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SOME RISK FACTORS AFFECTING THE PREVALENCE OF *BALANTIDIUM COLI* IN CATTLE AND THEIR BREEDERS IN BABYLON, IRAQ

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ABSTRACT
A cross section study was carried out to determine the prevalence of *Balantidium coli* infection in cattle and their breeders and to evaluate the risk factors including the gender, age and region. A total of 200 cattle fecal samples and 100 breeder fecal samples were collected foe different ages and sexes in Babylon. All samples were collected during the period from January to June -2016. The results showed that the prevalence of *Balantidium coli* were 22.00% and 12.00% in cattle and their breeders respectively. The differences between infection rates due to sex and age were not significant. However, females cattle were lower at risk (OR=0.67; 95% CI0.34-1.32) as compared with male cattle but with no significant effect (P=0.25). Also the age showed that cattle at age 1-<3 were lower at risk (OR=0.47; 95%CI 0.16-1.30) but with no significant effect (P=0.14). Based on the results of this research, it can be concluded that cattle are highly susceptible to balantidiasis irrespective of gender and age.

KEYWORDS: *Balantidium coli*, cattle, breeders.

INTRODUCTION

The disease problems in cattle caused by protozoa lead to losses of the productivity in milk, meat and mortality (Roy *et al*., 2011). Therefore, it is very important to identify the type of protozoa which caused the infection in the cattle to prevent and control the infection.The infection of protozoa is not limited to only cattle but could be extend to include humans also. One of the protozoan diseases is Balantidiasis which caused by *Balantidium coli* that could infect animals and humans (Levine, 1995; Schuster and Ramirez-Avila, 2008). Numerous studies confirmed that, *B. coli* could be a significant pathogen that is able to cause disease in horses, buffaloes, cattle, and camels (Headley *et al*., 2008; Tarrar *et al*., 2008; Randhawa *et al*., 2010; AL-Tayib, 2014). However, according to the conclusion demonstrated by Nakauchi, (1999) the Balantidiasis did not represent a serious problems in Japan because he found a low rate of infections in 56 mammalian species. Moreover, Thompson and Smith, (2011) considered the Balantidium to be zoonotic but its role in zoonotic transmission is likely to be minimal. The same situation exists in Islamic countries, although, Balantidiasis is a zoonotic disease, a few researchers take care about it. This could be attributed to that this disease can be found wherever pigs are found and in Islamic countries like Iraq, pigs are not breeding Balantidium could infect pigs and other mammals along with humans, but its effect on the gastrointestinal tract usually not serious. There are some fears of balantidiosis that can be expressed as the probability of increasing the prevalence of balantidiosis due to the warming of the earth's surface that could provide appropriate environment for survival of trophic and cystic stages of *Balantidium*. Moreover, Solaymani-Mohammadi (2004) found that wild boars were a reservoir for *Balantidium* in rural Western Iran. The wild boars are found in Iraq (Ministry of Environment, 2010) but its role in the infection was not studied. The information available is little about the prevalence of *Balantidium coli* in cattle and their breeders. Therefore, this study was carried out to determine the prevalence of *Balantidium coli* in the cattle and their breeders and to investigate the association infection between them.

MATERIALS & METHODS

A total of 200 cattle fecal samples and 100 breeder fecal samples were collected for different ages and sexes in Babylon during the period from January to June -2016. The fecal samples were collected directly from the rectum, in clean plastic containers (100ml size) and were given sequential numbers. All information about the animal and breeder included age and sex was recorded, then the samples were transported in refrigerated bag to a private laboratory for further examination. After that, a portion of stool was examined at field by direct wet mount, Lugol's iodine staining technique and modified Ziehle–Nelseen staining to identify the *Balantidium coli*.

RESULTS & DISCUSSION

Results revealed that the prevalence of *Balantidium coli* in cattle from different regions of Babylon, Iraq was 22.00% (Table 1). The present estimation is within the range of 6.6 – 45.45% obtained by previous studies (Niphadkar and Raote, 1994; Palanivel *et al*., 2005; Bilal, 2006; Kanyari *et al*., 2010; Rahman and Samad, 2010; Roy *et al*., 2011; Wisesa *et al*., 2015). The difference in estimations could be attributed to some factors for instant breed, sample size, method of detection, management, and nutrition (Hussin, 2015).

