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PREVALENCE OF INTESTINAL PARASITIC INFECTIONS AMONG FOREIGN MALE WORKERS IN AL-KHARJ CITY

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***Abstract*— The Kingdom of Saudi Arabia has a high number of foreign workers, especially those coming from endemic areas with intestinal parasites. The participating foreign workers (FWs) were from a variety of countries. Eleven species of intestinal parasites (nine helminthes and two protozoa) were identified, with an overall prevalence of 50 (31%), out of 160 FWs. The predominant parasite was Entamoeba histolytica, which was observed in 12 samples (24%), followed by Enterobius vermicular is in 8 samples (16%), 6 (12%) for each of Giardia and Ascaris lumbricoides, 5 (10%) for Ancylostoma dudenale, 4 (8%) for Hymenolepis nana, 3 (6%) for Schistosoma mansoni and 2 (4 %) for each of Taenia species and Heterophyes and 1 (2%) for each of Strongyloides stercoralis and Dipilidium caninum. Also the Distribution of detected parasites according to nationalities was studded; 12 (24%) of IPs were found in FWs from India, followed by 9 (18%) from Bangladesh, 6 (12%) from Philippine, 5 (10%) from Egypt, 5 (10%) from Pakistan, 3 (6%) from Sudan, 2 (4%) from Yemen and 8 (16%) from others.**

***Index terms*- intestinal parasites, Entamoeba histolytica, Dipilidium caninum ,**

I. INTRODUCTION

Nowadays, humans have acquired an amazing number of parasites, about 300 species of helminth worms and over 70 species of protozoa [1]. Parasites have been the subjects of some of the most exciting discoveries in the field of infectious diseases especially intestinal parasites [2]. Intestinal parasites (IPs) are the most common infections that contribute significantly to enteric diseases in both normal and immunocompromised patients worldwide [3]. About one third of the world (more than two billion people) is infected with intestinal parasites [4]. Poverty, illiteracy, poor hygiene, lack of access to potable water, and a hot and humid tropical climate are some of the common factors attributed to intestinal parasitic infections (IPI). About 39 million disability adjusted life years (DALYs) are attributed to IPI and thus represents a substantial economic burden due to these infections [5]. Moreover, Intestinal parasites (IPs) are the most prevalent infections causing significant morbidity and mortality in developing and tropical countries. The high rates of prevalence in some communities are usually attributed to inadequate hygiene, environmental contamination and occupational risks. The prevalence rate of infections correlates directly with the level of sanitation and adherence to infection prevention and control standards [3]. The World Health Organization (WHO) estimated that more than 2 billion people are infected with intestinal parasites worldwide which widely distributed in tropical and subtropical areas, especially in poor populations and these constitute the major source of foreign workers (FWs) [6].

It is noteworthy that with the rapid socioeconomic development in recent years and the improved standards of living in Kingdom of Saudi Arabia (KSA), furthermore KSA is considered to be one of the countries with a high number of expatriates. Also KSA has been a large influx of FWs with high rates of IPs from developing countries. This influx evidently brings with it the risks of disease transmission to the public [7] .

Therefore, in order to avoid disease transmission, the Saudi Ministry of Health and the Ministry of Interior require that FWs must be infection-free and physically fit. This is because most of the workers are housemaids, food-handlers, cooks and housekeepers in various private and governmental sectors. All FWs should be screened within 90 days of arrival and followed annually in order to renew their residency permits [8]. Subsequently the importance of this study lays in its approach to tackle a significant issue, which is the health of expatriate unskilled laborers who are serving the society in very vital activities such as clean workers, drivers, food dealers and home services. This study was aimed at determining the prevalence of intestinal parasitic infections among foreign male workers in Al-Kharj city, Saudi Arabia.

II. Materials and Methods

Prospective data collection on stool samples of male FWs from Asia and Africa was done at the parasitology lab of the College of Applied Medical Sciences, Prince Sattam University, KSA. This was performed over a period of 2 months by students of the College of Applied Medical Sciences, Prince Sattam University, in the second semester of the academic year 2016.

A total number of 160 samples were collected and examined. Microscopic examination of wet mount preparations was carried out, followed by the formalin-ethyl acetate concentration method. This made possible the detection of small numbers of organisms missed using a direct wet smear [9, 10].

