

Self-diagnosis as a possible basis for treating urinary schistosomiasis: a study of schoolchildren in a rural area of the United Republic of Tanzania

Partnership for Child Development¹

A questionnaire for schoolchildren about symptoms of urinary schistosomiasis is becoming widely used to identify schools where the prevalence of infection with *Schistosoma haematobium* is greater than 50%, the threshold for applying mass treatment. This strategy typically leaves many schools without treatment even though some of the children have urinary schistosomiasis and blood in urine. We examined data collected during an evaluation of a school health programme in Tanga Region, the United Republic of Tanzania, to determine whether self-diagnosis could be used as a basis for giving treatment. Over 2300 children in 15 schools were asked by a nurse whether they had *kichocho* (urinary schistosomiasis) and their answers were compared with the results of tests for visible and occult blood in urine, and microscopy for *S. haematobium* eggs. An average of 75% of children were correct in their self-diagnosis (95% confidence interval (CI) = 72–78%), while 3% gave a false-positive diagnosis (95% CI = 2–4%). The remaining 22% gave a false-negative diagnosis (95% CI = 20–25%) and would not have been treated, although most of these children were lightly infected. These proportions were independent of a wide range of prevalence levels (7–77%) and intensity of infection (23–827 eggs per 10 ml of urine). Self-reported schistosomiasis might thus be used to treat children in schools where mass treatment is not applied.

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Introduction

School health services are potentially among the most cost-effective of public health programmes in developing countries (1). Also, treating children with anthelmintic drugs is one of the most attractive health services that can be provided in schools, for a number of epidemiological, clinical, and practical reasons. First, school-age children typically harbour the heaviest infections with many species of worms, and such children appear to contribute most to the transmission of infections in their communities (2, 3). Second, the disease caused by moderate-to-heavy worm burdens can affect children's growth and nutritional status (4) and, even perhaps, absenteeism (5), cognitive function, and school achievement (6, 7). Treating worms during the school-age years is therefore timely and has the potential to promote

child development (8). Third, the drugs used to treat most species of worms are safe, highly effective and inexpensive, and are administered as single doses (9). Lastly, in many countries where worms are endemic, a large proportion of children are enrolled in school, which makes them accessible to health care delivered through an existing infrastructure (10). The questions which arise in this context are therefore more operational in nature. The Partnership for Child Development has, since its establishment in 1992, worked with the governments of several countries to explore simple, inexpensive methods to deliver anthelmintics to children in schools to treat intestinal worms and urinary schistosomiasis (10).

Urinary schistosomiasis, which is caused by moderate-to-heavy infections with *Schistosoma haematobium*, causes symptoms that include lower abdominal pain and the presence of blood in the urine (11). Of the 100 million people estimated to be infected with *S. haematobium*, 70% live in sub-Saharan Africa (12). In most communities, school-age children harbour the heaviest infections; in some schools in the United Republic of Tanzania, blood has been detected in the urine of up to 80% of children (13).

The recommended treatment for urinary schistosomiasis is praziquantel, typically given as a single dose at 40 mg/kg body weight (14), which keeps treatment simple and ensures compliance. Because praziquantel is safe and highly effective, WHO recommends its use in mass treatment of children in schools where the prevalence of infection with *Schistosoma* spp. is greater than 50% (15).

