Schistosomiasis reinfection and community compliance in a primary health care participatory research project in Menoufia, Egypt

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تكرر عـدوى البلهارسيـات والتزام المجتمع في إطار مشروع بحثي قـائم على المشاركة في الـرعايـة الصحية الأولية بمحافظة المنوفية ، جمهورية مصر العربية

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استهدفت هذه الدراسة تدريب فرق الرعاية الصحيـة الأولية المحلية على الطرائق العلمية السليمة لاكتشاف حالات الإصابة بداء البلهارسيـات ، وتسجيلها ومعالجتها ومتابعتهـا في إطار الرعاية الصحيـة الأولية . كما عملت على إشراك أفراد المجتمع المحلي في تصميم وإجراء البحث الوبـائي على داء البلهارسيات ومتابعة الحالات الإيجابيـة بالتعاون مع فرق الرعـاية الصحية الأوليـة ، وتقييم مدى تأثير هـذه المنهجيـة في التزام المجتمع بـالفحص المخبرى والمعـالجة ، إلى جـانب تأثيرها في معـدلات الانتشار والكثافة ومعدلات الوقوع وتكرر العدوى .

This study aimed to train local primary health care teams on sound scientific techniques for schistosomiasis case-finding, recording, treatment and follow-up in the context of primary health care; involve local community members in designing and conducting epidemiological research on schistosomiasis and follow-up of positive cases in collaboration with primary health care teams; and assess the impact of this methodology on community compliance to laboratory testing and treatment, besides the impact on rates of prevalence, intensity, incidence and reinfection.

La réinfestation par les schistosomes et l'observance de la communauté dans un projet de recherche participatif dans le contexte des soins de santé primaires à Menoufia en Egypte

L'objectif de cette étude est de former des équipes SSP aux techniques scientifiques éprouvées pour le dépistage, l'enregistrement, le traitement et le suivi des cas de schistosomiase dans le contexte des soins de santé primaires. Il s'agit également d'impliquer les membres de la collectivité locale dans la conception et la réalisation des travaux de recherche épidémiologique sur la schistosomiase ainsi que dans le suivi des cas positifs en collaboration avec des équipes SSP. Cette étude s'intéresse en outre à l'évaluation de l'impact de cette méthodologie sur l'observance de la communauté en matière d'épreuves de laboratoire et de traitement, ainsi que sur les taux de prévalence, l'intensité de la maladie, son incidence et la réinfestation.

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Introduction

Many endemic disease control activities can be carried out in the context of primary health care, depending on the degree of development of the supporting structure, and the proper orientation of primary health care (PHC) personnel [*1*]. In Egypt, many schistosomiasis control activities have been the responsibility of rural health units and centres since their establishment in the early 1940s. These activities have gradually developed into a primary health care strategy, extending coverage to urban areas [*2*].

Yet studies have shown that shortcomings in implementation of schistosomiasis control, among other activities carried out by PHC teams, are mainly due to the need for training and acceptance of the application of primary health care principles [*3*]. Other studies performed in the course of this research have revealed poor utilization of the facilities and practically no community participation in schistosomiasis control in the local PHC units [*4*].

This study aimed to:

- Train local primary health care teams on sound scientific techniques for schistosomiasis case finding, recording, treatment and follow-up in the context of PHC.
- Involve local community members in designing and conducting epidemiological research on schistosomiasis and follow-up of positive cases in collaboration with PHC teams.
- Assess the impact of this methodology on community compliance to laboratory testing and treatment, besides the impact on rates of prevalence, intensity, incidence and reinfection.

Methods

Study setting

Two villages, El-Garda and Salamoniya, in Menoufia governorate were chosen, because they are:

- large villages with almost similar populations: El-Garda has a population of 7679, and Salamoniya 8181 inhabitants;
- threaded by canals and drains;
- represent different sewage disposal facilities: El-Garda is provided with a sewage disposal system serving one third of the village houses, while Salamoniya lacks a municipal disposal system, and most houses, particularly those on the canal banks, dispose of sewage and refuse into the canal;
- El-Garda has no PHC unit, and villagers resort to a nearby unit in another village, whereas Salamoniya has its own unit.

