

**ORIGINAL ARTICLE****EPIDEMIOLOGY OF BRUCELLOSIS IN HIGH RISK GROUP  
& PUO PATIENTS OF WESTERN – RAJASTHAN**Prabhu Prakash<sup>1</sup>, Suman Bhansali<sup>2</sup>, Ekta Gupta<sup>3</sup>, Dinesh Kothari<sup>4</sup>, Arvind Mathur<sup>5</sup>, Sneha Ambuwani<sup>6</sup>

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**ABSTRACT**

**Background:** Brucellosis is an important re-emerging zoonosis with a worldwide distribution. Brucellosis in India is yet a very common but often neglected disease.

**Methods:** A retro prospective study was done in western Rajasthan on PUO patients those who attended Hospital attached of Dr. SNMC Jodhpur. Total 570 samples were tested for Brucella antibodies titration. In study group samples of PUO Patients (420), Milkmen & Veterinarians (70), Meat Handlers (30) & Healthy Control (50) were taken for finding their Antibrucella antibody titers Typhoid by Widal Test, Malaria by MP Strip Test were included in exclusion criteria for PUO patients All samples were tested by Stained Febrile Antigen.

**Results:** Positivity for Antibrucella Antibody was 25.72%, 26.66%, 37.14%& 6.00% in PUO Patients, Meat Handlers & Veterinarians, Milkman & Healthy Control respectively.

**Conclusion & Recommendations:** As climatic conditions of Western Rajasthan mimics with Middle East where Brucellosis is prevalent, in clinical practice Brucellosis should be kept in differential diagnosis & management of PUO& all preventive measure should be used for prevention of this Zoonotic disease.. A safe and effective vaccine in human is not yet available. Prevention is dependent upon increasing public awareness through health education programmes and safe livestock practices. Active co-operation between health and veterinary services should be promoted.

**Key Words:** PUO, SFA, MP test, RA test

**INTRODUCTION**

Brucellosis is a worldwide problem of both health and economy affecting both human and animals. It has got public health significance because it can be transmitted both directly and indirectly to human with consequence illness causing incapacitation and loss of man power but also because of serious diminution of much essential and important food stuff. (Joint WHO; FAO committee 1971)

Brucellosis is an important zoonotic problem in India accounting for a loss of about 30 million man days per year. In India, brucellosis was first

recognized in 1942 and is now endemic throughout the country, which remains in the background for lack of awareness. Mildness and chronicity of the disease makes the diagnosis difficult. It constitutes an uncontrolled public health problem in many developing countries where advance domestication of animal is not attended by corresponding level of advance hygiene. The problem is compounded by an absence of national surveillance programme, diagnostic facilities or reliable data. It is difficult to estimate the extent of the disease because of the variable symptoms and failure in reporting of cases. Brucellosis is an infection caused by

bacteria of genus *Brucella*. In natural course of disease man is affected as terminal host. Animal which congregate in herd are the usual reservoir of the disease. Contact with infected animals direct or indirect is crucial in the spread of the disease to human. Since the discovery of *B. melitensis* by Bruce, brucellosis has been an emerging disease. The disease has great public health significance because of serious diminution of man power, animals and essential foodstuffs. It has also been recognized as an occupational disease (Boycott and Oxon 1964) in Shepherds, Butcher, Abattoir, Veterinarians and lab workers. Its importance under Indian perspective is no way less in comparison to other countries. In our country Brucellosis is prevalent in areas where the animals are kept in herds because of economic reason and due to unawareness regarding the disease among occupationally involved persons. Brucellosis is found in families who rear sheep, goat and consume their products. Human infection result from occupational contact with infected animal or by ingestion of infected raw, under cooked meat. Human can get direct infection through skin abrasions or rarely by inhalation of airborne animal manure particles. Human brucellosis is known for protean manifestations (Mantur *et al* 2004a, 2006) and patients of brucellosis present with varying symptomatology ranging from headache, nausea, vomiting, arthralgia, arthritis, myalgia, fatigue, malaise, chills, sweats particularly during night, weight loss (Kocher *et al* 2007; Mantur *et al* 2007b), intermittent fever diagnosed as P.U.O. (Kocher *et al* 2007b) and hepatosplenomegaly. In case of neurobrucellosis patient can have meningoencephalitis, myelitis, radiculitis and peripheral neuritis as isolated entities or in combination (Sharma *et al* 1983), physical findings are not always present. Symptoms of acute brucellosis caused by *Brucella abortus* are 'flu-like'-pyrexia, backache and joint pain and are highly nonspecific. The acute form of human brucellosis is characterized by intermittent wave of undulant fever; hence it was named as "Undulant Fever" in addition to the signs and symptoms mentioned. Acute infection resembles with malaria, influenza, viral fever, relapsing fever, typhoid fever and acute arthritis. Chronic brucellosis is an insidious disease and refers to those patients in whom symptoms persist for 12 months or more from the time of diagnosis and treatment and present with vague symptoms that might be confused with other diseases affecting various organ systems. The commonly