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Because infections with *S. haematobium* tend to be focal, there is a need to be able to identify schools where mass treatment is required. Diagnosis of the infection by urine microscopy is time-consuming and expensive and requires technical skills; detecting blood in urine is simpler, but still requires urine to be collected and tested using reagent strips costing up to US\$ 0.15 each. Because the symptoms of urinary schistosomiasis are fairly specific, a simple questionnaire administered to pupils by their teachers has been developed which records, among a list of other self-reported health problems, urinary schistosomiasis and the presence of blood in urine. This questionnaire, which was developed in the United Republic of Tanzania (16) and then validated in seven African countries under the auspices of WHO (17), has been found to be a useful tool for identifying schools and communities where mass treatment for urinary schistosomiasis is required. In 1996, the questionnaire was used by the Regional School Health Programme to identify schools in Tanga, Muheza, and Korogwe districts, Tanga Region, United Republic of Tanzania, where the prevalence of urinary schistosomiasis was estimated to be greater than 50%. Validation of the questionnaire using reagent strips and urine microscopy indicated that the prevalence of reported schistosomiasis of 25% was equivalent to a prevalence of infection of 50% (13, 18). Mass treatment was subsequently given to nearly 40 000 children in 153 schools in these districts (19). However, this strategy left 199 schools, with an estimated 66 000 children, many of whom had reported urinary schistosomiasis and blood in their urine, but who were not receiving treatment. This raised the question as to how these children could be identified and given praziquantel by the school health programme.

This article presents data collected during the process of evaluating the questionnaire (18) and assessing the reliability of self-diagnosis by children at an interview (13, 18), with the aim of investigating whether self-diagnosis could be used as the basis for giving treatment to children. Because of concern about infected children who do not report having schistosomiasis, we examined the differences between the sexes in terms of the reliability of self-diagnosis (20) in order to assess the risks of giving a false-negative self-diagnosis and how this might be overcome in a school health programme.

Methods

The results reported here were obtained as part of a large-scale school health programme in three districts of Tanga Region, which is providing health education and delivering periodic mass treatment with albendazole for intestinal worms and praziquantel for urinary schistosomiasis. The delivery and impact of these services is being monitored and evaluated by *Ushirikiano wa Kumbwendeleza Mtoto Tanzania* (UKUMTA) (Tanzania Partnership for Child Devel-

opment) — an intersectoral collaboration between the Ministry of Health, Education and Culture, Ministry of Community Development, Women Affairs and Children, the Office of Local Government, and national technical institutions.

In order to identify schools where urinary schistosomiasis occurs, the regional school health programme undertook a questionnaire survey in August 1996 in all schools in Tanga, Muheza, and Korogwe districts, Tanga Region. Each schoolchild was interviewed by a teacher and asked about symptoms of recent ill-health, including urinary schistosomiasis (called *kichocho* in Kiswahili) and the presence of blood in urine. The answers were used to calculate the prevalence of self-reported urinary schistosomiasis in each school and the results were validated in 56 schools using reagent strips (18). In Muheza district, a more detailed examination of the relationship between self-diagnosis and infection was carried out. The methods used have been described in detail by Ansell et al. (13) and are only summarized here.

A total of 15 schools were selected to cover a range in the prevalence of reported urinary schistosomiasis of 7–77%. Each school was visited in November 1996 and a female public health nurse interviewed every child individually to ask whether he or she had passed blood in urine during the last week or had experienced *kichocho*. A fresh urine specimen was then collected, examined for visible blood, and tested for occult blood using a reagent strip (Hemastix, Bayer Diagnostics, Basingstoke, England). A 10-ml sample was then passed through a polycarbonate membrane and the number of eggs of *S. haematobium* seen under the microscope was recorded. A heavy infection was defined according to WHO criteria as ≥ 50 eggs per 10 ml of urine (21). Praziquantel was subsequently provided free by the school health programme to all schools in Muheza district to treat children who reported having urinary schistosomiasis.

For the purposes of the analysis presented here, children were classified into two main groups: “correct” or “mistaken” in their self-diagnosis. Children who were “correct” comprised both true positives (self-reported schistosomiasis and eggs seen in urine) and true negatives (schistosomiasis not reported and no eggs seen in urine). Children in the two diagnostic classes who were mistaken in their answer were examined separately: false positive (self-reported schistosomiasis but no eggs seen in urine) and false negative (schistosomiasis not reported but eggs seen in urine). The proportions of children in these categories were then used to explore whether there was a correlation between correct or mistaken self-diagnosis and the prevalence and intensity of infection in each school.

