

**Prevalence and Intensity of
Intestinal Helminthiases in Northwest and
Northeast of Iran**

By:

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Introduction :

Soil-transmitted helminths which, because of their high endemicity and pathogenicity in some species, constitute the main cause of morbidity in many areas (WHO , 1964) have not been adequately studied in all parts of Iran and only a few reports elucidate the high prevalence and intensity of infection in limited parts of the country, (Haratunian, 1959; Biocca, 1959; Sabokbar, 1961; Farhang-Azad et al, 1967; Biocca, Ghadirian et al, 1968; Sahba et al, 1967 and Arfaa et al 1969) .

Some reports on the surgical and complicated cases of ascariasis, enterobiasis and trichuriasis found in Iran (Avanesian, 1944; Adle et al, 1963) indicates the clinical importance of the infection in this country. As an example of this surgical complication due to helminths, Nasirpour et al (1966) found 5% adult *Enterobius vermicularis*, 0.3% *Trichuris trichiura* and 3.6% different helminth eggs in 333 cases of appendicitis operated in a hospital in Teheran.

In the present surveys attempts have made to use reliable sampling procedures to choose areas representative of larger areas, in Northeast of Iran, from which information is incomplete.

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Material and Methods:

Two mountainous areas of Torghabeh located in Khorasan province north east of Iran and of Basmenge situated in Azarbaidjan province north west of the country were selected for this survey.

Ten villages were surveyed in Torghabeh District which has a total population of 49,870 (Iran National Census of Population 1966) and 23 villages in Basmenge with a population of 15,489 (Iran National Census of Population 1966). Stratified random sampling technique using Fisher and Yates table (Fisher and Yates, 1957) was used to choose 20% of families in Torghabeh and 10% in Basmenge for examination.

A total of 1017 persons were examined in Basmenge and 1812 people from Torghabeh.

Since most of the people were illiterate, the paper cups used for collection were marked with special figures of heads as described by Saha et al (1966). The methods used for stool examination were qualitative methods of Kato thick smear and brine floatation recommended by WHO (1967) and Stoll egg count method for quantitative assessment of the infection (WHO, 1963).

Result:

Intestinal heminths found were *Ascaris lumbricoides*, *Trichuris trichiura*, *Hymenolepis nana*, *Taenia saginata* and *Enterobius vermicularis* of which the percentage of the first three was very high and the results will be dealt with in this paper. The prevalence of intestinal heminths found in villages in both areas is shown in table I. As indicated in this table prevalence of ascariasis being 81% and 74% in Basmenge and Torghabeh respectively and of tricburiasis 37% in Basmenge and 12% in Torghabeh.

Table I: Prevalence of helminthic infections found in Basmenge and Torghabeh, Iran (1968)

Areas surveyed	No. of villages	Total No. of persons examined	Range and mean of/percentage of infection With:					
			A. lumbricoides		T. trichiura		H. nana	
			Range	Mean	Range	Mean	Range	Mean
Basmenge	10	1017	56-93	81	10-76	37	0-17	4
Torghabeh	23	1812	23-95	74	0-57	12	0-22	8

Infection with *Hymenolepis nana* has been less than 10% in both areas.

Eighty-six of 1017 individuals (8%) examined in Basmenge and 411 of 1812 individuals (23%) in Torghabeh proved negative. The percentage of persons harbouring only one worm is 57% in Basmenge and 60% in Torghabeh. The percentage of persons infected with two species of parasites was 35% and 16% in Basmenge and Torghabeh respectively and 1% was infected with 3 species in both areas.

Tables II and III indicate the percentage of various infections in different age groups in two areas, 6 to 10 year old children having the highest number examined show also the highest prevalence for ascariasis.

For trichurias the peak of infection occurs in the age groups 11 to 20, but again its variation is not high in other groups.

Table II: Prevalence of various infections in different age groups in Basmenge Iran (1968)

Age groups	No. of persons examined	Percent infected with:		
		A. lumbricoides	T. trichiura	H. nana
0-2	81	49	16	4
3-5	116	81	26	8
6-10	178	94	43	3
11-15	103	83	48	8
16-20	116	87	47	4
21-25	66	90	44	2
26-30	90	80	45	2
31-40	90	81	43	1
41-50	92	77	40	2
51-60	53	68	36	2
61+	32	86	47	0
Total	1017	18	36	4

H. nana infection occurs mostly in children as expected.

The number of cases found infected with *E. vermicularis* and *T. trichiura* with stool examination only, were respectively 106 and 34 in Basmenge and 107 and 18 in Torghabeh villages,

No statistically significant difference is found in prevalence of infection between males and females.

