JOURNAL OF PHARMACEUTICAL AND BIOMEDICAL SCIENCES

Kollapu L, Pamu SK. **Seroprevalence Of Human Brucellosis Among High Risk Population.** *J Pharm Biomed Sci* 2015; 05(05): 419-423.

Journal of Pharmaceutical and Biomedical Sciences (***J Pharm Biomed Sci.***), **Member journal. Committee on Publication ethics (COPE) and Journal donation project (JDP).**

PBMS
Journal of Pharmaceutical and Biomedical Sciences

ISSN NO- 2230 – 7885
CODEN JPBSCT
NLM Title: J Pharm Biomed Sci.

Original article

Seroprevalence of Human Brucellosis Among High Risk Population

Lavanya Kollapu*, Suseela Kumari Pamu

Affiliation:
Assistant professor, Department of Microbiology, Rangaraya Medical College, GGH Campus, Kakinada, Andhrapradesh. 533001, India

The name of the department(s) and institution(s) to which the work should be attributed:
Assistant Professor, Department of Microbiology, Rangaraya Medical College, GGH Campus, Kakinada, Andhrapradesh. 533001, India

Address reprint requests to
Dr. Lavanya Kollapu.
Assistant Professor, Department of Microbiology, Rangaraya Medical College, GGH Campus, Kakinada, Andhrapradesh 533001, India or at lavanyakolapu@yahoo.com

Article citation:
Kollapu L, Pamu SK. Seroprevalence of human brucellosis among high risk population. *J Pharm Biomed Sci.* 2015;05(05):419-423. Available at www.jpbms.info

ABSTRACT: Brucellosis is a zoonotic disease of worldwide distribution and has great economic concern. It is a contagious disease of ruminant animals but also effects human beings. The duration of the disease can vary from a few weeks to many months.
Materials and methods: A total number of 200 samples tested for RBPT and STAT by using phenol saline as diluent to know the IgG titre and 2-mercapto ethanol was used as diluents to know the IgM titre. ELISA test was performed for all positive samples in RBPT, to know the presence of IgM antibody. All the results were analysed statistically.
Results: Of the200 serum samples, highest proportion of positive cases were slaughter house workers 21.05% and lowest proportion was with PUO cases 6.97%.case distribution according to positivity of RBPT and STAT highest proportion in slaughter house workers 13.5% and lowest proportion in PUO cases 6.97%.
Conclusion: Prevention of human brucellosis focuses mainly on elimination of infection among farm animals. Cooperation is recommended between public health and veterinary officials to overcome the failure of controlling disease among both animals and humans.

KEYWORDS: Human Brucellosis; RBPT; STAT; ELISA; IgM Antibodies.

INTRODUCTION

Brucellosis is one of the world's major zoonosis that continues to be public health and economic concern in many parts of the world. The disease is usually transmitted from infected animals to humans by direct contact or by consumption of raw milk infected with brucella[1].
Brucella organism shed in milk, urine and vaginal discharge thereby contaminate environment[2]. the infection occur through the ingestion of unboiled milk of infected animals, contact with vaginal discharge, urine, faeces and blood of infected animals through unbreached skin and mucous membrane of conjunctiva and also by inhalation. Brucellosis is an infectious zoonotic disease of various animals and humans caused by Brucella species. It is a contagious disease of ruminant animals but also affects human beings. In humans, it is known as undulant fever[3], because the severe intermittent fever is regular exacerbation and remission or Malta fever because it was first recognized as a human disease on the island of the Malta[4]. *Brucella abortus* principally affects reindeer, cattle and bison.
Brucella melitensis affects goats. In cattle and bison disease affects reproductive organs or udder. Bacteria are shed in milk, vaginal discharges, urine, and blood of infected animals[5]. The duration of the disease can vary from a few weeks to many months[6].
Veterinarians are usually infected by inadvertent inoculation of animal vaccines against *Brucella abortus* and *Brucella melitensis*[7]. Its clinical manifestations and focal complications are often troublesome in making a clinical diagnosis. Its diagnosis therefore requires microbiological confirmation by means of isolation from blood or

PBMS
ournal of Pharmaceutical and Biomedical Sciences
ISSN NO- 2230 – 7885
CODEN JPBSCT
NLM Title: J Pharm Biomed Sci.

demonstration of the presence of specific antibodies by serological tests.

India is an agricultural country and exposure of human beings to animals is quite high. In spite of this, very limited studies on brucellosis have been undertaken in an occupationally- exposed group. There are very few reports of Brucella in recent years even though it is discovered in 19th century. The aim of present study was to know the seroprevalence of human brucellosis and evaluation of serological tests for the diagnosis of brucellosis.

MATERIALS AND METHODS

The present study was done in the department of Microbiology, Rangaraya medical college, Kakinada, East Godavari district, over a period of 24 months.

