

EPIDEMIOLOGICAL STUDY: LABORATORY DATA MINING IN SOUTH OF JORDAN

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ABSTRACT

Introduction: To determine the prevalence of parasitic infection among the population of Ma'an governorate. **Methodology:** A retrospective data mining of retrieved and analysis laboratory stool specimens records of patients seen in Ma'an Hospital (in different specialties) during the period 1st January 2009 to 31 December 2009 were carried out for the detection of intestinal parasites. **Results:-**1999 Stool samples were examined; 338 were positive samples (16.9%). The highest incidence of intestinal parasites was during summer months (June -October) and the lowest was during winter months (December-January). Six different parasitic species were detected. The highest frequency was among adult males and females higher than children. Amoebiasis and Giardiasis (80.7% and 15.7%.respectively) were the commonest species detected while *Entrobilus. vermicularis* (0.9%), *Strongyloides. Stercoralis* (0.6%) and hookworms (0.9%) were the least common. **Conclusion:-** Intestinal parasite is not a major public health problem in Ma'an governorate. Nevertheless a comprehensive health education program, improvements to environmental sanitation should be developed to keep this health problem under control and activate the role of community nursing to raise community health awareness. Furthermore, a wider survey should be conducted in different health centers in the governorate to obtain a better epidemiological picture of parasitic infection in this region.

Keywords: Prevalence, Intestinal Parasite, Jordan

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 (WHO, 2010; Bdir and Adwan, 2010). 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 (Bdir and Adwan, 2010).

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 (Bdir and Adwan, 2010; Niyiyati, *et al.*, 2009;

Razi and Sami, 2009; Yassin *et al.*, 1999). 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 (Ali-Shtayeh *et al.*, 1989; Fadel, 2002).

All published reports on prevalence and importance of parasitic infections in Jordan indicated that *E. histolytica* and *G. lamblia* are among the most common parasites (MOH, 2002; Al-Momani *et al.*, 2000; Ammoura, 2010). However very little information is available concerning the incidence of parasitic infestations in Ma'an governorate and therefore, the aim of the present study was to determine the incidence among people referred to Ma'an hospital in order to help the health authorities in Ma'an governorate in planning for the, prevention and control of such diseases.

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2. MATERIALS AND METHODS

A laboratory data mining study through a retrospective approach retrieve and examine a stool samples of 1999 patients suffering from different abdominal disorders, who had been referred to Ma'an Hospital in south of Jordan during the period between 1st January to 31st December 2009. These samples were retrospectively reviewed and the incidence and percentages of parasitic infections were determined. Prior to that a permission was obtained from the director of Ma'an Hospital, samples were coded anonymous.

All the specimens were examined by direct fecal smear 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 prevalence of intestinal parasites and demographical factors. P value <0.05 was considered as significant.

3. RESULTS AND DISCUSSION

The total number of stool examined in the study period at Ma'an Hospital was 1999, including 1117 (55.9%) male and 739 (44.1%) female. Of these 857 (42.9%) were children less than 12 years old and 1142 (57.1%) adults.

The tests showed that 338 (16.9%) of the 1999 subjects had parasitic infections and six different parasitic species were identified. Amoebiasis and Giardiasis (80.7 and 15.7%) respectively, were the commonest intestinal parasites isolated and *E. vermicularis*, hookworms and *Strongyloids stercoralis* were the least prevalent (**Table 1**).

Table 2 and 3, show 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 is higher in adult male and female than children, male and female ($p < 0.05$), (**Table 4**).

The result also showed that the total number of subjects admitted to the hospital increased during summer months. This was accompanied by a much higher prevalence with both *E. histolytica* and *Giardia lamblia* during the same period which extended from June to October (**Table 5, 6 and Fig. 1**).

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 (MOH, 2002) and that of (Al-Momani *et al.*, 2000) in their retrospective study in Jordan (4.4%) (Al-Momani *et al.*, 2000).

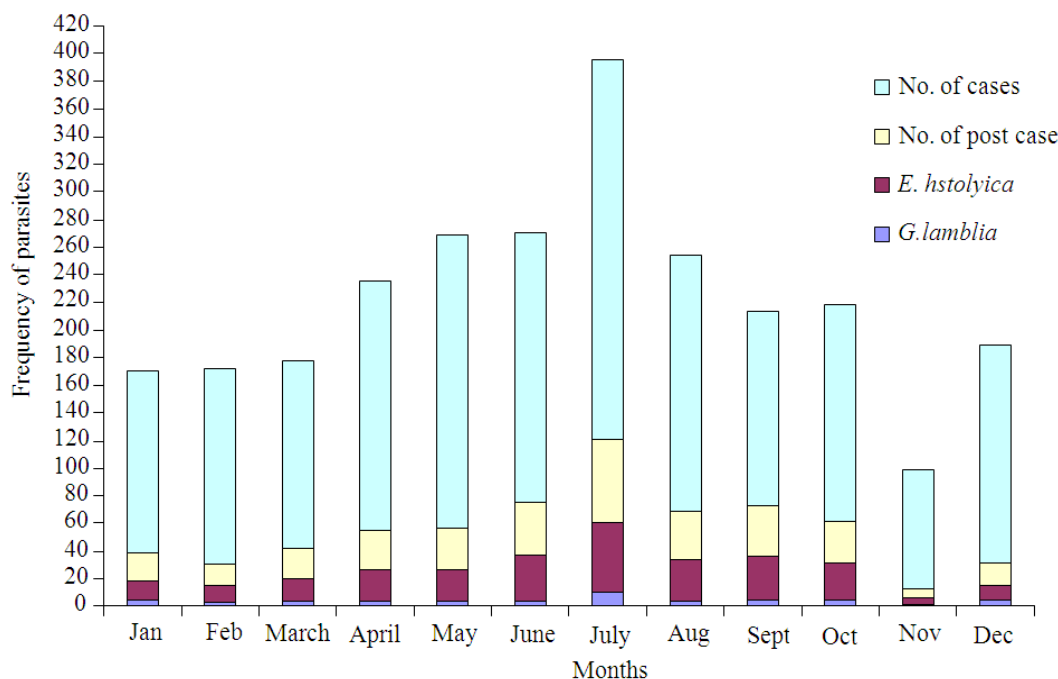


Fig. 1. Monthly distribution of intestinal parasites

Table 1. The incidence of different species of intestinal parasite in the stools of patients