Results

In the present study, there were 160 males whose ages ranged between 22 and 56 years, with a mean age of 35 years ± 4.82.The participating FWs were from a variety of countries such as Egypt, Sudan, Lebanon, India, Philippine, Bangladesh, Pakistan, Syria, Ethiopia, Sri Lanka, among others. They were mostly clean workers, drivers, food dealers and home services (table1, figure 1).

Eleven species of IPs (nine helminthes and two protozoa) were identified, with an overall prevalence of 50 (31%), out of 160 FWs. The predominant parasite was Entamoeba histolytica, which was observed in 12 samples (24%), followed by Enterobius vermicularis in eight samples (16%), six (12%) for each of Giardia and Ascaris lumbricoides , five (10%) for Ancylostoma dudenale, four (8%) for Hymenolepis nana, three (6%) for Schistosoma mansoni and two (4 %) for each of Taenia species and Heterophyes and one (2%) for each of Strongyloides stercoralis and Dipilidium caninum (table 2, figure 2).

On the other hand the distributions of detected parasites according to nationalities were studded; twelve (24%) parasites of IPs were found in FWs from India. These were followed by nine (18%) from Bangladesh, six (12%) from Philippine, five (10%) from Egypt, five (10%) from Pakistan, three (6%) from Sudan, two (4%) from Yemen and eight (16%) from others (table 3, figure 3 & 4).

Table 1. Sociodemographic characteristics of cases (age 22-56 year)

Characteristics	Number	Percentages
Nationality		
Bangladeshi	19	11.8 %
Egyptian	20	12.5 %
Ethiopian	9	5.6 %
Filipino	18	11.2 %
Indian	27	16.8 %
Lebanese	6	3.7 %
Pakistani	15	9.3 %
Sri Lankan	8	5 %
Sudanese	17	10.6 %
Syrian	8	5%
Yemeni	13	8.1 %
Type of work		
Barber	18	11.2 %
Clean worker	52	32.5 %
Food dealer	33	20.6 %
Salesman	41	25.6 %
Others	16	10 %
Total	160	100 %

