



A Comparative Study of Cattle and Sheep Amoebiasis in Selected Regions of Baghdad City

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A B S T R A C T

This study was performed to microscopically detect the prevalence of amoebiasis in cattle and sheep fecal samples. One hundred fecal samples were collected from cattle and sheep from 3 completely different area in Baghdad city (Al-Tarmiyah, Al-Fudhaliyah, AbuGhraib). Our data recorded a total amoebiasis infection rate of 54% in cattle and 50% in sheep, without any significant differences between them. Males showed higher infection rates than females in cattle and sheep (62.5%) and (57.14) respectively. The difference between age groups with significant difference ($P < 0.01$) were obtained in ages < 1 year (72.7%) and (68.75%) in cattle and sheep respectively. This study has demonstrated the widespread of *Entamoeba* parasite in cattle and sheep in Baghdad city.

Keywords: *Entamoeba histolytica*, cattle, sheep

INTRODUCTION

Amoebiasis is a disease caused by a protozoan parasite is called *Entamoeba*, that can infect human, primates and wide range of animals (1-3). There are up to 24 species of *Entamoeba*, including *Entamoeba histolytica*, *E. coli*, *E. dispar*, *E. moshkovskii*, *E. hartmanni*, and *E. polecki*, that are found in the human intestinal lumen (4, 5).

After malaria and schistosomiasis, *E. histolytica* infection is the world's third-leading parasitic cause of death (6Error! Reference source not found.). It affects approximately 180 million people, of whom 40,000 to

110,000 die each year (7, 8). Infections with *E. histolytica* can be found all over the world, but they are higher widespread in the tropics and subtropics. Infection spreads by food and water that are contaminated with cyst-containing feces. The vast majority of cases are caused by human carriers, also known as cyst passers, who pass cysts in partially formed or fully formed stools (9). Monkeys, sheep, and possibly pigs are naturally infected with *E. histolytica*, although these animals do not have the disease (10).

Entamoeba infections can result in either harmless intestinal colonization, or invasion of the colonic wall that

damages other tissues, such as liver, lung and brain. Most *Entamoeba* infections are asymptomatic as the commensal parasites only colonize the human intestinal tract and not cause any disease (11). Although *E. histolytica*, *E. dispar* and *E. moshkovskii* are morphologically identical, the pathogenicity of *E. dispar* and *E. moshkovskii* remain unclear (12).

The domestic animals, living in intimate contact with man in rural areas, constitute a high risk for transmission of infection with these protozoal agents to man (13, 14). These protozoa are of public health concern as they may cause infection and severe illness in human. Infections are mostly self-limiting in people with normal immune system, but infection can be life threaten in people who have compromised immune system (15).

E. moshkovskii, *E. histolytica*, and *E. dispar* are morphologically indistinguishable; therefore, it is not possible to differentiate the three species based on traditional microscopic examination. In the identification of *E. histolytica*, novel approaches are used, based on detection of *E. histolytica* specific antigen and DNA in stool and other clinical samples. Molecular diagnostic tests, including nested PCR, are developed for the detection and differentiation of *E. histolytica*, *E. dispar*, and *E. moshkovskii* in clinical samples (16). The aim of this study was to determine *Entamoeba* spp among cattle and sheep in Baghdad city, Iraq.

MATERIALS AND METHODS

Fecal Sample Collection

The procedures used in this study were reviewed and approved by the Scientific Committee at the University of Baghdad's College of Veterinary Medicine in compliance with animal welfare ethical standards. A total of one hundred fecal samples were collected from cattle and sheep from different areas in the Baghdad city. Samples included 23 from sheep and 23 from cattle from Al Tarmiyah area, 16 sheep and cattle from AL- Fudhaliyah and 11 sheep and cattle from Abu Ghraib area during December 1, 2019, to November 30, 2020. Fecal samples were collected in capped fecal containers and transported in cold box to the Parasitology laboratory, College of Veterinary Medicine, University of Baghdad.

Microscopic Examination

About ½ teaspoon from each fecal sample was used and examined by direct smear preparation, using iodine stain and concentration method, for the detection and identification of parasite cyst, as described by (17). Examination of smears was made by light microscope (Olympus) under low power 10× then higher power magnification 40×.

Statistical Analysis

Statistical analysis was performed using statistical package for the social science (SPSS) version 17 for windows software and Microsoft excel 2010. Difference between groups was analyzed using χ^2 (chi-square) test. All these statistical tests considered that P value less than the 0.05 level was statistically significant (18).

