Pathogenic Intestinal Parasites in Bahrain

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ABSTRACT

Pathogenic intestinal parasites were found in 32.4% of all faecal samples examined at the Parasitology Section of the Salmaniya Medical Centre (SMC) between 1978-1988. The common parasites were Giardia lambia, Ascaris lumbricoides, Hymenolepis nana, and Ancylostoma duodenale. The calculated incidence rates of these and other intestinal parasites in the present study do not reflect their true incidence in Bahrain. This is because of the influence on the results of such factors as the number of repeated faecal samples examined, the nationality of patients, type of patients studied, and the inclusion of non-pathogens.

Pathogenic intestinal parasitic infestations are a public health problem and their prevalence varies in different population groups. The incidence of these parasites is generally high in the tropical and subtropical countries particularly among low socio-economic groups. Bahrain is a subtropical archipelago, which during the last 15 years, has witnessed the influx of expatriate workers from different parts of the world, mainly from the Indian subcontinent and South East Asia. These workers brought with them many diseases which they contracted in their own countries and this has created a public health problem.

Fernandes and Mahmood were the first to establish the prevalence of parasitic diseases in Bahrain[1]. Their data which was collected from the Public Health Laboratory (PHL) is not without limitations. This is because of the influence on the final results of such factors as the period of study, the number of repeated samples, the nationality of patients, inclusion of non-pathogenic parasites, and the type of patients studied. The aim of the present study is to establish the prevalence of these parasites in Bahrain based on the analysis of hospital records during the last 10 years, and to compare the incidence pattern with that of Fernandes and Mahmood, as well as with studies from Saudi Arabia, the only country in the Arabian Gulf from which the incidence rates were reported[1-4].

METHODS

The laboratory records at the Parasitology Section of the Department of Pathology, SMC between 1978-87 were reviewed, and those with positive identification of pathogenic intestinal parasites were recorded. This section is the largest of its kind in Bahrain and its catchment area includes all the hospitals and health centres administered by the Ministry of Health. At various times during the period of the present study, the Department also acted as the sole diagnostic facility for many other government and private institutions. Non-pathogenic parasites such as Entamoeba coli, Entamoeba hartmanii, Endolimax nana, Iodomoeba butschii, Chilomastix mesnili, Trichomonas hominis, and Blastocystis hominis are usually reported by the above section, but were excluded from the present study. Cases of Trichomonas vaginalis and Schistosoma haematobium appearing in stool samples were also excluded.

RESULTS

During the 10 years of the present work, 131,611 faecal samples were examined at the SMC Parasitology Section, of which 42,639 (32.4%) samples contained pathogenic intestinal parasites (see Table). Of the positive samples 41,302 (97%) contained a single parasite, and 1,337 (3%) contained more than one infestation.

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Table

Prevalence of pathogenic intestinal parasites in Bahrain between 1978-87.

Parasite	Year											
	1978	**1979**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**Total**	**%**
PROTOZOA												
Entamoeba histolytica	81	55	38	70	78	44	43	31	38	21	499	1.2
FLAGELLATES												
Giardia lambia	1981	2072	1462	1152	1284	736	512	544	458	284	10485	25.4
ROUNDWORMS												
Ascaris lumbricoides	1577	1110	463	361	352	481	438	239	173	104	5298	12.8
Trichuris trichiura	3552	4519	2696	1687	1395	1074	842	732	731	342	17570	42.5
HOOK WORMS												
Ancylostoma duodenale	290	400	205	178	155	214	267	183	206	70	2168	5.2
Strongyloides stercoralis		69	15	13	48	49	58	42	30	22	346	0.8
PIN WORMS												
Enterobius vermicularis	23	45	16	12	25	32	25	14	14	9	215	0.5
TAPEWORMS												
Hymenolepis nana	1853	968	455	476	232	178	158	157	122	59	4658	11.3
Taenia species		6	9	8	5	5	6	4	2	1	46	0.2
BLOOD FLUKES												
Schistosoma mansoni		4	5	2		1	2	1			15	0.1
TOTAL %	**9357**	**9250**	**5364**	**3959**	**3574**	**2814**	**2351**	**1947**	**1774**	**912**	**41302**	**100.0**
Total number examined	14539	15338	15373	13250	13161	12496	13929	12584	11058	9883	131611	
% of total examined	11.0	11.6	11.7	10.1	10.0	9.5	10.6	9.6	8.4	7.7		
Total positive samples	9357	9358	5618	4171	3867	2962	2449	2051	1869	937	42639	
% of positive samples	22.0	22.0	13.2	9.7	9.0	7.0	5.7	4.8	4.4	2.2		
% of positive from total examined	64.4	61.0	36.5	31.5	29.4	23.7	17.6	16.3	16.9	9.5	32.4	
Number of Health Centres	13	14	15	17	18	18	19	19	19	19		

