

Diagnostic Study by Traditional Laboratory Methods for *Giardia* spp in Children in Thi Qar Province

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Abstract

Giardiasis is a globally prevalent disease and a common cause of diarrhea in children and adults. It is transmitted via the fecal-oral route through direct or indirect ingestion of cysts. Laboratory diagnosis of *Giardia* species of the microscopic cyst or trophozoite stage in stool samples. This study aimed to assess the effectiveness of traditional laboratory diagnostic methods, specifically the use of conventional microscopy with stool concentration in routine medical laboratories, due to its cost-effectiveness and high sensitivity. However, the use of immunological and molecular techniques is recommended as a complementary test to this traditional method. A study recoded (27%) Out of total of 100 samples collected from regions (Al-Nasiriyah, Al-Shatrah and Al-Rifai). A study showed that the infection rate in both males and females were (28.07%) and (25.58%) respectively ,with non-significante, rates of infection . the age (2-5 years) and (6-12years) of the children respectively , recorded infection rates of (38.09%) and (12.94%), with significant effected

Key words :Traditional methods, *Giardia*, children

الخلاصة

داء الجيارديات مرضٌ منتشرٌ عالمياً، وهو سببٌ شائعٌ للإسهال لدى الأطفال والبالغين. ينتقل المرض عن طريق التلوث المباشر أو غير المباشر لأكياس الطفيلي. يتم تشخيص أنواع الجيارديا مخبرياً في مرحلة الكيس المجهرية أو مرحلة الناشطة في عينات البراز. هدفت هذه الدراسة إلى تقييم فعالية طرق التشخيص المخبرية التقليدية، وتحديداً استخدام الفحص المجهرية، الروتينية، نظراً لفعاليتها من حيث التكلفة وحساسيتها العالية. مع ذلك، يُوصى باستخدام التقنيات المناعية والجزيئية كاختبار تكميلي لهذه الطريقة التقليدية. سجلت الدراسة نسبة إصابة بلغت 27% من إجمالي 100 عينة جُمعت من مناطق (الناصرية، والشطرة، والرفاعي). وأظهرت الدراسة أن معدل الإصابة لدى الذكور كان 28.07%، ولدى الإناث 25.58%، ولم يسجل أي فارق معنوي. كانت معدلات الإصابة لدى الأطفال الذين تتراوح أعمارهم بين 2-5 سنوات و 6-12 سنة على التوالي (38.09%) و (12.94%)، مع فرق معنوي. الكلمات المفتاحية: **Cefixime**؛ الكبد؛ الهمياتوكسيلين؛ سُمية الكبد؛ الجرذان البيضاء

الكلمات المفتاحية: الطرق التقليدية، الجيارديا، الأطفال

Introduction

Giardia is a unicellular flagellated protozoan the family Mastigophora. Giardiasis is an intestinal parasitic disease affecting humans and variety of mammals, primarily targeting the duodenum and causing intestinal disturbances and diarrhea. acute or chronic diarrhea, weight loss, nausea-like symptoms, hypersensitivity, while asymptomatic cases have also been documented [1][2][3] *Giardia* was first identified by Antonie van Leeuwenhoek in 1681; however, its public health importance was not recognized until the late twentieth century. Currently, it is considered a major etiological agent of diarrheal disease, with approximately 280 million cases reported annually worldwide [4][5] The life cycle of *Giardia* consists of two principal stages, the trophozoite and the

resistant cyst. Transmission occurs predominantly through the oral route via direct contact or the ingestion of contaminated food and water containing infective cysts. Following an incubation period of approximately 9–15 days, clinical manifestations may range from asymptomatic infection to acute diarrhea, nausea, Giardiasis poses a significant health concern particularly among preschool children, daycare workers, travelers, immunocompromised individuals, and malnourished populations. Epidemiological studies indicate that *G. lamblia* is among the most prevalent parasitic infections in children, especially in low-income regions with poor sanitation[6][7]. In Thi-Qar province, Iraq, Giardiasis infection rates ranging from 15–20% among preschool children and 21–26% in daycare centers have

been reported [8][9][10]. Contaminated drinking water is considered a primary source of large-scale outbreaks, whereas recreational water exposure contributes to smaller outbreaks [11]. Diagnosis of giardiasis relies on microscopic, immunological, and molecular techniques. Microscopy remains widely used due to its high specificity and moderate sensitivity in demonstrating parasite morphology, while molecular methods, particularly Polymerase Chain Reaction (PCR), enable detection through targeting conserved DNA regions among *Giardia* assemblages [12][13][14].