Blood samples were collected from different study groups like veterinary doctors, veterinary staff, slaughter house workers, dairy farm workers, patients with pyrexia of unknown origin, and blood donors. Consent was taken from the entire study group.

A total number of 200 blood samples were collected. Among them 119 were veterinarians, 38 were slaughter house and dairy farm workers, and 43 were PUO cases.

A detailed history of individuals was taken which included the name, age, history of consumption of raw milk, history of fever in the past and complaints of joint pains, if any.

For all the blood samples classical Rose Bengal test was performed. Standard tube agglutination test was done for all positives in RBPT by using phenol saline as diluent to know the IgG titre and 2-mercapto ethanol was used as diluents to know the IgM titre.

ELISA test was performed for all positive samples in RBPT, to know the presence of IgM antibody. All the results were analysed statistically.

RESULTS

A total number of 200 patients categorized into three groups like veterinarians, slaughter house workers, dairy farm workers and patients with Pyrexia of unknown origin. The age ranges from 21-60 years; most of them 31-40 years; more number of males and 130(65%) had residence in rural areas of Kakinada.

Distribution of cases according to positivity of RBPT and SAT, highest proportion of positive cases in slaughter house and dairy farm workers (13.5%) and lowest proportion in PUO cases (6.97%).

The prevalence of brucellosis by 2 Mercaptoethanol Standard tube agglutination test was highest in slaughterhouse and dairy farm workers (7.89%) and lowest in PUO cases (2.32%).

Distribution of cases according to results of IgM ELISA, highest proportion of positive cases was present in slaughter house and dairy form workers (21.05%) and lowest proportion was found in PUO cases (6.97%).

Distribution of seropositive cases in occupation wise, highest prevalence rate in slaughter house and dairy farm workers (21.05%) and lowest prevalence rate in PUO cases (6.97%).

Results are analysing by using chi-square test. P value *>0.05* for RBPT, SAT, SAT with 2 ME. So the difference in the positivity in all these is not significant among the occupational groups.

P value *<0.05* for IgM ELISA. So IgM ELISA test positivity is significant among occupational groups.

Table 1. Positivity of serological tests among patient groups.

	Number n = 200	RBPT +ve	%	STAT with phenol saline	%
Group I: Veterinarians	119	10	8.4%	10	8.4%
Group II: Slaughter house workers	38	5	13.5	5	13.5
Group III: PUO's	43	3	6.97	3	6.97

Table shows highest positivity of RBPT(13.5%) , STAT(13.5%) in slaughterhouse workers.

PBMS
ournal of Pharmaceutical and Biomedical Sciences
ISSN NO- 2230 – 7885
CODEN JPBSCT
NLM Title: J Pharm Biomed Sci.

Table 2.Positivity of serological tests among patient groups.

	N =200	STAT with 2ME +ve	%	IgM ELISA	%
Group I: Veterinarians	119	8	6.72	11	9.24
Group II: :Slaughter house workers	38	3	7.89	8	21.05
Group III:Puo's	43	1	2.32	3	6.79

Table shows highest positivity of STAT with 2ME(7.89%) and IgM ELISA(21.05%) in slaughter house workers.

DISCUSSION

Worldwide millions of persons are at risk of acquiring brucellosis especially in developing countries, where the infection in animals has not been under control, and also mismanagement of animal quarantine, eradication of infected animal[8].

It has been estimated that the incidence in humans ranges widely between different regions, with values of up to 200 cases per 1 lakh populations[9].

Clinical picture of brucellosis in man is very heterogenous and nonspecific which may be represented in both subclinical and atypical infection either in acute or chronic stage. So the diagnosis of brucellosis requires laboratory confirmation or isolation of the pathogen or determination of specific antibodies[10].

Furthermore, handling of these microorganism represents a high risk for laboratory personnel[11,12].

The most widely used serological tests for diagnosis of brucellosis are agglutination tests, however indirect enzyme linked immuno sorbent assay (IELISA) was documented as the most sensitive test[13].

The highest incidence of brucellosis was reported in this study by IgM ELISA (11%) may be due to occupational exposure among veterinary staff and handling of animals among the rural group. Higher prevalence rates were reported by Mahgoub (1995)[14] (17.5%); Soliman[26], 1998(10.9%). However, lower rates were detected by Mousa et al.,[15] (0.08%) Dajani et al.,[16] (0.04%).

The detection of specific IgM antibody is important to diagnose brucellosis in the early phase (Smits et al.,(1991)[17]. IgM antibodies were estimated in 200 screened cases (11%). These findings are similar to that reported by Diaz et al., (1991) [18] and Ariza et al., (1992)[19].

The present study was divided into 4 groups among them veterinary staff are in high proportion and PUO cases are in lower proportion.

