

Prevalence of Intestinal Parasitic Infections among People from Three Cities from Eastern Region, Libya

¹Dareen El shareef Jadullah ²Noor alhooda M. Alawkally, ³Maree Al Douakali Ali, ⁴Sara El-warred, ⁵Hamza Khalifa Ibrahim & ⁶Alreda M. Al-Awkally
¹ Microbiology, Faculty of pharmacy, Qurina International University, Benghazi– Libya,
^{2,3} Medical laboratory Department, Higher Institute of Science and Technology, Suluq, Libya

⁴ Department of Statistics, Faculty of arts and sciences, University of Benghazi, Libya

⁵Bani Waleed-Libya⁵ Qurina, University, Benghazi, Libya

⁶Central of Pharmacy, Health Ministry, Darna, Libya

¹Email: dareenelshareef@qiu.edu.ly

²E-mail: noornoor1973@gmail.com

Abstract— Intestinal parasitic infection is still a public health issue in many parts of the world, particularly in developing countries. The study's goal was to determine the prevalence of intestinal parasitic infections in Benghazi, Ajdabiya, and Albryqa. For the detection of intestinal parasites in normal saline and Lugol's iodine preparations, all stool specimens were examined using direct-smear microscopy and the formalin-ether sedimentation method. Intestinal parasites were found in 87.1 percent of males and 12.9% of females. *Entamoeba histolytica* was the most common protozoan parasite isolated from patients (87.9%), followed by *G. lamblia* (8.6%), and *Enterobius vermicularis* (3.4%). The highest prevalence rates were recorded in Ajdabiya (75%), and the lowest in Benghazi (11.2%). The investigation revealed an overall prevalence of 116 intestinal parasites, with data obtained from December 2021 to November 2022 revealing the highest parasite prevalence rates in 2022. *E. histolytica* prevalence ranged from 74.1% in Ajdabiya to 10.3% in Benghazi, while *G. lamblia* prevalence ranged from 7.7% in Albryqa to 0.8% in Benghazi, with significant differences found between infection prevalence and three areas. There were no mixed infections with these two parasites. Males were found to have a higher prevalence of amebiasis parasite infection than females, with 61% (11/18) males and 33.3% (6/18) females infected.

Keywords: *Entamoeba histolytica*, Intestinal, microscopic examination, Parasites

I. INTRODUCTION

In many parts of the world, particularly in developing countries, intestinal parasitic infection remains a public health issue. [1] Intestinal parasitism is a major public health concern around the world. Preschool and school-aged children are disproportionately affected by GI parasites, while economically disadvantaged children are at greater risk of recurrent infections. These infections can cause serious illness in children, impairing physical and cognitive development as well as school attendance and academic performance. [2-3] *Blastocystishominis* is the most common protozoal infection

among Libyans, followed by *Entamoeba histolytica/Entamoeba dispar* or *Giardia lamblia* and *Entamoeba coli*. [1] The study's goal was to, determine the prevalence of intestinal parasitic infections in the cities of Benghazi, Ajdabiya, and Albryqa.

II. EXPERIMENTAL

A. Study location:

This retrospective study was carried out in the cities of Benghazi, Ajdabiya, and Albryqa,

B. Research populations and data collection:

From December 2021 to August 2022, 116 parasites (101 males and 15 females) were identified from fresh stool specimens collected in clean, numbered plastic containers. For each sample, date of collection as well as personal information such as name, gender, and age were recorded.

C. Examining the samples:

Stool samples were diagnosed the same day they were collected. Each sample was serial number checked and macroscopically examined for color, consistency, and the presence of blood and/or mucus. Furthermore, both the normal saline solution and the the microscopic methods by both normal saline solution and Lugol's iodine was used to examine intestinal parasites. [15-16]

D. Methodology:

The data analyzed by SPSS version 20.

III. RESULTS AND DISCUSSION

A total of 116 intestinal parasites were identified and screened for the presence of intestinal parasites in the laboratories of Al shaheed Mohamed Al lemgaryef Hospital in Ajdabiya, Albryqa Medical Laboratory, and Al Salem Medical Laboratory in Benghazi city.

A. Parasite gender distribution table

Intestinal parasites were found in 87.1 percent of males and 12.9% of females. Five of the nine studies that looked at people who didn't have gastroenteritis (GE) included children, three included children and adults, and one included only adults. The prevalence rates for *E. histolytica/dispar* in the nine studies were 0.816.3% (mean 8.3%) and 1.828.8% (mean 4.8%) for *G. lamblia*. [4] As a result, gender had no significant relationship with the prevalence of intestinal parasitic infections ($p>0.05$). Ibrahim [5], Okayay *et al.*, [6], and Akinbo *et al.*, [7] discovered similar results. Elsaid *et al.*, [8] discovered an insignificantly higher rate in males (11.3%) than in females (10.1%), whereas Ngui *et al.*, [9] and Sah *et al.*, [10] found comparable rates. The higher prevalence in females could be attributed to women eating unwashed fruits and vegetables before or during washing, which could be contaminated with parasitic infective stages. [5]

TABLE I shows the gender distribution of amebiasis and giardiasis.

Gender	Frequency	Percent
Female	15	12.9
Male	101	87.1
Total	116	100.0

B. Parasite frequency

Entamoeba histolytica was the most common protozoan parasite isolated from patients (87.9%), followed by *G. lamblia* (8.6%), and *Enterobius vermicularis* (3.4%). Previously published studies in Libya included in this review used multiple techniques for microscopic examination of stool samples for cysts of *E. histolytica* and *G. lamblia*. The genus *Entamoeba* contains two species that can be found in the human intestine, among others. [11-12]

Table II shows the parasite frequency.