RESULTS AND DISCUSSION

The result of the microscopic examination of 50 cattle fecal samples was 27(54%), while infection rate in 50 sheep fecal samples was 25 (50%) (Table 1). These results agreed with (19) when they recorded infection rate of 59.5% (25/42) in cattle and 58.1% (25/43) in sheep in Al-Diwaniya province. Nearly similar results were previously recorded by (20) in Egypt who detected *Entamoeba* spp. in cattle samples at a percentage of 55.42% (143 out of 258). Our data disagreed with (21), who recorded an infection rate of *Entamoeba* spp reached 39.44% (71/180) in sheep in Wasit province. All these differences in studies may be due to several factors such as environmental conditions, animals' management, different areas, size of sample and immunity. In cattle, the highest infection rate recorded in males which was 62.5%, and the lowest recorded in females which was 46.15% without any significant differences between them ($P>0.05$). In sheep, the highest infection rate was 57.14% and recorded in males, while the lowest was 40.9%, and recorded in females, with significant differences ($P<0.05$) (Table 2). This may be due to the immunosuppressive activity of testosterone (20).

Table 1. Infection rate of *Entamoeba* spp in cattle and sheep as examined microscopically

Livestock	No. examined	Positive cases	
		No.	%
Cattle	50	27	54
Sheep	50	25	50
Total	100	52	52
P-value			0.746 NS

NS=non-significant

The age groups of cattle showed a significant difference ($P<0.05$), where the highest infection rate was 72.7% and recorded in the age group >1 year and the lowest rate was 40.9% and recorded in the age groups of 2-3 years (Table 3). In sheep the highest infection rate was 68.75% and recorded in age group >1 year and the lowest was 30% and recorded in the age group 2-3 years (Table 3).

Similar findings were recorded by (20) in Egypt who found that *Entamoeba* spp. was 74.8% in cattle less than 12 months old which was higher than the present findings. (22) has also recorded a highest prevalence of infection *Entamoeba* spp. (74.8%) in cattle less than 12 months, the adult ages are less susceptible to infection compared with youngers and that may be due to the fact that adult animals

Table 2. Infection rate of *Entamoeba* spp in cattle and sheep according to sex

Host	Sex		No. Positive cases		% Positive cases		P-value
	Male	Female	Male	Female	Male	Female	
Cattle	24	26	15	12	62.5	46.15	0.0419*
Sheep	28	22	16	9	57.14	40.9	

*P≤0.05

were more resistant than younger ones. This might be related to the physiological status of the animal, and the acquired immunity, that have been formed after an old infection. Furthermore, the difference of sample number, various numbers of age group, mixed rearing, bad management; season and regions of collection sample which were all together influence the infection rate (23).

The study revealed that all Baghdad areas showed the presence of cattle and sheep amoebiasis. The infection rates of cattle amoebiasis were 57.89%, 46.15% and 55.55 % in

Al-Tarmiyah, Abu Ghraib and AL- Fudhaliyah, respectively (Table 4). Whereas infection rate of sheep amoebiasis were 52.17%, 54.54 % and 43.75% in Al-Tarmiyah, Abu Ghraib and AL- Fudhaliyah, with significant differences of (P>0.05) (Table 4). This variation depended on methods of animal husbandry and management, grazing in open farmyard, the difference in the number of samples, contamination the water, feed, and soil with mature cysts; insect also played an important role in the mechanical transmission of cysts (24).

Table 3. Infection rate of *Entamoeba* spp in cattle and sheep according to age

Age	Cattle			Sheep		
	No. examined	No. Positive	% Positive	No. examined	No. Positive	% Positive
> 1 year	11	8	72.7	16	11	68.8
1-2 years	17	10	58.8	14	8	57.1
2-3 years	22	9	40.9	20	6	30.0
Total	50	27	54	50	25	50
P-value						0.0036**

**P≤0.01

Table 4. Infection rate of *Entamoeba* spp in cattle and sheep according to area of study

Area	Cattle			Sheep		
	No. examined	No. Positive	% Positive	No. examined	No. Positive	% Positive
Al-Tarmiyah	19	11	57.89	23	12	52.17
Al-Fudhaliyah	18	10	55.55	16	7	43.75
Abu-Ghraib	13	6	46.15	11	6	54.54
Total	50	27	54	50	25	50
P-value						0.166 NS

*P≤0.05. NS=non-significant

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N/A

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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دراسة مقارنة داء الأميبيا في الأبقار والأغنام في مناطق مختارة من مدينة بغداد

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الخلاصة

أجريت هذه الدراسة للكشف المجهرى عن انتشار amoebiasis في عينات براز الأبقار والأغنام. تم جمع مائة عينة براز من الأبقار والأغنام من 3 مناطق مختلفة تماما في مدينة بغداد (الطارمية، الفضلية، أبو غريب). كانت نسبة الإصابة الكلية *Entamoeba* spp (54%) في الأبقار و (50%) في الأغنام دون وجود فروق معنوية بينهما، أظهرت معدلات إصابة الذكور أعلى من الإناث في الأبقار والأغنام (62.5%) و (57.14) على التوالي. أظهرت الدراسة فرق بين الفئات العمرية مع وجود فرق معنوي ($P < 0.01$) في الأعمار أقل من سنة (72.7%) و (68.75%) في الأبقار والأغنام على التوالي. أظهرت هذه الدراسة انتشار طفيلي *Entamoeba* في الأبقار والأغنام في مدينة بغداد.

الكلمات المفتاحية: الزحار الأميبي، الأبقار، الأغنام