reported symptoms are fever, fatigue, malaise, chills, sweats, headaches, myalgia, arthralgia, and weight loss. Chronic form of brucellosis resembles with tuberculosis, rheumatoid arthritis, orchitis, rheumatism, amoebic hepatitis and even neurosis. The chronic form can also produce serious complications affecting the musculo-skeletal, cardio-vascular, and central nervous systems. Lack of appropriate therapy during the acute phase may result in localization of bacteria in various tissues and lead to subacute or chronic disease that can have serious clinical manifestations.

## MATERIAL & METHOD

This study was done in Western Rajasthan to detect seroprevalence of *Brucella*. A total of 570 persons included in this study (including healthy control). The following groups were made to evaluate their exposure with *Brucella* species: PUO cases (420), Meat Handlers (30), Milkmen (40) & Healthy Control (50). Patients with Widal Test, MP Test, RA Test positive were kept in exclusion criteria for PUO patients. Blood was collected & tested for antibrucella antibodies against *B. abortus* & *B. melitensis* agglutination tests by Stained Febrile Antigen by slide agglutination tests for detection of antibrucella antibodies for *B. abortus* & *B. melitensis* species.

## RESULT & DISCUSSION

This study was done in Dr. SNMC Jodhpur, for period of two years from January 2010 to November 2011 to detect seroprevalence of *Brucella*. A total of 570 persons included in this study (including healthy control). The following groups were made to evaluate their exposure with *Brucella* species:

- 1) **PUO Cases:** This group was comprised 420 patients of PUO attended or were admitted in Medicine Deptt. of various hospitals of Dr. S.N. Medical College, Jodhpur (MGH & MDM Hospitals)
- 2) **Milkmen and veterinarians:** included total 70 cases, out of these 40 were milkmen who were taking care of cattle, including their breeding, milking, preparation and handling of milk products and their deliveries. The rest 30 were veterinarians including both doctors and Para veterinarian's staff, who were also engaged

with various kind of handling of animals. The majority of them were males. Samples were collected from Kanhayya Goshala.

3) **Meat Handlers:** This group had total 30 numbers of cases of both males and females

having history of handling meat and its products

4) **Healthy Controls (50)** Medical & paramedical students.

**Table 1: Distribution of Disease in Various High Risk Groups**

	PUO patients	Meat Handlers	Veteranians & Milkman	Healthy Control
Total Number (570)	420	30	70	50
Positive (145, 25%)	108 (25.72%)	8 (26.66%)	26 (37.14%)	3 (6.00%)
Contact With Animal (178, 31.22%)	80 (19.04%)	30 (100%)	50 (71.42%)	18 (36%)
Rawmilk Use (70, 12.28%)	48 (11.42%)	3 (10.00%)	14(20%)	5 (10%)

Total- 570 Sample were processed for antibrucella antibody detection by agglutination test by stained febrile antigen ,maximum positivity rate was seen in Veteranians & milk man(37.14%)followed by meat handlers(26.66%)& in PUO Patients 108 (25.72%), out of this 50 were male & 58 female

maximum Positivity was seen in age group 31 to 40 yr, in age group <10 we did not received any Sample, while in age group >70 only 3 patient were there. In PUO Patient 80 Patient had history of Contact with animal, 48 gave history of Consuming Raw milk.

