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# Prevalence of Intestinal Parasitic Infections in Baghdad City

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**ABSTRACT**

In developing nations, intestinal parasite infections continue to rank among the main health issues. Intervention options include the monitoring of intestinal parasite infections and related risk factors. The primary aim of this study were to establish the prevalence of intestinal parasites by parasite type and to connect this infection with age and gender. Epidemiological surveys on intestinal parasite infections in Baghdad are crucial for understanding the city's health and developing effective management strategies. Method: A total of 100 patients who presented with various symptoms were examined in the period from August 2023 to February 2024. Their ages ranged from one to 60 years, from different socioeconomic statuses, to ensure the absence of intestinal diseases. Parasites in stool using direct swab methods. A detailed questionnaire with all necessary information was filled out for each patient. Result: Among the 100 patients who participated in this study, 34 cases were found to be infected with one or more specific parasite stages, while 66 of them did not show any parasite stages. . It was found that all the parasites found were of the protozoa type, and the largest percentage was E. histolytica, while one case was Giardia lamblia, The stages appeared as follows: 51.52% were the E. histolytica cyst, 36.36% were formed when both the cyst and the trophozoite phases of E. histolytica appeared, while only 9.09% were the trophozoite of E. histolytica, and one case (3.03%) was the cyst of Giardia lamblia. Patients' ages ranged from 1 to 65 years, with a mean of 18.91 ± 1.66 and a standard deviation of 16.69. Women constituted the biggest number of infections, with 21.00%, and 12.00% were male. All blood samples contained 100% of the parasite stages, followed by green at a rate of 91.018%, then yellow at a rate of 33.033%, while the brown stage was 27.027%, and no parasite stage appeared in the white samples.

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## 1. Introduction

Intestinal parasites, including helminths and protozoans, are a major public health concern worldwide (Handzel et al., 2003). Protozoa (Entameoba histolytica, Plasmodium falciparum, and Giardia lamblia) and helminths (Ascaris lumbricoides, Ancylostoma duodenale, Trichuris trichiura, and Schistoma spp.) are the main pathogenic parasites that cause significant death worldwide (Osman et al., 2016). Intestinal parasites can cause gastrointestinal illnesses such as ulcers, abdominal distension, diarrhea, acute inflammation, vomiting, loss of appetite, dysentery, and haematuria (Bethony et al., 2006). These parasites share common characteristics and are prevalent in communities with poor hygiene, low economic status, oral-faecal transmission, skin penetration by larvae, and low family income (Sayyari et al., 2005). Some gastrointestinal parasites are indigenous to tropical and subtropical regions, despite their global distribution (Kostopoulou et al., 2020). Parasite pathogenicity varies based on species and infection density (Okyay et al., 2004; Kostopoulou et al., 2020). Intestinal parasites are linked to low education, dirty habits, contaminated vegetables, unsterilized meals, and poor hand hygiene, particularly in youngsters (Andualem Asemahagn, 2014). Parasite illnesses, in general, can spread naturally from one person to another or through the exchange of instruments (Idowu and Rowland, 2006). According to estimates, over 3.5 billion people are infected with intestinal parasites, with approximately 450 million experiencing symptoms (Okyay et al., 2004). Parasites commonly infect children under 10 years old in low-income nations (Levett et al., 2005). The purpose of this study was to investigate the prevalence of intestinal parasites among children and adults in Baghdad. The primary goals of the study were to establish the prevalence of intestinal parasites by parasite type and to connect this infection with age and gender. Epidemiological surveys on intestinal parasite infections in Baghdad are crucial for understanding the city's health and developing effective management strategies.

## 2. Materials and Methods

A total of 100 patients who presented with various symptoms were examined in the period from August 2023 to February 2024. Their ages ranged from one to 60 years, from different socioeconomic statuses, to ensure the absence of intestinal diseases. Parasites in stool using direct swab methods. A detailed questionnaire with all necessary information was filled out for each patient.

