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Seroprevalence of brucellosis in cattle in Shekhawati region, Rajasthan

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Abstract

This is an important zoonotic diseases that affect people all over the world is brucellosis. Brucellosis is symptomatically showed abortion in the last three month of the pregnancy, metritis, mastitis, repeat breeding, retained placenta and decreased milk synthesis in the female whereas sterility epididymitis and swelling in scrotum in male. The overall of 155 cattle serum samples were collected from various villages in Rajasthan's Shekhawati region. Each samples were carried out to find out of seropositivity of brucellosis by RBPT, STAT and ELISA. The prevalence of brucellosis was determined to be 09.68% (15/155), 10.32% (16/155), and 11.61% (18/155) showed positive by RBPT, STAT, and ELISA, respectively, out of 155 cattle serum samples. In relation to significance of brucellosis seropositivity in this region for public health may need to be reported. When working with ruminants, especially cattle, it is advised to use good hygiene and sanitary management practices.

Keywords: Cattle, Serum, RBPT, STAT, I- ELISA

Introduction

One of the major risks to human and animal health is brucellosis, which is continuously present in many of Africa and prevalent in some south region of some European countries. In most of India's states, including Rajasthan, brucellosis is a significant endemic disease that has a negative influence on the dairy business and causes issues with public health (Godara, 1998) [15]. While this disease completely eradicated in many developed nations, including Japan, Africa, Australia, Europe, Japan, Canada, New Zealand and England (Geering *et al.*, 1995) [6]. This disease poses an uncontrolled threat in high-prevalent areas, including parts of Asia, Latin America, Africa, the Mediterranean, and the Middle East (Refai, 2002) [14]. With the exception of cats, who are immune to *Brucella* infection, almost all domestic animals are afflicted by this illness. Before or during childbirth, by milk, through intercourse, by physical contact, contaminated surroundings and eating polluted raw meat like placenta and birth products are the main ways that brucellosis is passed from mother to child. Clinical signs of brucellosis include reduced milk production in the female, epididymitis, whereas sterility epididymitis and swelling in scrotum in males, swelling in uterus, inflammation in udder, repeat breeding, retention of the placenta, and abortion in the final trimester of pregnancy (Radostits *et al.*, 2000) [13]. The causative agent of Brucellosis is *Brucella* spp. This is a facultative intracellular, non-motile, small, Gram-negative coccobacilli. This has capacity to cause disease and develops innate and adaptive immunity is closely linked to its capacity to replicate and present in host cells (Fichi, 2003) [5]. The four main hosts of the *Brucella* species are goats (*B. Melitensis*), cattle (*B. abortus*), sheep (*B. ovis*), and pig (*B. suis*). A primary pathogen, *Br. abortus* is frequently discovered in chronic bursal enlargements and also causes infection in horses (Radostits *et al.*, 2000) [13]. In peoples, brucellosis is connected with occupational illness which mainly cause disease in veterinarians, butchers and employees of slaughterhouses. In humans this disease causes undulant fever, swelling in scrotum, arthritis, and inflammation in epididymis (Hassan *et al.*, 2012) [7]. The primary cause of cattle brucellosis is *Brucella abortus*, which is a significant zoonotic disease that affects human health and causes impact on economy in endemic region.

Material and Methods

Source and Area of samples collection

Present study was carried out at a several villages in Rajasthan's Shekhawati region between June 2021 and May 2023. These villages were chosen due to their high concentration of gaushalas, smallholder dairy farmers, and ethical animal husbandry methods. Using sterile disposable syringes (Dispovan) which is properly labeled or vacutainers (BD, USA), approximately 15 ml of blood to each animal and the total of 155 cattle serum sample was collected in aseptic conditions during the current study. After the blood had clot, the serum was separated and shipped on ice to the laboratory. Prior to testing, all serum samples were kept at -200C.

Seropositivity based on different serological tests

Rose Bengal plate test & Standard tube agglutination tube antigen were bought from (IVRI), Barielly. The ELISA kit was bought from Svanova Company, Uppasala, Sweden. The 8-9% suspension of pure, killed *Brucella abortus* strain 99 cells which has phenolized and staining with dye of rose Bengal is act as RBPT antigen. The RBPT is a serum agglutination test with a single dilution. This test was performed in a clean glass slides as per the method by (Alton *et al.*, 1988) [1]. In order to perform the STAT on serum samples, *Brucella abortus* plain antigen, a heat-killed, phenolic suspension of strain 99 was obtained. This resulted in 50% agglutination at the 1/500 final serum dilution with

Indian standard. Using an Indirect ELISA (I-ELISA) kit purchased from Svanova (Biotech-AB), Uppasala, Sweden, antibodies were found in bovine serum samples. Let me summarize by saying that *Brucella abortus* antigen was pre-coated into each of the 96 flat bottom polystyrene antigen wells.

Results and Discussion

In present study sero-positivity of cattle brucellosis were determined of 09.68% (15/155), 10.32% (16/155), and 11.61% (18/155) seropositive by RBPT, STAT and ELISA, respectively. Present findings were extremely similar to those reported by Mishra *et al.* (2023) about 10.74% and Kebede *et al.* (2008) [11] about 11%, Eshetu *et al.* (2005) [4] about 10%, and Aggad and Boukraa (2006) [16] with a percentage of 9.7%. The somewhat higher seropositivity rates were found in cattle at Nigeria (32.2%) by (Junaidu *et al.*, 2008) [8], Berhe *et al.* (2007) [3] reported seropositivity about 42.31% and in Ethiopia, Kebede *et al.* (2008) [11] reported about 45.9% seropositivity in cattle serum sample. Kachhawaha *et al.* (2005) [8] and Ahmad *et al.* (2009) [17] reported cattle seropositivity of brucellosis about 17.5% and 25.8% respectively. In Southern Ethiopia, Kassahun (2004) reported a somewhat lower prevalence rate of 1.7% for extensive farms and 2.5% for intensive farms, while Algeria Berhe *et al.* (2007) [3] reported a 3.19 percent prevalence rate for extensive production systems.

Table 1: Area wise seroprevalence of Brucellosis in Cattle in Shekhawati region of Rajasthan

District	No. of Sample Examined	RBPT Positive	STAT Positive	ELISA positive	RBPT Positive (percentage)	STAT Positive (percentage)	ELISA Positive (percentage)	P value
Churu	60	7	6	8	11.67	10.00	13.34	0.8880
Sikar	55	5	6	6	09.09	10.90	10.90	
Jhunjhunu	40	3	4	4	07.50	10.00	10.00	
Total	155	15	16	18	09.68	10.32	11.61	

$p > 0.05$ at 5% level of significance

Conclusion

Higher seropositivity of cattle brucellosis in this geographical region of Rajasthan have major public health significance and in this region have high endemic risk of zoonotic transmission from animal to human beings through their milk and meat products and it impacted a serious threat to the man as well as animal population and also have major impact in economy of country by the loss of production and loss of animal population.

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