

# Brucellosis in Children: A Ten Years Prospective Study from Tertiary Care Centre

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## ABSTRACT

**Background:** Brucellosis remains the most common bacterial zoonotic infection in many countries worldwide. Despite being long recognized and controllable, the disease still causes substantial morbidity, affecting especially the young population. The aim of this prospective cohort study was to provide insight to the epidemiology, clinical features, diagnosis, and management of childhood brucellosis in children in Bikaner, Northwestern India. **Methods:** This study was conducted on 254 children of both genders. All children were subjected to rapid slide serum agglutination test using plasmatic stained febrile antigens reagent for B. Abortus and for B. Melitensis. Detailed history related to the occupation and exposure to the known predisposing factors and thorough clinical examination was performed in all subjects. **Results:** There were 132 males and 122 females. Clinical features were sweating in 42%, bone ache in 36%, chills in 32%, swollen joint in 24%, arthritis in 22%, splenomegaly in 5%, Hepatomegaly in 7% and lymphadenopathy in 3%. The difference was significant ( $P < 0.05$ ). Anemia was evident in 44%, leucopenia in 40%, leucocytosis in 5% and pancytopenia in 11%. B. Melitensis was seen in 66% and B. Abortus in 34%. The Agglutination titres 1/160-1/320 was seen in 65% and 1/320-1/640 & more in 35%. The difference was significant ( $P < 0.05$ ). Analysis of risk factors revealed history of raw milk ingestion (91.84%), occupational contact with animals (30.61%) and household contact (16%). **Conclusion:** Brucellosis is not been reported commonly in human because of unawareness about the disease owing to lack of suspicion and lack of diagnostic facilities. High degree of suspicion is crucial for diagnosis specifically in vulnerable group of society.

**Keywords:** Brucellosis, Children, Animal.

## INTRODUCTION

Brucellosis is caused by small, fastidious gram-negative coccobacilli of the genus *Brucella*, a primarily contagious disease of domestic animals.<sup>[1]</sup> There are four important species pathogenic to humans: *B. melitensis*, found primarily in goats, sheep and camels; *B. abortus* in cows; *B. suis* in pigs; and *B. canis* in dogs.<sup>[2]</sup> The *Brucella* species differ in degree of virulence and invasiveness with *B. melitensis* being the most invasive and most severe disease while *B. abortus* is the least invasive. In various part of world, in about 80-100%, human infection with *B. melitensis* is common while infection with *B. abortus* is less frequent. Infection with other species has not been reported.<sup>[3]</sup> The way brucellosis sustains among humans in endemic regions is mainly based on the food tradition and husbandry practice.<sup>[4]</sup> In developed countries, brucellosis is a sporadic illness, and illegally imported unpasteurized dairy products and international travel in endemic regions play a significant role in disease acquirement. Not to underestimate as a possible way for disease achievement in these regions is professional acquisition, either in microbiological laboratories, or during close professional activities with animals.<sup>[5]</sup>

It is seen in all age groups where it is quite common (25%) has been found to be in patients younger than 14 years especially in endemic regions. The percentage of childhood brucellosis in endemic regions is reported to be from 11% - 56%. Also, the existing literature is plenty with discrepancies concerning epidemiological and clinical characteristics as well as the outcome rates in children with brucellosis.<sup>[6]</sup> The present study was conducted to assess brucellosis in children.

## MATERIALS AND METHODS

This study was conducted in the department of Pediatrics, Sardar Patel Medical College, Bikaner, Rajasthan. It comprised of 254 children of both genders. Parents of all confirmed cases were informed regarding the study and their consent was obtained. Ethical clearance was obtained before starting the study.

Data related to patients such as name, age, gender etc. was recorded. All children were subjected to rapid slide serum agglutination test using plasmatic stained febrile antigens reagent for *B. abortus* and for *B. melitensis*. If a positive result was obtained, tube agglutination test was performed. A thorough clinical examination was performed in all subjects. Completed blood count (CBC), erythrocyte sedimentation rate (ESR), and C-reactive protein (CRP) was also done. Results were statistically analyzed. P value less than 0.05 was considered significant.

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## RESULTS

**Table 1: Distribution of patients**

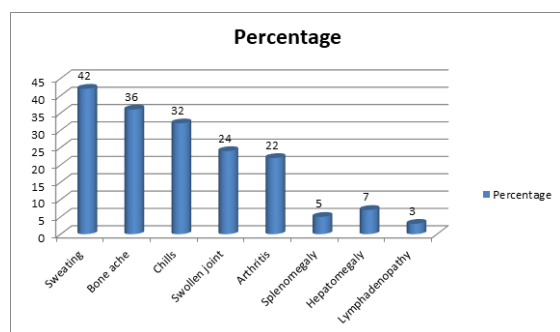
Total- 254		
Gender	Males	Females
Number	132	122

[Table 1] shows that there were 132 males and 122 females.