A detailed analysis of the sensitivity and specificity of self-diagnosis by sex and age indicated that older girls are less reliable than boys (19). This observation is examined here in terms of risk ratios for a false-negative self-diagnosis by sex and age.

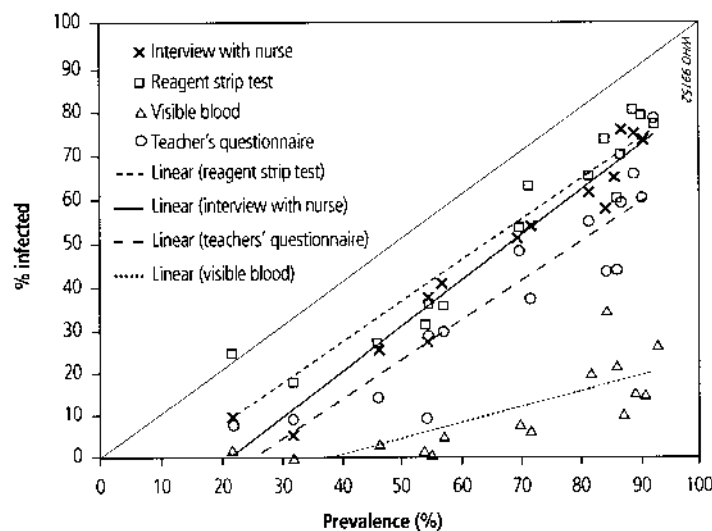
Results

Complete data were analysed for 2356 children in the 15 schools (range, 110–200 children per school). The overall prevalence of infection was 68.2%, and self-diagnosis showed a sensitivity of 67.5%, a specificity of 93.4%, a positive predictive value of 93.4% and a negative predictive value of 56.3%.

Fig. 1 shows the relationship in the 15 schools between the prevalence of urinary schistosomiasis diagnosed by urine microscopy and the four other diagnostic methods. The prevalences estimated by all methods were significantly correlated with diagnosis by microscopy (visible blood, correlation coefficient (r) = 0.76; reported *kichocho* in teacher questionnaire, r = 0.91; reported *kichocho* in nurse interview, r = 0.95; reagent strip test for occult blood, r = 0.98; all P < 0.001). The correlation between the prevalence of infection and reported blood in urine in the questionnaire (r = 0.830) was not as good as with reported *kichocho*, and the line (not shown) diverged from the line of perfect correlation, indicating that the degree of underestimation increased with prevalence. This observation and the analysis of the questionnaire from all schools by UKUMTA had indicated that the question about *kichocho* was a more sensitive and useful indicator of the prevalence of infection in schools than that about blood in urine (18). In contrast, during the interview by a nurse there was 100% concordance in the answers to the two questions, perhaps because the first question, which was about blood in urine, was seen as a leading question for the second, about having *kichocho*. Nevertheless, Fig. 1 shows that the question about *kichocho* in both the questionnaire and the interview underestimated the prevalence of infection by an approximately consistent amount over the range of prevalences observed: for the teacher questionnaire, by 29.2% (95% confidence interval (CI) = 24.5–33.9%) and for the nurse interview, by 19.0% (95% CI = 16.5–21.5%).