Laboratory facilities

For the purpose of this study a temporary laboratory was set up in El-Garda, and the PHC team from nearby Batanoun village was given the responsibility of running it. Meanwhile, laboratory facilities in Salamoniya were upgraded by the provision of new binocular self-illuminated microscopes, a bench and extra lighting.

Training

The PHC teams in both villages, including professional and paramedical staff, together with selected villagers were subjected to several training sessions throughout the study period. The training included preliminary sessions tackling the detailed description of the dimensions of the schistosomiasis problem, schistosomiasis transmission, the clinical picture, complications and public health implications. The ideal role of the PHC unit in mass diagnosis, treatment and

follow-up, in addition to its role in raising community awareness and mobilizing community involvement in prevention and control, received particular emphasis.

Training on active sample collection by house-to-house visits and follow-up of defaulters with accurate recording were also explained initially and throughout the study. Meetings to discuss obstacles and solutions suggested were held regularly, and a special form was constructed and modified accordingly. These sessions were attended by the PHC teams and community participants.

Training in the use of the thick-smear Kato technique, for qualitative and quantitative stool examination, took place at Qalyoub Training Centre near Cairo. It was repeated several times on site by the PHC staff of the High Institute of Public Health, Alexandria, who also performed quality control and refresher training throughout the study.

The pilot study and the in-depth study sample

The pilot study was performed on 5% of all residential units in each of the villages, with the aim of estimating the required minimum size of the in-depth study sample. At the same time it provided a good opportunity to evaluate the efficiency of PHC teams and their retraining. Accuracy was ensured by a complete quality control procedure. Since the whole project was household based, the in-depth study was performed on a sample of households in each village. The sample ratio in each village was calculated using pilot study results, so as to secure a preset approximate number of about 100 schistosomiasis positive cases. Accordingly, a 15% systematic random sample of households in El-Garda was chosen (comprising 156 houses containing 177 families). To maintain approximately the same number of positive cases, the sample in Salamoniya village was 6% (comprising 78 houses with 102 families). Since a very low prevalence rate of 1% of *Schistosoma haematobium* appeared, the in-depth study was limited to *Schistosoma mansoni*; epidemiological study stool examination and case treatment was performed yearly for three years.

Quality control in the in-depth study was performed on 20% of the total sample plus all positive cases. Two slides were prepared for every stool sample, each of which was examined by a different technician. Schedules were constructed with special columns for examiner's code, examiner's results and quality control results. Positive cases were treated and re-examined four months later.

Statistical analysis

The *SPSS* computer program was used. The chi-square and the z tests of significance were applied.

Results

Salamoniya village is provided with a rural PHC unit of five rooms, staffed with one physician, eight nurses and nurse-midwives, a clerk, a sanitarian and several other workers. A laboratory technician comes three times a week to perform necessary urine and stool examinations for patients referred from the outpatient clinic. The PHC unit is responsible for the provision of all the elements of primary health care including schistosomiasis control as part of the endemic disease control element.

Table 1 shows that the prevalence rates of *Schistosoma mansoni* in 1992 were 8.1% in El-Garda and 27.9% in Salamoniya. They dropped sharply after the first year, but the decline was less pronounced after the second year.

Table 2 demonstrates that the incidence rates of *Schistosoma mansoni* in the two

villages were 3.8% and 10.3% respectively in the second year; and a negligible, if any, decline in incidence and reinfection appeared in the third year (shown in Table 3). Reinfection rates (10.9% and 8.0%) scarcely differed between the two villages.

In Table 4, it is obvious that the highest rates of "severe" intensity of schistosomiasis infection appeared in the first year in the age groups from 6 to 18 years, with rates exceeding 95.0%. These rates, however, dropped gradually in the second and third years of the study in the same age groups.

