

PREVALENCE OF INTESTINAL HELMINTHIASIS IN THE RURAL AREA OF SOWMEHSARA GILAN PROVINCE (CASPIAN LITTORAL)*

A.A. Alemi**
F. Arfaa***

INTRODUCTION

Human infection with several intestinal helminths especially soil-transmitted species is very prevalent in most parts of Iran(1, 2).

Attempts made in the past decade by using systematic epidemiological surveys have indicated the true distribution and prevalence of these infections in most parts of the country.

In this paper on soil-transmitted helminths collected during a longitudinal health and morbidity survey in a rural area of Gilan province in the north of Iran and along the Caspian Sea are presented.

MATERIALS AND METHODS

The province of Gilan is located in the west of the Caspian Littoral in the north of Iran and is divided into 10 shahrestans (county boroughs) each with a number of districts (map).

The district of Gourabzarmikh of the shahrestan of Sowmehsara was chosen by the judgement sampling technique for this study.

The total population of Sowmehsara shahrestan including all its districts, was estimated at the time of the survey to be 91,000, dispersed in an area of 618 sq.kms.

Since the main objective of a longitudinal health survey is to determine the health and socio-economic status of the population of this area for the possible establishment of health services, a great

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** School of Public Health

*** School of Public Health

deal of information on various socio-economic and health aspects of the population has been collected.

A population of approximately 11,000 in this area underwent a social survey and then 30% of this sample, as randomly selected households, underwent a detailed medical survey.

The social survey was carried out by interviewers who completed a precoded standard questionnaire. The sub-sample who in addition underwent the standard medical survey, were examined by a medically qualified team. A further 30% of the sub-sample, randomly chosen households were selected for blood and stool examination.

Other information concerning parasitic infection such as the existence of sanitation facilities and other related clinical conditions were also collected.

Stool samples were examined by Formalin ether and negative ones, once more, with flotation methods, and infection of each individual with intestinal helminths and protozoa was recorded.

RESULTS

Prevalence of most prevalent soil-transmitted helminths, i.e. *Ascaris*, hookworm and trichuris amongst various sex and age groups of the inhabitants of 15 villages are set out in Table 1.

As is indicated in the Table, *hookworm* is the most prevalent species found. The mean prevalence of infection with this species in all surveyed villages is 46.6% with a range of 29 to 63%. Infection is higher among men in most villages.

Trichuris trichura is the second most prevalent infection affecting 44.8% of the population of these villages with a minimum prevalence of 19 and a maximum of 57%. The mean prevalences are not significantly different between the two sexes.

Ascaris Lumbricoides is infecting 22% of the population and the range of prevalence is 4 to 38%.

Prevalences of infection with the 3 helminths in various age groups are shown in Table 2.

For *Ascaris*, the highest prevalence of infection is found among age group 5-14 but the prevalence of infection is rather high in 0-4 year old children.

The peak prevalence of infection with both hookworm and trichuris is found among the age group 15-19.

For all three species the prevalence of infection gradually increases up to the age of 10-19 and gradually decreases thereafter.

Infection of the population with other intestinal helminths was very low.

Trichostrongylus was found among the population of 7 out of 15 villages surveyed. It was surprisingly higher (20%) in the village of Siah Kooch, about 9% in two villages and less than 3% in other infested villages.

Taenia saginata was present among the inhabitants of four villages. It was 7% in one village and less than 4% in others.

Strongyloides stercoralis larvae were found in the examined people of 10 villages. This highest prevalence of 9% was found in the village of Posht Mokh. It was also found among 7% of the population of two villages and was less than 5% in other infested villages.

In general, 79.6% of the population were infected with one or more parasites and only 20.4% were free from parasites.

Percentages of people infected with one or more helminths in various villages are presented in Table 3.

As is shown in this table, the majority of persons examined (more than 60%) were infected with one or two helminths, only 8.7% with 3 and 0.7% with 4 helminths. It is of interest that in few villages, the proportion of people having multiple infection is higher than in others.

Table 4 has been prepared in order to demonstrate the possible correlation between hookworm infection and anaemia. As shown in this table, only 1.2% of the total infected population had a haemoglobin level below 8gr/100, with this level the patient can be considered to be severely anaemic, taking into account other causes of anaemia. The haemoglobin level of 12.5% of the 343 people infected with hookworm lies between 8–10gr/100 and can hence be classified as moderately anaemic. If we consider haemoglobin level higher than 11gr/100 as a normal value, according to these data, 14% of the population are showing some degree of anaemia.

DISCUSSION AND CONCLUSIONS

Results obtained from the present studies clearly indicate the public health importance of helminthiasis in this area.

The percentage of people infected with various parasites which was found to be 79.6% during this study does not show the true prevalence since more people would certainly be found to be infected with helminths such as *Entrobilus vermicularis*, *taenia saginata* and *strongyloides stercoralis*, if proper methods of stool examination were performed.