Table 1 showed the infection rates in male and female cattle were 25.53% and 18.86% respectively with no significant difference. This result agreed with the result obtained by Kanyari *et al*. (2010) and Singh *et al.* (2012)

in cattle. In this context Azhar *et al*. (2002) reported that male and female have the same chance of being infected with the *Fasciola sp* in buffalo. However, the result of this study disagreed with the result reported by Bachal *et al*. (2002), Roy *et al.* (2011) and Wisesa *et al*. (2015) who found that the infection rate of balantidiasis significantly different between male and female. The effect of sex could be attributed to the differences in the physiological condition between them (Roy *et al*., 2011). The elevate of prolactin and progesterone make female more susceptible to any infection (Lloyd, 1983).

TABLE 1: Infection rate of *B. Coli* according to gender in cattle

Gender	Total No.	+ve No	Percentage %	Odds Ratio OR	95% CI OR	P
Male	94	24	25.53	Reference		
Female	106	20	18.86	0.67	0.34-1.32	0.25
Chi-square value			1.28			
P			0.25			
Total	200	44	22.00			

Regarding the difference among age groups, results showed that the differences were not significant (Table 2). These results agreed with the results obtained by Kanyari *et al*. (2010) and Wisesa *et al.* (2015) but disagreed with the results of Roy *et al*. (2011) who reported that age was significantly influenced the infection rate of balantidiasis. However, females cattle were lower at risk (OR=0.67; 95% CI0.34-1.32) as compared with male cattle but with no significant effect (P=0.25). Also the age showed that cattle at age 1-<3 were lower at risk (OR=0.47; 95% CI 0.16-1.30) but with no significant effect (P=0.14).

Results in Table (3) showed that the prevalence of *Balantidium coli* in breeders (12.00%) was out of the range of 1.4–6.6% reported by some researchers (Chavalittamrong and Jirapinyo, (1984; Kaur *et al*., 2002; Al-Hasan *et al*., 2015). The difference in infection rates between male (8.51%) and female breeders (15.09%) was not significant. The present finding disagreed with results obtained by Biu *et al*. (2008) who reported that prevalence of balantidiasis was higher in male (11.5%) than female (3.4%). The non-significant effect of gender on the rate of infection could be attributed to that the males and females in rural regions are equal in exposure to same pathogenic agents (Hussin, 2015). The infection rate showed a non-significant decreasing in the trend of infection along with advanced age (Table 4). These results disagreed with results reported by Biu *et al.* (2008) and Al-Hasan *et al.* (2015) who found a significant effect of age on infection rate of *Balantidium coli.* According to the results of this research, it can be concluded that the high prevalence of *Balantidium coli* infection in cattle (22.00%) indicated that cattle are highly susceptible to balantidiasis. On the other hand, the prevalence of *Balantidium coli* in breeders is also high (12.00%) as compared with the prevalence obtained by other studies. The results also indicated the absent of the sanitary condition and lack of knowledge about health and hygiene.

TABLE 2: Infection rate of *B. Coli* according to age in cattle

Age/year	No.	+ve No.	Percentage %	Odds Ratio OR	95%CI OR	P
<1	66	18	27.27	Reference		
1-<3	40	6	15.00	0.47	0.16-1.30	0.14
3-<6	41	9	21.95	0.75	0.20-1.87	0.53
6≤	53	11	20.75	0.80	0.33-1.93	0.62
Chi-square value			2.25			
P			0.52			

TABLE 3: Infection rate of *B. Coli* according to gender in breeders

Gender	Total No.	+ve No	Percentage %	Odds Ratio OR	95%CI OR	P
Male	47	4	8.51	Reference		
Female	53	8	15.09	1.91	0.53-6.81	0.31
Chi-square value			1.28			
P			0.31			
Total	100	12	12.00			

TABLE 4: Infection rate of *B. Coli* according to age in breeders

Age/year	No.	+ve No.	Percentage %	Odds Ratio OR	95%CI OR	P
<10	51	5	9.80	Reference		
10-<30	29	2	6.89	0.68	0.12-3.75	0.65
30≤	20	1	5.00	0.48	0.05-4.42	0.52
Chi-square value			0.51			
P			0.77			

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