In this study age distribution of group 1 veterinarians, group 2 slaughter house workers and dairy farm workers, group 3 pyrexia of unknown origin cases were from 21 to above 60 years. Regarding the prevalence of brucellosis among different age groups there is highest percentage of patients with age 31-40 years (35.5%) and the lowest percentage of patients with age 51-60 years (11.50%) by agglutination tests. However the same prevalence by ELISA in both the age groups of 31-40 years.

In Agasthya et al.[20], study, the highest prevalence was found among 41-50 yrs age group (45.36%) and the lowest prevalence was found among 21-30 years (7.21%).

22 patients were brucella positive by IgM ELISA. In that 21 (12.28%) were males and 6(6.89%) were females. The seropositivity is higher in males compared to females in this study due to higher exposure to risk factors[20].

In Kapoor[21] study females have the high seropositivity than males. In this study, less number of females was taken than males. So difference in seropositivity between males and females is statistically not significant.

In this study 200 patients were tested by RBPT, 18 samples (9%) were positive. Cifti C et al.,(2005)[22] compared slide agglutination, standard tube agglutination test and coomb's tube agglutination test.

Kumar P et al.,(1997)[23] compared the serum samples by using slide agglutination test and standard tube agglutination test. He stated that slide agglutination was positive in 12.75%.

In our study the Rose Bengal plate test was positive in 9%. It is less than that of IgM ELISA used in our study. This was consistent with the findings of Kumar et al.,(1997)[23].

200 Serum samples were tested and significant antibody titre of >160 IU was detected in 18 samples (9%). In Kumar P et al., (1997)[23] study,

ISSN NO- 2230 – 7885
CODEN JPBSCT
NLM Title: J Pharm Biomed Sci.

the standard tube agglutination test was positive in 50.30% samples.

In other studies like that of Barbuddha SB[27] et al. (1994) showed that STAT was positive in 18.7% among the serum samples. Our study used STAT and detected lesser number of positive cases when compared to ELISA IgG and IgM. This conquers agreement with the results of Barbuddha SB et al., (1994)[27] and Handa R et al., (1998)[24].

IgM antibodies were estimated in 200 screened cases (11%). These findings are in agreement with that reported by Diaz[18] et al., (1991)[18] and Ariza et al.[19].

Annapurna S. Agasthya et al, (2011)[20] compared Brucella indirect ELISA test with RBPT and STAT. In his study, by indirect ELISA detected 20 samples positive (3.6%) which are negative by RBPT and STAT.

M.O. Gad EL- Rab(1998)[25] compared Brucella ELISA test with Brucella culture and STAT. In his study, he professed that IgM ELISA detected lesser number than other serological techniques.

Our results revealed that the prevalence of brucellosis was significantly higher in rural areas (13.07%) than in urban areas (7.14%). These findings are in agreement with that reported by Smits[17] et al., (1999) who concluded that the higher prevalence in rural areas may be due to close contact of individuals with livestock. This is a concordance between that results of IgM ELISA with RBPT & STAT with only insignificant difference of 2%.

In controls among 50 individuals 1(2%) had RBPT positive>160IU in standard tube agglutination test. 22 were positive by IgM ELISA. Of these, 18 had significant antibody titer of >160 IU by standard tube agglutination test also. Geographical variation was found between different regions.

CONCLUSION

This study was done to diagnose the brucellosis in high risk groups. Persistence of animal reservoir of infection, low physician awareness, poor availability of diagnostic facilities and non existence of regional databases contributes towards the perpetuation of the zoonosis in India. The cases of brucellosis may be easily misdiagnosed because of the deceptive nature of the clinical signs and symptoms. High degree of cure rate can be achieved by treatment, which is otherwise having high degree of mortality and morbidity.

Prevention of human brucellosis focuses mainly on elimination of infection among farm animals. Cooperation is recommended between public health and veterinary officials to overcome the failure of controlling disease among both animals and humans. IgM ELISA antibody detection is the sensitive and specific test of choice in the diagnosis of patients with acute brucellosis.

