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Prevalence of intestinal parasitic infestation in Ma'an governorate, Jordan

Khalil I Altaif

College of Aisha Bint Al-Hussein for Nursing Al-Hussein Bin Talal University, Ma'an, Jordan

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ABSTRACT

Objective: To determine the prevalence of parasitic infection among the population of Ma'an governorate. **Methods:** A retrospective analysis of laboratory records of stool specimens of patients seen in Ma'an hospital (in different specialties) during the period of 1 January 2009 to 31 December 2009 was carried out for the detection of intestinal parasites. **Results:** The total number of stool samples in the survey examined in this retrospective study was 1 999, and the number and percentage of positive samples were 338 and 16.9%, respectively. The highest incidence of intestinal parasites was during summer months (June-October), while the lowest incidence was during winter months (December-January). Six different parasitic species were detected. The highest frequency was among males both adult and children and was higher in adult males and females than children (male and female). *Entamoeba histolytica* and *Giardia lamblia* (80.7% and 15.7%, respectively) were the commonest species detected while *Entrobius vermicularis* (0.9%), *Strongyloides stercoralis* (0.6%), and hookworms (0.9%) were the least common. **Conclusions:** The results indicate that intestinal parasites in Ma'an governorate (south of Jordan) is not a major public health problem. Nevertheless, a comprehensive health education program and improvements to environmental sanitation should be developed to keep this health problem under control.

1. Introduction

Parasitic infestations are one of many factors that cause gastrointestinal syndromes such as, diarrhea, weight loss, abdominal discomforts and pain in many tropical and subtropical countries of the world[1,2]. Many environmental and socioeconomic factors such as poverty, malnutrition, potable water, low health status, poor sanitary facilities and other factors are the major causes of the increasing incidence of parasitic infections in these areas[2].

Epidemiological surveys carried out in many countries have demonstrated the importance of parasitic infections and some of these studies showed that there is correlation between the incidence of parasitic infections and seasons of the year[2-5].

It appears that summer months are a favorable period for the development and survival of many parasitic species and accordingly the rate of incidence increases during this season[6,7].

All the published reports on the prevalence and the importance of parasitic infections in Jordan indicated that *Entamoeba histolytica* (*E. histolytica*) and *Giardia lamblia* (*G. lamblia*) are among the most common parasites[8-16]. However, very little information is available concerning the incidence of parasitic infestations in Ma'an governorate. Therefore, the aim of the present study was to determine the incidence among people referred to Ma'an hospital in order to help the heath authorities in Ma'an governorate in planning for the prevention and control of such diseases.

2. Materials and methods

The results from the examination of the stool samples of 1 999 patients suffering from different abdominal disorders, who had been referred to Ma'an hospital, Ma'an south of Jordan during the period between 1st January to 31st December 2009 were reotrospectively reviewed and the incidence and percentages of parasitic infections were determined.

All the specimens were examined by direct fecal smear

*Corresponding author: Khalil I Altaif, Professor, Dean of College of Aisha Bint Al-Hussein for Nursing, Al-Hussein Bin Talal University, P.O Box 20, Ma'an, Jordan.
E-mail: hasanat25@hotmail.com

with saline or lugol iodine. Data including gender and other relevant information were recorded on a special form. *Chi* square test of statistical significance was applied to study the association between the prevalence of intestinal parasites and demographical factors. P value <0.05 was considered as significant.

3. Results

The total number of stool examined in the study period at Ma'an hospital was 1 999, including 1 117 (55.9%) male and 882 (44.1%) female. Among these 857 (42.9%) were children less than 12 years old and 1 142 (57.1%) were adults.

The tests showed that 338 (16.9%) of the 1 999 subjects had parasitic infections and six different parasitic species were identified. *E. histolytica* (273, 80.7%) and *G. lamblia* (53, 15.7%), were the commonest intestinal parasites isolated and *Enterobius vermicularis* (*E. vermicularis*) (3, 0.9%), hookworms (3, 0.9%) and *Strongyloids stercoralis* (*S. stercoralis*) (2, 0.6%) were the least prevalent. And *Ascaris lumbercoides* (*A. lumbercoides*) (4, 1.2%) had the intermediate prevalence rate.

Tables 1 showed that the highest incidence was amongst male adults and children than female adults and children (P<0.01) and was true for all the species encountered in this study. Furthermore, the prevalence was higher in adult male and female than children male and female (P<0.05) (Table 2).

Table 1
The prevalence and percentage of intestinal parasites by gender and age of the patients [*n* (%)].

Parameters		Positive	Negative	Total
Gender	Male	192 (17.2)	925 (28.8)	1 117 (100.0)
	Female	146 (16.6)	736 (83.4)	882 (100.0)
Age & sex	Child male	49 (9.7)	458 (90.3)	503 (100.0)
	Child female	40 (11.3)	314 (88.7)	354 (100.0)
	Adult male	143 (23.3)	471 (76.7)	614 (100.0)
	Adult female	106 (20.1)	422 (79.9)	528 (100.0)

Table 2
Distribution of intestinal parasite according to the species of parasite in different age and gender groups [*n* (%)].