Table III: Prevalence of various infections in different age groups Torghabeh, Iran (1968)

Age groups	No. of persons examined	Percent infected with:		
		<i>A. lumbricoides</i>	<i>T. trichiura</i>	<i>H. nana</i>
0-2	50	20	4	0
3-5	199	63	6	10
6-10	394	83	11	16
11-15	289	82	15	11
16-20	136	76	18	5
21-25	97	73	14	3
26-30	98	74	14	4
31-40	221	76	10	3
41-50	174	74	16	3
51-60	97	70	16	0
61+	100	68	16	2
Total	1812	74	12	8

Table IV: Prevalence of infection according to sex in Basmenge and Torghabeh Iran, (1968)

Area	No. of persons examined		Percent infected with:			
			<i>A. Lumbricoides</i>		<i>T. trichiura</i>	
	Male	Femal	Male	Female	Male	Female
Basmenge	550	467	79	80	36	37
torghabeh	904	908	71	76	12	11

As table V shows the average number of *A. lumbricoides* and *T. trichiura* eggs per gr. of feces for each individual is highest in 0 to 15 year old children for *A. lumbricoides* and 3 to 15 for *T. trichiura*. These are the ordinary ages for both infections.

Table V: Intensity of ascariasis and trichiuriasis found by egg count in different age groups in Basmenge and Torghabeh, Iran, (1968)

age groups	Average No. of eggs per gr. of feces per individual			
	<i>A. lumbricoides</i>		<i>T. trichiura</i>	
	Basmenge	Torghabeh	Basmenge	Torghabeh
0-2	10707	10882	64	183
3-5	10966	13123	415	476
6-10	12800	10843	370	470
11-15	12492	11979	423	373
16-20	10393	9007	262	325
21-25	9359	8239	300	328
26-30	9848	9801	344	212
31-40	9449	10023	240	179
41-50	8103	10063	263	205
51-60	7986	7658	266	200
61+	6480	5789	231	175
Total	9871	9764	289	284

Discussion

Because of the significant variation in the topography and geographical structures of Iran, the fauna of the intestinal helminths varies a great deal in different parts of the country.

The two areas surveyed were similar in some aspects such as the topographical condition, altitude, and the habits of inhabitants, and although the fauna of helminths was similar in both areas, the prevalence of some helminths such as *H. nana* and *T. trichiura* differed significantly.

The reason for this difference as well as for absence of some infections such as trichostrongylosis, which is very high in some parts of the country, (Biocca, 1959; Sadeghi et al, 1966; Ghadirian et al, 1968 and Sahba et al, 1967), is not clear.

The low temperatures which prevail during the winter months in the areas surveyed cannot be considered as the responsible factor since infection with *Trichostrongylus* is very high in Isfahan villages (Ghadirian et al, 1968) where the winters are also very cold; while it is rare in southeast of Iran (Farhang-Azad et al, 1967) where no snow falls during the winter.

Another interesting finding is the high rate of infection of ascaris in villages where latrines are provided and are in use. This maintained in an area because of the children's habits of defecating in courtyards and the use of night-soil as fertilizer.

However, based on findings from the present work, the necessity for more studies on the epidemiology of intestinal helminths in Iran to find some of the unknown factors involved is highly recommended.

Summary

The prevalence of intestinal helminths was determined by stool examination of the inhabitants of two mountainous areas in the northeast (Torghabeh) and northwest (Basmenge) of Iran.

All members of 20% of the families from 10 villages of Torghabeh amounting to 1812 persons, and 10% of families from 23 villages of Basmenge to 1017 individuals were chosen by stratified sampling method and were examined, and the intensity of infection was determined by egg count.

The highest rates of infection were found for ascaris (74% and 81%) in both areas. Then *T. trichiura* (with a prevalence of 21% and 37%) and *H. nana* (4% and 8%), were more prevalent infections detected.

In Basmenge 57% were infected with one, and 37% with two and 1% with three species of helminths and only 8% were free from infection, while in Torghabeh 60% had one, 16% had two, and 1% had 3 worms, and their differences discussed.

These data are compared with those from other parts of Iran and their differences discussed.