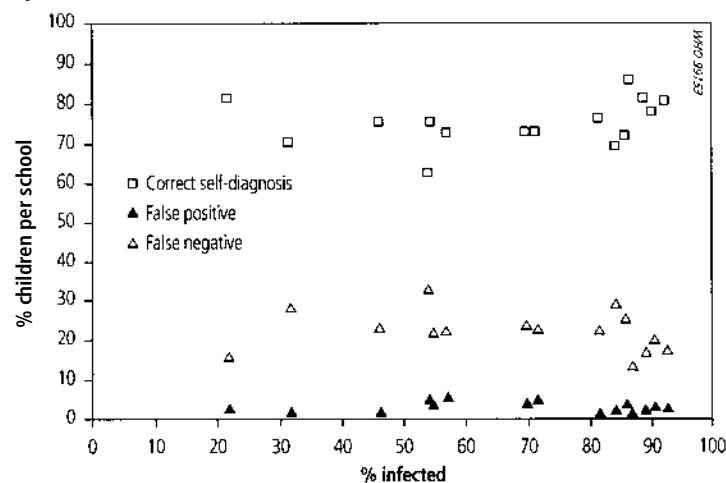
Fig. 2 shows the relationship in the 15 schools between the prevalence of infection as indicated by microscopy and the proportion of children who were correct in their self-diagnosis in the interview with the nurse, as well as the prevalences of false-positive and false-negative self-diagnoses. There was little variation in these proportions across the observed range of infection prevalence, and confidence intervals were narrow: the average proportion of children who were defined as correct in their self-diagnosis (termed efficiency) was 74.7% (95% CI = 71.8–77.7%); the average proportion of children who were defined as false positives was 3.1% (95% CI = 2.5–3.8%); and the average proportion of children who were defined as false negatives was 22.1% (95% CI = 19.5–24.8). Table 1 shows the number of children in each of the four possible diagnostic classes who had blood either visible in their urine or detected using reagent strips. Only 19 (3.6%) of the 523 false negatives had blood visible in their urine, while 28 (36.8%) of the 76 false positives with no eggs seen in their urine had occult

Fig. 1 Relationship between the prevalence of infection with *Schistosoma haematobium*, diagnosed by microscopy of urine, in children in 15 primary schools in Muheza district, United Republic of Tanzania, and the prevalence among the same children determined during an interview with a nurse, by a questionnaire administered by teachers, by observation of blood in urine and by detecting blood in urine using a reagent strip



All correlations were statistically significant ($P \leq 0.001$). The uppermost solid line indicates perfect equivalence between the pairs of variables.

Fig. 2. Relationship between the prevalence of infection with *Schistosoma haematobium*, diagnosed by microscopy of urine, in children in 15 primary schools in Muheza district, United Republic of Tanzania, and the correct or mistaken self-diagnosis of infection by the same children



blood detected in the sample they gave, suggesting that they were infected.

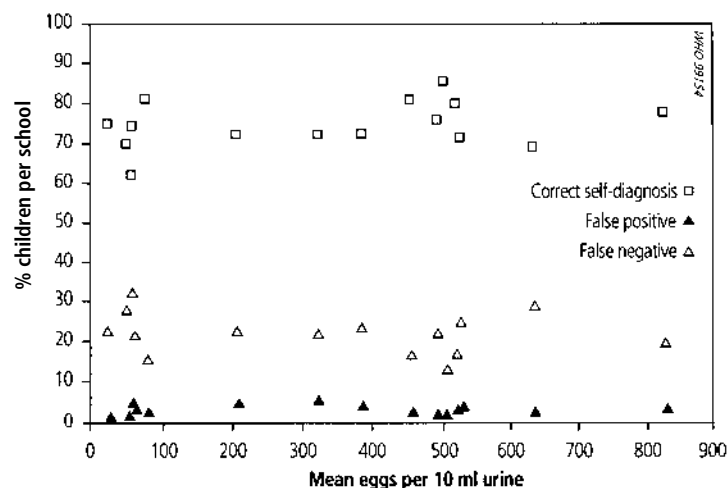
Fig. 3 shows the same diagnostic indices, but against the mean egg counts, and reveals that the relationships were again remarkably uniform across a wide range, from 23 to 827 eggs per 10 ml of urine. Table 1 shows that the mean concentration of eggs in the urine of false negatives was significantly lower than the mean egg count of true positives