**Table 2: Clinical features in patients**

Clinical features	Percentage	P value
Sweating	42	0.01
Bone ache	36	
Chills	32	
Swollen joint	24	
Arthritis	22	
Splenomegaly	5	
Hepatomegaly	7	
Lymphadenopathy	3	

[Table 2, Figure 1] shows that clinical features were sweating in 42%, bone ache in 36%, chills in 32%, swollen joint in 24%, arthritis in 22%, splenomegaly in 5%, Hepatomegaly in 7% and lymphadenopathy in 3%. The difference was significant ( $P < 0.05$ ).



**Figure 1: Clinical features in patients**

**Table 3: Hematological manifestations, cultures and agglutination titres**

Variables	Percentage	P value
Hematological		0.05
Anemia	44	
Leucopenia	40	
Leucocytosis	5	
Pancytopenia	11	0.01
Culture		
B. Melitensis	66	
B. Abortus	34	0.01
Agglutination titres		
1/160-1/320	65	
1/320-1/640 & more	35	

[Table 3] shows that anemia was evident in 44%, leucopenia in 40%, leucocytosis in 5% and pancytopenia in 11%. B. Melitensis was seen in 66% and B. Abortus in 34%. Agglutination titres 1/160-1/320 was seen in 65% and 1/320-1/640 & more in 35%. The difference was significant ( $P < 0.05$ ).

## DISCUSSION

Brucellosis is a primary disease of domestic animals. Humans are commonly infected through ingestion of

raw milk, cheese, or meat, or through direct contact with infected animals, and through inhalation of infectious aerosols.<sup>[7]</sup> It is seen that common feature of Brucellosis are

undulant fever, abortion, orchitis, spondylitis, arthritis, endocarditis, encephalitis, and asthenia.<sup>8</sup> The present study was conducted to assess brucellosis in children.

In this study, out of 254 patients, there were 132 males and 122 females. Koumi et al,<sup>[9]</sup> conducted a study which comprised of 60 patients. All patients were subjected to complete blood count (CBC) and blood culture. Patients with pancytopenia were subjected to bone marrow (BM) aspiration. It was found that 50 (83%) ingested raw animal milk and 27 (45%) had a positive family history of brucellosis. Excessive sweating was seen in 68%, bone aches in 62%, chills in 55%, arthritis in 32%, hepatomegaly in 18% and splenomegaly in 15% of all cases. Anemia was seen in 43%, leukopenia in 38% and leukocytosis in 20%. Pancytopenia was detected in 18% (11) patients. 23 patients (38%) showed Brucella in blood culture. B. melitensis from 21 patients was cultured in vitro. Out of 9 BM aspirate cultures, 3 were positive for B. melitensis. Out of 11 patients with pancytopenia, 9 (82%) patients had bone aches and weakness, 7 (64%) patients sweating and chills, 6 (55%) patients petechiae and purpura.

We found that clinical features were sweating in 42%, bone ache in 36%, chills in 32%, swollen joint in 24%, arthritis in 22%, splenomegaly in 5%, Hepatomegaly in 7% and lymphadenopathy in 3%. Bosilkovski et al,<sup>[10]</sup> found that childhood brucellosis composed 317 (18.7%) of 1691 patients with brucellosis. It was found that family history was present in 62.1% (197), and direct contact with animals was evident in 44.2% (140) of the children. Fever was seen in 78.2% (248), joint pain in 71.9% (228) and hepatomegaly in 68.1% (216). Organ affection was present in 206 (65.0%) of the patients. 106 (33.4%) patients were treated with combination composed of two, and 211 (66.6%) with 3 antimicrobial agents. Relapses were registered in 21 (6.6%), and therapeutic failures in 3 (0.9%) of the children.

We found that anemia was evident in 44%, leucopenia in 40%, leucocytosis in 5% and pancytopenia in 11%. B. Melitensis was seen in 66% and B. Abortus in 34%. Agglutination titres 1/160-1/320 was seen in 65% and 1/320-1/640 & more in 35%. Yoldas et al,<sup>[11]</sup> found that hematological studies during the active course of brucellosis showed that leukopenia occurred in 33% of patients, anemia in 44%, thrombocytopenia in 5%, and pancytopenia in 14%. Furthermore, pancytopenia was detected in 10% of children suffering brucellosis. The frequency of pancytopenia with brucellosis varies from 3% to 21% in the previous studies, being relatively higher in adults than

children. The possible mechanisms suggested for pancytopenia include autoimmune process, hypersplenism, granuloma formation in the bone marrow, phagocytosis of formed elements by reticuloendothelial cells, or bone marrow depression due to the associated septicemia. In our study, anemia was present in 52.6%, thrombocytopenia in 14.4%, leukopenia in 9.3%, leukocytosis in 11.3%, and thrombocytosis in 6.2% of the patients. A strict control of veterinary studies and precautions to prevent consumption of raw milk products is mandatory. In patients admitted with fever, arthralgia, fatigue, and sweating, brucellosis should be kept in mind.<sup>[12]</sup>

## CONCLUSION

Brucellosis is not been reported commonly in human because of unawareness about the disease owing to lack of suspicion and lack of diagnostic facilities. High degree of suspicion is crucial for diagnosis specifically in vulnerable group of society.

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