

Prevalence of Brucellosis in Sheep and Goat Population of District Chitral Pakistan

Kalim Ullah¹, Muhammad Sohail^{2*}, Muhammad Rashid Khan³ and Zafar Khan⁴

¹Senior Research Officer, Veterinary Research and Disease Investigation Centre, Chitral, Pakistan

²Research Officer, Veterinary Research and Disease Investigation Centre, Abbottabad, Pakistan

³Principal Research Officer Veterinary Research and Disease Investigation Centre, Chitral, Pakistan

⁴Veterinary Officer Civil Veterinary Hospital Totakan District Malakand, Pakistan

***Corresponding Author:** Muhammad Sohail, Research Officer, Veterinary Research and Disease Investigation Centre, Abbottabad, Pakistan.

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Abstract

Brucellosis affects various species of animals and human beings. It is caused by *Brucella abortus* in animals and *Brucella melitensis* in human. The current study was carried out to find out the prevalence of *Brucella abortus* and active brucellosis in the Sheep and Goat population of District Chitral Khyberpakhtunkhwa, Pakistan. Serum samples (n = 600) were collected and processed in the Lab. Brucellosis was detected in 6% (34/600) samples by SPAT (Standard Plate Agglutination Test) and 4% (22/600) by STAT (Serum Tube Agglutination Test). The confirmation of disease was done with RBPT (Rose Bengal Plate test) and it was observed that 3% (18/600) were found positive. Two groups (G1 for sheep and G2 for goats) were made. In group 1, 6.3% (19/300) samples found positive through SPAT whereas, STAT showed 4% (12/300) positive samples. The RBPT showed 3% (09/300) Positive results in this group. In group 2, 5% (15/300) samples were positive through SPAT while only 3.3% (10/300) were positive through STAT. The RBPT showed 3% (09/300) Positive results in this group. It is suggested that a strategy should be developed to create awareness regarding brucellosis spread and care in the peoples of the locality to prevent its spread in animals and also to human population.

Keywords: Prevalence; Standard Plate Agglutination Test; Serum Tube Agglutination Test; Rose Bengal Plate Test

Introduction

The Chitral is one of the largest districts of Pakistan in the Khyberpakhtunkhwa Province with an area of 14,850 km². There are about 14 valleys in this district accommodating about 22 percent area of the province. Livelihood of the peoples in this area mostly depends upon livestock and poultry production. Livestock rearing is performed by women. It provides food to the community and also enhances income through wool and hide marketing [1].

Brucellosis is a zoonotic disease. Brucellosis is caused by bacterial genus *Brucella*. It is one of the most deleterious zoonosis resulting in serious health issues. The causative specie sin humans is *B. melitensis* (sheep and goats), whereas, *B. abortus* occurs in cattle and *B. suis* in swine.

It is aerobic gram-negative Bacteria. It can survive in the cells by avoiding immune system [2]. Its transmission occurs through various ways *viz*; direct contact with infected animals, inhalation and unpasteurized milk or cheese [3]. Diagnosis of brucellosis is carried out by detecting agglutinating antibodies in the serum [4]. The tests performed for diagnosis of brucellosis are tube agglutination test (TAT), Rose Bengal Plate test (RBPT) and complement fixation test (CFT) [5]. Disease control can be effective with sufficient information regarding epidemiology and animal management systems in the area. Brucellosis can be controlled with effective strategies which should be initiated on priority basis [6].

Objectives of the Study

The current study was carried out to find out the prevalence of *Brucella abortus* and active brucellosis in the Sheep and Goat population of District Chitral.

Materials and Methods

Total 600 animals (both female and male of all ages) were included in the study. Blood samples were collected using sterile 5 ml syringe, placed in ice box and shifted to lab for further analyses.

Blood samples were collected from six Union Councils of District Chitral and were collected according to the following table 1. The samples were collected during July 2019 to June 2020 (one Year).

Name of Union Council	Sheep		Goat		Total
	Male	Female	Male	Female	
Drosh	25	25	25	25	100
Chitral	25	25	25	25	100
Garam Chashma	25	25	25	25	100
Mastuj	25	25	25	25	100
Booni	25	25	25	25	100
Torkho	25	25	25	25	100
Total	150	150	150	150	600

Table 1: Sample collection from different regions of District Chitral.

From each animal 5 ml blood was collected in clot activator vacutainers and transported to Veterinary Research and Disease Investigation Centre Chitral in cold chain. Centrifugation of each sample was performed at 3000 rpm for 5 minutes and serum was placed at -20°C for future analyses.

Two serological tests SPAT (Standard Plate Agglutination Test) and STAT (Serum Tube Agglutination Test) were used for the diagnosis of brucellosis and were later confirmed by RBPT (Rose Bengal Plate Test).

