IJBPAS, February, 2015, 4(2): 751-757

ISSN: 2277–4998

International Journal of Biology, Pharmacy and Allied Sciences (IJBPAS)

'A Bridge Between Laboratory and Reader'

www.ijbpas.com

PREVALENCE RATE OF SMALL RUMINANTS BRUCELLOSIS IN GONBAD REGION

ABDOLMANNAN GOKZADEH[1] AND AFSHIN JAVADI[2*]

1: Department of Veterinary Medicine, Tabriz Branch, Islamic Azad University, Tabriz, Iran

2: Department of Food Hygiene, Collage of Veterinary Medicine, Tabriz Branch, Islamic Azad University, Tabriz, Iran

ABSTRACT

Brucellosis is the most important zoonosis. It is transmitted from animals to humans by ingestion of raw milk, milk products and close contact with animals through breeding; birth and slaughtering. So, determination of Brucella contaminated sheep and goat meat and transmission risk to human are the purpose of present study. Totally 768 samples, including 384 slaughtered sheep and 384 samples from goats in slaughterhouses of Gonbad city with age group of higher and lower of 2 years old female and male had been taken up in the slaughtering stage. At first positive samples, was recognized by Rose Bengal test, and then measured with Wright and 2-ME test. All the responses of this research compared with veterinary standard tables. Chi square test were used for analyzing of data. According to this research, prevalence rate among goats was (2%) and sheep was (4%) in which there was statistically significance among goats and sheep in term of prevalence. Fresh milk and unpasteurized dairy products are important causes of human brucellosis. High risk of transmission also may occur through contact with meat of infected animals. Furthermore, *B. melitensis* is most the virulent for man .

Keywords: Brucellosis, Sheep, Goat, Meat, Slaughterhouse

INTRODUCTION

Worldwide, brucellosis remains an important disease in humans, domestic and wild animals **(OIE, 2009)**. It is an infectious disease caused by bacteria of the genus *Brucella* which comprises eight species ranked according to their pathogenicity and host preferences. Six of the eight species can be isolated from terrestrial mammals: *B. abortus, B. melitensis, B. suis, B. canis, B. ovis et B.*

neotomae **(Hallingand Young, 1994)**. The disease is endemic with significant effects on economic and social conditions of people **(FAO, 2009)**. Indeed, brucellosis has an important impact on the health and productivity of livestock greatly reducing their economic value **(Ly, 2007)**. The epidemiology of brucellosis is complex and the prevalence varies across geographic regions and livestock systems **(Mangen *et al.*, 2002)**. The disease incidence is influenced by management factors, herd size, population density, type of animal breed and biological features such as herd immunity **(McDermott and Arimi, 2002; Acha and Szyfres, 2005)**.

Gidel *et al.* (1974) showed seroprevalence rates ranging from 1% to 17% in humans in pastoral areas of Côte d'Ivoire, Niger and Burkina Faso. According to the same authors, the prevalence of the disease in 1974 was 0.5% in the city of Niamey. Since then, very little research has been conducted in order to assess the magnitude of, and risk factors for the disease transmission within different production systems. Later, investigations in pastoral livestock systems of the country in 1986 by **Akakpo *et al.* (1986), Akakpo and Bornarel (1987)**, and in 1991 by **Bloch and Diallo (1991)** have confirmed the presence of brucellosis in cattle with apparent prevalence rates ranging between 1.4% and 30.9%.

The increased demand for animal products following the growth of the urban population and the depletion of food resources in pastoral areas due to climate change is forcing livestock keepers and their animals to move to the peripheral cities **(Thys *et al.*, 2006)**. This has led to the development of a dynamic and complex livestock production system in the urban and suburban regions of Niamey city **(Boukary *et al.*, 2007)**. Breeders are in most cases installed on unhealthy and unmanaged land without adequate infrastructure to conduct their activities **(Marichatou *et al.*, 2005)**. Dietary habits such as consumption of unpasteurized dairy products, close contact with infected herds and with contaminated environmental sources could be major risk factors for the spread of *Brucella* infections among humans **(Marichatou *et al.*, 2005; Boukary *et al.*, 2007)**. The aim of this study was to determine the prevalence of *Brucella* infectionin Gonbad region, Iran in goats and sheep.

MATERIALS AND METHODS

In present study we used 768 samples comprising 384 from sheep and 384 from goats. Samples were obtained by chance in slaughterhouse of Gonbad region, Iran. In this study, samples were obtained from sheep and goats of less and more than 2 years old. Samples were transferred to

laboratory to separate serum by centrifuging at 3000 rpm for 10 minute then were frozen at -18˚C till usage. In laboratory, sera were undertook Rose Bengal Test (RBT).

It must be noted that samples were tested 2 times by RBT and antigen was checked with positive serum sample. In next step, positive samples from RBT were tested by 2ME, coombs wright and wright tests. All these procedures were done according to the guidelines presented by manufacturers and based on standard tables confirmed by Iran Veterinary Organization (IVO).

Data were analyzed by SPSS ver. 19. Chi square, ANOVA and t-tests were used for statistical methods and $p<0.05$ considered as significance difference.

