Seroprevalence of Bovine Brucellosis in Karnataka, Uttar Pradesh and Uttarakhand

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ABSTRACT

A total of 1170 cattle and buffaloe serum samples were collected from Karnataka, Uttar Pradesh and Uttarakhand states to study seroprevalence of brucellosis using Rose Bengal plate agglutination test (RBPT) and standard tube agglutination test (STAT). Of the 425 animals from 5 organized farms of Karnataka, 126 (29.64%) and 135 (31.76%) animals were found positive by RBPT and STAT, respectively. From 366 serum samples collected from 5 unorganized farms, 47 (12.84%) and 81 (22.13%) animals were found positive by RBPT and STAT, respectively. In Uttar Pradesh 344 samples were collected from 5 organized farms, out of which, 46 (13.37%) animals were found positive by RBPT and 49 (14.24%) by STAT for brucellosis. Screening of 35 animals from an organized farm of Uttarakhand, revealed 2 (5.71%) samples each positive by both RBPT and STAT. Overall out of 1170 samples collected from 3 states, 221 (18.88%) and 267 (22.82%) were found positive for brucellosis by RBPT and STAT, respectively. Based on results, it was found that Brucella infection is widely prevalent in organized and unorganized dairy farms in these states of India.

Keywords: Brucellosis, buffalo, cattle, organized farms, seroprevalence, unorganized farms

Introduction

Brucellosis in cattle and buffaloes is one of the major bacterial diseases and is responsible for heavy economic losses to dairy industry and has public health implications. Brucellosis seems to be associated primarily with intensive farming practices in large organized dairy farms. Brucellosis is a common disease of cattle and the major causative agent is *B. abortus*. *B. melitensis* can also cause the disease in cattle, where cattle are reared in close proximity with goats. Occasionally, *B. suis* can cause chronic infection in mammary gland of cattle (Corbel and Brinley-Morgan, 1984). The adult animals are more prone to the disease and if affected, young ones show infection after maturity. The disease is more contagious and remains in herd as clinical or subclinical form, makes eradication difficult.

The existence of bovine brucellosis in cattle and buffalo dairy farms has long been reported by many researchers and studies have confirmed widespread prevalence in different states of India (Agarwal et al., 2007; Brahmabhatt et al., 2009).

Diagnosis of brucellosis can be done with isolation or serologically using RBPT, STAT (Allan et al., 1976), milk ring test (MRT), radio immuno assay (RIA), fluorescent antibody test (FAT), enzyme linked immunosorbent assay (ELISA), complement fixation test (CFT) (Nielsen and Yu, 2010) or using molecular techniques like polymerase chain reaction (PCR), real time PCR (Yu and Neilson, 2010) or loop mediated isothermal amplification test (LAMP). Serum being safe for the handlers most people adopt serological tests for diagnosis.
The aim of the present study was to know the prevalence of brucellosis in cattle and buffaloes in Karnataka, Uttar Pradesh and Uttarakhand states.

Materials and Methods

A total of 1170 serum samples were collected from cattle and buffaloes, which includes 791, 344 and 35 from Karnataka, Uttar Pradesh and Uttarakhand, respectively, during the period of 2011 to 2013.

Brucella antigen

Rose Bengal Brucella antigen and Brucella plain antigen for serological screening was procured from Division of Biological Products, Indian Veterinary Research Institute, Izatnagar.

Serum samples

After collection of blood from cattle and buffaloes the serum was separated and stored at -20°C till assays.

RBPT and STAT

The serum samples were subjected to screening for brucellosis using RBPT and STAT antigens, following Allan et al. (1976) protocol and validated using positive and negative control sera.

