Plant Archives Vol. 21, Supplement 1, 2021 pp. 1874-1876 e-ISSN:2581-6063 (online), ISSN:0972-5210

Plant Archives

Journal homepage: http://www.plantarchives.org
doi link : https://doi.org/10.51470/PLANTARCHIVES.2021.v21.S1.302

INFECTION RATE OF *GIARDIA DUODENALIS* IN SHEEP IN BABYLON PROVINCE, IRAQ

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ABSTRACT

Giardia duodenalis is a common intestinal protozoan that can cause diarrhea, weight loss and even death in animals or humans, threatening the livestock industry and public health. It can virtually infect (zoonosis) humans and all domestic animals, including sheep. Objective of this research was to study the prevalence of *Giardia duodenalis* infection in sheep in the province of Babylon, Iraq. 100 fecal samples were obtained from sheep of different age groups (1month to 5 years) from 3 areas in Babylon province, middle of Iraq. The samples were tested for the presence of *Giardia duodenalis*cysts using concentration Zinc Sulphate solution and Giemsa staining method. *Giardia duodenalis* cysts were present in 13% of sheep. The results showed significant ($p < 0.05$) differences in prevalence rates among different area of study. The highest infection rate was in Al-Qasim 20%, while the lowest in Al-Hillah 10%. The sex of sheep had no effect on the infection ratio with *Giardia duodenalis*. The infection rate was 12 % for males and 14 % for females respectively. The results showed no significant ($p>0.05$) differences in prevalence rates among different age groups of sheep infected with *Giardia duodenalis*. The presence of *Giardia duodenalis* in sheep in Babylon province indicates that this protozoan parasite should also be considered in the etiology of sheep exhibiting diarrhea.

Keywords: *Giardia duodenalis*, Cysts, Prevalence, sheep, Babylon.

Introduction

Sheep infecting gastrointestinal protozoa is *Giardia duodenalis* (syn. Giardia lamblia, Giardia intestinalis). The clinical signs of the parasites are enteritis, including malodorous excretion, loss of diarrheal feces, decreased weight gain, and impaired feed quality, particularly in lambs. (Aloisio *et al*., 2006; Feng and Xiao, 2011).

Sheep are commonly infected with Giardia by ingestion of unintentionally contaminated pasture or additional food with cysts. (O'Handley and Olson, 2006). It is also normal for livestock to become infected with Giardia through the ingestion of tainted water (Thompson *et al.*, 2008). As well as its veterinary importance, this parasite is a zoonotic pathogen and animals can make a major contribution to watershed contamination. Sheep have long been considered a source of human infection because of the unexpectedly high levels of infection in sheep. (Van der Giessen 2006; Ozdal, *et al.,* 2009).

The studies conducted in Iraq recorded the prevalence of *Giardia* infection, Abd Al-Wahab (2003) pointed to the presence of *Giardia* in sheep for the first time in the country with infection rate 6.92% in ewes and 6.71% in lambs in Baghdad province. Swadi (2008)confirmed that 36 sheep (24.82 %) of the 145 sheep examined were infected with Giardia, the prevalent was high in lambs 52.17%, while Khalil (2009) recorded 13.71% in Baghdad province. In AL-Diwaniya province AI-Fetly *et al.*, (2010) showed the overall prevalence rate of *Giardia* was (13.5%).

Materials and Methods

The study included one hundred fecal samples of sheep from different ages of both sexes in different regions of Babylon province. The research was conducted from the beginning of March 2019 to the end of September 2019, with 15-20 grams of fecal samples taken from each individual sample and fecal samples prepared from each sample.

Flotation methods: The solutions Zinc Sulphate using to investigate *Giardia* cysts according to (Ruest *et al.*, 1997).

Staining methods: The smears prepared and stained by Giemsa stain to investigate *Giardia* cysts according to (Mor, 1981).

Statistical analysis : A computerized database system has been converted into data. Expert statistical guidance has been obtained. Statistical analyzes were computer-assisted using SPSS version 17, and the variables were evaluated by Yat's Chi-square test. (Team, 2013).

