

Epidemiological status of brucellosis in animals and human of Uttar Pradesh and Uttarakhand

MAANSI and A. K. UPADHYAY

Department of Veterinary Public Health and Epidemiology, College of Veterinary and Animal Sciences, G.B. Pant University of Agriculture and Technology, Pantnagar-263 145 (U. S. Nagar. Uttarakhand)

ABSTRACT: The status of brucellosis in various species of animals in U.P./ Uttarakhand was investigated. The distribution pattern of the disease in relation to species, age, sex, lactation number and nature of herd organization was determined. A total of 627 blood serum samples obtained from animals and man were screened employing battery of tests that include Rose Bengal plate agglutination test (RBPT), standard tube agglutination test (STAT), plate-enzyme linked immunoabsorbent assay (plate-ELISA), dot- enzyme linked immunoabsorbent assay (dot-ELISA) for the purpose. The prevalence of brucellosis was found to be highest in cattle (29.61%). Females of the species (cattle, 33.90%; goat, 5.81% and humans, 13.88%) were generally more affected than the males (6.25%, 3.44% and 11.50% respectively). Of 138 crossbreds in a herd with history of brucellosis though maximum number of reactors (55.55%) were recorded in the 7th lactation, no definite pattern in this regard could be detected as 2nd lactation yielded 50% and 5th lactation showed 27% reactors. As compared to animals in rural areas, the prevalence in the organized herd was much higher.

Key words: Brucellosis, serological tests, prevalence

Brucellosis is a global disease involving a range of animal species. Dairy animals of all ages especially those raised intensively are comparatively at higher risk (Radostits *et al.*, 1994). Besides being a zoonosis, the disease exhibits complex epidemiological features. In India, the disease in humans is caused by *B. melitensis* for which sheep and goats serve as the major reservoirs (Mathur, 1968). One of the basic concerns in the containment and management of brucellosis has been the establishment of the sound surveillance/monitoring mechanism. The success of the mechanism depends upon the intensity and continuity of the surveillance efforts towards recognition of new foci of the disease, estimation of existing status of the infection in animals and man and evaluation of ongoing disease management efforts. The core of a successful surveillance programme is constituted of an efficient diagnostic service. Mass screening programmes in brucellosis have relied heavily on the use of various serological tests in the target population especially in the absence of positive cultures. The tests provide an estimate of the disease that helps in formulating appropriate strategies for the management of disease. The present study, therefore records the status of brucellosis in various animal species in U.P./Uttarakhand, alongwith its distribution in relation to parameters like age, sex, lactation number and herd organization.

MATERIALS AND METHODS

A total of 627 serum samples were collected from Pantnagar, Rampur, Bareilly, Nagla and Deorampur village. Of the samples, 206 were from cattle and 79 from buffaloes. Other animal species screened were sheep (9), goat (86) and dog (26). As many as 221 human sera samples obtained from Pantnagar medical hospital were also screened. To obtain serum 3-5 ml blood was collected from dog and human and 10-15 ml from cattle, buffalo, sheep and goats. Serum was separated and stored at -20°C till further use. From the harvested serum, Rose Bengal plate agglutination test (RBPT) (Morgan *et al.*, 1969), Standard tube agglutination test (STAT) (Alton *et al.*, 1975), Enzyme linked immunosorbent assay (plate-ELISA) (Hudson and Hay, 1991) and dot-enzyme linked immunosorbent assay (dot-ELISA) (Batra *et al.* 1989) were performed. From 10 ml collected milk of cows, buffaloes and goats, milk ring test was performed (Alton *et al.*, 1975).

