SEROPREVALENCE OF BRUCELLA ABORTUS ANTIBODIES IN THE CATTLE POPULATION IN THE SELECTED UPAZILAS OF SIRAJGONJ DISTRICT

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ABSTRACT

A study was carried out on 135 commercial dairy farms of five upazillas of Sirajgonj district to know the prevalence of *Brucella abortus* antibody in herds during the period from January 2012 to December 2013. A total of 270 blood samples were tested by Anigen® Rapid *Brucella* Ab test kit. The overall prevalence of bovine brucellosis was recorded as 8.51%. Distribution on the basis of breed, age, sex and pregnancy revealed the significant relationship among the infection, breed, sex, age and pregnancy in the population. The prevalence was relatively high in older cattle (9.09%) and the highest prevalence was 9.34% in the pregnant female. The prevalence of *Brucella abortus* antibody was considerably high in most of the large herds. Further study is needed to know the species and biovar of *Brucella* circulating in the study area.

Key words: Brucellosis, cattle, seroprevalence, Anigen® Test Kit

INTRODUCTION

Livestock industry plays an important role in the economy of the country. Human life is highly associated with livestock population in the different livestock production systems (Bekele *et al.*, 2010). But the sector is continuously facing some threats; brucellosis is one of them which not only affect the cattle population but also human associated with it. In both pastoral and mixed livestock production systems, people live very closely with livestock having a high incidence of brucellosis and thus, are at higher risk of acquiring the infection (Gebretsadik *et al.*, 2007). Brucellosis is a disease of domestic, livestock and wild animals with serious zoonotic implications in man; causing huge economic losses to the livestock industry. Cattle, goats, pigs, sheep, horses and dogs play an important role in the transmission of this disease to man. It is defined as a contagious systemic bacterial disease primarily of ruminants, characterized by inflammation of the genital organs and fetal membranes, abortion, sterility and formation of localized lesions in the lymphatic system and joints (WHO, 1971; CDC, 2005). Brucellosis is a zoonosis transmitted directly or indirectly by exposure to infected animals (Mandell *et al.*, 2005). It is considered as one of the most important zoonoses in the world (WHO/FAO/OIE, 2004). Although the density of cattle population is high in Sirajgonj but most of the previous studies on bovine brucellosis have been carried out nationally, and do not provide an adequate epidemiological picture of the disease in this zone. We, therefore, designed a study to know the seroprevalence of brucellosis in cattle as measured by the Antigen rapid Brucella Ab test kit.

MATERIALS AND METHODS

Location and duration of study

Five Upazillas of Sirajgonj district namely Sirajgonj Sadar, Shahjadpur, Ullapara, Kamarkhand and Belkuchi were selected on the basis of number and size the herds. Three administrative union from each Upazilla and three villages from each union were taken for this study. The study was conducted over a period of 24 months during January 2012 to December 2013.

Animal selection and sample collection

Three herds from each village and two cattle of over 6 months old from each herd were selected for the study. About 10 ml of whole blood sample was collected from the jugular vein, using plain vaccutainer tubes and needles from each cattle aged above six and with no history of vaccination for brucellosis. Each sample tube was labeled using codes specific to the individual sample. The tubes were tilted and serum was collected either passively by decanting or after centrifugation of the blood samples at 2,500 rpm for 5 min .The serum was stored at −20°C until tested serologically.

Rapid kit test (Chromatographic Immunoassay)

The samples were subjected to Anigen® Rapid B. Brucella Antibody Test Kit for the detection of *Brucella abortus* antibodies.

As, for the interpretation of test results, positive reactions were indicated by the appearance of two distinct red lines (Figure 1), the chances of misinterpretation were little or absence.

Figure 1: Positive result

RESULTS AND DISCUSSION

Over the study period, although an average seroprevalence of 8.51% was obtained, but the prevalence was found to vary insignificantly in different upazillas. The highest prevalence was found in Shahjadpur upazila (11.11%) and the lowest was found in Belkuchi (5.55%) (Table 1). Although some studies reported variable trend in the prevalence of the disease (Rahman *et al.,* 2012; Rahman et al., 2013) but the prevalence obtained in this study represent area of high cattle density where there are chances of intermixing during free grazing in the field (bathan) during dry season. The farmers of this area were accustomed to an extensive system of management, keeping both healthy and infected animals together under purely traditional systems and providing less nutritious feed which made animals highly susceptible to diseases like brucellosis and tuberculosis (Adesokan *et al.*, 2006).