The total number of parasites for the year 1979 was adjusted to include two cases of Clonorchis sinensis. Note that the 1337 difference between the positive faecal samples examined and the total number of parasites is due to the influence of samples containing more than one parasite.

The frequencies of the 41,302 intestinal parasites were as follows: 40,803 (98.8%) helminthic parasites, and 499 (1.2%) protozoan infections. The helminthics included 22,868 (56%) round worms, 10,485 (25.7%) flagellates, 4,704 (11.5%) tape worms, 2,514 (6.2%) hook worms, 215 (0.5%) pin worms, and 17 (0.1%) blood and liver flukes. All the pathogenic protozoa in this study were Entamoeba histolytica, and the liver fluke was Clonorchis sinensis diagnosed among two Korean workers.

The commonest parasitic infestation was Trichuris trichiura accounting for 42.5% of all intestinal parasites, followed by Giardia lambia (25.4%), Ascaris lumbricoides (12.8%), Hymenolepis nana (11.3%), and Ancylostoma duodenale (5.2%).

There was a gradual decline in the annual number of faecal specimens examined during the 10 years period of the present study accompanied by similar pattern in the number of positive samples. For example, the average annual rate of the total number of stools examined during the five years period between 1978-82 dropped from around 11% to 7.7% during 1987. The number of positive samples also showed a progressive decline from as high as 22% during 1978 and 1979 to 2.2% in 1987.

DISCUSSION

The study of Fernandes and Mahmood on the prevalence of parasitic diseases in Bahrain was based on the analysis of stool samples examined at the Parasitology Section, PHL, Ministry of Health during a period of 4 years between 1975-78[1]. This section deals almost exclusively with the faecal specimens collected from expatriate workers employed in Bahrain. It does not handle samples collected from hospitals and health centres patients who are mostly Bahraini nationals. By contrast, the present study covered a period of 10 years (1978-87) and was based on the analysis of records of patients examined at the government hospitals and health centres.

Like in the study of Fernandes and Mahmood[1], it was not possible in the present study to eliminate the number of repeated samples belonging to the same patients. This is because the total number of records in the present study was too big to undertake manual verification and it is regrettable that computerized analysis was not available. As a result, the number of positive parasites is expected to include the new cases as well as those diagnosed throughout the follow up of the patients under therapy.

It was also not possible in the present study to classify the patients according to their nationality because the laboratory records did not contain such information and it was not practical to refer to the patients' files to verify their nationality. In this respect it is important to highlight the public health hazard to the local community of infestations acquired outside Bahrain. Expatriate workers coming from areas where parasitic infestation is common must be screened so as to eliminate the possibility of local spread of diseases. Fernandes and Mahmood alerted hazards of blood flukes particularly clonorchiasis, filariasis, paragonimiasis, and schistosomiasis among the expatriate population of Bahrain although the rate of these parasites were not included in their study[1]. In this respect one may expect that the patients with Schistosoma mansoni in the present study were non Bahrainis because the environment on islands is not favourable for the spread of this parasite. Schistosomiasis, however, is endemic in some parts of Saudi Arabia and accounts for 7.4% of all parasites among Saudis, and 1.7% among non-Saudi nationals[2,3,5]. In the same context it also needs to be mentioned that both patients in this study with Clonorchis sinensis, a common liver fluke in South East Asia, were Koreans.

Like in the case of pathogenic intestinal parasites, the presence of non pathogenic species is also regarded as a public health problem[3]. These parasites may not produce any symptoms, but their presence in excessive numbers may warrant their reporting. Parasitology services are therefore advised to report the presence of these species if found in excessive numbers, and to exclude their counting from the total number of stools examined so as not to inflate the results. During the period of the present study some of these species were counted to the number of positive samples. For example the reporting and counting of E. coli, a commensal protozoan, was discontinued since 1977, whereas that of T. hominis, a commensal flagellates, is still being recorded at the SMC laboratory as well as at the PHL.