Table 1. Number and proportions (%) of schoolchildren in each of four diagnostic classes who had blood seen in their urine or had occult blood detected using reagent strips, together with the mean concentration of eggs of *Schistosoma haematobium* in urine and number of moderate to heavy infections

Self-reported <i>kichocho</i>	Eggs seen in urine	Diagnostic class	No. in class	Visible blood in urine		Occult blood in urine		Eggs/10 ml of urine	
				No.	% of total	No.	% of total	Mean	No. ≥ 50
Yes	Yes	True positive	1085	243 (22.4) ^a	10.3	956 (88.1)	40.6	725	809
No	No	True negative	672	0 (0)	0.0	40 (6.0)	1.7	0	0
Yes	No	False positive	76	2 (2.6)	0.1	28 (36.8)	1.2	0	0
No	Yes	False negative	523	19 (3.6)	0.8	227 (43.4)	9.6	106	173
Total	–	–	2356	264	11.2	1251	53.1	357	982

^a Figures in parentheses are percentages of number in diagnostic class.

Fig. 3. Relationship between the mean concentration of *Schistosoma haematobium* eggs in the urine of children in 15 primary schools in Muheza district, United Republic of Tanzania, and the correct or mistaken self-diagnosis of infection by the same children



(106 vs. 725 eggs per 10 ml of urine, $P < 0.001$), and 67% of false negatives were classified as lightly infected. False negatives were about three times more likely to have a light infection (< 50 eggs per 10 ml of urine) than true positives (risk ratio (RR) = 3.17, 95% CI = 2.72–3.69).

Girls were more likely than boys to be mistaken in their self-diagnosis (RR = 1.53, 95% CI = 1.33–1.77, $P < 0.001$), largely because 63% of the 523 false negatives were female (RR = 1.71, 95% CI = 1.46–2.01, $P < 0.001$). Fig. 4 shows the variation by age and sex of the risk ratios for giving a false-negative self-diagnosis, and reveals that the findings for adolescent girls were mostly responsible for the differences between the sexes.

Among the 76 (3.1%) false positives, there was no significant variation with age, but boys were more likely than girls to give such self-diagnoses (RR = 2.29, 95% CI = 1.49–3.53, $P < 0.001$).

Discussion

Mass treatment of children in schools where a questionnaire has indicated that the prevalence of infection with *S. haematobium* is greater than 50% has been shown to be simple, practical and inexpensive because the questionnaires and drugs can be delivered through the existing school system and can be administered by teachers. The cost of praziquantel treatment in the Tanzanian programme in 1996 was estimated to be US\$ 0.79 per child (19). The use of tablets to treat the minority of uninfected children in such schools is offset by savings in the costs of individual diagnosis and treatment; WHO's recommendation of mass treatment (15) is based on the premise that unnecessary treatment with praziquantel is not harmful.

However, when this strategy was applied in the three demonstration school health programme districts in the United Republic of Tanzania, an estimated 7000 children who had reported having urinary schistosomiasis in 199 schools were not treated because the prevalence of reported schistosomiasis was too low for mass chemotherapy (18). The analysis presented here indicates that an interview with a nurse specifically about symptoms of urinary schistosomiasis can identify about 75% of children who are correct in their self-diagnosis, and that this figure is independent of the prevalence and intensity of infection over the ranges observed. The question as to whether this reliability can be achieved by teachers in a direct interview with each pupil about urinary schistosomiasis, rather than as a questionnaire about general health problems in which the main interest in schistosomiasis is concealed, is currently being investigated. This difference in the context in which the questions were asked may help to explain the differences between the results for the questionnaire and those for the interview shown in Fig. 1, but it is clear that children understand what *kichocho* is, even if, because of the way the teachers asked the questions, it was not synonymous with the presence