Table 5 shows the improving compliance rates in both villages, particularly from the first year with a compliance rate of 85.1% to the second year with a rate of 95%. For the noncompliance cases, 60.8% simply refused to give samples and 13.5% were not present at the time of sample collection. Only 19 out

Table 1 ***Schistosoma mansoni*** **prevalence rates, by village, 1992–1994**

Village	1992 No.	1992 %	1993 No.	1993 %	1994 No.	1994 %
El-Garda						
Total examined	998		961		949	
Positive	*81	8.1	*41°	4.3	23°	2.4
Salamoniya						
Total examined	462		437		430	
Positive	**129	27.9	**45+	10.3	51+	11.9

*z = 3.525 p < 0.01 **z = 6.685 p < 0.001
°z = 2.238 p < 0.05 +z = 0.733 p > 0.05

Table 2 ***Schistosoma mansoni*** **incidence rates, by village, 1993–1994**

Village	1993 Year II No.	1993 Year II %	1994 Year III No.	1994 Year III %
El-Garda (+ve)				
Total examined	880		908	
Positive	*33	3.8	*20	2.2
Salamoniya (+ve)				
Total examined	319		390	
Positive	**33	10.3	**45	11.5
(previous year negatives)				

*z = 1.929 p < 0.05 **z = 0.505 p < 0.05

Table 3 **Annual** ***Schistosoma mansoni*** **reinfection, by village, 1993–1994**

Village	1993 Year II No.	1993 Year II %	1994 Year III No.	1994 Year III %
El-Garda				
Total cured	64		40	
Reinfected	*7°	10.9	*3°	7.5
Salamoniya				
Total cured	75		32	
Reinfected	**6+	8.0	**4+	12.5
Grand total				
Cured	139		72	
Reinfected	13	9.4	7	9.7

*z = 0.579 p > 0.05 **z = 0.732 p > 0.05
°z = 0.593 p > 0.05 +z = 0.712 p > 0.05

Table 4 **Intensity of *Schistosoma mansoni* infection by age and year**

Age		Year I				Year II				Year III			
(years)	Intensity*	Low	Mod.	Severe	Total	Low	Mod.	Severe	Total	Low	Mod.	Severe	Total
< 6 years		1	0	6	7	3	0	2	5	1	0	0	1
	%	14.3	0	85.7	100	60.0	0	40.0	100	0	0	0	100
6–11		0	1	19	20	4	2	11	17	7	2	2	11
	%	0	5.0	95.0	100	23.5	11.8	64.7	100	63.6	18.2	18.2	100
12–17		0	1	35	36	2	1	8	11	22	4	1	27
	%	0	2.8	97.2	100	18.2	9.1	72.7	100	81.5	14.8	3.7	100
18–23		16	4	9	29	4	2	1	7	7	0	0	7
	%	55.2	13.8	31.0	100	57.1	28.6	14.3	100	'100	0	0	100
24–29		13	3	6	22	9	2	0	11	5	0	1	6
	%	59.1	13.6	27.3	100	81.8	18.2	0	100	83.3	0	16.7	100
≥ 30 years		71	16	9	96	33	1	1	35	20	1	1	22
	%	74.0	16.7	9.4	100	94.3	2.9	2.9	100	90.9	4.5	4.5	100
		$\chi^2_{10} = 122.367$ $p < 0.001$				$\chi^2_{10} = 48.461$ $p < 0.001$				$\chi^2_{10} = 8.593$ $p < 0.05$			

** Low = egg count < 100 Mod. = egg count 100–199 Severe = egg count ≥ 200*

Table 5 **Population compliance with *Schistosoma mansoni* diagnosis and treatment, by village**

Village	*1992 Year I No.	%	*1993 Year II** No.	%	1994 Year III** No.	%
El-Garda						
Complied	998	84.2	960	96.2	949	98.9
Total sample	1185		998		960	
Salamoniya						
Complied	462	87.0	437	92.4	430	97.5
Total sample	531		473		441	
Total						
Complied	1460	85.1	1397	95.0	1379	98.4
Total sample	1716		1471		1401	

*$z = 9.134$ $p < 0.001$ **$z = 5.157$ $p < 0.001$

Table 6 **Population noncompliance in schistosomiasis stool testing by sex and reason, 1993**

