

Research Article



Detection of Intestinal Protozoa in Camels and their Breeders in Najef, Iraq

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Abstract | The study aimed to investigate the existence of intestinal protozoa in feces of the camels and their breeders in Najef province, Iraq because this province is having a large number of camels. One hundred fecal samples were collected from camels (33 males and 67 females) aged between >3 to 6≤ year and 25 fecal samples were collected from camels breeders (14 males and 11 females) aged between >30 to 60 years during November 2014 to May 2015. Samples were examined through direct wet smear and Lugol's iodine for cysts or trophozoite of *Giardia* spp. and *Entamoeba* spp. while modified Ziehl-Neelsen staining technique for oocysts of *Cryptosporidium* spp. The results showed that the infection rates of *Cryptosporidium* spp., *Giardia* spp. and *Entamoeba* spp. in camels were 61%, 24%, and 20%, respectively. The corresponding infection rates in camel-breeders were 56%, 20%, and (16%), respectively. It can be concluded that the high prevalence values of the intestinal protozoa were detected in camels and camel-breeders. The prevalence values seems to be parallel between camels and camel-breeders who are mainly in touch with camels. This could be an evidence of the association of infection between camels and camel-breeders.

Keywords | Intestinal protozoa, Camels, Camel-breeders, Najef

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INTRODUCTION

Camels (*Camelus dromedaries*) are generally infected with numerous parasites. Parasitic infection cause considerable losses in camels as a result of mortality. Several types of protozoa are responsible for enteric infections in camels (Wahba and Refail, 2003). Enteric protozoan parasites are ubiquitous in domestic mammal populations (Taylor, 2000). Many species have intracellular life-cycle phases in the intestinal epithelia and have the potential to cause disease. Their widespread occurrence, economic importance coupled with limited options for treatment and sometimes zoonotic potential have meant most investigations of protozoan infections in ruminants have come from outbreaks on farms or from experiments involving production animals (Craig et al., 2007). Intestinal protozoa are increasingly being studied because of their association with acute and chronic diarrhoea in immunocompromised as well as immunocompetent patients (Mak, 2004). Various community outbreaks due to contamination of water or food with these protozoa have further highlighted their

importance in public health (Mak, 2004). Intestinal parasites, caused by protozoa represents one of the major causes of impaired milk production, as well as impaired fertility and low calving rates of camels (AL-Megrin, 2015). The aim of this study is to investigate the effect of some factors on infection rate of *Cryptosporidium* spp., *Giardia* spp. and *Entamoeba* spp. in camels and camel's breeders along with to identify the association infection between them.

MATERIALS AND METHODS

STOOL COLLECTION

Samples of 5-10 grams were collected randomly from different ages and sex of camels besides samples of camel's breeders in the Najef province/Iraq. All these samples collected from November, 2014 to May, 2015. The fecal samples were collected directly from the rectum, in a clean plastic containers (100ml size) and were tightly closed and given sequential numbers. All information for the animal included age and sex were recorded on the special form cart. The samples were transported in refrigerated bag to

the laboratory (Zoonotic Unit at the College of Veterinary Medicine, University of Baghdad).

DIRECT WET MOUNT AND LUGOL'S IODINE STAINING METHODS

A portion of stool was examined at field by direct transport to the wet mount with saline (0.85% sodium chloride solution) to observe motile intestinal parasites (*Cryptosporidium* spp., *Giardia* spp. and *Entameba* spp.) and trophozoites under light microscope at 10X and 40X magnifications. Lugol's iodine staining technique was also done to observe cysts of the intestinal protozoan parasites (Levine, 1961).

MODIFIED ZEHL-NEELSEN METHOD

A smear was also made from the fresh stool samples on glass slide and stained with Modified Ziehl-Neelsen acid-fast stain as described by (Garcia, 2001) for the identification of the oocysts of *Cryptosporidium parvum* using the x40 and x100 objectives.

STATISTICAL ANALYSIS

Statistical analysis was performed by SPSS software. Chi-square test was used to detect the association between each of age and sex with infection rate of *Cryptosporidium*, *Giardia* and *Entameba* spp. P value less than 0.05 were considered statistically significant.