**Table 2: Age & Sex Distribution in PUO Patients**

Age (years)	PUO Cases	Male	Female	Total positive	Male	Female
<10	-	-	-	-	-	-
11-20	70	26	44	9	7	2
21-30	60	34	26	26	13	13
31-40	54	28	26	29	6	23
41-50	60	52	8	18	8	10
51-60	78	70	8	11	5	6
61-70	68	0	28	12	8	4
>70	20	18	2	3	3	-
<b>Total</b>	<b>420</b>	<b>290</b>	<b>130</b>	<b>108</b>	<b>50</b>	<b>58</b>

In PUO patients both B.abortus& B.melitensis cases were seen .High positivity of disease in even in asymptomatic healthy control shows prevalence of disease in society.

IN PUO Patient 80 Patient had history of Contact with animal, 48 gave history of Consuming Raw milk. In PUO Patient maximum Patient were received in age group of 51: 68 (78 Patient) which in age group <10 we did not received any Sample. Out of this 108 patient should positive result for anti Brucella antibodies out of this 50 were male & 58 female maximum Positivity was seen in age group 31 to 40 yr. While in age group >70 only 3 positive patient were there .We had two patients of neurobrucellosis. Majority of patients gave history of PUO with joint pain especially chronic backache hence in all patients RA Test was done to rule out rheumatic arthritic.

**Table 3: Symptomatology amongst Positive Cases (n=157)**

Symptoms	No. of cases
Joint Pain	
Neck pain	32
Back-ache	26
Knee joint pain	60
Joint Swelling	8
Headache	10
PUO	420
Leg cramps	3
Chronic illness	
TB	-
Diabetics	-
Hypertension	-
Neurobrucellosis	2
Malaria & Typhoid	-

Out of 108 positive results in 90 Case (83.33%) both *Brucella abortus* & *B. Melitensis* antibody were detected. Only *B. abortus* were positive in 106 & *B. melitensis* were positive in 90cases.

In meat handlers Positivity was seen in 26.66% Veterinarians, in milk man was 37.14% & Healthy Control was 6%. They all were having history of

contact with animals ,their excreta or milk/meat products in their daily life. Though number of samples were very less of occupationally exposed (high risk group) persons but still high positivity indicates need of vast study group & need of active immunization for occupationally high risk group peoples.

**Table 4: Incidence of B. Abortus& B. Melitensis in Study Group**

Category	Cases	Positive by SFA	B. Abortus	B. Melitensis	Both Positive
PUO cases	420	108	106	92	90
Meat handlers	30	8	6	4	4
Veterinarians & milkman	70	26	22	14	10
Healthy (control)	50	3	2	1	-
Total	570	145	136	111	104

## CONCLUSIONS

There is prevalence of *Brucella* infection in Western Rajasthan particularly in high risk population. History of contact with animals ,animal products, conducting deliveries of animals without any protective measures, raw milk consumption and handling of raw meat are the main factors for disease transmission.

Milkmen and veterinarians are at higher risk for acquiring infection with lesser risk amongst meat handlers in comparison to the normal population. Stained Febrile Antigen Test (SFAT) is rapid, economical and sensitive test which should be used for screening of suspected cases of brucellosis. By this further typing of *Brucella* (whether by *B.abortus* or *B.melitensis*) can be done .By doing titration of serum antibodies prognosis of disease can be known. Even very low serum antibodies titers can seen in cross infection by other Enterobacteriaceae group of bacteria eg *E.coli*, *Salmonella* etc.

Milkmen, veterinarian and meat handlers should be screened routinely for *Brucella* infection and advised for protective measures. Animals should also be routinely screened for *Brucella* infection and if found positive should be adequately treated.

Medical professional of this region should be educated to confirm/exclude brucellosis as a possible cause of pyrexia and joints pain in the clinical practice.

## RECOMONDATIONS

Raw milk consumption and handling of raw meat without any personnel protection should be banned .Milkmen, veterinarian and meat handlers& Animals should also be routinely screened for *Brucella* infection and if found positive should be adequately treated.

Brucellosis as a possible cause of pyrexia of unknown origin(PUO) ,joints pain or any other atypical presentation should be included in differtial diagnosis in the clinical practice & immunisation should be mandatory for all meat handlers, milk men & Veterinarian (all High Risk Group subjects)

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