RESULTS

Data obtained from analyzing of 768 blood samples from sheep and goats showed that prevalence rate in Gonbad region is 4% and 2% respectively which is showed significance difference ($p<0.05$, **Table 1**).

Based on data represented in **Table 2**, there is no significant difference among sex and prevalence rate ($p>0.05$). Also, it has been shown that the outbreak of brucellosis in sheep aged less than 2 years old is higher than those aged more than 2 years old ($p<0.05$), contrary, the prevalence rate in goats aged more than 2 years old was higher than in goats less than 2 years old ($p<0.05$).

According to the **Table 3**, maximum and minimum positive cases were related to RBT and Coobs' wright tests respectively. In which, statistically significance was observed in this relation ($p<0.05$). However, there was no significant difference between RBT, wright and 2ME as well as between wright, 2ME and Coobs' wright tests ($p>0.05$).

Table 1: prevalence of brucellosis in sheep and goats of Gonbad region

Animal	No.	Positive cases (%)	Negative cases (%)
Sheep	384	16 (4%)	736 (96%)
Goat	384	8 (2%)	376 (98%)

Table 2: prevalence of brucellosis in sheep and goats in term of sex and age

Animal	Sex	Age	No.	Positives (%)	Negatives (%)
Sheep	Male	<2	96	2 (2%)	94 (98%)
		>2	96	4 (4%)	92 (96%)
	Female	<2	96	10 (10%)	86 (80%)
		>2	96	0	96 (100%)
Goat	Male	<2	96	0	96 (100%)
		>2	96	0	96 (100%)
	Female	<2	96	0	96 (100%)
		>2	96	8 (8%)	88 (92%)

Table 3: prevalence of brucellosis in sheep and goats in term of tests used

Animal	No.	RBT	Wright	Coombs wright	2-ME
Sheep	384	16	10	6	10
Goat	384	8	6	2	6

DISCUSSION AND CONCLUSION

Due to lack of unbiased data and standardized method to estimate the seroprevalence in Iran, Gonbadregion, comparing our findings with those from other studies should be made with caution. The apparent prevalence in our study was low compared with that obtained in other studies conducted in Iran.

Using the Rose Bengal Test (RBT), **Akakpo *et al*. (1986)** found an AP rate of brucellosis of 27.7% in the Kirkissoye ranch not far from Niamey, while **Bloch and Diallo (1991)** reported an AP rate ranging from 3.7% to 9.5%. Using RBT, **Boukary *et al*. (2011)** reported an AP rate of brucellosis comprised between 2.4 and 5% in smallholder dairy cattle herds in the urban and periurban areas of Niamey. The difference in prevalence between our study and the previous ones may be partly explained by the methodology used in the study protocol. In fact, in some studies, the lack of sampling frames or their imperfection does not allow to achieve representative sampling **(Domenech *et al*., 1983)**. Another important issue is the difference in sensitivity and specificity of serological tests used for screening. This factor contributes to the variability of results among researchers **(Mangen *et al*., 2002; McDermott and Arimi, 2002)**. The reported high prevalence in the other studies might be due to false-positive serum reactions **(Makita *et al*., 2011)**. The RBT used for screening individual animals at national-local-level is cheap, rapid and highly sensitive **(OIE, 2009)**. However, its specificity is low because the smooth lipopolysaccharides of the *Brucella* antigen can cross-react with antibodies from closely related Gram-negative bacteria such as *Yersinia enterocolitica* O:9, *Escherichia coli* O:157, *Salmonella spp*., and *Sternotrophomonasmaltophilia* as well as antibodies produced by *B. abortus* S19 vaccine **(Nielsen, 2002; Saegerman *et al*., 2004)**.

The fact that the risk of transmission of brucellosis in animals at the population and herd level varied significantly depending on the strata is in agreement with the findings of several authors who demonstrated variations in the prevalence of brucellosis related to the production systems **(Mangen *et al*., 2002; Acha and Szyfres, 2005)**. Considering the contagious nature of *Brucella*species, sharing grazing land and drinking water facilitate transmission of the disease **(Mekonnen *et al*., 2010; Makita *et al*., 2011)**.

Difference in management can also explain this, as small ruminants play a very important economic role in urban areas. For many households, keeping sheep and goats is a way of saving money **(Marichatou *et al*., 2005)**. Males are kept separately where

they are fed with forage complemented and with kitchen waste. Their market value is much higher than that of females and they are usually sold when there is a need for cash or are slaughtered during religious ceremonies **(Thys *et al.*, 2006)**. Unlike rural areas where herds are usually mixed, urban flocks are in most cases separated from cattle. Ewes and she-goats of the different flocks are typically collected by a shepherd who brings them to the pasture **(Boukary *et al.*, 2007)**. These specific conditions of raising small ruminants in urban areas promote aggregation of animals within neighborhoods, pastures and water points, favouring the transmission of the disease **(Megersa *et al.*, 2011)**.

In conclusion, the present study confirms the existence of *Brucella* in sheep and goats from the studied area. These risk factors are related to the complexity of interactions that exist within and between the different production systems and the different practices observed in studied areas. At the end it remembers that the main way of transmission of Brucella is milk and dairy products and less importance by meat.

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