Results and Discussion

Among the total 1170 cattle and buffaloes serum samples, 425 from organized farms of Karnataka showed 126 (29.64%) and 135 (31.76%) positive by RBPT and STAT, respectively. In organized farms, out of 79 cattle 37 (46.83%) and 43 (54.43%) tested positive by RBPT and STAT, respectively, while out of 346 samples from buffaloes, 89 (25.72%) and 92 (26.59%) reacted for brucellosis by RBPT and STAT, respectively (Table 1). Prevalence recorded in the present study seems high, probably because the study was conducted on the outbreak samples with the history of abortions, retained placenta and infertility in the dairy farms. Our results can be compared with Chakraborty et al. (2000) who reported the seroprevalence in cattle as 56.02% and 50.35% by employing RBPT and STAT, respectively. Seroprevalence reported in different states of India have been 38.95% in Northern Gujarat (Chauhan et al., 2000) and 26.50% in Haryana (Chand and Sharma, 2004). Ghodasara et al. (2010) reported prevalence of 24.30% in cows and 26.03% in buffaloes. In organized farms, 22.18% animals were reported as sero-positive by RBPT with history of abortion (Trangadia et al., 2010). The high prevalence of brucellosis in farms could be due to exposure to aborted foetus, foetal membranes or secretions and common feeding or watering points.

A total of 366 sera samples (239 cattle and 127 buffaloes) were collected from 5 unorganized farms or villages of Karnataka, out of which 47 (12.84%) and 81 (22.13%) were positive by RBPT and STAT, respectively. Out of 239 cattle, 35 (14.64%) and 66 (27.61%) were tested positive by RBPT and STAT, respectively, while out of 127 buffaloes, 12 (9.44%) and 15 (11.81%) animals reacted for brucellosis by RBPT and STAT, respectively (Table 1).

Some authors have reported lower prevalence (0.4% to 19.6%) in different states of India (Chatterjee et al., 1984, Sharma and Saini, 1995, Varasada, 2003, Bhattacharya et al., 2005, Agarwal et al., 2007, Patel et al., 2007). Mishra et al. (2005) reported that 1.55% of cows and 1.97% of buffaloes were found positive from Gorakhpur district of Uttar Pradesh using STAT. The prevalence of brucellosis among Murrah buffaloes and cross bred cows was observed to be 16.25% and 8.75% by RBPT and STAT, respectively (Rao et al., 1999). Similarly low seroprevalence of 7.09% and 2.70%, were recorded by RBPT and STAT respectively, in buffaloes of Delhi (Prahlad et al., 1999).

A total of 344 serum samples were collected from 5 organized farms of Uttar Pradesh. Among 304 cattle, 46 (15.13%) and 49 (16.11%) animals were found positive for brucellosis using RBPT and STAT, respectively, but none of 40 buffaloes tested positive for brucellosis. Of the thirty five animals from a dairy farm of Uttarakhand revealed 2 (5.71%) animals to be positive by both RBPT and STAT. In our study, overall 221 (18.88%) and 267 (22.82%) animals were found positive for brucellosis by RBPT and STAT, respectively out of total 1170 animals from 3 states of India (Table 1).
Table 1. Prevalence of bovine brucellosis using RBPT and STAT in different states

<table>
<thead>
<tr>
<th>State</th>
<th>Cattle</th>
<th>Buffalo</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RBPT</td>
<td>STAT</td>
<td>RBPT</td>
</tr>
<tr>
<td>Karnataka</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unorganized farms (5)</td>
<td>35/239</td>
<td>66/239</td>
<td>12/127</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organized farms (5)</td>
<td>46/304</td>
<td>49/304</td>
<td>0/40</td>
</tr>
<tr>
<td>Uttarakhand</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organized farm (1)</td>
<td>2/35</td>
<td>2/35</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>120/657</td>
<td>160/657</td>
<td>101/513</td>
</tr>
</tbody>
</table>

Discrete and small dairy farms have less possibility to contact with infected animals and thus incidence relatively decreases with herd size decreases (Dinka and Chala, 2009).

Our results can be correlated with Singh et al. (2004) who reported lower seroprevalence in organized and well managed farms (5.2%) when compared with poorly managed farms (14.81%) in Punjab.

The present study revealed that the high prevalence of bovine brucellosis recorded in both organized and unorganized farms, as in Karnataka which may due to selective screening of serum samples collected from abortion cases in the farms. Further spread of infection from one animal to other may be by contact between the females or during natural service with infected bull. Thus, in intensive dairy farms regular screening and elimination of reactors should be practised for controlling bovine brucellosis in India.

References