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Stool specimens: Samples were collected from each patient in clean global battles, one gram of stool was kept ready for examination by the direct swab method, a drop of Lugol's iodine solution was mixed with a spot of stool (about 0.2 g) and spread by stick applicator on a slide Clean microfibre to suitable thickness. The smear was capped and examined under a low- and high-objective lens. Finally, iodine-stained slides were prepared and examined microscopically (Marquardt, 2000)

## 3. Results and Discussion:

The number of patients who were found to be infected with a specific parasite was 34 cases, while 66 of them did not show any parasite in their samples during microscopic examination Figure 1. It was found that all the parasites found were of the protozoa type, and the largest percentage was *E. histolytica*, while one case was *Giardia lamblia*, and the stages appeared as follows: where the percentage was 51.52% the *E. histolytica* cyst, 36.36% were formed both the cyst and the trophozoite phases of *E. histolytica* appeared, while only 9.09% of the cases showed the trophozoite of *E. histolytica* and one case (3.03%) was the cyst of *Giardia lamblia* Figure 2.

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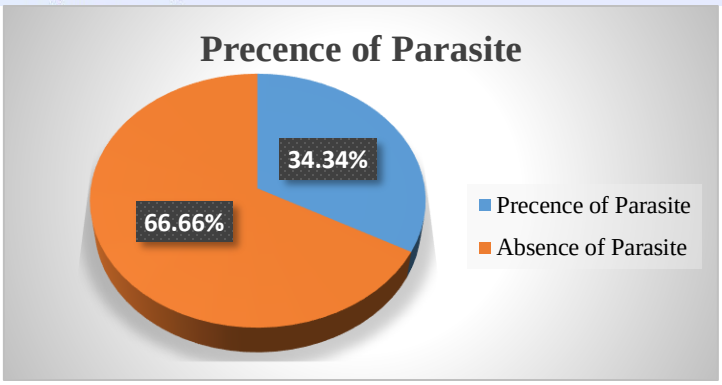
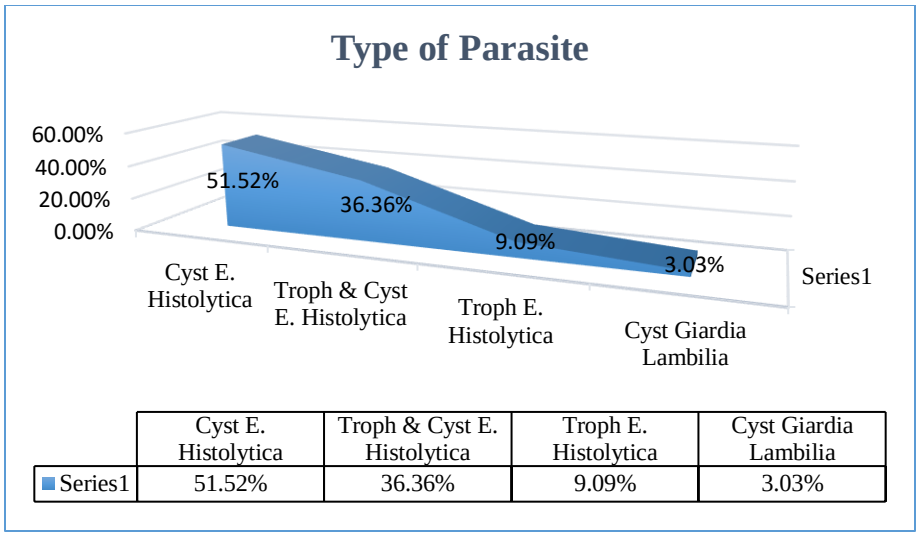



**Figure 1 Distribution of specimens depends on whether there is a parasite in the sample or not.**




| | Cyst E. Histolytica | Troph & Cyst E. Histolytica | Troph E. Histolytica | Cyst Giardia Lambilia |
|---|---|---|---|---|
| Series1 | 51.52% | 36.36% | 9.09% | 3.03% |

**Figure 2 Distribution of specimens depends on type of parasite.**

## Ages of Patients:

Patients' ages ranged from 1 to 65 years, with a mean of 18.91 ± 1.66 and a standard deviation of 16.69. The greatest frequency was within the age category of 1 to 17 years, which included 26 patients (infected with a parasite) out of the total examined cases. The maximum frequency of ages (mode) was one year Figure 3.