Figure 1. Sociodemographic characteristics of cases according to nationality

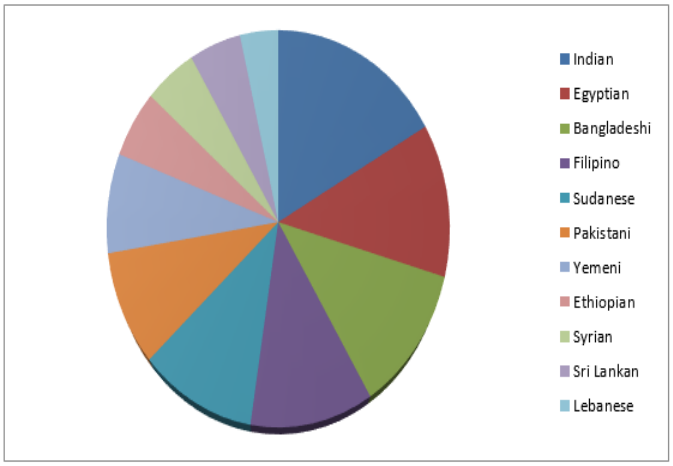


Figure 2. Sociodemographic characteristics of cases according to type of work

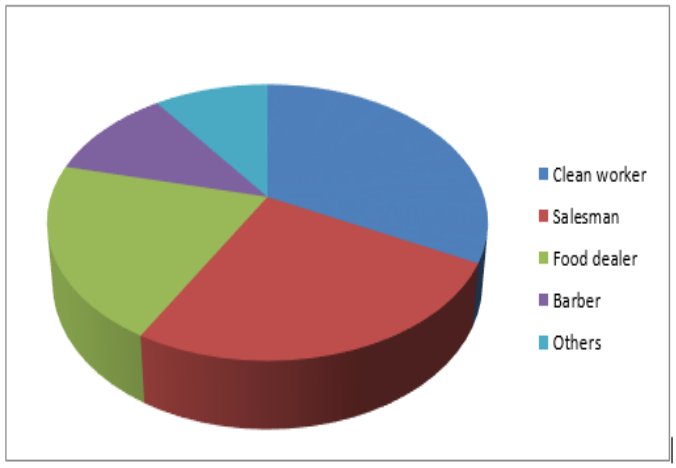
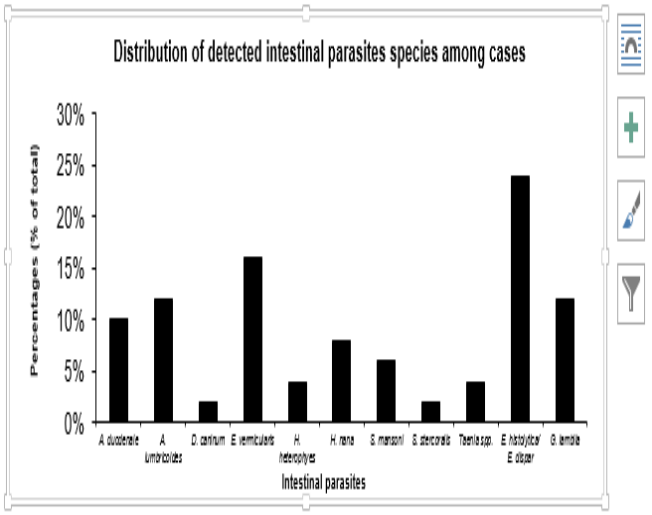
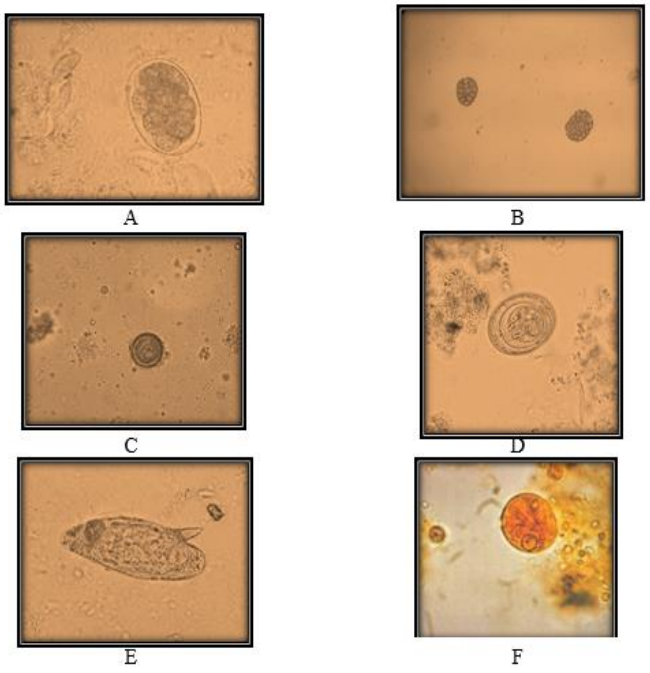


Table 2. Distribution of detected intestinal parasites species among cases

Detected parasites	Number	Percentages
Helminthes		
Ancylostoma duodenale	5	10 %
Ascaris lumbricoides	6	12 %
Dipylidium caninum	1	2 %
Enterobius vermicularis	8	16 %
Heterophyes heterophyes	2	4 %
Hymenolepis nana	4	8 %
Schistosoma mansoni	3	6 %
Strongyloides stercoralis	1	2 %
Taenia spp.	2	4 %
Protozoa		
Entamoeba histolytica/ E. dispar	12	24 %
Giardia lamblia	6	12 %
Total	50	100 %

