Frequency of Intestinal Protozoan Parasitic Infection Among attending patients to King Salman general hospital in Hail City, Saudi Arabia: A 3-years Retrospective study

ABSTRACT

Objective: A retrospective study was conducted to determine the prevalence of intestinal protozoans detected during routine stool examinations between 2018 and 2021 in King Salman general hospitals in Hail, Saudi Arabia.
Methods: Obtaining data from logbooks and reports was done with the help of laboratory technicians and with the permission of the hospital manager.
Results: In this study, 300 patients were examined for parasites. 51 of these patients had five different parasite species infected with them, representing a prevalence of 17.01%. These parasites were *Entamoeba histolytica/ Entamoeba dispar* (7.3%), *Giardia lamblia* (5.5%), *Cryptosporidium* spp. (4.4%), and *Blastocystis hominis* (0.3%). The prevalence rate of protozoan infection among males and females was 17.9% and 15.9%, respectively. In addition, the prevalence of infection among patients was presented based on nationality and age group.
Conclusions: In the Hail region of Saudi Arabia, intestinal protozoan infections are still a public health concern. In order to develop effective prevention and control strategies, it is essential to update the epidemiologic survey frequently using appropriate statistical methods.

Keywords: Intestinal Protozoa, ~~hail~~Hail, Saudi Arabia, Retrospective study, ~~prevalence~~Prevalence

1. INTRODUCTION

Parasitic infections, particularly intestinal protozoal infections (IPIs), are a serious public health concern around the world. In undeveloped countries, they are among the most common human infections [1].~~[1]~~ According to WHO reports, 450 million people worldwide are infected with intestinal parasites [2]. ~~[2]~~ Intestinal parasite infections are prevalent at various rates throughout the world. Geographic and socioeconomic factors, relative humidity, poverty, poor hygiene, high population density, and inadequate sanitation all have a role in the prevalence of IPIs. These factors promote the growth and transmission of intestinal parasites and increase the likelihood of infection. [3,4] Additionally, the number of stool samples examined and the diagnostic methods utilized have affected the results.[5]

Saudi Arabia receives large influxes of expatriates from countries around the world, including Egypt, the Philippines, Pakistan, Bangladesh, India, Sri Lanka, and Indonesia. Many diseases, particularly those caused by intestinal parasites are endemic in all of these countries. Despite the fact that all workers are medically inspected twice in their home and once in Saudi Arabia, various studies have shown that this population has a high risk of infection with in protozoa and helminths. [6–8] Researchers have found high prevalence rates of intestinal parasite infection handlers (23%) and schoolchildren (33.8%), as well as Saudi and non-Saudi patients who attend hospitals (varyi 39.7% to 77.1%) in Saudi Arabia. [6–16] The majority of earlier studies in Saudi Arabia concentrated on a few lo

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including Riyadh, Jeddah, Mekkah, Al-Madina, Al-Munawara, Asir, and Al-Ahsa, and provided updated data on the frequency of intestinal protozoan infection among various populations. There is limited data available on the prevalence of human intestinal protozoan infection in the Hail district of Saudi Arabia. The purpose of this study was to find out how prevalent intestinal protozoan infection was among patients who visited a local public hospital in Hail City.

2. MATERIAL AND METHOD

2.1 Study Area

The current study is a retrospective analysis of 300 in-and outpatient stool sample reports for intestinal parasite diseases from the King Khaled hospitals in Hail, Saudi Arabia, between 2018 and 2021. Hail is situated in the northwest region of Saudi Arabia (27.3 N., 41.E) and has a continental desert climate with hot summers and mild winters. Hail is located at a high elevation (1,140 meters above mean sea level) and receives a yearly rainfall of 100.6 millimeters [figure 1]. Study participants included Saudi and non-Saudi patients at King Salman General Hospital.

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Fig. 1. A geographic map showing Hail province area involved in the study.