REFERENCES

1.Charif A, Moullok B, Douclock A. Arch de Inst Past Algeria 1996; 55:14.
2.Young EJ: An overview of human brucellosis.Clin Infect Dis 1995 Aug :21(2):283-9:quiz 290.
3.Dalrymple- Champneys, W. 1960. Brucella isolated from reindeer (in Russian). Trudy Vsyesoyuz Inst Eksp Vet. 27.24-31.
4.Zammit, T. 1905. A preliminary note on the examination of blood of goats suffering from Mediterranean Fever, Report of the commission on Mediterranean Fever, part III. London: Harrison and Sons, 83.
5.Horrocks, W.H. and Kennedy, J.C. 1906. Goats as a means of propagation of Mediterranean Fever, Report of the commission on Mediterranean Fever, part IV. London: Harrison and Sons, 37-69.
6.Young, E.J. 1983, Human brucellosis. Rev Infect Dis, 5, 821-42.
7.Sadusk, J.F., Browne, A.S and Eorn, J.L., 1957. Brucellosis in man resulting from Brucella abortus (strain19) vaccine. JAMA. 164, 1325-7.
8.Wong, D.H. and Chow, C.H. 1937. Group agglutinins of Brucella abortus and Vibrio cholera. China Med J.52, 591-4.
9.Evalution of often immune capture agglutination test for sero diagnosis for human brucellosis-Antonio O Orduna etal., 2000.
10.Colmenero JD, Reguera JM, Martos F, Sa'nchez-DeMora D, Delgado M, Causse M et.al., Complications associated with Brucella melitensis infection. A study of 530 cases Medicine (Baltimore) 1996; 75; 195-211.
11.Young EJ: An overview of human brucellosis. Clin infec Dis 1995 AUG; 21(2):283-9; Quiz 290.
12.Baldi, PC.,Araj, GF., Racaro, GC., Wallach, JC. & Fossati, CA(1999). Detection of antibodies to Brucella cytoplasmic proteins in the cerebrospinal fluid of patients with neurobrucellosis. Clin Diagn Lab Immunol 6,756-759.
13.FAO/WHO. 1986. Report, Joint FAO/WHO Expert committee on Brucellosis, Technical Report Series No.740. Geneva:WHO.
14.Mahgoub , kambel AM , 1983 G.A. Jamjom and M . N. H Chowduary 1983. Brucellosis in Riyadh Saudi Arabia A Microbiological and clinical study. Trans - R - Soc - Trop . Med -Hyg 77:820-824.
15.Mousa, A.R.M., Elhag, K.M., et al.1988. The nature of human brucellosis in Kuwait: study of 379 cases. Rev Infect Dis, 10;211-17.
16.Dajani YF, Masoud AA, Barakat HF. Epidemiology and diagnosis of human brucellosis in Jordan. J.Trop.Med.Hyg.(1989-92(3):209-14.

ISSN NO- 2230 – 7885
CODEN JPBSCT
NLM Title: J Pharm Biomed Sci.

17.Smits HL, Kadri SM.Brucellosis in India. A deceptive infectious disease. Indian J Med Res. 2005; 122:375-384.
18.Diaz R. And Moriyon, I. 1989.Laboratory techniques in the diagnosis. In Young, E.J. and Corbel, M.J.(eds). Brucellosis: clinical and laboratory aspects. Boca Raton, FL: CRC Press.73-83.
19.Ariza, J., Pellicer, T.,et al. 1992. Specific antibody profile in human brucellosis. Clin Infect Dis, 14, 131-40.
20 .Annapurna S. Agasthya et al. Seroprevalence study of Human Brucellosis by Conventional tests and Indigenous Indirect Enzyme-linked immunosorbent assay.2012.
21.Kapoor PK .sharma SN Rao KL. Seroprevalence of brucellosis in goats and human being in BiANER,(Rajasthan). Ind J. Comp microbial Immunol infect Dis 1985;6; 96-101.
22.Cifti C, Ozturk F, Oztekin A, Karaoglan H, Saba R, Gultekin M, Mamikoglu L. Comparison of the serological tests used for the laboratory diagnosis of brucellosis. Microbiyol Bul 2005 Jul; 39 (3)291-9.
23.Kumar p .Singh D. Barbuddhe SB.Seroprevalence of brucellosis among abattoir personnel in Delhi. J.Commun Dis 1997; 29:131-7.
24.Handa R, Singh S, Singh N, Wali JP. Brucellosis in North India results of a prospective study. J.Commun Dis 1998; 30 85-7.
25.M.O.Gad EL- Rab and A.M.kambal,"of a brucella enzyme immunoassay test (ELISA) in comparison with bacteriological culture and agglutination, Journal of Infection 36;Supplement 2:197-201.
26.Soliman, S.A., 1998 studies on brucellosis in farm animals with reference to public health importance in suez canalDistrict. P.h.D . thesis, for Med - Suez - canal Univ
27.Kumar P, Singh D, Barbuddhe SB. Sero prevalence of brucellosis among abattoir personnel in Delhi. J Commun Dis 1997; 29 :131-7.

Source of funding: None

Competing interest / Conflict of interest: The author(s) have no competing interests for financial support, publication of this research, patents and royalties through this collaborative research. All authors were equally involved in discussed research work. There is no financial conflict with the subject matter discussed in the manuscript.

Disclaimer: Any views expressed in this paper are those of the authors and do not reflect the official policy or position of the Department of Defense.