RESULTS

Cryptosporidium spp., *Giardia* spp. AND *Entameba* spp. INFECTION

IN CAMELS ACCORDING TO SEX

The results revealed that out of (100) fecal samples collected from camels in Najef province were as follows; total positive cryptosporidiosis percentage in the males and females were 33(63.63%) and 67(59.70), respectively. The prevalence of giardiasis was 18.18% and 26.86% in the males and females respectively. The corresponding prevalence of entamebaiasis was 18.18% and 20.89% respectively. The highest prevalence was detected in *Cryptosporidium* spp. (61%), whereas the lowest was found in *Entameba* spp. (20%) and *Giardia* spp. (24%). On the other hand the differences between males and females were not significant across the three protozoa (Table 1).

The prevalence of *Cryptosporidium* spp. in camels (61%) in the present study was higher than prevalence reported by several researchers for the same animal; 37.9% in Iran (Razavi et al., 2009), 17.5% and 19.3% (El Kelesh et al., 2009; Abdel-Wahab and Abdel-Maogood, 2011) in Egypt.

The prevalence of *Giardia* in camels was 24% which was

too lower than 100% documented in Iraqi by Radhy et al. (2013). On the other hand Beck et al. (2011) confirmed the absence of *Giardia* in Croatia. These differences could be attributed to difference in environment condition between the countries besides the difference in the number of camels included in these studies. Similarly, the prevalence of *Entameba* spp. (20%) was not much differed from (17.85%) reported by Rewatka et al. (2009) in migratory.

IN CAMELS ACCORDING TO AGE

In Table 2, it was shown that highest estimations of *Cryptosporidium* spp. and *Entameba* spp. were 75% and 29.16% in age (3-≤6 years), respectively. While the highest estimation of *Giardia* spp. was 29.41% in age 6≤ years. Statistical analysis shows that the differences in prevalence among age categories are significant (P < 0.01) in *Cryptosporidium* spp. and *Entameba* spp. (P < 0.05), while the differences in prevalence of *Giardia* spp. was not significant.

The highest infection rate of *Cryptosporidium* spp. in camels found at age (3≤ 6 years). These results agreed with the previous studies which showed that the highest rate of infection appeared at age group of (2-<4) years (Hamza, 2007) in AL-Qadysiya Province, Iraq. Also this percentage was almost compatible with the result obtained by Razavi et al. (2009) in Iran who found that the highest percentage was at the age of <5 years. The high prevalence rate of *Cryptosporidium* spp. in camels in our study could be attributed to the risk of infection through environmental contamination due to grazing with other infected animals or to the spreading of manure (Razavi et al., 2009).

The highest infection rate of *Giardia* spp. was found at the 6≤ age. This could be due to increase susceptibility to the *Giardia* infection with age progress because of increased exposure to causative agent with increased water and feeds intake, also the change in the physiological status in females such as parturient and suckling periods as well as, the difference of hormonal excretion, all these represent a stress factors which caused a decline in immunity level and then would increase to the opportunity of infections. The highest infection rate of *Entameba* spp. (29.16%) at age 3-6< year was higher than the 17.85% recorded by Rewatka et al. (2009).

AMONG CAMEL'S BREEDERS ACCORDING TO SEX

Table 3 showed the prevalence of *Cryptosporidium* spp., *Giardia* spp. and *Entameba* spp. of camel's breeders according to sex. The infection rates of Cryptosporidiosis in males and females were 57.14% and 54.54%, respectively. The prevalence of giardiasis was 21.42% in the males and 14.28% in the females. While the prevalence of Entamebaiasis was 14.28% and 18.18% in the males and females respectively. The highest prevalence was found in *Cryptosporidium* spp. (56%), whereas the lowest was found in *Entameba* spp.

Table 1: Prevalence of *Cryptosporidium* spp., *Giardia* spp. and *Entameba* spp. in camels according to sex

Sex	Total animals	<i>Cryptosporidium</i> spp.		<i>Giardia</i> spp.		<i>Entameba</i> spp.	
		No. of Positive	(%)	No. of positive	(%)	No. of positive	(%)
Males	33	21	63.63	6	18.18	6	18.18
Females	67	40	59.70	18	26.86	14	20.89
Total	100	61	61	24	24	20	20
Chi sq			0.14		0.91		0.10
P value			0.70		0.33		0.75

Table 2: Prevalence of *Cryptosporidium* spp., *Giardia* spp. and *Entameba* spp. in camels according to age

