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Seroepidemiology of human brucellosis in nomads in a rural area of Iran

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PEER REVIEW

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Comments

This is an interesting research in which authors have studied the incidence of a zoonosis disease in rural region, and risk factors among nomads have been highlighted.
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ABSTRACT

Objective: To survey the seroprevalence of brucellosis among nomads in Shoulabad, Lorestan province, Iran.

Methods: In this descriptive study, a total of 5 847 person took part by randomized cluster sampling and 312 of them with clinical feature of brucellosis were selected. The diagnosis of brucellosis was made with a standard tube agglutination test (STAT), Coombs test, and 2-mercaptoethanol (2ME) test, and the results with titers equal 1:80 or more were considered positive.

Results: The seroprevalnce of anti-*Brucella* titer was 29.5% for STAT, 29.9% for Coombs test and 21.1% for 2ME test. Overall, 92, 93 and 66 patients had titers of 1:80 or higher in STAT, Coombs test and 2ME test, respectively. Seroprevalence was more among males (54.3%) than females (45.7%). There is statistical difference between seroprevalence of infection and age ($P<0.05$). Based on age group, 10-19 years age group was more affected (37%).

Conclusions: This results confirmed the necessity of conducting comprehensive and scheduled program of seroprevalence survey, particularly in nomad area, which aims at reducing the incidence of brucellosis as well as to guide planning programs by decision makers to improve community health.

KEYWORDS

Seroprevalence, Brucellosis, Lorestan, Nomads, standard tube agglutination test

1. Introduction

Brucellosis as a global zoonotic disease remains an significant public health problem in many regions around the world, especially those in the Asia and Middle East. In Iran, brucellosis is endemic and uninterruptedly reported from different part of Iran[1,2]. Its prevalence in Iran ranges from 0.5% to 10.9% in different reports[3]. Brucellosis is usually transmitted from infected animals to humans through direct contact with animals or use of their products, mostly dairy products made from unpasteurized milk. In Iran, traditional eating habits including the consumption of unpasteurized milk and fresh cheese and butter, are particularly common in the nomadic areas. These products are the primary causes of the spread of brucellosis[4,5].

Brucellosis is diagnosed either by isolation of *Brucella* organism in culture or by a combination of serological tests and clinical findings consistent with brucellosis. Isolation of the *Brucella* organism is the definitive means of diagnosis but in practice, it is difficult due to the early tissue

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localization, exacting culture requirements of the organism and also prolonged time required for isolation. In practice, blood cultures are positive in 10%-30% of brucellosis and the remainders are diagnosed serologically[6]. Therefore, in the absence of bacteriological confirmation, a presumptive diagnosis can be made based on a single high rising titer of specific antibodies. Among a variety of serological tests, standard tube agglutination test (STAT) or Coombs test are the most widely used[7]. According to epidemiological status of brucellosis in Iran, diagnosis of active brucellosis is based upon positive results for Coombs and 2-mercaptoethanol (2ME) tests (*Brucella* antibodies) with titers equal or higher than 1:80[8].

Brucellosis can have a considerable impact on human and animal health as well as a socioeconomic status, especially in nomadic areas that largely rely on livestock breeding and dairy products for their livelihood[9]. Hence, attempt should be applied to screen the seroprevalence of *Brucella* antibody, especially in nomadic area, for planning more efficient health promoting programs in the affected areas. For the same reason, in the present study, seroprevalence of *Brucella*-antibody titer, using STAT, Coombs and 2ME test, was evaluated in nomadic population of Shoulabad in Lorestan province, Iran.

2. Material and methods

This was a descriptive study which was done in Shoulabad nomads, Lorestan province, Iran during 2008 to 2009. The study protocol was approved by the ethical committee of Khorramabad University of Medical Sciences. After giving informed consent according to local ethic committee guidelines, participants were enrolled in the study. The present survey including 5 847 of nomads who were living in western Iran was carried out, using a semi-structured questionnaire. Out of these participants, 312 patients with clinical picture of brucellosis such as fever, sweating, lethargy, malaise, weakness, arthritis and weight loss were selected. The name, address, age and sex were noted. Then, blood samples were collected in vacuum tubes (to prevent freezing) and were taken into a cool box filled with the icepack/ice cubes to the Laboratory of Communicable Disease Center and Prevention, Lorestan University of Medical Sciences. Blood samples were centrifuged at 3 000 r/min for 10 min, and serum was stored at -20 ℃ until assayed.

All serum were routinely diluted from 1:20 to 1:1280 and STAT was performed on serum dilutions using *Brucella abortus* standard antigen obtained from the reference central lab in Khorramabad, Iran. Serial dilutions of serum were mixed with the standard tube agglutination antigen and then incubated at 37 ℃ for 24 h. Each batch of the test included a positive and negative control. The anti-human globulin (Coombs) test and 2ME test were performed on all serum.

Titration of 1:80 was accepted as exposure to *Brucella*, and 1:160 was accepted as brucellosis infection. Therefore, the titrations of 1:80 and over were accepted as positive. The results were analyzed by descriptive-analytic statistical methods with SPSS 16 software.

3. Results

Screening of all serum specimens by STAT gave positive results in 29.5% (92/312) serum, of which 23.9% (22/92) were positive at a titer of 1:80 and remain samples showing a titer of more than 1:80. The most of seroprevalnce of anti-*Brucella* antibody was related to titer 1:320 in STAT. The overall distributions of STAT titer found in the surveyed patients are shown in Table 1.

Table 1

Results of serological test in 312 samples.

Titer	Serological tests		
	STAT*	Coombs	2ME
	No. (%)	No. (%)	No. (%)
1:20	0 (0.0)	0 (0.0)	9 (10.6)
1:40	0 (0.0)	0 (0.0)	10 (11.8)
1:80	22 (23.9)	23 (24.7)	25 (29.4)
1:160	12 (13.1)	12 (13.1)	28 (32.9)
1:320	29 (31.5)	29 (31.5)	10 (11.8)
1:640	22 (23.9)	22 (23.9)	3 (3.5)
1:1280	7 (7.6)	7 (7.6)	0 (0.0)

*STAT: standard tube agglutination test.

The results of Coombs test with a titer ⩾1:80 was positive in 93 patients. The results of 2ME test was also positive in 66 patients (1:80-1:640). The results of Coombs and 2ME tests are shown in Table 1.

Out of 92 positive serum, 50 (54.7%) of samples were related to male and remain samples (45.7%) were related to female. We found significant difference between seroprevalence of infection and age groups. The highest and lowest seroprevalence occurred in the age groups of 10-19 years old (37%) and 0-9 years old (3.3%), respectively ($P<0.05$) (Table 2).

Table 2

Seroprevalence of brucellosis in Shoulabad nomads' based on gender and age.

Age	Gender		
(year)	Male No. (%)	Female No. (%)	Total No. (%)
0-9	1 (2)	2 (4.8)	3 (3.3)
10-19	20 (40)	14 (33.3)	34 (37.0)
20-29	7 (14)	7 (16.7)	14 (15.2)
30-39	4 (8)	4 (9.5)	8 (8.7)
40-49	7 (14)	8 (19.1)	15 (16.3)
50-59	8 (16)	4 (9.5)	12 (13.0)
⩾60	3 (6)	3 (7.1)	6 (6.5)

4. Discussion

Brucellosis has remained an important public health challenge in the developed and the developing countries particularly located between Europe, Northern Africa and Southwestern Asia (Mediterranean region). Despite all efforts to control of brucellosis in Iran, it is still endemic and has been reported in different province including in the south