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References

- Ade, Y. and Hesabi, A. (1963). Some observation on the Intestinal Occlusion by Ascaris. *J. of General Medicine, Teheran University*. 2, 237 (in Persian).
- Arfaa, F. and Mahdavi, M. (1969). The Importance of Intestinal Helminthiasis in Iran. *J. of General Medicine, Teheran University*. 8, 125 (in Persian).
- Avanesian, A. (1944). Ascariasis, Result of 471 Necropsy Undertaken in Hospitals of Teheran Medical School. *J. of Medicine, Teheran*. 3, 474 (in Persian).
- Beaver, P. C. (1961). Control of Soil Transmitted Helminths. *Public Health Papers*. 10, WHO, Geneva.
- Biocca, E. (1959). Studies of Intestinal Helminthiasis in Jewish Communities in Iran. *Parasitologia*, 1, 21, 67.
- Biocca, E., Paggi, L. and Etrorecchia, P. (1960). Further Studies on *Trichostrongylus* in Jewish Communities in Iran. *Parasitologia*. 2, 345-352.
- Faghih, M. (1958). Prevalence of Intestinal Parasites in Isfahan, Central part of Iran. *J. School of Medicine, Teheran*. 7, 530 (in Persian).
- Farhang-Azad, A. and Parvaz, P. (1967). Preliminary Studies on Intestinal Helminths in Baluchestan and Sistan Province, South west of Iran, - A Report of Health Corp Organization., Ministry of Health Iran. (in Persian).
- Fisher, A. R. and Yates, (1957). *Statistical Tables for Biological, Agricultural and Medical Research*, 5th ed. Oliver and Boyd. Edinburg.
- Ghadirian, E., Mofidi, Ch. and Bijan, H. (1968). Premier Travail Sur l'identification de differentes especes de *Trichostrongylus* en Iran. *Ann. Parasit. Hum. Comp.* 43, 467.
- Ghadirian, E., Bijan, H. and Sabokbar, R. (1968). Particularites de l'epidemiologie de l'ascaridose et Accessoirement de celles de la trichostrongylose et de la trichocephalose dans la ville d'Isfahan, Iran. *Bul. Soc. Path. exot.* 61, 879
- Haratunian, S. A. (1959). Intestinal Helminths in the Northwest part of Iran. The-

- sis for D. Pharm, No. 484, Univ. of Teheran (in Persian).
- Institute of Public Health Research, Iran. (1956). Annual Report, Shahsavari Training and Research Centre. (in Persian).
- Nasirpour, B. and Araghizadeh, M. (1966) Studies on Clinical Symptoms and Pathology of 333 Cases Operated for Appendicitis in Teheran. J. School of Medicine, Teheran. 24, 558 (in Persian).
- Sadeghi, V. Amini, H. (1966). Studies on Helminthic Infections and Anemia of Shahre-Kord District, Central Part of Iran. Report No. 1616, Institute of Public Health Research, Iran, (in Persian).
- Sabokbar, R. (1961) Ascaris, Oxyuris, Trichostrongylus and Trichocephalus Infections and their Diagnosis by Laboratory Methods Proceedings of 10th Medical Congress of Iran, Ramsar, Iran.
- Sahba, G. H., Arfaa, F. and Bijan, H. (1967). Intestinal Helminthiasis in the Rural Area of Khuzestan. Southwest Iran. Ann. Trop. Med, and Parasit. 61, 352.
- WHO. (1953). African Conferences on Ancylostomiasis. Technical Report Ser 255. Geneva
- . . . (1964). Soil-transmitted Helminths. Expert Committee on Helminthiasis, Technical Rep. Ser. 277 Geneva
- . . . (1967). Control of Ascariasis. Report of a WHO expert Committee. Tech. Rep. Ser. 379. Geneva.

SOME STUDIES ON FREEZE-DRIED ARTERIES.

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While gaining experience in the management of artery bank and the technique of preservation by freeze-drying, I have carried out experiments which concern freeze-drying methods and vessel reconstitution.

These experiments are divided into three groups:

- (1) The value of the secondary stage of freeze-drying;
- (2) Residual moisture determinations;
- (3) Reconstitution of freeze-dried vessels prior to use.

Primary Stage of Freeze-Drying (FIG I)

After removing arteries from the cadaver and trimming them, they are sterilised by being incubated in a 1% solution of beta-proiolactone for three hours. After that, freeze-drying takes place in two stages. In the first stage, using a vacuum of 1 to 0.5 mm. Hg. most of the water is removed. A cold condenser is used to avoid swamping of the pump. This stage lasts for two days.

Secondary Stage of Freeze - Drying (FIG II.)

In the second stage, as is shown in the figure, the arteries are placed in separate containers. The system is evacuated with a greater vacuum and the small amount of remaining water is removed by P₂O₅ trap. This stage also lasts for two days.

EXPERIMENTS

A. Concerning Freeze - Drying Techniques.

The first step in the experiment was to check the amount of water removed in any of the stages. The arteries were removed as soon as possible after death, and after trimming were weighed with the accuracy of 1/10,000 of a gramme. They were incubated in 1% sol. of B. P. L. for three hours and were then weighed again.