Sex	Refused No.	%	Temporary absence No.	%	Permanent absence No.	%	Total No.	%
Male								
Number	20	44.4	8	80.0	9	47.4	37	50.0
Percent	54.1		21.6		24.3		100.0	
Female								
Number	25	55.6	2	20.0	10	52.6	37	50.0
Percent	67.6		5.4		27.0		100.0	
Total								
Number	45		10		19		74	100.0
Percent	60.8	100	13.5	100	25.7	100	100.0	

Permanent absence = deceased, emigrated or moved.
$\chi^2_2 = 4.206$ $p > 0.05$

of 74 absentees were permanently unavailable (Table 6).

Discussion

The results show that in spite of the quick drop in the prevalence rates of *Schistosoma mansoni* after one year, the curve flattened out, probably as a result of the continuous incidence of new cases which hardly changed from the second to the third year. Besides, the persistently high rates of reinfection were apparently unaffected by the different environmental conditions in the two villages. Meanwhile, there was a drop

in the rate of infection, as indicated by the sloping curve of severe intensity cases apparent in the second and third years, in the total study sample. This shows that to achieve a continuous drop in prevalence, incidence, and reinfection rates, more effort is needed than the ongoing mass media educational messages. In fact, even the training of PHC teams, mass diagnosis and case treatment, though effective, are apparently insufficient in themselves. Sociological and water-contact studies performed in other areas of the Nile Delta [*5,6*], as well as in the course of this study [*7*], have demonstrated that the pattern of community canal-water interaction involves many traditional, cultural and occupational factors that should be taken into consideration in any effective long-term control programme.

Moreover, the difference between the physicochemical nature of canal water and that of tap water apparently plays a role in the persistence of peasants in using canals for many domestic purposes. These findings are supported by results of previous studies in the Delta [*8*].

Compliance rates clearly improved, particularly after the first year of the study. While no other intervention took place during that period except the training of personnel, effective mass diagnosis, and case treatment, this improvement could be attributed to these factors.

On the other hand, the majority of cases of noncompliance were due to community rejection and temporary absence at the time of sample collection. Both reasons point to the need for further continuous training of PHC personnel to upgrade case follow-up abilities and skills; not to mention the need to raise confidence in the health services. It is obvious that while refusal rated higher among females, temporary absence predominated among males, possibly indicating the important role of assuring women responsiveness to PHC personnel, and the need for more concentration on this category in community involvement programmes. In fact, the important part played by women in self-help programmes has frequently ranked first in previous studies [*9,10*].

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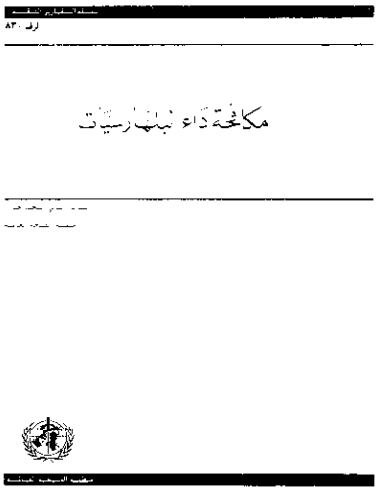

أسباب تأليف هذا الكتاب

على الرغم من النجاح الذي حققته برامج مكافحة داء البلهارسيات ، إلا أن هذا الداء مايزال يمثل مشكلة خطيرة من مشكلات الصحة العمومية في أكثر من سبعين بلداً في مختلف أنحاء العالم . ونظراً لأنه لا يوجد حل واحد يمكن تطبيقه في جميع الأوضاع : فإن هذا الكتاب يستهدف تقديم بدائل مختلفة للمكافحة ، تتلاءم مع الأحوال الصحية والتنموية المختلفة في كل من البلدان التي يتوطنها هذا الداء .

القراء المستهدفون

عمال الرعاية الصحية الأولية ، والمثقفون الصحيون ، والوكالات المعنية بتطوير الإمداد بالمياه والإصحاح ، ومنظمات الأمم المتحدة لتربية المائيات والأغذية والزراعة ، ومختبرات الرعاية الصحية .