RESULTS AND DISCUSSION

A total of 627 animals and human serum samples were collected to investigate the distribution pattern of the infection in regard of species, sex, age, lactation number and herd organization. Each serum sample was

subjected to a battery of tests that included RBPT, STAT, ELISA and dot-ELISA. Serum sample detected positive through any of the tests was regarded as positive for brucellosis. Stratification of data in respect of species indicated that the brucellosis was more prevalent in cattle (29.61% including data from the endemic herd) than in goats (5.81%) and buffaloes (3.79%). As many as 7.69% dog serum samples also reacted positive. The prevalence of infection in man was 12.66%. The overall species-wise prevalence in animals was estimated to be 19.93%, 1.67%, 5.37% and 7.69% in cattle, buffaloes, goat and dogs, respectively (Table 1) agreeing with, Chanderyal (1995) and Aulakh *et al* (2008) in case of cattle and buffaloes. The differences in the management practices between cattle and buffaloes probably accounted for the lower prevalence in buffaloes (Saini *et al.*, 1992). The prevalence in goats was somewhat similar to that reported by Dessai *et al.* (1995). Nearly similar prevalence has been reported in dogs by Ahmad and Munir (1995). A somewhat higher prevalence in humans (12.66%) was attributed to the fact that most serum samples tested belonged to persons hailing from the low socio-economic stratum of the society who have little or no knowledge about the disease, thus exposing themselves to the risk of infection.

In case of cattle (33.90%), goat (7.01%) and humans (13.88%) females of the species were found to be affected more than the males (6.25%, 3.44% and 11.5%, respectively) as also observed by Tolosa *et al.* (2008) and Bayemi *et al.* (2009).

Age distribution of *Brucella* reactors was elucidated only in case of cattle and buffaloes and recorded that prevalence was higher in older animals as also reported by Sarumathi *et al.*, 2003. Moreover, a higher number of positives was observed (Table 2) in animals between 6-8 years of age (cattle, 48.33% and buffaloes, 14.28%) collaborating with Aulakh *et al.* (2008).

The prevalence tended to increase with advancing lactations even though no definite pattern could be illustrated. The highest prevalence (55.55%) was recorded in animals at 7th lactation as also reported by Paul (1980).

The number of *Brucella* reactors in the organized herd was far greater (41.30%) than in the samples collected from rural areas (4.34%) (Table 3). The intimacy of contact and high density of the animals in the herd seem to contribute to the higher risk of infection in the organized herd (Khire *et al.*, 1998).

Table 1: Species and sex-wise seroprevalence of brucellosis in animals and human

Description of / species / sex	Cattle			Buffalo			Sheep			Goat			Dog		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
1. Serum samples examined	32	174	206	52	27	79	2	7	9	29	57	86	18	8	26
2. Serum samples positive	2	59	61	2	1	3	-	-	-	1	4	5	2	-	2
3. Per cent positive	6.25	33.90	29.61	3.84	3.70	3.79	-	-	-	3.44	7.01	5.81	11.11	-	7.69

Table 2 : Age-wise seroprevalence of brucellosis in cattle and buffaloes in an organized herd

Species	Age group (in years)	Samples examined	Samples positive	Per cent positive
Cattle	0-2	17	4	23.52
	3-5	47	13	27.65
	6-8	60	29	48.33
	9-11	21	6	28.57
	12-14	17	6	35.29
	15-17	22	-	-
Buffalo	0-2	15	1	6.66
	3-5	8	-	-
	6-8	7	1	14.28
	9-11	6	-	-
	12-14	23	1	4.34

Table 3: Brucellosis in an organized herd and in cattle reared in rural areas

Sample(cattle)	Organized herd			Rural Areas		
	Samples examined	Samples positive	Per cent(%) positive	Samples examined	Samples positive	Per cent(%) positive
Serum	138	57	41.30	46	2	4.34
Milk	74	20	27.02	29	9	3.06

ACKNOWLEDGEMENTS

The facilities provided by the Dean, College of Veterinary Sciences and Director, Experiment Station, for the study are thankfully acknowledged. The authors are also thankful to Immunochemistry Lab (NII, New Delhi) and the Division of Veterinary Public Health, IVRI for providing enzyme conjugated antisera and antigens respectively. The financial assistance received by UPCAR is duly acknowledged.

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Received : June 9, 2014

Accepted : October 13, 2014