Table 1. Distribution of brucellosis in cattle in different areas of Sirajganj district

Upazilla	Number of Union	Tested	Positive	Prevalence
Sirajgonj Sadar	03	54	05	9.25%
Shahjadpur	03	54	06	11.11%
Ullapara	03	54	05	9.25%
Kamarkhand	03	54	04	7.40%
Belkuchi	03	54	03	5.55%
Overall	15	270	23	8.51%

Table 2. Age-wis Prevalence of brucellosis in cattle

Age group	Tested	positive	Prevalence
6 month-2 yr.	74	6	8.11
>2-6 yrs.	108	9	8.33
Above 6 yrs.	88	8	9.09
Overall	270	23	8.51

Prevalence of bovine brucellosis found in the study area was 8.11% in the younger stock which was increasing with the advance of age and reached as much as 9.09% in animals older than 6 years (Table 2). Animals younger than 6 months were not included in this study because of lacking report of occurrence in this age group. Adult cattle over the age of 3 years had the highest seroprevalence. Younger animals are said to be less susceptible to *B. abortus* than older. Sexually mature animals and non-vaccinated young cattle are at higher risk of brucellosis if exposed to pathogenic strains of the organism (Radostits *et al.*, 1995). Variation in the seroprevalence was also observed with sex. Female maintained a comparatively higher seroprevalence than the male. The prevalence of brucellosis, regardless of the upazilla, in male and female was 7.60% and 8.97% respectively and among the female, pregnant female was found carrying highest rate of seroprevalence and it was 9.34 % (Table 3).

The prevalence of brucellosis was relatively higher in Holstein-Friesian × Local cross-breed (8.75%) (Table 4). Similar reports were also made by others (Cadmus *et al.*, 2006; Cadmus *et al.*, 2008) and the Holstein Friesian cross with indigenous cattle is the most predominant breed in the study area.

Table 3.Prevalence of brucellosis on the basis of sex of cattle

Sex	No. of sample	Positive	Prevalence
Male	105	8	7.60
Female	58	5	8.61
Pregnant female	107	10	9.34
Total	270	23	8.51

Table 4. Prevalence of brucellosis on the basis of breed of cattle

Breed	No. of sample	Positive	Prevalence
Local	60	5	8.34
HF×L	80	7	8.75
SL×L	70	6	8.58
S× L	60	5	8.34
Overall	270	23	8.51

Local=Indigenous cattle, HF = Holstein-Friesian, SL = Sahiwal, S = Sindhi, L= Local cattle

The male to female infection ratios recorded over the years where females were found more susceptible to brucellosis (Table 3). This may be due to the inclusion of more pregnant cows in the population studied as the sexually mature pregnant cattle are more susceptible to infection than sexually immature cattle of either sex (Radostits *et al.*, 1995).

Brucellosis is a worldwide zoonosis (Nicoletti *et al.*, 1993) that causes serious economic losses in livestock and poses important human health hazards worldwide (Ibrahim *et al.*, 2010). One of the major implications of the burden of this disease is the exposure of livestock traders, butchers and other meat processors as well as veterinarians/meat inspectors. The poor facilities and safety precautions in most herds and slaughter houses contribute to the likelihood of exposure. In most instances, these personnel use their bare hands to handle infected organs and carcasses from diseased animals.

The economic impact and public health significance of the uncontrolled prevalence of brucellosis in livestock population is undoubtedly high (Cadmus *et al.*, 2008) and the financial costs of the disease nationally has to be been estimated (Ajogi *et al.*, 1998, 2001).

In conclusion, therefore, for the control and eradication of brucellosis in cattle population, more attention should be paid towards separation of healthy and infected animals/herds. This should be combined with more government intervention in the areas of regulations and policies concerning routine screening of all cattle populations, purchasing healthy bulls from foreign market, using semen from healthy bull for artificial insemination, introduction of vaccine in herd where the prevalence is very high, etc. Awareness program should be undertaken involving stakeholders in the livestock industry as well as consumers to avert public health and economic losses associated with brucellosis.

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