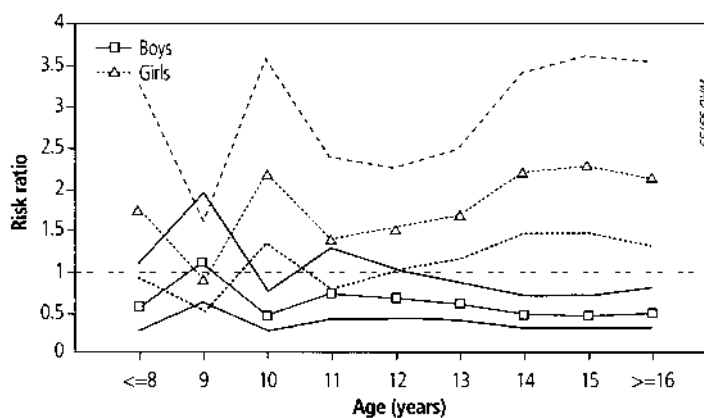
of blood in urine for all children. An analysis of the answers given by 11 500 children to the teacher's questionnaire in 50 randomly selected schools showed that 90.4% gave concordant replies to the questions about *kichocho* and the presence of blood in urine (yes/yes or no/no), 7.5% said they *kichocho* but not blood in urine and, 2.1% said they had blood in urine but not *kichocho* (18). This indicates that, in Tanga Region at least, *kichocho* and the presence of blood in urine may not be exactly the same and that *kichocho* may be experienced without blood in urine. Having blood in urine without *kichocho* is less likely unless there are other causes of this symptom than urinary schistosomiasis.

Validation of the questionnaire using reagent strips indicated that the question about *kichocho* was generally better than that about blood in urine as an estimate of the prevalence of microhaematuria in schoolchildren (18), although experience in other countries may be different. The Red Urine Study, which validated the questionnaire in several African countries, indicated that in Cameroon, Congo, Democratic Republic of the Congo, and Zambia the question about blood was better, whereas in Malawi and Zimbabwe, the question about schistosomiasis was better (17). Other studies in which children have been interviewed about the symptoms of urinary schistosomiasis in both East and West Africa have apparently only asked about blood in urine (22, 23).

Of the 25% of children classed as mistaken in their self-diagnosis of urinary schistosomiasis, about 3% ($n = 76$) thought they were infected, but no eggs were found. These children may have been correct because some infections may be missed by microscopical examinations of single specimens only (23). Moreover, 28 of these children had occult blood in their urine (see Table 1) and may have been infected, so it is probable that only 2% of the total would have been treated unnecessarily. This is likely to be a small proportion compared with the proportion of uninfected children given praziquantel in schools where mass treatment is used.

The main concern, however, is for the remaining 22% of children who said they were uninfected but had parasite eggs detected in their urine and would thus not have been treated on the basis of self-diagnosis. Two-thirds of this group were lightly infected and were probably unaware of their infections; they also had considerably less macrohaematuria (3.6%) and microhaematuria (43.4%) than true positives (22.4% and 88.1%, respectively). If the aim of programmes is to control morbidity rather than infection, this may be of less concern, and such children may be treated in future rounds if their infections become heavier. Of greater concern, perhaps, is the fact that nearly two-thirds of this group were female, and many were adolescents for whom treatment may be desirable because of risks of anaemia and genital schistosomiasis (4, 24). The reason why girls gave a false-negative diagnosis more often than boys has been examined in more detail

Fig. 4. Risk ratios by age for boys ($n = 194$) and girls ($n = 329$) of giving a false-negative self-diagnosis of schistosomiasis in an interview with a nurse in 15 primary schools in Muheza district, United Republic of Tanzania



The 95% confidence intervals are shown above and below the risk ratios (\square , \triangle) as follows: (---), girls; (—), boys.

elsewhere (21), but requires further investigation. It may be worthwhile to test with a reagent strip the urine of adolescent girls if they do not report urinary schistosomiasis, to ensure that infected girls are treated.