Parasite	Gender		Age & sex group				Total
	Male	Female	Adult male	Adult female	Child male	Child female	
E. histolytica	152 (55.7)	121 (44.3)	107 (39.2)	84 (30.8)	45 (16.5)	37 (13.5)	273 (80.7)
G. lamblia	35 (66.0)	18 (34.0)	30 (56.6)	15 (28.3)	5 (9.4)	3 (5.7)	53 (15.7)
Others	8 (66.7)	4 (33.3)	5 (41.6)	2 (16.7)	3 (25.0)	2 (16.7)	12 (3.6)

Table 3
Monthly distribution of intestinal parasites [*n* (%)].

Month	No. of cases	Infection cases	*E. histolyica*	*G. lamblia*
Jan	132	20 (15.2)	13 (9.8)	5 (3.8)
Feb	142	15 (10.6)	13 (9.2)	2 (1.4)
March	136	22 (16.2)	16 (11.8)	4 (2.9)
April	181	27 (14.9)	23 (12.7)	4 (2.2)
May	212	29 (13.7)	23 (10.8)	4 (1.9)
June	195	38 (19.5)	34 (17.4)	3 (1.5)
July	275	61 (22.2)	49 (17.8)	11 (4.0)
Aug	185	35 (18.9)	30 (16.2)	4 (2.2)
Sept	141	37 (26.2)	31 (22.0)	5 (3.5)
Oct	156	31 (19.9)	26 (16.7)	5 (3.2)
Nov	86	7 (8.1)	5 (5.8)	1 (1.2)
Dec	158	16 (10.1)	10 (6.3)	5 (3.2)
Total	1999	338 (16.9)	273 (13.7)	53 (2.7)

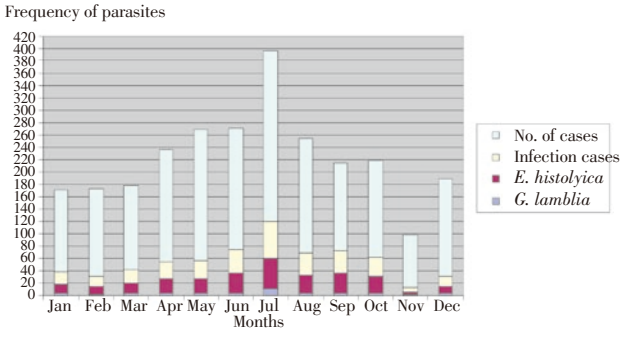

Figure 1. Monthly distribution of intestinal parasites.

The result also showed that the total number of subjects admitted to the hospital was increased during summer months. This was accompanied by a much higher prevalence with both *E. histolytica* and *G. lamblia* during the same period which extended from June to October (Tables 3 and Figure 1).

4. Discussion

The overall prevalence and percentage of intestinal parasitic infections in this study 338 (16.9%) is higher than the overall prevalence rate (9.9%) reported by the Ministry of Health in Jordan, Directorate for Disease Prevention and Control in 1996[8] and that of Al-Momani *et al* in their retrospective study in Jordan (4.4%)[9]. However, the overall prevalence is lower than that reported from Southern Jordan (28.5%)[10]. Several reports from neighboring countries showed that the prevalence rate varies between these countries and our findings[2,5,6]. It seems that these differences can be attributed to a number of factors such as geographic, socioeconomic, climate, poverty, malnutrition, personal hygiene, population density, potable water and sanitary facilities. These factors play a key role in determining the prevalence of any parasite population in any geographical region of the world[2].

Six types of different intestinal parasites were detected

during this retrospective study. *E. histolytica* is by far the most common species in both male and female patients as well as in adults and children. In general protozoal infections with *E. histolytica* and *G. lamblia* were found to be much higher than helminth infestations. This is in agreement with reports from Palestine[2], Iran[3] and Jordan[15]. However, *G. lamblia* seems to be the commonest species in south Jordan with a prevalence rate of (42.6%)[16]. The low prevalence of helminth parasites such as *Ascaris lumbercoides*, hookworms and *S. stercoralis* is probably due to adverse conditions in this area of Jordan where the climate is characterized by a desert environment. Such weather is not suitable for the survival of eggs and larvae of helminth parasites in the environment. However, the unexpected result of a low incidence of *E. vermicularis* in children is probably due to the method employed in the stool examination. A higher percentage (5.9%) from southern Jordan was reported with *E. vermicularis*[16]. This differnece is probably due to both sample groups which were selected from a community population (school children) and the technique employed (scotch tape exam).

With regard to the seasonal effect on the prevalence of parasites, a remarkable seasonal fluctuation was observed. The highest numbers and percentage occurred in summer months with a peak incidence in September (26.2%), while the lowest occurrence of parasitic infestations was evident in winter season (November-February). The prevalence showed the lowest percentage during November (8.1%). A similar finding was reported from Palestine that a peak of incidence occurred during summer months[6,7]. The higher prevalence may be linked to unsanitary conditions and the abundance of house flies during the summer months. The incidence of intestinal parasitism in Ma'an Governorate is therefore considered to be comparatively low as compared with other parts of Jordan and other Arab countries and countries in middle east[2-5].

Though the prevalence of intestinal parasites in Ma'an governorate Southern Jordan is low, it is necessary to develop a comprehensive health education program and sanitation improvements to keep this problem under control and at a low level. To confirm these results a further survey is needed in order to obtain reliable data on the prevalence of intestinal parasites in different health care centers in the governorate.

Conflict of interest statement

We declare that we have no conflict of interest.

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