Parasite	Frequency	Percent
<i>E. histolytica</i>	102	87.9
<i>Enterobius vermicularis</i>	4	3.4

<i>Giardia lamblia</i>	10	8.6
Total	116	100.0

C. Frequency of Area.

Based on the area, the highest prevalence rates were recorded in Ajdabiya (75%), and the lowest was 11.2% in Benghazi. The main modes of transmission of intestinal protozoa are water and food-borne. In general, there is lack of information regarding the prevalence of intestinal protozoa in water, fresh fruits, and vegetables in Libya. Only one study from Libya examined *Giardia* cysts in 126 specimens of fresh tomatoes, cucumber, lettuce, and cress from wholesale and retail markets in Tripoli. It reported a prevalence rate of 10%. [13]

TABLE III. Frequency of Area

Area	Frequency	Percent
Ajdabiya	87	75.0
Albryqa	16	13.8
Benghazi	13	11.2
Total	116	100.0

D. Months Distribution Table

According to seasonal variations, the highest prevalence rates (73.3%) were recorded in March to May, and the lowest (17.2%) in September.

TABLE IV. Month Distribution Table

Month	Frequency	Percent
12-2	6	5.2
3-5	85	73.3
6-8	20	17.2
9-11	5	4.3
Total	116	100.0

E. Parasite distributions in clinical specimens collected from patients by year

The investigation revealed an overall prevalence of 116 intestinal parasites, with data obtained from December 2021 to November 2022 revealing the highest parasite prevalence rates in 2022.

TABLE V. shows the parasite distribution in clinical specimens collected from patients over time.

Years	Frequency	Percent
2021	29	25.0
2022	87	75.0
Total	116	100.0

1) Parasite prevalence in patients according to gender

Table. 6 Males were found to have a higher prevalence rate of amebiasis parasite infection than females, with 61% (11/18) males and 33.3% (6/18) females infected with amebiasis parasites. However, no significant differences in case distribution between males and females were reported from such countries.

TABLE VI. shows the prevalence of parasites in patients based on gender.

Parasite	Female	Male	Total
<i>E. histolytica</i>	10	92	102
<i>Enterobius vermicularis</i>	2	2	4
<i>Giardia lamblia</i>	3	7	10
Total	15	101	116

F. Gender distributions by area

According to the area variations, Ajdabiya had the highest prevalence rates, followed by Albryqa.

TABLE VII. shows the gender distributions by area.

Gender	Ajdabiya	Albryqa	Benghazi	Total
Female	7	4	4	15
Male	80	12	9	101
Total	87	16	13	116

G. Parasite distributions by area

E. histolytica prevalence ranged from 74.1% in Ejdabya to 10.3% in Benghazi, while *G. lamblia* prevalence ranged from 7.7% in Albryqa to 0.8% in Benghazi, with significant differences found between infection prevalence and three areas. There were no mixed infections with these two parasites. Other studies, however, found a higher prevalence of giardiasis: 8.7% in outpatients in Tripoli, 7.8% in expatriates in Benghazi, 6.24% in children attending hospital in Benghazi, 15.5.85% in children with gastroenteritis in Benghazi, 7.2% among Libyan patients in Sirte, and 10.29% in children and neonates admitted to Ibn-Sina Hospital in Sirte. [14]

TABLE VIII. shows parasite distributions by area.

Parasite	Ajdabiya	Albryqa	Benghazi	Total
<i>E. histolytica</i>	86	4	12	102
<i>Enterobius vermicularis</i>	1	3	0	4
<i>Giardia lamblia</i>	0	9	1	10
Total	87	16	13	116

H. Seasonal variations in protozoan parasitic infection prevalence

The highest prevalence rates of *E. histolytica* were recorded between March and May, based on seasonal variations (2022). While the highest *Giardia lamblia* prevalence rates were recorded between June and August (2022).

TABLE IX. Seasonal variations in the prevalence of protozoan parasitic infection.

Parasite	Month				Total
	12-2 (2021)	3-5 (2022)	6-8 (2022)	9-11 (2022)	
<i>E. histolytica</i>	3	83	11	5	102
<i>Enterobius vermicularis</i>	0	0	4	0	4
<i>Giardia lamblia</i>	3	2	5	0	10
Total	6	85	20	5	116

I. Variations in the prevalence of protozoan parasitic infection over time

The highest prevalence rate of *E. histolytica* was recorded in 2022, according to year variations. While the highest *Giardia lamblia* prevalence rates were recorded between June and August (2022).

TABLE X. shows the ten-year variation in the prevalence of protozoan parasitic infection.

Parasite	Years		Total
	2021	2022	
<i>E. histolytica</i>	23	79	102
<i>E. histolytica</i>	0	4	4
<i>Giardia lamblia</i>	6	4	10
Total	29	87	116

IV. CONCLUSION

In comparison to previous studies in Libya, this study found a low prevalence of intestinal parasitic infections, particularly by *E. histolytica* and *G. lamblia*. Many factors contribute to the

rise in parasitic infections, including contaminated food and water, poor environmental sanitation, poor personal hygiene, and poverty. The microscopic examination of stool specimens remains the foundation of intestinal protozoa diagnosis, particularly in developing countries. Microscopic methods, on the other hand, necessitate well-trained medical technologists who can identify and differentiate pathogenic from non-pathogenic protozoa as well as distinguish artifacts.

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