Parasite	Infection	
	No	%
Entamoeba. Histolytica	273	80.7
Giardia lamblia	53	15.7
Enterobiusvermicularis	3	0.9
Ascarislumbercoides	4	1.2
Hookworm spp	3	0.9
Strongyloidesstercoralis	2	0.6
Total	338	100.0

Table 2. The prevalence and percentage of intestinal parasites by gender of the patients

Gender	Positive		Negative		Total	
	No	%	No	%	No	%
Male	192	17.2	925	28.8	1117	100
Female	146	16.6	736	83.4	882	100
Total	338	16.9	1661	83.1	1999	100

Table 3. The prevalence and percentage of intestinal parasites by age of the patients

Age and sex	Positive		Negative		Total	
	No	%	No	%	No	%
Child						
Male	49	9.7	458	90.3	503	100
Female	40	11.3	314	88.7	354	100
Total	89	10.4	768	89.6	857	100
Adult						
Male	143	23.3	471	76.7	614	100
Female	106	20.1	422	79.9	528	100
Total	249	21.8	893	78.2	114.2	100

Table 4. Distribution of intestinal parasite according to species of parasite in different age groups and gender

Parasite	Age Group													
	Gender						Age Group							
			Male		Female		Adult			Child				
	No	%	No	%	No	%	No	%	No	%	No	%		
Entamoebahistolytica	273	80.7	152	55.7	121	44.3	107	39.2	84	30.8	45	16.5	37	13.5
Giardia. Lamblia	53	15.7	35	66	18	34	30	56.6	15	28.3	5	9.4	3	5.7
Others	12	3.6	8	66.7	4	33.3	5	41.6	2	16.7	3	25	2	16.7
Total	338 (100)													

However the overall prevalence is lower than that reported from southern Jordan (28.5%) (Ammoura, 2010). Several reports from neighboring countries showed that the prevalence rates varies between these countries and our findings (Bdir and Adwan, 2010; Yassin *et al.*, 1999; Ali-Shtayeh *et al.*, 1989). 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 (Bdir and Adwan, 2010).

Six types of different intestinal parasites were detected during this retrospective study Entamoeba. 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 Giardialamblia were found to be much higher than helminth infestations.

Table 5. Monthly infectivity rate and percentage with intestinal parasites

Month	No. of cases	No. of post case	E. histolytica	Giardia
Jan	132	20	13	5
Feb	142	15	13	2
March	136	22	16	4
April	181	27	23	4
May	212	30	23	4
June	195	38	34	3
July	275	61	49	11
Aug	185	35	30	4
Sept	141	37	31	5
Oct	156	31	26	5
Nov	86	7	5	1
Dec	158	16	10	5
Total	1999	339	273	53

Table 6. Monthly distribution of intestinal parasites

Month	No. of samples	No. of post samples	Percentage
Jan	132	20	15.2
Feb	142	15	10.6
March	136	22	16.2
April	181	27	14.9
May	212	29	14.2
June	195	38	19.5
July	275	61	22.2
Aug	185	35	18.9
Sep	141	37	26.2
Oct	156	31	19.9
Nov	86	7	8.1
Dec	158	16	10.1
Total	1999	338	

This is an agreement with reports from Iran (Niyati *et al.*, 2009), Jordan (Al-Momani *et al.*, 2000) and Palestine (Bdir and Adwan, 2010). However *G. lamblia* seems to be the commonest species in south Jordan with a prevalence rate of (42.6%) (Ammoura, 2010). The low prevalence of helminth parasites such as *A. lumbricoides*, 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* (Ammoura, 2010). This difference 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 a peak of incidence occurred during summer months (Ali-Shtayeh *et al.*, 1989). 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 to other parts of Jordan and other Arab countries and countries in middle east (Bdir and Adwan, 2010; Niyati *et al.*, 2009; Razi and Sami, 2009; Yassin *et al.*, 1999).

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. Nurses at Maan governorate and Al-Hussein Bin Talal University particularly community health nurses students at Princess Aisha Bint Al-Hussien College of Nursing, should play active role in promoting healthy life style and raising community and school health awareness to reduce the incidence of parasitic infection among the population of Ma'an governorate. 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.

4. CONCLUSION

The result of some preliminary study on the prevalence of intestinal parasites is described. The overall prevalence with these parasites is low as compared to other parts of Jordan. However among the species detected Amoebiasis and Giardiasis seem to be the commonest species, while other parasites species showed a low prevalence and has no significant role in public health in Ma'an governorate. With regards to seasonal effect, the present results reveal that the highest prevalence occurs during summer months and the highest frequency was among adult male and female.

Health education program, improvements to environmental sanitation should be developed to keep this health problem under control. Furthermore, a wider survey should be conducted in different health centers in the governorate to obtain a better epidemiological picture of parasitic infection in this region.

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