Age/Year	Total animals	<i>Cryptosporidium</i> spp.		<i>Giardia</i> spp.		<i>Entameba</i> spp.	
		No. of Positive	(%)	No. of positive	(%)	No. of positive	(%)
<3	42	28	66.66	10	23.80	11	26.19
3-<6	24	18	75	4	16.66	7	29.16
6≤	34	10	29.41	10	29.41	2	5.88
Chi sq			15.21		1.25		6.50
P value			<0.01		0.53		<0.05

Table 3: Prevalence of *Cryptosporidium* spp., *Giardia* spp. and *Entameba* spp. infection among breeders contact with camels according to sex of breeders

Sex	Total breeders	<i>Cryptosporidium</i> spp.		<i>Giardia</i> spp.		<i>Entameba</i> spp.	
		No. of Positive	(%)	No. of positive	(%)	No. of positive	(%)
Males	14	8	57.14	3	21.42	2	14.28
Females	11	6	54.54	2	18.18	2	18.18
Total	25	14	56	5	20	4	16
Chi sq			0.01		0.04		0.06
P value			0.89		0.84		0.79

Table 4: Prevalence of *Cryptosporidium* spp., *Giardia* spp. and *Entameba* spp. infection among breeders in regards to contact with camels according to age of breeders

Sex	Total Breeders	<i>Cryptosporidium</i> spp.		<i>Giardia</i> spp.		<i>Entameba</i> spp.	
		No. of Positive	(%)	No. of positive	(%)	No. of positive	(%)
<30	11	6	54.54	1	9.09	1	9.09
30-60	14	7	50	4	28.75	3	21.42
Chi sq			0.05		1.46		0.69
P value			0.82		0.22		0.40

Table 5: Comparison of infection rate between camels and their breeders

Sex	Total No.	<i>Cryptosporidium</i> spp.		<i>Giardia</i> spp.		<i>Entameba</i> spp.	
		No. of Positive	(%)	No. of positive	(%)	No. of positive	(%)
Camels	100	61	61	24	24	20	20
camel's breeders	25	14	56	5	20	4	16
Chi sq			0.20		0.17		0.20
P value			0.64		0.67		0.64

The probability less than 0.01 or 0.05 was significant (P<0.05) (P<0.01)

(16%) and *Giardia* spp. (20%). All differences between males and females across all types of protozoa were not significant.

AMONG CAMEL'S BREEDERS ACCORDING TO AGE OF BREEDERS

The results obtained in Table 4 the highest infection rate of

Cryptosporidium spp. was 54.54% at age <30years while the highest infection rates of *Giardia* spp. and *Entameba* spp. Were 28.75% and 21.42% in age 30-60 years, respectively. Statistical analysis shows that the differences in prevalence among age categories across the three types of protozoa were not significant.

The Table 3 and 4 show that there were no effects of the age and sex on the prevalence of *Cryptosporidium* spp. of camels breeders. These results were in agreement with Sazmand et al. (2012) in Iran who recorded the prevalence of *Cryptosporidium* spp. in camel's breeders as 24% this percentage was lower than prevalence of *Cryptosporidium* spp. found in our study which was 56% in camel's breeders, while the prevalence of *Giardia* spp. and *Entamoeba* spp. was 20% and 16%, respectively. These percentages were higher than percentage 6.6% and 1.7% reported by Mahdi and Ali (2002) for animals handlers and non-animal handlers respectively. On the other hand, *Entamoeba* in the animals handlers was 7 out of 60 (11.6%) while in non-animal handlers was 8 out of 175 (4.5%).

COMPARISON OF INFECTION RATE BETWEEN CAMELS AND THEIR BREEDERS

Results in Table 5 show that the infection rates in camel's breeders and camels were nearly close with non-significant differences across the three types of protozoa. The trend of infection of the three types of protozoa in camel's breeders is parallel to the trend of infection rates in camels (Figure 1). This could represent evidence about the mutual infection between camel's breeders and camels.

