SOME EPIDEMIOLOGICAL ASPECTS OF SOIL–TRANSMITTED HELMINTHS IN ISFAHAN, CENTRAL IRAN*

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ABSTRACT

Epidemiological features of soil transmitted helminths were studied in six villages in Isfahan area.

The mean overall prevalences of ascariasis and trichostrongyliasis were 91.5% and 70.9% respectively with higher infection rate among females.

Mean prevalences of Trichuris and *Hymenolepis nana* were 73.8% and 5.4% respectively.

Prevalences of Ascaris and Trichuris did not fluctuate very much in various ages but for Trichostrongylus, infection was lower in 0-4 age group and *H. nana* was mostly found in lower age groups.

In some villages 100% of both sexes were infected with one or more helminth parasites, and overall prevalence of infection was 97.3%.

In all villages, it was found that a small proportion of inhabitants (12.5%) excrete a large proportion (43.3%) of total eggs of Ascaris.

Prevalence and intensity of ascariasis established four years after therapy have shown that the group of population who had the highest prevalence before therapy, had the highest prevalence and intensity. The high proportion of infected cases with Ascaris had less than 25000 eggs/gr of faeces and less than 50 worms.

Results of this study indicate once again the importance of intestinal helminthiasis in Isfahan and also the possibility of reducing the

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transmission force by regular mass-chemotherapy of a small proportion of the inhabitants.

More than 100 persons from each village who were infected with Ascaris and some infected with other helminths simultaneously, were treated a few days after examination, using pyrantel pamoate with a single dose of 10 mg/kg. body weight. Tablets given to adults and suspension for children were taken in the presence of authors.

A saline purge has also been administered to the patients treated who had constipation. A plastic pan containing 10% formaline solution and labeled with the name of the patient was also given to each patient after the drug was taken, in which all stools passed, up to 48 hours after treatment, were collected and all worms expelled during this period were removed and identified.

Treated cases were re-examined 2-3 weeks after the treatment and the cure rate established.

INTRODUCTION

Soil transmitted helminths are very prevalent in most parts of Iran (1 and 2). Infection rates with these parasites are extremely high in Isfahan, Central part of Iran (3).

Present studies have been conducted to collect more information on the epidemiology, transmission and the effect of mass-chemotherapy the information badly needed for the program of control of helminthiasis in Isfahan, recently started by the Ministry of Health and Welfare.

MATERIALS AND METHODS

Six villages with similar human ecology and socio-economic status were chosen in the rural area of Isfahan and stool samples from the majority of inhabitants in each village have been examined using formaline ether sedimentation and flotation techniques (4) for qualitative assessment of the prevalence of various intestinal helminthiasis in each village.

The first village was surveyed in May 1972 and the others at two month intervals thereafter.

RESULTS

Prevalences of various helminthiasis in both sexes are shown in Table 1.

Ascariasis has a mean overall prevalence of 91.5% with a range of 87 to 95%. Infection is slightly higher among females.

The mean overall prevalence of Trichostrongylus is 70.9% with a range of 55 to 78%. The rate of infection is higher amongst females in all villages except one.

Infection with Trichuriasis is also high in all villages with a mean overall prevalence of 73.8% and a range of 53 to 82%. Infection is higher among females in all villages except one.

The overall prevalence of *H. nana* is 5.4 with a range of 3 to 7%.

As is shown in Table 2, prevalences of infection with Ascaris, Trichostrongylus and Trichuris do not very much differ in various age groups except for Trichostrongylus which is much lower among 0-4 year old children.

Percentage of people infected with one or more species of intestinal helminths including Ascaris, Trichuris, Trichostrongylus, *H. nana, Taenia saginata* and *Entrobius vermicularis* in different sexes are shown in Table 3.

As is indicated in this table, in some villages, 100% of both sexes are infected with one or more helminths and the overall infection rate with one or more is 97.3%.

The highest proportion of people are infected with three species of worm in which more than half of the population in both sexes are infected.

People infected with two species of worms constitute the second highest proportion. Less than 10% of people are infected with four and 12% with one species of worm.

Data on the epidemiology of Ascariasis collected in these villages were analysed and compiled and the results are already published in detail (5).

One interesting finding not reported in the previous paper is the fact that small proportion of inhabitants in all villages excrete a high per centage of egg per gram of faeces, as follows.

In Karimabad and Saleh Abad-Ferdous villages, 12.9% of population produces 40.6% and 41.7% of total eggs excreted by 93 persons examined in each village respectively.

