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# OBSERVATIONS ON HUMAN BRUCELLOSIS IN PATIENT'S FROM SOLAPUR DISTRICT

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## ABSTRACT

*Brucellosis is a zoonotic disease seen in livestock and humans as well. Present study was conducted to find out the seroprevalence of B.abortus and B.melitensis in humans from various fields, age and sex. A total of 200 samples were tested from different groups. Different age groups from both male and female were included in the study. Positive prevalence was seen mostly in the age group of 30-45 years from both sexes.*

*Persons such as health workers laboratory workers who come in direct contact with infected specimens before consumption. Standard procedures such as use of Protective clothing may minimize the risk. Mass vaccination of domestic livestock should be followed.*

**KEYWORDS:***B.abortus, B.melitensis, seroprevalence, livestock.*

## INTRODUCTION

Brucellosis is a major source of disease in domesticated cattle, sheep, goats, pigs and dogs and also in humans.It is very common in several countries including India.The disease is caused by different species of Brucella. At present six major species of Brucella are well known. These are *Brucella suis, B.melitensis, B.abortus, B.ovis B.canis, B.neotomae.* (Dr.V.M. Bhuktar, Dr.Bharde).

Brucella is Gram negative, facultative, intracellular bacterial pathogens.

*Brucella abortus, B. meli tensis and B. suis* are pathogenic for man of which most important in India regarding human related are *B. melitensis and B. abortus* (Smits and Kadri, 2005).

## PATHOGENESIS:

### Animals

It is observed that in cattle it causes abortions, infertility, and economic loss in terms of milk and calf crop yield. Cattles such as sheep, goats, pigs, camels, yaks, buffaloes are seen infected with Brucellosis.

In sexually mature animals the reproductive system is affected displaying placentitis with abortion in the pregnant female and epididymitis and orchitis in the male. Sheep and goats are infected of *B. melitensis* and because of close contact caused by the density of the herds, exposure to common housing. Animal-to-animal

transmission results due to the number of organisms exposed in the environment (WHO, 2004).

## HUMANS

In humans, it causes fever, chills, profuse sweating, weakness, and fatigue, pain in legs, joints and lumbar regions. The disease may last from few weeks to months to several years. In some it may become even chronic (WHO, 2006). All age groups in human are affected. Humans are infected due to direct animal contact or ingestion of contaminated dairy products (Bikas et al., 2003). Animal handlers, butchers, veterinarians and laboratory workers represent the high risk groups.

## DIAGNOSIS:

### Humans

Serological procedures like RBT, tube agglutination and ELISA procedures are widely used. EILSA tests for IgM and IgG can rule out active and past infection.

### Animals

Culture of *Brucella* can be done from aborted material, milk or tissues. Serology tests on surveillance for herd or flock basis includes RBT, ELISA etc. Many molecular aspects such as Polymerase Chain Reaction for genome detection of bacteria is employed nowadays and rapid diagnostic techniques like Brucella IgM and IgG lateral flow assay (LFA), latex agglutination (LA) are also used Smits *et al*.,2003; Abdoel *et al*.,2007) .

## MATERIALS AND METHODS

### Collection of blood sample:

Blood samples were collected from 74 human males and 57 female patients for duration of two years. Blood was drawn in plain test tube. The samples were then centrifuged and serum was separated. The experiment was conducted in Department of Microbiology, Ashwini Co-operative Hospital for further analysis. The samples were tested for detection of specific antibody in the serum with the help of Slide Agglutination Test (SAT) which is the most efficient, rapid, sensitive, and cost effective method to test the samples in large numbers. The positive samples were rechecked and confirmed by confirmatory method of Tube Agglutination Test and ELISA. The samples were subjected for detection of both *B.meletensis* and *B.abortus.*

### Slide Agglutination Method –

Reagents – Stained antigen suspension (Rose Bengal Plate Test) are for the identification and quantitative determination of specific antibodies in human sera are used for the diagnosis of infection of Brucella pathogens. It is an immunologic reaction between the antibodies produced to bacteria (agglutinins) and their other various counterpart febrile antigens. The reagents are stored at $2^{0}$ C - $8^{0}$ C. Before Starting the procedure, all reagents were brought to room temperature.

Fresh serum was obtained by centrifugation of clotted blood and used for Slide Agglutination Test. After use the samples were preserved at $2^{0}$-$8^{0}$C. A titre of 80 IU/ml or greater was considered positive as per the protocol (Alton et al., 1975).

The samples were decontaminated properly before washing the tubes. The agglutinating tile was also washed carefully.