Material and methods

Samples collection

A total of 100 stool samples were randomly collected from children of both sexes and different age groups (2–12 years) from selected regions in Thi-Qar province, including (Al-Nasiriyah, Al-Shatrah, and Al-Rifai). The study was conducted over a five month- period, from September 2025 to end January 2026. The collected samples were divided into two equal groups according to the type of examination: 100 samples were allocated for direct microscopic examination, the remaining samples were placed in clean, labeled plastic containers and transported to the parasitology laboratory at the College of Veterinary Medicine, University of AL-Shatrah, for conventional microscopic examination. All samples were collected under strict hygienic conditions to prevent contamination, and relevant information such as age, sex, region, and date of collection was recorded for each sample to ensure accurate epidemiological analysis.

Laboratory examination

Direct Wet Smear Technique:

Approximately 1–2 gm of each stool sample was weighed and mixed with 10 mL of physiological saline solution (0.9% NaCl). The

mixture was filtered through fine gauze to remove debris, after which a drop of the filtrate was placed onto a clean glass slide and covered with a coverslip. The prepared smear was examined microscopically under low power (10×) and high power (40×) power magnifications. The detection of cysts or motile trophozoites was considered indicative of a positive parasitic infection. Morphological identification of *Giardia* spp. was based on previously established criteria, including the pear-shaped trophozoite characterized by the presence of flagella and two nuclei, as well as the cyst stage containing four nuclei [15][16][17][18]

Flotation method :

About 1-2 gm of stool sample was added with 10ml of water and strained through a gauze. By centrifuge, the mixture was allowed to settle until the supernatant was clear. Without disturbing the sediments, the supernatant was discarded in a centrifuge tube, the sediment was thoroughly mixed with a saturated sodium chloride and centrifuge 1500 rpm for 10 minutes. The cysts floated to the top of the cover slip and adhered. The cover slip was inverted on the glass slide and inspected for *Giardia* cysts using a low power (10X) and high power (40X) microscope. [19](Charles and Robinsons, 2006) [8]

Statistical analysis:dy with difference factors (percentages distribution). Chi-square test was used to significant compare between percentage (0.05 and 0.01 probability) in this study [20]

Results and discussion:

The morphological characteristics of *Giardia* sp in stool samples from children were examined by light microscopy, results both the direct wet smear approach or flotation methods were used to find *Girdia* sp trophozoite and cyst for this study. Under a microscope,

trophozoite and cyst (Fig 1), morphological traits were investigated

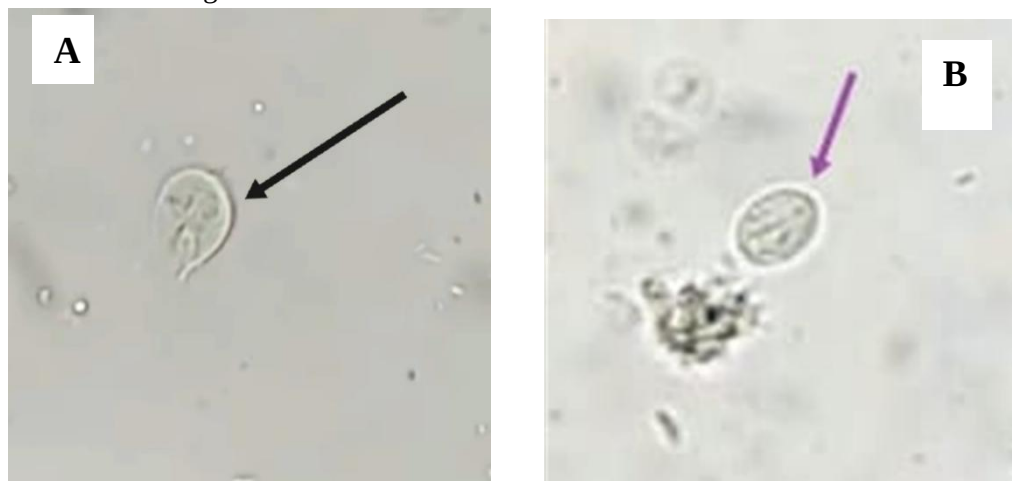


Figure :Morphological stages of *Giardia* sp (A) Trophozoite , (B) Cyst . (40x by Direct wet smear)

The total infection of *Giardia* sp was recoded (27) Out of total of 100 samples collected from regions (Al-Nasiriyah, Al-Shatrah and Al-Rifai).