2.2. Sample collection and examination

A sterile plastic container was used to collect samples, labels were appropriately applied, and samples were delivered to the microbiology lab. The color, consistency, presence of mucous and blood, and any adult worms in the feces samples were all evaluated macroscopically. On the other hand, the protozoan parasites were detected by direct microscopic examination with normal saline and the formal ether concentration method. Stains for coccidian parasites were made using modified Ziehl-Nelsen and trichrome stains.

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2.3. Data Collection.

From the hospital information system database department, with prior approval from hospital officials, stool sample examination datasets were obtained for a total of 300 patients from 2018 to 2021. The committee of medical laboratories department, and the college of applied medical sciences at Hail university approved the protocol of the study.

2.4. Limitations of the study

Only patients who visited the King Salman hospital in Hail were included in the study. More stool samples from other general and private hospitals inside and outside of the town would have given a better picture of the prevalence of IPIs in the area.

2.5. Statistical Analysis.

All statistical analyses have been conducted using the SPSS program version 20, and the Kolmogorov-Smirnov (KS) test was used to determine the normality of the obtained data. The Chi-square test compared the parasite infection rates among the patients by gender, nationality, and age. Statistical significance was defined in this study as P <0.05.

3. RESULTS

The datasets of 300 patients who had their stool samples examined were collected. There were 207 Saudis (69.0%) and 93 non-Saudis (31.0%) among them. Among the participants, 162 (54.0%) were males, and 138 (46.0%) were females. The overall prevalence of intestinal protozoa was 17.0% (51 out of 300). *Entamoeba histolytica/dispar*, *G. lamblia*, and *Cryptosporidium* spp were found in 7.3%, 5.3%, and 4.4% of the population, respectively [Fig. 2]. The prevalence of Blastocystis hominis was low (0.3%), and no mixed infection was detected. Saudi and non-Saudi patients had 14.0% (29) and 23.7% (22) of infected intestinal parasites, respectively. The difference between these two groups was statistically significant (P = 0.040) (Table 1). Overall, males were infected with protozoans at a higher rate (17.9%) than females (15.9%), although the difference was not statistically significant (P = 0.653). Table 1. Furthermore, Table 2 shows that the prevalence of intestinal protozoa infection was higher (18.8%) in the 19–39-year age group and lower (14.4%) in the ≥ 40-year age group, with no statistically significant differences between the age groups.

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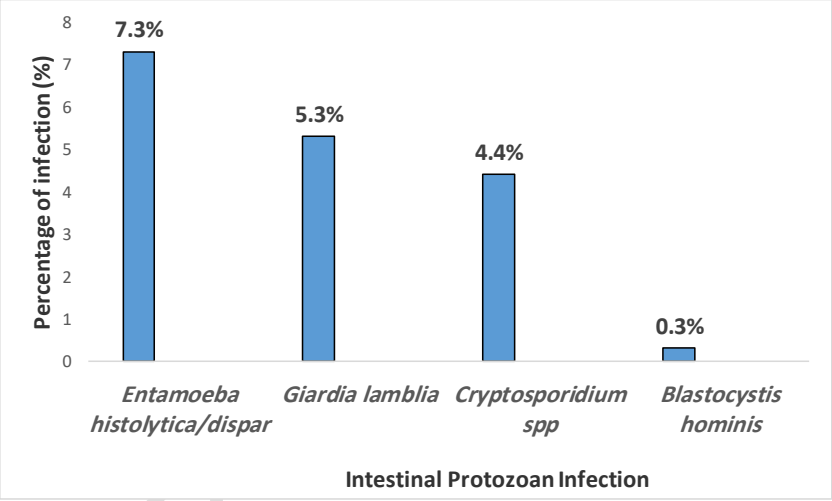

Fig. 2. Prevalence of intestinal protozoan infections among patients attending King Salman hospital, Hail, KSA (2018–2021)

Table1. Prevalence of intestinal protozoan infection by nationality and gender at King Salman General Hospital, Saudi Arabia (2018-2021).