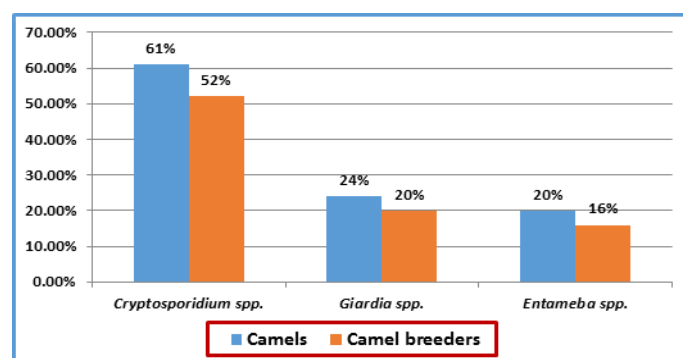


Figure 1: Relationship between camels and their breeders

CONCLUSION

The study conclude the high prevalence values of the intestinal protozoa were detected in camels and camel's breeders. The prevalence values seems to be parallel between camels and camels breeders who in touch with camels. This could be an evidence of the association infection between camels and camel's breeders.

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CONFLICT OF INTEREST

Authors declare no conflict of interest.

AUTHORS CONTRIBUTION

All authors contributed equally in all details of this manuscript.

REFERENCES

- Abdel-Wahab A, Abdel -Maogood S (2011). Identification of *Cryptosporidium* species infecting camels (*Camelus dromedarius*) in Egypt. J. Am. Sci. 7(2): 609.
- AL-Megrin WAI (2015). Prevalence rate of parasites in camels in Riyadh, Saudi Arabia. Int. J. Zool. Res. 11(2): 65-70. <http://dx.doi.org/10.3923/ijzr.2015.65.70>
- Beck R, Sprong H, Bata I, Lucinger S, Pozio E, Simone M (2011). Prevalence and molecular typing of *Giardia* spp. in Captive mammals at the Zagreb, Croatia. Vet. Parasitol. 175: 40-46.
- Craig BH, Pikington JG, Kruuk LEB, Pemberton JM (2007). Epidemiology of parasitic protozoan infections in Soay sheep (*Ovis aries*) on St Kilda. Parasitology. 134: 9 -21. <http://dx.doi.org/10.1017/S0031182006001144>
- El Kelesh EA, Abdel- Maogood SZ, Abdel-Wahab AM (2009). Comparative studies on some *Cryptosporidium* species infecting different animals. Egyptian Vet. Med. Soc. Parasitol. 5: 19-36.
- Garcia LS (2001). Diagnostic medical parasitology. ed. 4, ASM Press, Washington, D.C.
- Hamza MA (2007). Studay in the epidemiology of intestinal protozoa of the camels in AL-Qadysiya province. M.Sc. Thesis, University of Baghdad, College of Veterinary Medicine. Iraq.
- Levine ND (1961). Protozan parasites of Domestic Animals and of Man. Burgess Publishing Co., Minneapolis. Pp. 133.
- Mak JW (2004). Important zoonotic intestinal protozoan parasites in Asia. Trop. Biomed. 21(2): 39-50.
- Mahdi NK, Ali NH (2002). Cryptosporidiosis among animal handlers and their livestock in Basrah, Iraq. East African Med. J. 79(10): 550-553.
- Radhy AM, Khalaf JM, Faraj AA (2013). Some gastro intestinal protozoa of zoonotic importance observed in captive animals of Al-zawraa Zoo in Baghdad. I. J. S. N. 4(3): 567-570.
- Razavi SM, Oryan A, Bahrami S, Mohammadalipour A, Gowhari M (2009). Prevalence of *Cryptosporidium* infection in camels (*Camelus dromedarius*) in a slaughterhouse in Iran. Trop. Biomed. 26(3): 267-273.
- Rewatka SG, Deshmukh SS, Deshkar SK, Maske DK, Jumde PD, Bhangale GN (2009). Gastrointestinal helminths in migratory camel. Vet. World. 2(7): 258. <http://dx.doi.org/10.5455/vetworld.2009.258>

- Sazmand A, Rasooli A, Nouri M, Hamidinejat H, Hekmatimoghaddam S (2012). Prevalence of *Cryptosporidium* spp. in camels and involved people in Yazd Province, Iran. Iran J. Parasitol. 7(1): 80–84.
- Taylor M (2000). Protozoal disease in cattle and sheep. In Practice. 22: 604–617. <http://dx.doi.org/10.1136/inpract.22.10.604>
- Wahba AA, Refail MAH (2003). Detection and identification of enteric parasite infesting camel. Egyptian J. Agri. Res. 81(1): 297- 310.