The present study shows that the symptoms of urinary schistosomiasis experienced by children appear, to them, to be clear and fairly specific, especially when infections are moderate or heavy. A study of self-reported blood in urine, not schistosomiasis, in Zanzibari schoolchildren (25) reported a much lower positive predictive value of 46.4%, compared with 93.4% in the present study, but because the negative predictive value was higher (85.5% vs. 74.7%), the difference led to similar figures in both studies for children who were correct in their self-diagnosis. Positive and negative predictive values tend to be dependent on the prevalence of infection (26), but the present study indicates that the efficiency of self-reported schistosomiasis appears to be independent of the prevalence and intensity of infection.

The evidence presented here indicates that giving treatment to individual children who report having urinary schistosomiasis may be a strategy for administering praziquantel in schools where mass treatment is not warranted. The practicality, feasibility and costs of this approach are currently under investigation in Tanga Region after a second round of treatment in 1997. Such a strategy would lead to the treatment of most moderately to heavily infected children, and although some infected children would be missed because they would fail to report their infection, such children tend to be lightly infected and experience less morbidity. ■

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Résumé

Autodiagnostic de la schistosomiase urinaire en République-Unie de Tanzanie

En 1993, la Banque mondiale a considéré que parmi cinq programmes de santé publique potentiellement rentables, figurait l'organisation de services de santé en milieu scolaire. En Afrique subsaharienne, les helminthiases sont si courantes chez les enfants d'âge scolaire que la distribution d'anthelminthiques est désormais la caractéristique d'un nombre croissant de programmes de santé en milieu scolaire. L'Organisation mondiale de la Santé recommande de procéder à un traitement de masse des helminthiases intestinales et de la schistosomiase en milieu scolaire dès que leur prévalence dépasse 50%, et elle a fait rédiger un questionnaire simple, administré par les enseignants, qui permet d'identifier avec certitude les écoles où un traitement de masse de la schistosomiase urinaire se justifie. L'Ushirikiano wa Kumwendeza Mtoto Tanzania, ou Partenariat tanzanien pour le développement de l'enfant, a utilisé ce questionnaire pour identifier 153 écoles de trois districts de la région de Tanga où un traitement de masse par le praziquantel était justifié, mais de nombreux enfants atteints de schistosomiase dans 199 autres écoles sont quand même restés sans traitement. Nous avons examiné les données recueillies lors du processus d'évaluation du questionnaire afin de voir dans quelle mesure un enfant était capable d'autodiagnostiquer correctement une schistosomiase urinaire, et de déterminer ensuite si ces enfants pouvaient être traités individuellement à l'école.

Nous avons choisi 15 écoles de la région de Tanga où la prévalence de la schistosomiase, déterminée par les enseignants au moyen d'un questionnaire, allait de 7 à

77%. Tous les élèves de chacune des écoles ont été interrogés par une infirmière qui leur a demandé s'ils avaient eu dernièrement des symptômes de schistosomiase (nom local : *kichocho*) et on a procédé au prélèvement d'un échantillon d'urines fraîches à la recherche de traces de sang visibles, puis de sang occulte au moyen d'une bandelette réactive et enfin d'œufs de *Schistosoma haematobium* par examen au microscope.

En moyenne, 75% des élèves des écoles (n = 2356) ont su diagnostiquer correctement leur affection eux-mêmes (IC à 95% = 72-78%) et ils auraient donc reçu le traitement approprié. Sur les 3% qui ont donné un résultat en apparence faussement positif, puisque l'examen microscopique n'a pas montré d'œufs (IC à 95% = 2-4%), 28 présentaient une hématurie, de sorte que finalement, la proportion des traitements inutiles n'aurait été que de 2%. Les 22% restants ont fourni un autodiagnostic faussement négatif (IC à 95% = 20-25%) et n'auraient donc pas été traités, mais la majorité d'entre eux étaient tout de même légèrement infestés. Ces pourcentages étaient indépendants de la prévalence de l'infestation (limites : 22-93%) et de son intensité (limites : 23-827 œufs pour 10 ml).