Factors	No. examined	Infected No.	Prevalence (%)	95% CI	X2	P-value
Nationality						
Saudi	207	29.0	14.0	0.283-0.976	4.230.40	0.040
Non-Saudi	93	22.0	23.7			
Gender						

Male	162	29	17.9	0.474-1.597	0.870	0.653
Female	138	22	15.9			

**The total number examined is 300.*

Table 2. Prevalence of intestinal protozoan infection by the age groups at King Salman General Hospital, Saudi Arabia (2018-2021). *

Factor	No. examined	Infected No.	Prevalence (%)	95% CI	X2	P-value
Age Group						
19-39	114	16	14.0	0.746-2.703	1.146	0.284
>40	186	35	18.8			

**The total number examined is 300.*

4. DISCUSSION

There is a vast range of parasitic infections that are endemic throughout the world and have been identified as the leading causes of illness and disease in the world. [17] There are differences in the prevalence and degree of these infections between regions due to poor sanitary habits, inadequate water access, and poor hygiene.[6] Knowing the extent of intestinal parasite infection in a particular community is essential to establishing an effective intervention program.

The current study aimed to determine the prevalence of intestinal ~~protozona~~ protozoan infection in the Hail region of Northwestern Saudi Arabia. In this study, intestinal protozoan infection was found in 17.0 % of the diagnosed patients. This intestinal protozoan disease affects both Saudi and non-Saudi patients. There was a statistically significant difference in the prevalence of infection between these two groups. Non-Saudi patients are primarily expatriate workers from Bangladesh, the Philippines, India, Indonesia, Pakistan, Sri Lanka, and Egypt, all of which are endemic to intestinal parasites. [18–26]

Males had a higher prevalence of intestinal parasite infections (54%) than females (46%), but this difference was not statistically significant (P > 0.05). This could be attributed to males' greater contact with the environment and animals when compared to females. This finding is consistent with findings from prior studies conducted both within and outside the kingdom. [5, 26] Nonetheless, this finding disagrees with other reports from both outside and inside Saudi Arabia. [27,28] This study also found that the 19–39-year age group had the highest prevalence (18.8%), while the > 40-year age group had the lowest frequency. This study found no statistically significant difference between the different age groups (P = 0.284). This finding is inconsistent with some other studies from different regions[29–35]. Among the 19–39-year-old age group, a high prevalence could be attributed to their frequent exposure to the contaminated environment by spending most of their time outside of their homes and eating fast food from restaurants. *E. histolytica/dispar* had the highest infection rate (7.3%), followed by G. lambila (5.3%). These infection rates are lower than those previously reported from various parts of Saudi Arabia. In Riyadh City, for instance, 31.0% of people were infected with *E. histolytica*.[5,36] These two protozoans continue to be the most frequently reported intestinal parasitic infections.[37] These parasites are transmitted via the fecal-oral pathway, either directly from person to person or indirectly through the consumption of or drinking of focally contaminated food and water. Carriers of these diseases who are asymptomatic provide a constant risk of transmission in the community.[27]

Furthermore, the prevalence of *Cryptosporidium* spp was 4.4% in the current study, which is lower than the (41%, 42%, and 43%) observed in Jeddah, Riyadh, and Hail, respectively. [5,29,38] Differences in sample size, study area, and diagnostic methods may be responsible for these disparities.

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4. CONCLUSION

In this study, a relatively high prevalence of intestinal protozoan parasites was identified among patients at King Salman general hospital. The prevalence of intestinal protozoan infections, such as Entamoeba histolytica/ dispar, Giardia lamblia, and Cryptosporidium spp., is an important public health concern in Hail City, Saudi Arabia. Since intestinal parasites are mainly transmitted through feco-oral routes, improving sanitation, providing safe water supplies, and educating people on personal and environmental hygiene are significant factors for controlling and reducing intestinal protozoan infections.

CONSENT (WHERE EVER APPLICABLE)

Not applicable

ETHICAL APPROVAL (WHERE EVER APPLICABLE)

The Faculty Ethics Committee of the College of Applied medical Sciences at Hail University, KSA, reviewed and approved the ethical clearance. After the study investigation, the data obtained and recorded was treated with confidentiality.

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