In Cham Gousaleh 12.1% of population produces 38.7% of eggs and in Foudan village 12% of infected cases excrete 47.4% of eggs.

In the village of Foudan-Jazine, 12.3% of infected cases excrete 41.9% of eggs and in Jazine 12.5% of population produce 41.9% of

all eggs.

In general, it was found that 55 (31 females and 24 males) out of 440 persons examined or 12.5% of population of all six villages produce 43.3% of eggs.

Out of 55 persons 26 or 48% are in the age group 0-9, 10 or 18% in the age group 10-14, 9 or 16% in the age group 15-39, and 10 or 18% in the age group 40 and over.

Stool examination of highly infected group undertaken in April 1977 or four years after the survey has shown that 38 persons out of 47 examined or 81% are infected with Ascaris, 38 or 81% with Trichuris and 14 or 30% with Trichostrongylus spp.

Egg count among re-infected people has shown that the majority of these people have the highest density of infection.

Figures 1 and 2 have been prepared by counting the number of infected persons with various numbers of eggs (with 5000 eggs intervals) and the number of persons with various number of Ascaris works expelled by them (with 10 worms intervals).

As is indicated in Fig. 1, the high proportion of infected cases have less than 25000 eggs/gr of faeces and less than 50 worms. Both curves show over dispersed or clumped distribution and the trend is similar in male and female groups.

Few cases of hookworm have also been detected among the population of some villages, but they were all infected in the hookworm endemic area of Khuzestan, South West of Iran.

DISCUSSION AND CONCLUSION

Present studies indicate once again the importance of intestinal helminthiasis in the rural areas of Isfahan, Central Iran. One interesting result obtained from this study is that only a small proportion (about 13%) of infected people excrete about half of the eggs of Ascaris into the environment, or in other words, by treating this small per centage 50% of the force of transmission will be reduced. Moreover, since 76% of these highly infected people are in the age group 0-19, a dramatic reduction in the transmission can be produced by treating this proportion.

Examples from few countries have shown that the success in the control of helminthiasis and other parasitic infections depends mostly on the improvement of socio-economic condition, changing the habits and the provision of sanitation facilities, which all can take place in very long periods of time and even generations.

On the other hand, it has been shown that mass-chemotherapy by using more effective drugs with broad-spectrum activities, if properly used can dramatically decrease the rate of helminthiasis.

This success has been achieved in few countries such as in Japan where the prevalences of Ascaris and hookworm infections have been reduced from more than 60% to less than 1% by regular mass-chemotherapy (6) repeated at least once every three months. The result of the present studies is further proof to this strategy and can be strongly recommended to the public health authorities for their future control operations.

Fortunately, the results of the extensive drug trials, comparing the effect of various anthelminthics has shown the broad spectrum activities of new compound oxantel-pyrantel which is effective in most soil-transmitted helminths (7).

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Table 1. Prevalence of various intestinal helminthiasis among inhabitants of 6 villages surveyed bi-monthly in Isfahan, Central Iran (May 1972-March 1973)

Name of Village	Date of Survey	No. examined			Per cent infected with:											
					Ascaris			Trichostrongylus			Trichuris			H.nana		
		M	F	T	M	F	T	M	F	T	M	F	T	M	F	T
Karim Abad	May 1972	102	77	179	88	99	93	75	66	66	70	83	75	6	3	4
Saleh Abad and Ferdous	July 1972	116	110	226	91	92	92	61	70	65	81	75	78	3	10	6
Cham Gousaleh	Sept. 1972	126	136	262	87	96	92	47	58	53	45	60	53	3	4	4
Foudan	Nov. 1972	134	158	342	93	98	95	80	85	82	77	87	82	10	4	7
Foudan-Jazine	Jan.1973	108	94	202	86	92	89	75	82	78	75	81	78	11	2	7
Jazine	March 1973	121	123	244	83	90	87	74	78	76	71	82	77	5	1	3
Total		757	698	1455	88.6	94.6	91.5	67.2	74.8	70.9	70	77.8	73.8	7.6	3.9	5.4

Table 2. Prevalence of various intestinal helminthiasis in different age groups in 6 villages surveyed in Isfahan, Central Iran. 1972-1973.

Age Group	Percent infected with:			
	Ascaris	Trichost-	Trichuris	H.nana
0-4	82.2	29.2	96	7.8
5-9	92.7	68.0	70.8	8.7
10-14	95.3	79.7	84.9	9.9
15-19	89.4	81.1	88.6	9.1
20-39	94.4	84.1	84.4	0
40+	92.2	79.8	75.5	2.5
Total	91.5	70.9	73.8	5.4