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ORIGINAL RESEARCH

Seroprevalence of brucellosis in sheep of organized and unorganized sector of Kashmir valley

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Abstract

Aim: A seroprevalence study of brucellosis in sheep was conducted from April 2010 to April 2012 from both organized and unorganized sectors of the Kashmir valley.

Materials and Methods: A total of 6615 sera samples were tested by Rose Bengal Plate test (RBPT) and Standard Tube Agglutination Test (STAT).

Results: The overall seropositivity revealed 6.50 % of prevalence of brucellosis. Higher prevalence (14.14%) of brucellosis was recorded in unorganized sector as compared organized sector (3.23%).

Keywords: brucellosis, Kashmir, seroprevalence, sheep

Introduction

Brucellosis is a bacterial zoonotic infection and is amongst the most important diseases, in terms of loss to economy that affects sheep and goat population in the developing countries [1,2]. It is a contagious disease caused by bacteria of genus *Brucella.*. Nine *Brucella* species are currently recognized, seven of these that affect terrestrial animals : *B. abortus, B. melitensis, B. suis, B. ovis, B. canis, B. neotomae, and B. microti* [3,4,5]. Five out of the nine known Brucella species can infect humans and the most pathogenic and invasive species for human is *B. melitensis,* followed in descending order by *B. suis, B. abortus and B. canis* [6]. In places where brucellosis is endemic, humans can get infected via contact with infected animals or consumption of their products, mostly milk and milk products especially cheese made from unpasteurized milk of sheep and goats and rennet from infected lambs and kids. Some specific occupational groups including farm workers, veterinarians, ranchers, and meat-packing employees are considered at higher risk [7]. *B. abortus and B. suis* infections usually affect occupational groups, while *B. melitensis* infections occur more frequently than the other *Brucella* species in the general population [6, 8]. Consumption of sheep or goat milk containing *B. melitensis* is an important source of human brucellosis worldwide and has caused several outbreaks. For example; in some countries including Italy, 99% of human brucellosis is caused by *B. melitensis* [8]. The prevalence of human brucellosis acquired from dairy products in some countries is seasonal, reaching a peak usually after kidding and lambing [9].

Brucella melitensis is considered to be the most important cause of abortion, reduced fertility, increased neonatal losses and leads to emergency slaughtering of the infected animals [10]. Ovine and caprine brucellosis due to *B.melitensis* is widespread in the country [11, 12] and is considered to be the most important disease due to its economic impact where it has an adverse effect on total animal protein supplies, and severe hazard it represents to human health [13]. It has been reported in different countries in Asia including Pakistan [14], Sri Lanka [15], India [16], China [17], Mongolia [18] and other parts of Asia [19]. There are about 500,000 new human cases of brucellosis reported annually worldwide making it the commonest zoonosis [5].

Sheep brucellosis can be divided into classical brucellosis and ram epididymitis. Ram epididymitis is caused by non-zoonotic agent B. ovis, while classical brucellosis is caused by *B. melitensis* and constitutes a major public health threat equal to goat brucellosis [6]. Besides the abortion, swine may also develop orchitis, lameness, hind limb paralysis, or spondylitis; occasionally, metritis or abscesses [20].

Brucellosis has been emerging as a serious concern in last few years in Jammu and Kashmir and therefore this study was undertaken. The main objective of this study was to screen out livestock in farms, Units established under different scheme and many private farms including all flocks from where abortions that proves positive on Rose Bengal Plate test (RBPT).

Keeping in view, the above facts, this serological survey of brucellosis through RBPT and Standard Tube

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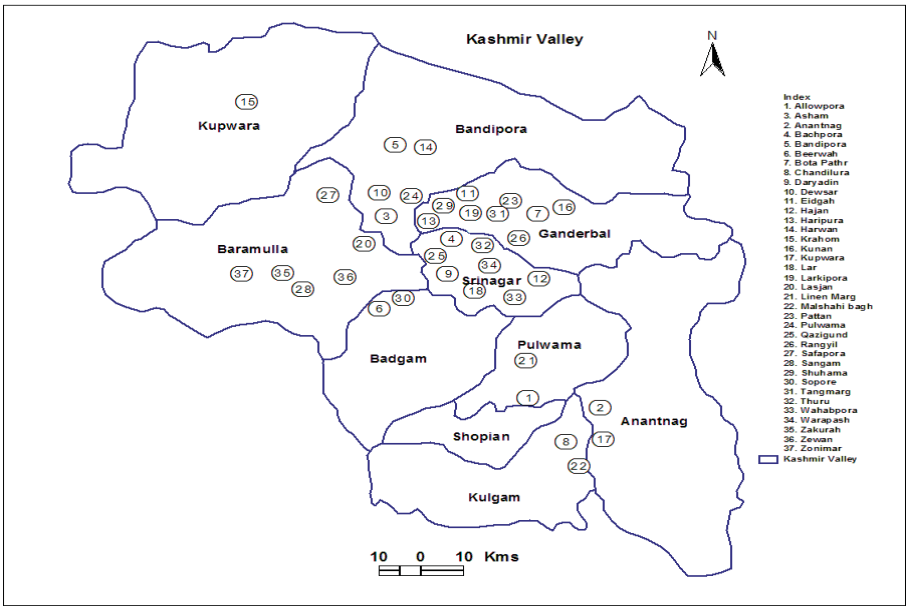

Figure-1. Map showing brucellosis affected areas of kashmir valley

Figure-2. RBPT negative (left) and positive (right)

Agglutination Test (STAT) in sheep kept at various government and private farms in Kashmir valley has been described, to assess the current status of the disease in the region.