Results

Infection rate of *Giardia duodenalis* in relation to study areas

Total infection rates of *G. duodenalis* in sheep in three different areas in Babylon province was 13%. It was showed that there were significant differences ($p < 0.05$) in the infection rate among different regions. AL-Qasimregion showed the highest infection rate (20%) while Al-Hillah region showed the lowest infection rate (10%) (Table 1).

Table 1 : Rate of infection with *Giardiaduodenalis* according toareas of study:

Area	No. of Samples examined	No. Positive	Infection Rate %
Al-Hillah	30	3	10
Abo-Garaq	30	4	13.3
AL-Qasim	40	6	20
Total	100	13	13

X^2= 12.4

The infection rate of *Giardia duodenalis* in relation to the sex

The infection rate in male sheep was 12%, while in female was 14% (Table 2).

Table 2 : Rate of infection with *Giardiaduodenalis* according tosex:

Sex	No. of Samples examined	No. Positive	Infection Rate %
Male	50	6	12
Female	50	7	14
Total	100	13	13

X^2= 1.6

Rate of infection of *Giardia duodenalis* in relation to the age groups:

There are no significant differences in the rate of infection among different age groups in the current study (Table 3).

Table 4-14 : Rate of infection with *Giardiaduodenalis* according toage groups:

Age groups	No. of Samples examined	No. Positive	Infection Rate %
1- 6 months	38	6	15.8
7 – 12 months	25	3	12
1-2 years	25	3	12
3-5 years	12	1	8.3
Total	100	13	13

X^2= 2

4. Cyst of *Giardiaduodenalis*:

Morphologically, *G. duodenalis* cyst had an oval shape with a thick wall. It comprises four nuclei that appear not to be visible. Longitudinal fibrils consisting of remnants of axostyle and parabasal bodies can also be seen (Fig. 1). The flagella disintegrate and form a central 'streak' that, when stained with iodine or giemsa stain, becomes visible. Dimensions of cysts with a mean length of 15 µm and a width of 10 µm (Fig. 2).

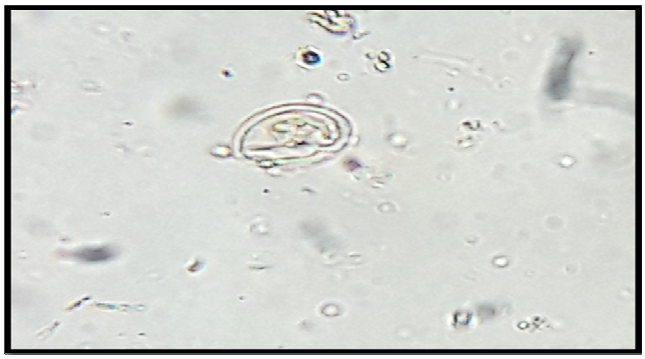

Fig. 1 : Cyst of *Giardia duodenalis,* zinc sulfate flotation method, size (15x10) µm (40x).

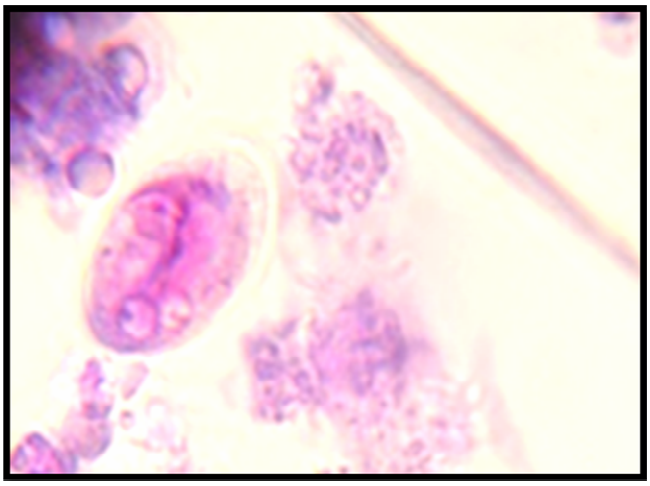

Fig. 2 : *Giardia duodenalis* cyst stained with Giemsa Stain, (40x).

Discussion

The result was in accordance with Rhaymah and Mohammed (2006) in Ninevah province, Khalil (2009) in Baghdad province and AL-Fetly *et al.*, (2010) in Al-Qadisiya province whom recorded the rates of infection of *Giardia duodenalis* in lambs 15.5%, 13.71% and 13.5% respectively.