For example, it has been shown that only a small proportion of infection with *taenia saginata* can be detected by stool examination(3).

Infection with *Strongyloides stercoralis* could be higher than 9%

found in one village, if proper methods have been used and because of the high pathogenicity of this parasite its high prevalence needs more consideration.

However, the low morbidity of the helminthiasis found in this area needs further investigations and discussions.

Hookworm infection which is considered as one of the most pathogenic species is infecting more than 45% of the population but as is shown by the result of blood examination, it does not cause significant anaemia among inhabitants.

This might be due to the low intensity of infection with this parasite. Unfortunately quantitative stool examination has not been performed in this particular study. However, in another study on the same sample of the infected population, quantitative stool examinations were carried out separately, and confirmed the low intensity of infection in this area(6). The species of hookworm which is important as regards the severity of infection has not been determined during these studies, but based on previous reports, (5), the predominant species found is *Necator americanus*.

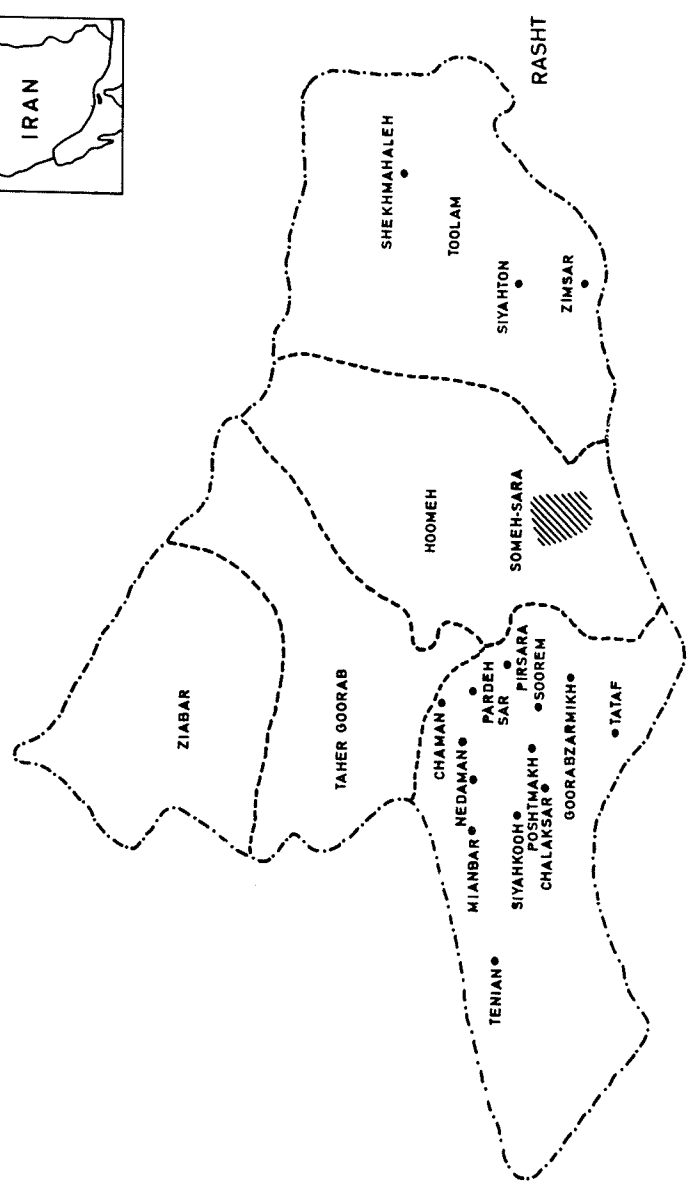
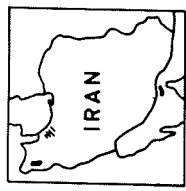
The reason for low prevalence of trichostrongylus in this area in comparison with other parts of the country(7) is not clear. The species of trichostrongylus infecting man in this area should also be determined. No correlation has been found between the existence of sanitation facilities and the prevalence of various helminthiasis, especially hookworm infection.

This is not surprising since the main source of infection with *Necator* is the rice field and tea plantation, and in this area about 95% of the population are farmers working in rice fields and the rest in tea plantations, and related activities, and even mothers who work in these fields take their offspring into the fields where they play.