Figure 3. Distribution of detected intestinal parasites species among cases





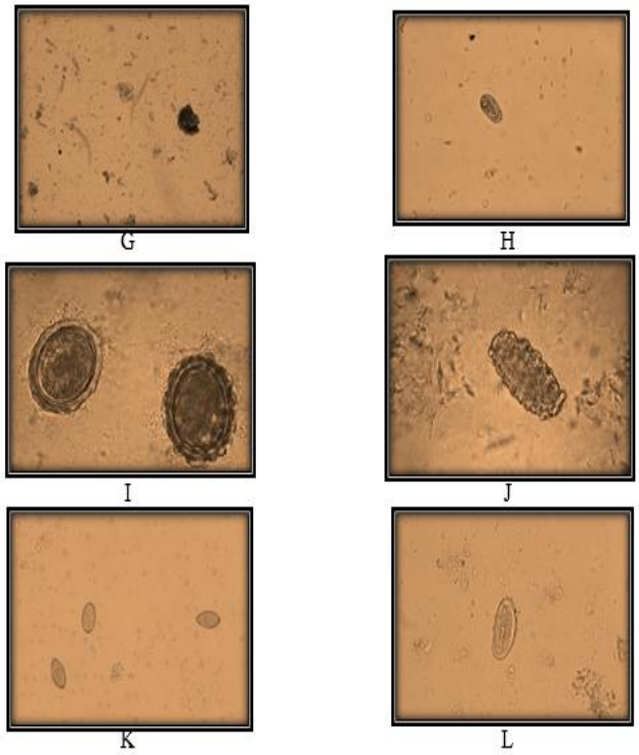


Figure 4. Showing parasitic stages

A: Ancylostoma duodenale egg, B: Dipylidium caninum eggs, C: Taenia spp. egg D: Hymenolepis nana egg, E: Schistosoma mansoni egg, F: Entamoeba histolytica/ E. dispar cyst, G: Strongyloides stercoralis larvae, H: Giardia lamblia cyst, I: Ascaris lumbricoides fertilized eggs, J: Ascaris lumbricoides unfertilized eggs, K: Heterophyes heterophyes eggs, L: Enterobius vermicularis egg.

Table 3. Distribution of detected parasites according to nationalities

Detected parasite species	Nationality											Total
	Indian	Egyptian	Bangladeshi	Filipino	Sudanese	Pakistani	Yemeni	Ethiopian	Syrian	Sri Lankan	Lebanese	
Helminthes												
Ancylostoma duodenale	2	1	1	0	0	1	0	0	0	0	0	5
Ascaris lumbricoides	2	0	1	2	0	0	0	0	0	1	0	6
Dipylidium caninum	0	0	0	1	0	0	0	0	0	0	0	1
Enterobius vermicularis	2	1	1	1	1	1	1	0	0	0	0	8
Heterophyes heterophyes	0	1	0	0	1	0	0		0	0	0	2
Hymenolepis nana	2	0	1	1	0	0	0	0	0	0	0	4
Schistosoma mansoni	1	1	0	0	1	0	0	0	0	0	0	3
Strongyloides stercoralis	1	0	0	0	0	0	0	0	0	0	0	1
Taenia spp.	0	0	0	1	0	0	0	1	0	0	0	2
Protozoa												
E. histolytica/ E. dispar	1	1	3	0	0	1	1	3	1	1	0	12
Giardia lamblia	1	0	2	0	0	2	0	1	0	0	0	6
Total n. for each nationality	12	5	9	6	3	5	2	5	1	2	0	50
Percentages	24 %	10 %	18 %	12 %	6 %	10 %	4 %	10 %	2 %	4 %	0 %	100 %

III. Discussion

Foreign workers, mainly Asians and Africans, come from areas where IPs are a major health problem. Consequently, they may pose a potential public health threat [11]. Previous studies carried out on FWs in KSA reported different prevalence rates of IPs. These were up to 55.7% in Riyadh, 40.3% in Jeddah

and 46.5% in Abha [12, 13, 14]. Generally speaking, the prevalence of parasitic infections among expatriates was found to be higher than in Saudi patients [12, 13]. As for Madinah, a study done on food-handlers reported a 14% prevalence of IPs [15]. In this study, it was found that infection was more prevalent in the younger age group, (between 25 and 29 years). This is in agreement with a study in India, which reported that the highest rate of Ascaris and hookworm infections were in those aged 26-30 years [16].

A part from direct wet smear, a sedimentation concentration technique was used to increase the chances of not missing any parasitic stages in the examined samples [17, 18].

Indeed, the value of concentration techniques, especially for the detection of protozoa, was underpinned by the results of this study. By wet mounts, the total number of detected helminthes and protozoa was 42. However, using the concentration method the number increased to 50, because 8 more infections with protozoa were detected.

There was a close relationship between the nationality and the heaviness of parasitic infections detected. Parasitic infections were found to be more prevalent among Indian, followed by Bangladeshi and Filipino (table 3). The high rates of prevalence in some communities are usually attributed to inadequate hygiene, environmental contamination and occupational risks. The prevalence rate of infections correlates directly with the level of sanitation and adherence to infection prevention and control standards.

Conclusion

Given these positive rates among different nationalities enrolled in this study, it is clear that FWs, particularly those who come for domestic work or as child minders may pose a hazard to public health as a source of IPs transmission. Careful examination of such laborers, especially those who have parasites transmitted by autoinfection, is mandatory to reduce the negative impact they may have on their employers or other contacts.

Recommendation

In view of the low cost of the laboratory tests required, a risk assessment study is recommended, along with a mass screening project for IPs in all FWs, before and after receiving treatment. This aims at achieving a high rate of eradication of IPs in order to minimize the risk of transmission to the community.

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