In the meantime the rate of infection in this study was lower than those recorded by Swadi (2008) in Baghdad province (52.17%), Geurden *et al.* (2008) in Bulgaria (25.5%) and Wilson and Hankenson (2010)in United States (68%).

Abd Al-Wahab (2003) in Baghdad and Giangaspero *et al.* (2005)It has been shown in Italy that the rate of infection of *G. duodenalis* In lambs, were (6.92%) and (1.5%) respectively, which were lower than the result in the current study.

These results were due to differences in season of samples collection, study area, number of samples collected, methods of rearing and methods of diagnosis used which have highly effective on determination such ratios particularly the density of the flocks (Craig *et al*., 2007).

Females showed numerically higher than males without significant differences. This was due to mixed rearing (males and females) (Diaz *et al.,* 1996).

These results were in agreement with those found by Dawood and Abdullah (2007) in Al-Diwaniya province who recorded rate of infection in male 4% and female 5%, Swadi (2008) in Baghdad province recorded 20% in male and 25.83% in female, Khalil (2009) in Baghdad province recorded 14.73% in male and 14. 28% in female, and AI-Fetly *et al.* (2010) in Al-Diwaniya province recorded rate of infection in male 12.92% and female 13.96%. But disagree with Abd Al-Wahab (2003) who showed that the highest infection rate recorded in female lambs (10%) and lowest in male 4.73% in Baghdad province, while Craig *et al.* (2007) in UK showed the highest infection rate in male.

The results were in accordance with previous studies that showed highest infection rate appeared at age group of ≤ 6 months up to 12 months then the infection decline, Swadi (2008) recorded highest rate 52.17% at age group age group of ≤ 6 months and lowest 9.52% at age group 2 years and over, Khalil (2009) recorded highest rate 21.6% at age group

less than year and lowest 7.6% at age group year and over, AI-Fetly *et al.* (2010) recorded highest rate 21.78% at age group < 6 months and lowest 6.78% at age group 6 months and over, and AL-khayat (2013) recorded in calves highest rate 55.55% at age group ≤ 6 months and lowest 44.44% at age group > 6 months. The high rate of infection among these age groups are The physical characteristics of some facilities on farms where cysts can remain viable and infectious for a long time, as well as the incomplete immune system in these young animals, due to the presence of animal carriers, (Khalil, 2009).

The results were in accordance with Abd Al-Wahab (2003) and Khalil (2009) in Baghdad province, who recorded that the measurements of *G. duodenalis* cysts were 15–15.6 µm in length and 10–11 µm in width, while in AL-Diwaniya province AI-Fetly*et al.*, (2010)found that the size of cysts was 14.32±0.244 µm in length and 9.43±0.261 µm in width, also in BulgariaIvanov (2010) recognized cysts of 8–12 µm in length and 7–10 µm in width.

Conclusions

Our study indicates that the frequency of *Giardia duodenalis* infection in sheep in areas of Babylon is higher than the other rural areas of Iraq. Instigation of control programs is suggested to reduce the risk of sheep infection and mortality, morbidity rate and loss of production in sheep farms.

References

Abd Al-Wahab, I.H. (2003). Study in the epidemiology of the intestinal protozoa (Eimeria spp. Cryptosporidium spp. Giardia spp.) in the sheep in Baghdad province. M. Sc. Thesis, College of Veterinary Medicine, University of Baghdad.

Al-Fetly, D.R.; AIrodhan, M.A. and Abid, T.A. (2010). Epidemiological and therapeutical study of Giardiasis in sheep in AL-Diwaniya province.

Al-Khayat, F.A. (2013). Some epidemiological aspects and molecular diagnosis of Giardia duodenalis in human and cattle. Ph.D. Thesis - College of Veterinary Medicine - University of Baghdad.

Aloisio, F.; Filippini, G.; Antenucci, P.; Lepri, E.; Pezzotti, G.; Cacciò, S.M. and Pozio, E. (2006). Severe weight loss in lambs infected with *Giardia duodenalis* assemblage B. *Veterinary parasitology*, 142(1-2): 154-158.