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MAP OF THE SURVEYED AREA IN THE GILLAN PROVINCE
(SOMEH-SARA SHAHRESTAN)



● SURVEYED VILLAGES

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Table 1
Prevalence of intestinal helminthiasis in villages surveyed in Sowmehsara, Gilan Province, 1976

Name of village	Pop.	Number examined			Percent infected with								
		M	F	T	Ascaris			Hookworm			Trichuris		
					M	F	T	M	F	T	M	F	T
Nadaman	1,059	44	34	78	25	18	22	55	58	56	50	49	49
Pir Sara	596	22	17	39	23	35	28	55	56	56	50	47	49
Tataf	1,123	23	25	48	52	24	38	70	32	50	40	52	48
Tanian	1,525	57	60	117	18	18	18	68	40	54	67	47	54
Chaman	307	10	10	20	10	20	15	60	40	50	30	40	35
Souroum	355	14	10	24	29	20	25	36	60	55	36	30	33
Siah Kooch	363	12	18	30	25	33	23	42	72	60	42	61	53
Gourab Zarnikh	2,172	73	60	133	14	30	21	36	50	42	37	53	44
Mahvizan	1,115	17	29	46	24	41	35	53	34	41	53	59	57
Mian Bar	513	13	13	26	0	8	4	46	38	42	0	38	19
Posht Mokh	592	33	21	54	9	0	6	55	33	46	27	14	22
Siah tan	523	27	21	48	30	43	35	30	29	29	63	29	48
Zimsar	411	15	14	29	14	36	25	14	43	29	36	43	39
Sheikhmahalith	621	11	8	19	9	13	11	64	63	63	45	50	47
Chalaksar	509	17	17	34	12	28	18	18	44	29	41	28	32
Total	11,784	388	357	745	19.6	24.4	22.0	48.0	44.9	44.6	44.7	44.9	44.8

Table 2
Prevalence of various intestinal helminths among different age and sex groups of inhabitants of 15 villages in rural area of Sowmehsara, Gilan Province. 1976

Age Group	Number examined						Prevalence of infection with					
	M		F		T		Ascaris		Hookworm		Trichuris	
	M	F	M	F	M	T	M	F	M	F	M	F
0-4	60	73	133	23	21	22	17	21	19	32	34	33
5-9	79	77	156	27	32	30	37	32	35	50	53	52
10-14	59	40	99	24	40	30	53	63	57	53	53	53
15-19	28	38	66	25	26	26	79	61	68	68	53	59
20-41	75	75	150	15	19	17	59	60	60	53	43	48
41+	87	54	141	10	13	11	57	50	55	29	39	33
Total	388	357	745	19.6	24.4	21.9	48.0	44.9	46.6	44.7	44.9	44.8

Table 3
Percent of people infected with one, two and more species of
helminths in villages of the rural area of Sowmehsara,
Gilan Province. 1976

Name of Village	No. exam'd	Percent infected with				Not infected %
		1 sp.	2 sp.	3 sp.	4 sp.	
Nadaman	78	33	35	8	-	24
Pir Sara	39	36	30	13	-	21
Tataf	48	33	27	15	-	24
Tanian	117	27	35	13	0.9	24
Chaman	20	40	20	5	-	35
Sourom	24	33	30	4	-	33
Siahkoooh	30	30	37	20	-	13
Gourab Zarnikh	133	29	29	8	-	35
Mahvizan	46	22	34	11	-	33
Mian Bar	26	46	12	4	-	38
Posht Mokh	54	30	22	-	-	48
Siahtan	48	42	23	8	-	27
Zimsar	29	52	14	3	-	31
Sheikh Mahaleh	19	48	26	5	-	21
Chalak Sar	34	32	18	3	-	47
Total	745	32.8	28.1	8.7	0.1	30.3

Table 4
Correlation between the prevalence of hookworm infection
and haemoglobin levels in various villages

Name of Village	Total	Prevalence of hookworm infection according to Hb level							
		Below 8 gr/100		8-10 gr/100		11-13 gr/100		14+ gr/100	
		No.	%	No.	%	No.	%	No.	%
Goorabzar Mikh	55	-	-	10	18.2	35	63.6	10	18.2
Tanian	63	-	-	14	22.2	37	58.7	12	19.1
Sheikmahaleh	12	-	-	1	8.3	3	25.0	8	66.7
Zimsar	8	1	12.5	-	-	6	75.0	1	12.5
Chaman	10	-	-	2	20.0	4	40.0	4	40.0
Pirsara	22	-	-	3	13.6	12	54.5	7	31.8
Surem	11	-	-	1	9.1	7	63.7	3	27.3
Siahtan	14	-	-	2	14.3	10	71.4	2	14.3
Posht Mokh	25	-	-	-	-	11	44.0	16	56.0
Nedaman	43	-	-	-	-	33	76.7	10	23.3
Chaleksar	10	-	-	1	10.0	6	60.0	3	30.0
Tataf	22	-	-	1	4.5	17	77.3	4	18.2
Siahkuh	18	1	5.6	3	16.7	9	50.0	5	27.8
Mianbar	11	1	9.1	-	-	10	90.9	-	-
Mahvizan	19	1	5.3	6	31.6	10	52.6	2	10.5
Total	343	4	1.2	44	12.8	210	61.2	85	24.8