Data recorded was arranged in microsoft excel sheet and chi-square test was applied for comparative analyses. Less than 0.05 P-value was considered as significant.

Results and Discussion

Serum samples (n = 600) were processed in the current study for the detection of brucellosis as presented in the table 2. 6% (34/600) of serum samples were found positive through Standard Plate Agglutination Test; whereas, 4% (22/600) were found positive through Serum Tube Agglutination Test. The confirmation of brucellosis was done through RBPT in 3% (18/600) of samples collected. Two groups were made viz: group-1 presenting sheep while group two presenting goat population. In sheep, 6.3% (19/300) of serum samples collected were found positive through SPAT; whereas: 4% (12/300) were positive through STAT. The RBPT showed 3% (09/300) of Positive results in this group (Table 3). In goat 2, 5% (15/300) of serum samples were found positive through SPAT; whereas; only 3.3% (10/300) were positive through STAT. The RBPT showed 3% (09/300) Positive results in this group (Table 4). When area wise distribution of disease was assessed, out of total 18 confirmed brucellosis samples, 7 were from Torkho, 3 were from Garm Chashma, 2 each were from Booni, Mastuj, Chitral and Drosh. The result of current study depicted that brucellosis is more common in female animals than male population.

Parameters	Total out of 600 samples	Samples Positive for Brucellosis	Samples Negative for Brucellosis	P Value
Species				
Sheep	300	19	283	0.48
Goat	300	15	285	
Gender Sheep				
Males	150	8	142	0.47
Females	150	11	139	
Gender Goats				
Males	150	5	145	0.18
Females	150	10	140	

Table 2: Prevalence of brucellosis in association with different Species and Gender characteristics.

Code No	Gender	Area	SPAT	STAT	RBPT
BS16	M	Drosh	+	-	-
BS37	F	Drosh	+	+	+
BS54	M	Chitral	+	+	+
BS77	F	Chitral	+	-	-
BS95	F	Chitral	+	+	-
BS104	M	Garm Chashma	+	+	-
BS133	F	Garm Chashma	+	+	+
BS149	F	Garm Chashma	+	-	-
BS158	M	Mastuj	+	+	+
BS173	M	Mastuj	+	-	-
BS187	F	Mastuj	+	-	-
BS196	F	Mastuj	+	+	+
BS214	M	Booni	+	+	-

BS243	F	Booni	+	+	-
BS259	M	Torkho	+	+	+
BS261	M	Torkho	+	-	+
BS279	F	Torkho	+	-	-
BS286	F	Torkho	+	+	+
BS291	F	Torkho	+	+	+

Table 3: Analysis of brucellosis in sheep in different areas of district Chitral.

Code No	Gender	Area	SPAT	STAT	RBPT
BG306	M	Drosh	+	-	-
BG331	F	Drosh	+	+	+
BG384	F	Chitral	+	+	+
BG399	F	Chitral	+	-	-
BG423	M	Garm Chashma	+	+	+
BG438	F	Garm Chashma	+	+	+
BG484	F	Mastuj	+	+	-
BG498	F	Mastuj	+	-	-
BG517	M	Booni	+	+	+
BG541	F	Booni	+	-	+
BG544	F	Booni	+	+	-
BG560	M	Torkho	+	-	+
BG571	M	Torkho	+	+	-
BG589	F	Torkho	+	+	+
BG593	F	Torkho	+	+	+

Table 4: Analysis of brucellosis in goat in different areas of district Chitral.

Brucellosis is mainly halted by cell mediated immunity. Re-infection can be prevented through increased IgM levels, which is followed by IgG levels in the serum of the patient [2].

Shafee., *et al.* [7] reported that the occurrence of disease through RBPT (3%) and through ELISA (3.20%) in cow and buffaloes.

Hussain., *et al.* [8] observed similar results viz; 4% by Rose Bengal Plate Test (RBPT), 3% by Serum Agglutination Test (SAT) and 3.33% by Milk Ring Test (MRT) in goats.

Low literacy rate, less concern about health, poverty and malnutrition is one of the reasons about the prevalence of infection in this area. Vaccination of brucellosis in animals can be practiced in the areas where disease is prevalent as it has a direct effect on human population because the people are continuously exposed to excreta and secretions of animals during dealing with animals and if infection persists it can affect human population [9].

Conclusion

Current study reveals that the prevalence of brucellosis is higher in female animals than male population. Brucellosis is a public health threat in the study area especially Torkho area of the district. So it is advised that government should take measures to create awareness among the farmers of the locality regarding disease spread, its control and treatment to prevent exposure of such deadly infections to human population.

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