Craig, B.H.; Pikington, J.G.; Kruuk, L.E.B. and Pemberton, J.M. (2007). Epidemiology of parasitic protozoan infections in Soay sheep (Ovisaries) on St Kilda. Parasitology 134: 9 –21.

Dawood, K.A. and Abdullah, S.R. (2007). Identification of Some Causative Agents of Diarrhea in Children and Lambs of Diwaniya. Al -Qadisiya J. Vet. Sci.-Supplement of 3rd conference.

Diaz, V.; Campos, M.; Lozano, J.; Manas, I. and Gonzalez, J. (1996).Aspects of animal giardiosis in Granada province (Southern Spain).Vet. Parasitol. 64:171-176.

Feng, Y. and Xiao, L. (2011). Zoonotic potential and molecular epidemiology of Giardia species and giardiasis. Clin. Microbiol. Rev. 24: 110-140.

Geurden, T.; Thomas, P.; Casaert, S.; Vercruysse, J. and Claerebout, E. (2008). Prevalence and molecular characterisation of Cryptosporidium and Giardia in lambs and goat kids in Belgium. Veterinary parasitology, 155(1-2): 142-145.

Giangaspero, A.; Paoletti, B.; Iorio, R. and Traversa, T. (2005). Prevalence and molecular characterization of Giardia duodenalis from sheep in central Italy, Parasitol Res., 96: 32–37.

Ivanov A.I. (2010). Giardia and giardiasis. Bulgarian Journal of Veterinary Medicine, 13(2): 65−80.

Khalil, N.K. (2009). Study of epidemiology and pathology of Giardia in sheep and goat in some area of Baghdad province. M.Sc. thesis, Collage of Veterinary Medicine, University of Baghdad.

Mor, L.G. (1981). Methods for protozoa. In: Staining Procedure. (ed.). Williams and Wilkins. 4th (Ed). Baitimore, USA.; 281- 309.

O'Handley, R.M. and Olson, M.E. (2006). Giardiasis and cryptosporidiosis in ruminants. Veterinary Clinics: Food Animal Practice, 22(3): 623-643.

Ozdal, N.; Tanritanir, P.; Goz, Y.; Deger, S.; Kozat, S. (2009). Parasitic protozoans (*Eimeria, Giardia*, and *Cryptosporidium*) in lambs with diarrhoea in the Van province, Turkey. Bull Vet Inst Pulawy; 53: 47-51.

Ozmen, O.; Yukari, B.A.; Haligur, M. and Sahinduran, S. (2006). Observations and immuno histochemical detection of *Coronavirus*, *Cryptosporidium parvum* and *Giardia intestinalis* in neonatal diarrhoea in lambs and kids. Schweiz. Arch. Tierheilkd. 148: 357–364.

Rhaymah, M.SH. and Mohammed, B.A. (2006). Prelimiary study on the prevalence of Giardia in ruminant in Ninevah province. Iraqi Journal of Veterinary Science, 20(1): 153-163.

Ruest, N.; Couture, Y.; Faubert, G.M. and Girard, C. (1997). Morphological changes in the jejunum of calves naturally infected with Giardia spp. and Cryptosporidium spp. Veterinary parasitology, 69(3-4): 177-186.

Swadi, H.A. (2008). Study of prevalence of Giardia infection in Iraqi sheep of Yuesephiya provence /Baghdad, Journal of Kerbala University, Vol. 6 No.2 Scientific. P. 128-131.

Team, R. C. (2013). R: A language and environment for statistical computing.

Thompson, R.C.A.; Palmer, C.S. and O'Handley, R. (2008). The public health and clinical significance of *Giardia* and *Cryptosporidium* in domestic animals. Vet. J. 177: 18-25.

Van der Giessen, J.W.; de Vries, A.; Roos, M.; Wielinga, P.; Kortbeek, L.M. and Mank, T.G. (2006). Genotyping of *Giardia* in Dutch patients and animals: a phylogenetic analysis of human and animal isolates. Int. J. Parasitol. 36: 849–858.

Wilson, J.M. and Hankenson, F.C. (2010). Evaluation of an inhouse rapid ELISA test for detection of Giardia in domestic sheep (Ovisaries). Journal of the American Association for Laboratory Animal Science, 49(6): 809-813.