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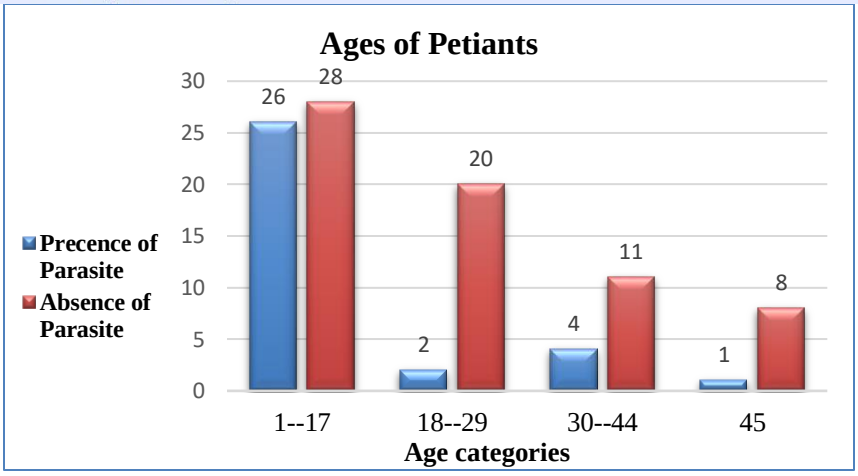


**Figure 3 Distribution of patients according age categories**

## Gender of Patients:

There were 34 patients with apparent parasite phases in their samples; women constituted the biggest number of infections, with 21.00% (21 cases) being female and 12.00% (12 cases) being male Figure 4.

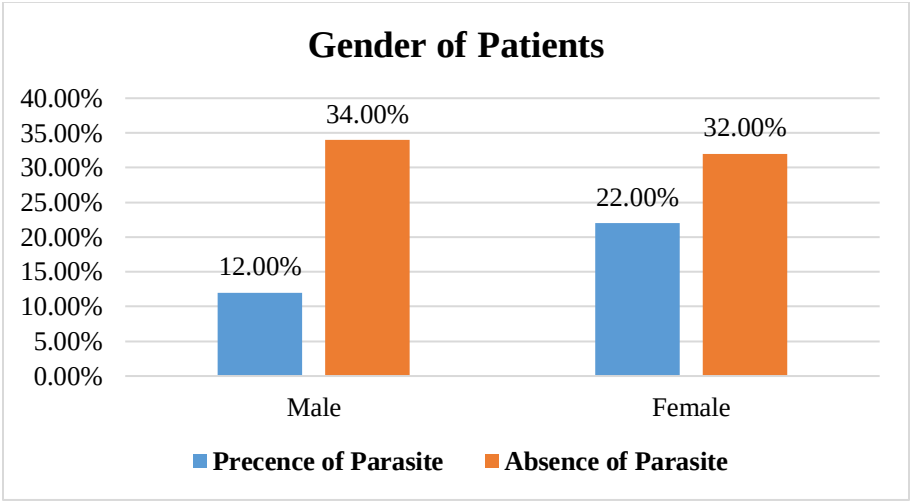


**Figure 4 Distribution of patients according to gender**

## Color of specimen:

All bloody samples contained 100% of the parasite stages, followed by samples in which the stool was green at a rate of 91,018%, then yellow at a rate of 33,033%,

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while the brown stage was 27,027%, and no parasite stage appeared in the white samples. In addition, there is a relationship between the color of the stool and the presence of the parasite P value < 0.05 (Figure 5), (Table 1).