The reason for the progressive decline in the annual number of faecal samples examined at the

SMC Parasitology Section over the 10 years period of the present study is due to the opening of newer diagnostic laboratories in Bahrain. These laboratories, which were affiliated to the various health centres on the islands, took most of the workload from the SMC laboratory. Thus in 1978 there were only 13 health centres, whereas in 1987 there were 20 centres.

The incidence rates of intestinal parasites reported from SMC laboratory was different from those established at the PHL[1]. For example, whereas the overall positive rates were 32.4% and 21% respectively, there was also a selective difference in the incidence of such parasites as G. lambia, A. lumbricoides, T. trichiura, and H. nana. Differences are expected to vary from one region to another in such a big country like Saudi Arabia, but in a small country like Bahrain these differences must be treated with care[2–4].

The factors which may possibly explain the differences in the incidence rates between the two main laboratories on the islands are the type of faecal samples analysed at the PHL, and the influence of opening new health centres in the country. Since the PHL deals with the analysis of faecal samples collected from expatriate workers, it is reasonable to conclude that the PHL rates were a reflection of the incidence among expatriate workers living in Bahrain, who may have contracted the infection while in their home countries, rather than Bahrain. Similar differences have been observed between Saudi and non-Saudi workers[2,3]. On the other hand, the establishment of a network of health centres covering the various regions of Bahrain has provided medical care, including health education, to a wide sector of the population. As a result, the SMC work load was diverted to the regional health centres thus reducing the reporting of intestinal parasites at the SMC laboratory.

Generally, the incidence rates of pathogenic intestinal parasites are higher in Bahrain than in reports from Saudi Arabia except for giardiasis, schistosomiasis, and infections caused by E. histolytica[3]. The reasons for these differences are not known, although the frequent use in Bahrain of dried human and animal faecal sludges as an agricultural fertilizer may have a contributory effect. For example, it has been found that the ova and larvae of certain species such as A. lumbricoides, H. nana, Strongyloides stercoralis can survive severe dryness for six months, and it was recommended that such sludges must be dried for a year to guarantee death of all faecal organisms including viri[6].

Irrespective of the common problems reflected in the study of Fernandes and Mahmood and in the present work, both reports must be regarded as an adequate, informative, and documented data reflecting and describing the incidence pattern of pathogenic intestinal parasites in Bahrain[1]. However, to ascertain the validity of these reports, and in order to eliminate the problems posed in the present paper, it is highly recommended to carry out a long prospective study based on hospital catchement samples.

T. trichiura was the commonest pathogenic intestinal parasite identified in Bahrain accounting for 34.5% of all intestinal parasites in the study of Fernandes and Mahmood and 42.5% in the present work[1]. For unknown reason, Trichiuriasis appears to be less common in Saudi Arabia where it accounts for 5.7% and 2.5% of all pathogenic intestinal parasites among Saudi nationals and non-Saudi workers respectively[2,3].

Furthermore, it is interesting to note that the disease does not seem to exist in the Abha region of Saudi Arabia[4].

G. lambia, an organism seen more commonly in faeces than any other parasite is endemic throughout the world including Europe and North America[3,7]. The prevalence in the present work of this protozoan is double that of Fernandes and Mahmood, and six folds more than the rate of the Center for Disease Control, USA[1,8]. Giardiasis is also common in Saudi Arabia accounting for 60.7% and 5.5% of all intestinal parasites among the Saudi nationals and non-Saudi workers respectively[2,3]. The Saudi rate, however, seems very high and it contradicts the recent report of 15.5% reported from Abha region in Saudi Arabia[4]. The parasite is known to be transmitted orally through waterborne sources such as the contamination of municipal water supplies with raw sewage, or from inadequate water treatment systems[5]. Contamination of water supplies has occurred in Bahrain on a number of occasions and this may explain the high incidence of giardiasis in the present study.

CONCLUSION

The identification of endemic intestinal parasites is important in the control of parasitic diseases, and their prospective registration in Bahrain must be improved by introducing a computerized system of recording. There is also a need to carry out further studies on the incidence of parasitic diseases to include not only intestinal pathogens, but also those retrieved from other tissues and body fluids such as the skin (eg leishmaniasis), blood (eg malaria, filariasis etc), urine (eg S. haematobium).

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