ABSTRACT
BACKGROUND: Brucellosis is a zoonotic disease of great public health significance as it can cause illness, physical incapacity and loss of man power. Due to nonspecific clinical presentation, the disease usually goes undiagnosed unless specifically looked for and thus it becomes important to know the percentage of people exposed to this organism in a particular geographical area to decide strategies to deal with the situation. This study was aimed to find sero-prevalence of human Brucellosis in high risk population of Anand district as Anand being an area with dairy industry, veterinary college, farming, etc. may have a large number of carriers as well as febrile illnesses due to Brucellosis. MATERIALS AND METHODS: This is a cross sectional study conducted in Anand district. The material consisted of 54 subjects from the high risk group, and 25 subjects from the low risk non-exposed group. The serum sample was collected and tested for detection of antibody to Brucella abortus and brucella melitensis using tube agglutination test. Comparative statistics was used for data analysis. RESULTS: Out of a total number of 54 test serum samples tested for brucella antibody, 8 test serum samples were positive for brucella melitensis and 1 test serum sample was positive for brucella abortus. Of the 25 control serum samples tested only 1 serum sample tested positive for brucella melitensis and none positive for brucella abortus. CONCLUSION: It can be concluded from the results that exposure to brucella in high risk individuals is present and clinicians must keep their index of suspicion high for early detection and treatment to prevent chronic morbidity.

Keywords: Human Brucellosis, high risk individuals, sero-prevalence

INTRODUCTION
Brucellosis is a zoonotic disease of worldwide distribution\(^1\). The infection is usually transmitted by direct or indirect contact with infected animals or their products. Brucellosis presents with a very wide variety of clinical manifestations, which can be confused with a number of other infectious and non-infectious diseases of both acute and chronic onset\(^2\). The most common clinical presentation is in the form of a fever, which usually remains undiagnosed. It is one of the diseases transmitted from animal to man and can cause illness, physical incapacity and loss of man power and thus is of great public health significance. Its diagnosis is vital for early treatment as untreated cases may progress to chronic stage. Due to nonspecific clinical presentation, the disease usually goes undiagnosed unless specifically looked for and thus it becomes important to know the prevalence of people exposed to this organism in a particular geographical area to decide strategies to deal with the situation\(^2,3\). Anand being an area where man and herds are in close proximity due to various reasons like dairy industry, veterinary college, farming, etc. may have a large number of carriers as well as febrile illnesses due to Brucellosis. Though there are some studies on animal Brucellosis in Anand district, human Brucellosis still remains unexplored area and thus this study was planned.

MATERIALS AND METHODS
This is a cross sectional study conducted in the Department of Microbiology, from May-July 2010, under ICMR STS scheme after due approval by the institutional ethics committee. The material consisted of 54 subjects from the high risk group, which consists of individuals that were in direct contact with cattle such as those working in dairy farms, animal husbandry, reared cattle or consumed un pasteurized milk, and 25 subjects from the low risk non-exposed group. All the subjects were explained about the study and their informed consent was taken. Relevant history of each individual was recorded in a prepared format. 2ml of blood was withdrawn from the anti-cubital vein after due antisepsis by a trained phlebotomist in gel tube vacutainers. The blood was centrifuged and serum was separated immediately on reaching the laboratory. The separated serum samples were stored at 2-6 °C till subjected to serological investigation for detection of IgG antibody to Brucella abortus and brucella melitensis. The serological detection of brucella antibody was carried out at the microbiology laboratory as per

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standard guidelines using tube agglutination test kits acquired from Tulip. Positive and negative controls were run with each batch. The results were noted down accurately along with the titres if found positive and were interpreted in light of the patients history. Effort to find any relation between the age and sex of the subjects with exposure to brucella spp was also made using Statistical Package for the Social Sciences (SPSS) for windows (version 15.0; SPSS Inc, Chicago, IL, USA).

RESULTS

Age and sex distribution of subjects showed that majority i.e 70% of the subjects were male (38/54) in high risk group where as it was females i.e. 68% (17/25) in low risk group. The age of the subjects in high risk group ranged from 14-60 yrs with majority falling in the age group of less than 35yrs which was 19-22 years for low risk group. The most common risk factor that was found in all the subjects (n=54) was milking of cows (direct animal contact) and drinking of unpasteurized milk (indirect animal contact). Out of a total number of 79 serum samples tested for Brucella antibody a total of 9 (11.39%) samples were detected positive with majority i.e. 8/54 (14.81%) being positive from high risk group and only one (4%) from low risk samples. The titres for the positive serum were found to be in the range of 1:20 (2 samples), 1:40 (2 samples) and 1:80 (4 samples). Seropositivity for Brucella melitensis (10.12%) was found to be more than Brucella abortus. One sample was found to be positive for both Brucella melitensis & Brucella abortus (1.26%) with low titres of 1:40. The results of the Brucella IgG antibody detection is shown in table no 1. Exposure to brucella spp was found to be statistically significant (p= <0.001) in exposed individuals but no such significance (95% CI of 0.17-3.63 and OR of 0.79) was found between male and female among exposed groups when comparison of proportions was done. This indicates no relation between exposure to the disease and gender of the subject.