Un traitement sélectif des écoliers basé sur leur propre observation d'une schistosomiase urinaire pourrait donc se révéler efficace pour la prise en charge thérapeutique d'une forte proportion d'enfants modérément à fortement infestés, enfants qui resteraient sans traitement en cas de chimiothérapie de masse limitée aux écoles où la prévalence de l'infestation est supérieure à 50 %.

Resumen

Autodiagnóstico de la esquistosomiasis urinaria en la República Unida de Tanzania

En 1993 el Banco Mundial identificó los servicios de salud escolar como uno de los cinco programas de salud pública potencialmente eficaces en relación con el costo. Dada la alta incidencia de helmintiasis entre los niños en edad escolar, los medicamentos antihelmínticos son un componente habitual del creciente número de programas de salud escolar emprendidos en el África subsahariana. La Organización Mundial de la Salud recomienda el tratamiento masivo de las infecciones helmínticas y la esquistosomiasis en las escuelas en que la prevalencia de esas infecciones es superior al 50%, y ha promovido la elaboración de un sencillo cuestionario, administrado por los maestros, que permite identificar fiablemente las escuelas en que vale la pena aplicar el tratamiento masivo contra la esquistosomiasis urinaria.

Empleando dicho cuestionario, la Ushirikiano wa Kumwendeza Mtoto Tanzania (Asociación de Tanzania para el Desarrollo Infantil) identificó 153 escuelas de tres distritos de la región de Tanga en las que siguiendo ese criterio se había aplicado un tratamiento masivo con praziquantel, pero de ese modo quedaron sin tratar muchos niños que habían referido sufrir esquistosomiasis en otras 199 escuelas. Examinamos los datos reunidos durante el proceso de evaluación del cuestionario para determinar con qué fiabilidad pueden los niños autodiagnosticarse la esquistosomiasis urinaria y establecer si sería posible tratarlos individualmente en esas escuelas.

Se seleccionaron 15 escuelas de la región de Tanga en que la prevalencia de esquistosomiasis autodiagnosticada, determinada mediante un cuestio-

nario utilizado por los maestros, se situaba entre el 7% y el 77%. En cada una de las escuelas todos los niños fueron entrevistados por una enfermera que les preguntaba si habían tenido recientemente síntomas de esquistosomiasis urinaria (conocida como *kichocho*); se tomaba una muestra de orina fresca para descartar la presencia de sangre visible, analizar la presencia de sangre oculta mediante una tira reactiva, y buscar al microscopio huevos de *Esquistosoma Haematobium*. Las respuestas a las preguntas se comparaban con el diagnóstico microscópico.

Como promedio el 75% de los niños (n = 2356) de las 15 escuelas se habían autodiagnosticado correctamente (IC 95%: 72%-78%), de modo que la decisión de tratarlos o no habría sido acertada en su caso. Del 3% de niños con un diagnóstico que finalmente se reveló falsamente positivo, pues no se detectaron

huevos (IC 95%: 2%-4%), 28 tenían sangre en la orina, de modo que sólo se habría tratado innecesariamente a un 2%. El resultado del autodiagnóstico del 22% restante fue un falso negativo (IC 95%: 20%-25%), por lo cual esos niños no habrían sido tratados, pero la mayoría de ellos sufría sólo una ligera infección. Esos porcentajes eran independientes tanto de la prevalencia de la infección (intervalo: 22%-93%) como de su intensidad (intervalo: 23-827 huevos/10 ml).

Así pues, el tratamiento selectivo de los escolares en función de los signos de infección referidos por los propios niños con esquistosomiasis urinaria podría ser un método eficaz para tratar a una gran proporción de niños aquejados de infección entre moderada y grave, que de lo contrario quedarían sin tratar en los programas de quimioterapia masiva que sólo se aplican en las escuelas donde la prevalencia de la infección supera el 50%.

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