### 2-ME Test -

The active participation of 2-mercaptoethanol brings about breaking of the – S – S – bindings. This results in the loss of biological activity by the IgM, and loses its agglutination capabilities The total disappearance of agglutination reaction indicates that agglutinins active in agglutination reaction are from the IgM class, and reverse is the lack of the effect of reducing the titre after 2-ME reduction is evidence that agglutinins present in the investigated serum belong to the IgG class.

2 ME test was also used for the samples which were positive from RBPT test. The 2-mercaptoethanol was added

to the positive sample showing agglutination and incubated in wet chamber. After which the results interpreted.

Statistical analysis

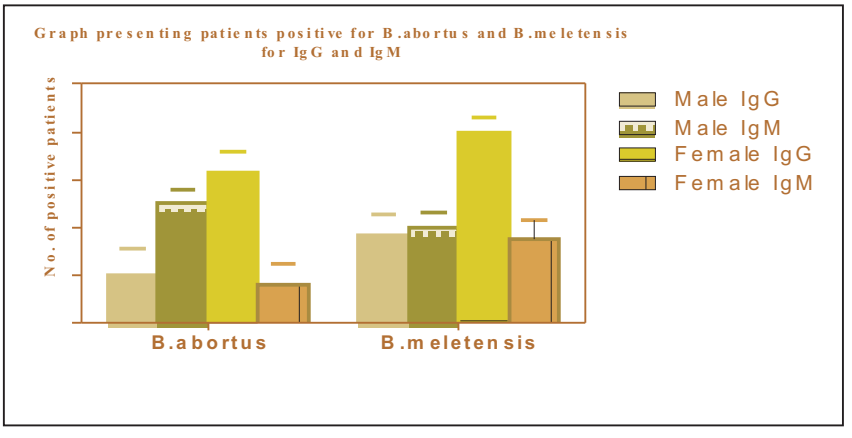
Analysis of data was included arithmetic mean and standard deviation by using Software of GraphPad Prism 5.00.288.

## RESULTS

The results of this investigation are represented in the table.

| | Positive | Male | Female | Age of positive patients | Positive Patients | Negative Patients |
|---|---|---|---|---|---|---|
| B.abortus | IgG | 2 | 6 | 30– 45 yrs | 35 | 165 |
| | IgM | 5 | 2 | | | |
| B.meletensis | IgG | 4 | 8 | | | |
| | IgM | 4 | 4 | | | |

Graph showing the positivity with regard to antibodies IgG and IgM




## DISCUSSION AND CONCLUSION –

The results obtained in the present investigation show that Brucellosis is quite common in the population of Solapur District. The positive results were seen in both male and female and mostly from the age group of 30-45 years. The results showed the presence of both antibodies IgG and IgM from patients blood. Seroprevalence of both *B.abortus and B.melitensis* were seen in both sexes and ages.

Two species of Brucella, *B.abortus and B.melitensis* are responsible for infection in the humans. A much wider survey is needed to obtain a complete picture of Brucellosis in Solapur. Also, there is need for educating the people about this debilating disease. Government health agencies and Non-Government organizations should undertake this work on priority basis, because along with humans, domesticated animals and livestock are also largely affected resulting in huge economic loss and causing potential danger to the human population, because such infected animals are reservoirs of Brucella.

Prakash *et al*., 2012 reported incidence of brucella infection in both male and female individuals of different age groups from which positive results were seen between the age group of 31-40 years.

Similar study was conducted by Abo-Shehada *et al* 1996 during the seroprevalence of brucellosis among high risk professionals and reported that brucellosis increased among individuals with increasing age and no significant difference was seen between the sexes.

Buchanan and Faber (1980) reported that the standard tube agglutination titer test was more sensitive than the 2ME test and is indicated for initial screening of patients with signs and symptoms of acute brucellosis. However, in patients with a more insidious onset, or symptoms lasting 3 or more weeks, the 2ME test was more useful. A positive 2ME brucella agglutination titer was a better correlate of brucella infection requiring treatment than a positive STT titer, which persisted for 1.5 years in approximately one-half of our patients,

despite adequate antibiotic therapy. The 2ME test also proved useful to monitor antibiotic therapy,

Gemechu and Gill (2011) while studying the human brucellosis in India suggested an education campaign for awareness and prevention of brucellosis amongst professionals and veterinarians must be conducted. Occupational hygiene and food hygiene should be maintained regarding professionals who are at risk of exposure. Milk, milk products and meat should be properly boiled and cooked.

Persons such as health workers laboratory workers who come in direct contact with infected specimens before consumption. Standard procedures such as use of Protective clothing may minimize the risk.

Mass vaccination of domestic livestock should be followed. In many countries this is achieved by the detection of infected animals, their elimination by slaughter and the development of certified brucella – free herds (WHO, 2005).

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