Table 1: Number of samples positive for Brucella species in both the high risk and low risk population (n=79)

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>High Risk Group (n=54)</th>
<th>Low Risk Group (n=25)</th>
<th>Total (n=79)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B abortus</td>
<td>7 (12.96%)</td>
<td>3 (18.75%)</td>
<td>10 (14.81%)</td>
</tr>
<tr>
<td>B melitensis</td>
<td>1 (1.85%)</td>
<td>-</td>
<td>1 (1.26%)</td>
</tr>
<tr>
<td>Both</td>
<td>8 (14.81%)</td>
<td>4 (18.75%)</td>
<td>12 (16.23%)</td>
</tr>
<tr>
<td>Total</td>
<td>8 (14.81%)</td>
<td>3 (18.75%)</td>
<td>11 (13.99%)</td>
</tr>
</tbody>
</table>

Table 2: Number of samples positive for brucella species in male and female among high risk population (n=54)

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Male (n=38)</th>
<th>Female (n=16)</th>
<th>Total (n=54)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B abortus</td>
<td>4 (10.52%)</td>
<td>3 (18.75%)</td>
<td>7 (12.96%)</td>
</tr>
<tr>
<td>B melitensis</td>
<td>1 (2.63%)</td>
<td>-</td>
<td>1 (1.85%)</td>
</tr>
<tr>
<td>Both</td>
<td>5 (13.15%)</td>
<td>3 (18.75%)</td>
<td>8 (14.81%)</td>
</tr>
</tbody>
</table>

DISCUSSION

Brucellosis, a worldwide bacterial zoonotic disease is a significant and increasing veterinary and public health problem in India. Human beings acquire this infection commonly by direct contact with the infected animals especially the cattle, sheep and goat, ingestion of unpasteurized milk and milk products and contaminated meat, inhalation of aerosolized organisms etc. Worldwide, reported incidence of human Brucellosis in endemic disease areas varies widely, from <0.01 to >200 per 100,000 population. A range of prevalence of 1-3.2% from Turkey, 4.5% from Saudi Arabia, 5.4% from Malaysia and 8.8% from Kyrgyzstan has been recorded. The true incidence of human Brucellosis however, is unknown for most countries as the disease remains undiagnosed and underreported. It has been estimated that the true incidence may be 25 times higher than the reported incidence due to misdiagnosis and under reporting. In India 80% of the population live in villages and small towns in conditions of poverty and poor hygiene; have close contact with domestic animal with high risk of acquiring the disease. In spite of being a disease of great public health significance not many studies on human Brucellosis are available from India. Different studies have shown a wide range of sero prevalence of 0.8-41.23%, with higher rates in high risk individuals. In a study done by AS Agasthya et al disease prevalence was 41.23% in veterinary inspectors, 30.92% in veterinary assistants, 12.37% in veterinary officers, 6.18% in veterinary supervisors, 6.18% in Group D workers, 2.06% in shepherds and 1.03% in butchers. In a similar study in Haryana, 34% prevalence of human Brucellosis was reported among veterinary attendants and compounders. Thakur and Thapliyal (2002), revealed a prevalence rate of 4.97% in samples obtained from persons exposed to animals with markedly high prevalence of 17.39% among field workers. The much higher seroprevalence rate has been also noted in specific risk groups such as abattoir workers. In 2009, Sharma and Savalia overall sero prevalence of 16.35% with 33.33% in veterinary officers, 15.38% in animal handlers, 15% farmers, 11.47% patients with Pyrexia of Unknown origin and 10% being blood donors. They observed a higher prevalence in rural population in comparison to urban. Kumar Ajay et al from Kerala found overall seropositivity for Brucellosis to be 1.6% which was 2.45% among the general population and 1.14% among the veterinary students. Prevalence of Human Brucellosis in patients with fever as the only clinical manifestation has been studied by some workers and they have reported a sero prevalence of 0.8%-9.94%. A sero prevalence of 8.5% has been
reported in human cases in Gujarat in 2005 which is quite less in comparison to sero-prevalence of 14.81% among the high risk population of Anand district found by us. These observations support the occupational risk factors and need for more intense studies on Brucellosis as only a few studies have addressed the prevalence and importance of Brucellosis as a human disease problem in India.

CONCLUSION
Based on tube agglutination tests a sero-prevalence of 14.81% exists in the high risk population of the Anand district which is significant and needs to be studied in more details involving more number of subjects along with active follow up of cases that are found sero-positive.

REFERENCES