determined by the ability to identify target communities for treatment using rapid assessment methods. A questionnaire-based method exists for *Schistosoma haematobium* (LENGELER *et al.*, 1992), and there is increasing evidence that a similar approach may be possible for *S. mansoni* (HAILU *et al.*, 1995; BOOTH *et al.*, 1998). Unfortunately, no comparable approach exists for the geohelminths, and parasitological screening remains the only option, though it is expensive and time-consuming. If the prevalence of schistosome infection could be used to predict the prevalence of geohelminth infection this would improve the efficiency of targeted control programmes.

In an effort to investigate this issue, an exhaustive search was made of all published prevalence surveys undertaken among school-aged populations in East Africa (Kenya, Tanzania, Ethiopia and Uganda) and West Africa (coastal countries of Cameroon, Nigeria, Ghana, Côte d'Ivoire, Liberia, and Sierra Leone). These countries were selected because there exist extensive data and they represent different ecological zones of Africa. Data were derived from computerized literature searches of MEDLINE and CAB Health databases using keywords relevant to helminth species infection, scrutiny of appropriate journals taken by the London School of Hygiene and Tropical Medicine and Oxford University, and with the help of colleagues in Africa. The search included only cross-sectional studies that had an adequate sample size ($n > 30$), with the present analysis including surveys which reported data on schistosome and geohelminth prevalence. Non-parametric Spearman's rank analysis was used to test the significance of associations between the different species. Significance was tested at the 5% level.

The search located 42 publications with data on the prevalence of schistosomes and geohelminths in school-aged children, covering 139 sites in East Africa and 98 sites in West Africa. Relationships between the prevalences of *S. mansoni* and *S. haematobium* and each of the 3 main geohelminth infections (*Ascaris lumbricoides, Trichuris trichiura* and hookworms) in East and West Africa are shown in the Figure. In many areas the prevalence of schistosome infection was extremely low, and communities with high prevalence were restricted to a limited number of foci. Nonetheless, the data demonstrate clearly that the distribution of schistosome infection is largely independent of the distribution of each geohelminth species in the study countries. A similar pattern was observed even when the analysis was undertaken for each country separately. In accordance with previous work (BOOTH & BUNDY, 1992), the analyses also showed a highly significant association between *A. lumbricoides* and *T. trichiura* prevalences ($P < 0.0001$) (data not shown), but here the relationship was demonstrated clearly for school-aged children. No significant relationship was observed between the prevalences of *S. haematobium* and *S. mansoni* infections in West Africa (data not shown).

Overall, these results suggest that schistosome and geohelminth infections are independently distributed within countries where they are both endemic. It follows that the prevalence of *S. haematobium* or *S. mansoni* infections cannot be used to predict the prevalence of geohelminth infections, and vice versa. Reported gastrointestinal symptoms also appear not to be associated with geohelminth infections (BOOTH *et al.*, 1998), confirming that parasitological screening, which adds obvious costs to any programme, is still necessary for estimating community prevalences of geohelminth infection. The results also reduce the prospects for a single strategy aimed at the combined control of both schistosomes and geohelminths on a national scale. Our observations therefore suggest that a more refined approach to combined control is required, whereby target communities are identified separately for intervention against schistosomes and geohelminths and drugs are distributed according to local needs.

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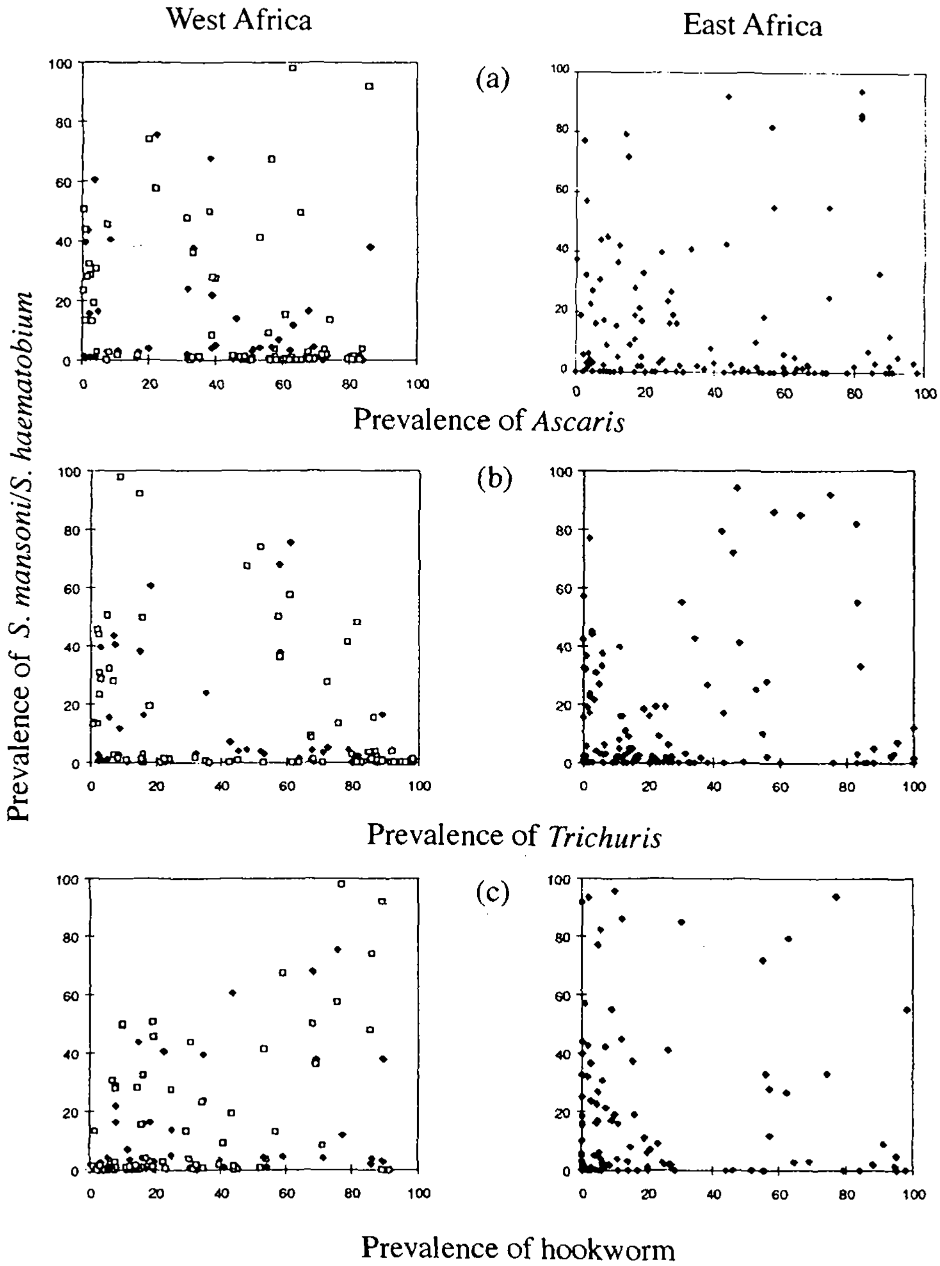

Figure. Comparative prevalences of *Schistosoma mansoni* and *S. haematobium* with *Ascaris lumbricoides* (a), *Trichuris trichiura* (b) and hookworm (c) in East and West Africa. (◆) *S. mansoni*; (□) *S. haematobium*. The reference list for the data sources is available from the authors.

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