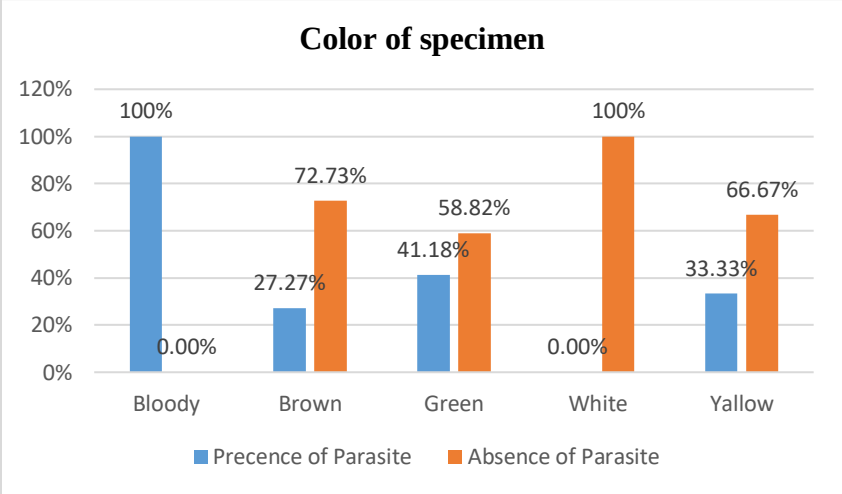


**Figure 5 Distribution of specimens according to color of specimen**

**Table 1 Correlation of type of parasite with color of specimen.**

| color | Parasite | | | | | Asymp. Sig. (2-sided) |
|---|---|---|---|---|---|---|
| | Cyst *E. histolytica* | Cyst *Giardia lambilia* | Troph & Cyst. *E. histolytica* | Troph *E. histolytica* | Clear | |
| Bloody | 1 | 0 | 4 | 0 | 0 | 0.02 |
| Brown | 7 | 1 | 3 | 2 | 31 | |
| Green | 3 | 0 | 3 | 1 | 10 | |
| Yellow | 6 | 0 | 2 | 0 | 24 | |
| White | 0 | 0 | 0 | 0 | 1 | |
| Total | 17 | 1 | 12 | 3 | 66 | 100 |

*χ2 = chi-square; P = level of significance; P ≤ 0:05*

## Appearance of specimen:

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The high percentage of parasites appears in liquid and mucoid appearances and constitutes 68.75%, followed by soft samples, while not finding any parasite in solid specimens. Showed a high correlation between the type of parasite and the appearance of the specimen, P value < 0.001(Figure 6), (Table 2).

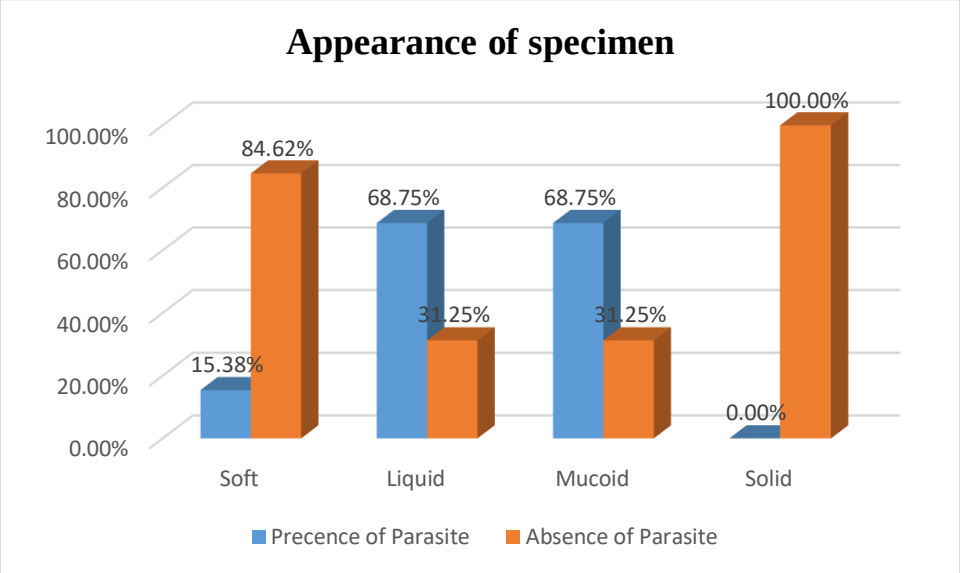


**Figure 6 Distribution of specimens according to appearance of specimen**

**Table 2 Correlation of presence of parasite with appearance of specimen.**

| color | Parasite | | | | | Asymp. Sig. (2-sided) |
|---|---|---|---|---|---|---|
| | Cyst *E. histolytica* | Cyst *Giardia lambilia* | Troph & Cyst. *E. histolytica* | Troph *E. histolytica* | Not found parasite | |
| Liquid | 6 | 1 | 4 | 0 | 5 | **0.001** |
| Mucoid | 3 | 0 | 8 | 0 | 5 | |
| Soft | 8 | 0 | 0 | 3 | 54 | |
| Solid | 0 | 0 | 0 | 0 | 3 | |
| **Total** | 17 | 1 | 12 | 3 | 67 | **100** |

## Discussion:

consideration, epidemiological studies on the prevalence of intestinal parasite infections and associated risk factors in various regions an essential matter, and that to improve control mechanisms and update the risk of populations (Hailu and Ayele, 2021). Accordingly, this study was done to know the types of parasites and its epidemiological features within a specific period in Baghdad city.