Table 1: Total infection rate of *Giardia* sp. in Children

Examined Stool samples	Positives samples	Total. Inf. rate %
100	27	27.00%

A study showed that the infection rate in both males and females were (28.07%) and (25.58%) respectively ,with non-significant when ($\chi^2 = 0.6713$).

Table 2: The relationship between sex of Children and infection rates in Giardia sp.

Sex	Examined stool samples	Positives samples	Percentage
Males	57	16	28.07%
Females	43	11	25.58%
Total	100	27	27.00%
Chi-Square: χ^2 (P-value)			0.894 (0.6713)
NS (P $\geq$ 0.05) : Non-Significant.			

The relationship between age of children and rates of infection . from (2-5 years) and from (6-12years) of the children respectively , had infection rates of (38.09%) and (12.94%), with highly significant whene ($\chi^2 = 0.0022$).

Table 3: The relationship between age of Children and infection rates in Giardia sp.

Age groups	Examined stool samples	Positives samples	Percentage
2-5 Years	42	16	38.09%
6-12 Years	58	11	12.94%
Total	100	27	27.00%
Chi-Square: χ^2 (P-value)			11.641 ** (0.0022)
** (P $\leq$ 0.01). Highly Significant			

Infection of rates of Giardia spp . according to study regions. The current study recorded 27 cases of Giardia sp in three regions of Thi qar province and the higher rate infection was (30.55%) in Al-Nasiriyah region while the infection rates for other regions were Al-Rifai and Al-Shtrah (27.27% and 27.00%) respectively, with non-significant when ($\chi^2 = 0.1502$).

Table 4: Infection rates of *Giardia* sp. in Children among regions of present study

Regions	Examined stool samples	Positives samples	Percentage %
AL-Nasiriyah	36	11	30.55%
AL-Shatrah	31	7	22.58%
AL-Rifai	33	9	27.27%
Total	100	27	27.00%
Chi-Square: χ^2 P-value)	--	--	2.479 NS (0.1502)
NS (P $\geq$ 0.05) : Non-Significant			

Infection rates of *Giardia* SP in children according to the study months . The current study recorded 27 cases of *Giardia* sp in five months and higher rates infection was (45.00%) in December while were as the infection rates for in September and October (15.00% and 10.00%) were November and January (35.00% and 30.00%) respectively , with highly significant when ($\chi^2 = 0.0043$)

Table5: Infection rates of *Giardia* sp in Children according to the study months

Months	Examined stool samples	Positives samples	Percentage (%)
September 2025	20	3	15.00%
October	20	2	10.00%
November	20	7	35.00%
December	20	9	45.00%
January 2026	20	6	30.00%
Total	100	27	27.00%
Chi-Square: χ^2 (P-value)			11.028 ** (0.0043)
** (P $\leq$ 0.01). Highly Significant			

Giardia is a protozoan parasite that is thought to be one of the main causes of diarrhea in both children and adults. Giardiasis is a condition marked by diarrhea, vomiting, and weight loss due to watery diarrhea [21][22] [23] .The parasite causes acute diarrhea in humans, especially in children, and has the potential to infect other mammals. *Giardia lamblia* is a parasite that lives in the small intestine and colonizes the

mucous lining of the duodenum along with jejunum [24] It has two life stages, the environmentally existence cyst and the motile trophozoite stage, and the best way to spread it is by consuming contaminated food and water

[25][26]

An epidemiological investigation on giardiasis conducted in the mosul city demonstrated prevalence rate of 29%, [27].

[28] in AL-Diwaniyah city by using conventional microscopic examination, the total rate infection of parasite *Giardia* was 5.61 % (52 sample of 926 samples) The findings of the present study are also consistence with other previous studies [29] study in Dhi-Qar Province, which recorded a prevalence of 23.7% among children , showed the rate of infection among males 6.12 % was higher than in females 5.11 % and [30] indicated that the monthly rate was higher in males (6.71%) compared to females (5.43%) , the highest infection rate 13.87 % in the age group 2-4 years and the lowest rate in the age group 8-10 years [31] and [32] was recorded as 1.52 % .the highest rate of infection in June 10.37 % and the lower rate in January 1.92 % These findings are consistent with previous study [33], a study conducted in Thi Qar province on patients at Bint Al-Huda Hospital and Al-Hussein Teaching Hospital. The variation in infection rates may be due to the number of samples tested, healthcare, and public health awareness in human societies, and infection rates may differ between rural and urban children.

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