Materials and Methods

The study was carried out through the period from April, 2010 to April, 2012 on different Government sheep breeding farms and field organizations representing Kashmir valley. Though the samples from *Brucella* hot spots were initially received in greater quantity, randomization of sample was done by collecting samples from widely spaced villages and from different breeders and flocks of different districts. Samples from north, south, eastern and western parts of Kashmir valley were taken mostly from units established by the Department (Figure-1). As the units are widely separated and in different districts they are largely represent general picture though it can't be claimed that the present study is quite exhaustive. It needs to be supplemented by further studies especially screening of herds, instead of only a group of animals, as brucellosis is a herd problem and may be confined to particular pockets. The fact that the study is based on two year time further randomizes our sample as unnoticed cases often result in quick horizontal spread and within two year, the flock is expected to show evidence of infections. A total of 6615 sheep serum samples were randomly collected from both organized and unorganized farms through out Kashmir valley. Serum samples were collected from a total of five established Government breeding farms (4635) from organized sector having mainly crossbred population as well as from all the eight district extension organizations (1980) of the valley. Serum samples were tested by Rose Bengal Plate test (RBPT) and Standard Tube Agglutination Test (STAT)" employing standard procedures [21] (Figure-2). *B. abortus* plain antigen obtained from IVRI, Izatnagar was used for the test. As per the guidelines, the sera from animals positive by RBPT and SAT, and showing 40 IU/ml or above titre were considered as positive, whereas 20 IU/ml was considered as doubtful.

Results and Discussion

Sera of 6615 sheep were analyzed and the prevalence of brucellosis was recorded by RBPT and STAT. The overall prevalence of brucellosis recorded in sheep was 6.50%. Similar prevalence was earlier reported [22, 23, 24, 25]. However higher prevalence of brucellosis was recorded elsewhere [26, 27]. This may be due to variation in the environment, sex, age, breed and other factors.

In this study, the prevalence of brucellosis was recorded higher (14.14%) in unorganized sector as to compared (3.23%) organized sector (Table 1 and 2). The findings are in the agreement with earlier observation [25]. The lesser incidence of the organized sector may be due to good and controlled managemental practices and screening of male animals for brucellosis before letting them for breeding. The findings of the present study suggest that *Brucella* infection may also be present in the native sheep of the valley. To prevent this, regular screening of the newly introduced rams for crossbreeding should be carried out.

The prevalence of brucellosis at Govt. sheep farms varied from 0.83% at Dachigham to 7.23% at Kewa, while as in the unorganized (field organizations) sector the prevalence rate varied from 4.87% in district Budgam to 19.81% in district Shopian (district Pulwama and Kupwara were not considered as the samples were less than 100). Increased prevalence in unorganized sector is attributable to certain hot spots where brucellosis had affected huge percentage of animals in the flocks screened. Amongst the government sponsored units in the districts only two

Table-1. Brucellosis picture from received and randomly collected samples (April 2010-April 2012)

Sr. No	District	Total no. of samples	Samples positive	% prevalence
1	Srinagar	438	80	18.26
2	Budgam	246	12	4.87
3	Ganderbal	458	72	15.72
4	Baramulla	184	35	19.02
5	Kulgam	130	7	5.38
6	Shopian	106	21	19.81
7	Anatnag	136	12	8.80
8	Bandipora	282	41	14.53
	Total	1980	280	14.14

Table-2. Brucellosis results of organized farms (April 2010-April 2012)

Sr. No	Name of farm	Total no. of samples	Samples positive	% prevalence
1	Goabal	780	29	3.71
2	Dachigam	477	4	**0.83**
3	Kralpathri	1060	43	4.05
4	Daksum	1945	47	2.41
5	Kewa	373	27	**7.23**
	Total	4635	150	**3.23**

showed significant presence of brucellosis. It was assumed that herds from which no reports of abortions came in last three years were free from it but for studies a few small herds (consisting of more than 20 animals) too were screened fully. Thus our consideration of data from fully affected herds doesn't affect our sampling fairness as we took highly affected, completely unaffected and little affected herds that had reportedly suffered a case or two of abortion in last three years. As the source of infection is often a ram which may pick up infection anywhere in the field and not necessarily from the farms from which it is supplied, tested against brucellosis before releasing for breeding in the field, we can attribute the relatively higher percentage in certain selected districts to infected rams that have escaped detection. Absence of strict cull and slaughter policy has compelled breeders to retain infected animals or sell to others as there is no compensation to farmers presently available if they decide to cull infected animals. The question of pattern of prevalence of brucellosis needs further study.

Conclusion

Our results could make a useful contribution towards preventing brucellosis in small ruminants and decreasing losses in the livestock industry. More attention should be paid towards implementing a proper control program for brucellosis and more efforts should be directed towards improving the animal health biosecurity program in those governorates that are large in size. Progress in control should be monitored serologically and evaluated epidemiologically. Veterinary extension should play a major role to guarantee the application of the sanitary procedures and measures in rearing, raising and breeding places, education of personnel and dissemination of awareness as well as veterinary public health through various media.

Recommendations

Apart from capacity building and training for improving the quality of the veterinary services and appropriate diagnostic laboratories on the basis of adopted standards of the OIE, bringing appropriate veterinary legislation and animal health policies, is also important. Farmers need to be compensated for brucella positive animals so that cull and slaughter policy could be implemented and significant control achieved. There is a need for systematic control programme that should involve large scale testing, culling, implementation of controlled breeding strategies and lastly vaccination. The need for work on indigenous vaccine is also strongly felt as part of long term control policy.

Authors' contribution

All authors contributed equally in planning and designing the study, collection of samples from field and farms, analysis of samples in laboratory and compilation of data. All authors were involved in drafting, revision and approval of the final manuscript.

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Competing interests

The authors declare that they have no competing interest.

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