The results in this study showed the highest frequency of the parasites in the patients were of the *E.histolytica* in all of its forms (cyst only, cyst & trophozoite and trophozoite only) (51.52%, 36.36% and 9.09%) respectfully, and followed by *G. lamblia* (3.02%). This finding corresponds with Ethiopian study which found 88% from cases diagnosed with *E.histolytica* (Hailegebriel, 2017). As well as, this study were similar to also another Ethiopian study where was the number of cases of the sufferer with this parasite formed 245 from 656 case (Eyayu *et al.*, 2021). Infection occurs worldwide, with a higher prevalence in countries of low socioeconomic status and poor public health. Countries with a high rate of infections include India, Africa, Mexico, and Central and South America (Chou and Austin, 2025). Risk factors for infection are mostly related to fecal-oral transmission and have been due to poor hand hygiene, defecation into water sources such as rivers, and being in close proximity with animals. In developed countries such as the United States, amebiasis infections are rare, accounting for at least 5 deaths per year, and are commonly seen in individuals that have had exposure to endemic areas such as immigrants or recent travelers (Shirley *et al.*, 2018).

The most age categories vulnerable to infection with parasites were shown to be 1-17 years, according to the results of this study, while only one case was found in the age category of equal or more than 45 years. This agrees with a Saudi study that found the highest percentage of infections were in the age categories 0-10 years and 10-20 years (Amer *et al.*, 2018). In another study, the age categories were also formed for those less than or equal to 30 years, with a percentage of 62.5%, while 13.8% were in age categories over 50 years (Ameya *et al.*, 2019), also Ethiopian study showed results similar to this study (Eyayu *et al.*, 2021).

Another aspect in the current study is sex, which revealed that the highest rate of infections with parasites was shown in females and constituted 22% of all collected specimens, and males formed 12%. This corresponds with Hailegebriel who found the percent of females to be 50.7% while males formed 49.3% (Hailegebriel, 2017). Also, this study agreed with the Sudanese study, which showed the prevalence of females and males (0.58% and 0.38%, respectively) (Amer *et al.*, 2018). On the other hand, this study disagrees with some studies that were males

cases more than females (Amer *et al.*, 2018; Tigabu *et al.*, 2019; Eyayu *et al.*, 2021).

In this study, all bloody samples contained the parasite stages. In addition, there is a relationship between the color of the stool and the presence of the parasite (p-value < 0.05). Also, this study found the highest percentage for the parasite's stages were in liquid and mucous samples and it percentage formed 68.75% figure 6. Finally, this study showed the highest correlate between presences of parasite with appearance of specimen (p-value < 0.001). However, this finding contradicts a number of earlier research that claim that bloody or abundant mucus is abnormal. Because bilirubin and bile are present, the usual color is tawny. Infants may have green stool with a pasty or watery consistency. Dietary factors have a significant impact on stool color (Kasırga, 2019).

This study also do not correspond with study in Saudi Arabia which examining 1,238 specimens and found no significant association between intestinal parasitic infections and positive FOBT results (Wakid, 2010). Also another study do not found correlation between of bloody diarrhea and Presence the parasite (Tigabu *et al.*, 2019), anyway in invasive intestinal amoebiasis, blood is generally present in stool samples. The presence of phagocyted erythrocytes is not diagnostic for E.histolytica infection. Phagocyted erythrocytes may also be seen with E.dispar. Leukocytes may not always be observed in the stool because they may be disintegrated by parasitic organisms (Kasırga, 2019).

## 4. Conclusion

This study provides information about the types of parasitic injuries in the region from which information was taken, the period in which the samples were collected, and the extent of the spread of these parasites, which reflects a picture of the health status of this society.

**Disclosure**

The authors declared no conflicts of interest.

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