Journal of Animal and Veterinary Advances 7 (4): 460-463, 2008
ISSN: 1680-5593

Epidemiological Survey of Brucellosis in Human and Animals in Birjand, East of Iran

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Abstract: Brucellosis is a major bacterial zoonosis of global importance. In Iran human brucellosis is endemic in all parts of the country and brucellosis is a significant health problem. The aims of this study were determination of seroprevelance of brucellosis in sheep and goat, cattle and human and evaluation the correlation between human and animal brucellosis in Birjand, a sub tropical city in east of Iran. Among 472106 individuals referred to hygiene centers of Birjand and among 12113 cattle and 7199 sheep and goat that tested by veterinary organization of South Khorasan province, Iran during 2002-2006, statistical analysis was performed to show the prevalence rate of brucellosis. Pearson correlation coefficient was used to evaluate the correlation between animal and human brucellosis. Results shows that the prevalence rate of brucellosis during 2002-2006 in Human was 37/ 100,000, in sheep and goat was 340/10, 000 and in cattle was 56/ 10,000. Statistical analysis showed that Pearson correlation coefficient of cattle and sheep brucellosis (r = + 0.746), cattle and human (r = + 0.228), human and sheep (r = + 0.304) are positive but incomplete.

Key words: Brucellosis, birjand, prevalence, zoonosis

INTRODUCTION

Brucellosis is a major bacterial zoonosis of global importance. The causative organisms are Gram-negative facultative intracellular pathogens that may affect a range of different mammals including man, cattle, sheep, goats, swine, rodents and marine mammals. In most host species, the disease primarily affects the reproductive system with concomitant loss in productivity of animals affected (Cutler *et al*., 2005). Humans are commonly infected through ingestion of raw milk, cheese and meat or through direct contact with infected animals (Al-Eissa, 1999; Ruben *et al*., 1991, Corbel, 1997, Al-Eissa, 1990). In man, infection is associated with protean manifestations and characteristically recurrent febrile episodes that led to the description of this disease as undulant fever. The disease is severely debilitating and protracted with several documented cases with signs associated with the disease lasting for over 30 years. The severity of this disease and lack of vaccines suitable for use in man has led to the investigation of Brucella as agents for bioterrorism. Indeed, the American military weaponized Brucella suis in 1954 (Greenfield *et al*., 2002) however, changing global politics resulted in abandonment of these efforts following the biological and toxic weapons convention in 1972.

Distribution of disease is world wide, especially Mediterranean basin, Persian Gulf and Indian subcontinent (Roberts and Kemp, 2001). The global incidence is estimated to be around 500000 cases year^{-1}, but brucellosis is underreported at a ratio of about 1: 26, one reported to 26 unreported (Araj, 1991).

Sheep (53,900,000) is predominate the animal population in Iran, following by goats (1,300,000), cattle (8,047,420), buffaloes (474,000) and camels (175,000) (Refai, 2002) therefore, Brucellosis is a significant health problem in Iran where control of zoonoses is inadequate.

In Iran human brucellosis is endemic in all parts of the country (Refai, 2002).

The aims of this study were determination of brucellosis prevalence in sheep, goat, cattle and human and evaluate the correlation between human and animal brucellosis in Birjand, a sub tropical city in east of Iran.

MATERIALS AND METHODS

Study was carried out in Birjand, capital of Shouth Khorasan province in the east of Iran during January 2002

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to December 2006. From 472106 individuals referred to hygiene centers of Birjand, information about brucellosis prevalence was obtained. Patients' age and sex and season they contracted the disease, kind of residency (rural or urban) were recorded. Animal brucellosis data was recorded among 12113 cattle and 7199 sheep and goat sera samples that tested by veterinary organization of South Khorasan province by Rose Bengal Plate Test (RBPT) during 2002-2006. Seasonal occurrence of animal brucellosis was considered. Both human and animal data were entered a computerized database and statistical analysis was performed by SPSS software version 15 to show the prevalence rate of brucellosis among human, goat and sheep and cattle. Pearson correlation coefficient was used to evaluate the correlation between animal and human brucellosis.

RESULTS

Results shows that the prevalence rate of brucellosis during 2002-2006 in Human was 37/100,000, in sheep and goat was 340/10,000 and in cattle was 56/10000. Alteration of brucellosis prevalence of cattle and sheep, cattle and human, human and sheep based on time show as follow in Fig. 1-3. Statistical analysis showed that Pearson correlation coefficient of cattle and sheep brucellosis (r = + 0.746), cattle and human (r = + 0.228), human and sheep (r = + 0.304) are positive but incomplete. Human brucellosis was more prevalent in males than females (54.6-5.5%). Human brucellosis in rural regions was more frequent than urban regions (84.1-16.0%) Table 1 shows human demographic factors such as sex, place of life and age as follow.

The occurrence of human and sheep and goat brucellosis in spring and summer is more common than fall and winter (Table 2). Human disease frequency in <20 year age group was 22.7%, in 20-40 year age group was 42.0% and in >41 year age group was 35.2%.

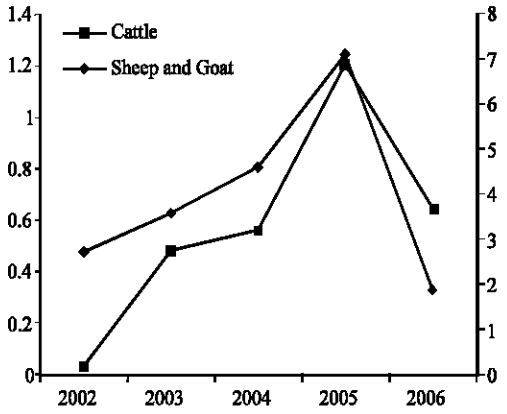

Fig. 1: Alternation of brucellosis prevalence in cattle and sheep and goat during 2002-2004 (r = + 0.746)

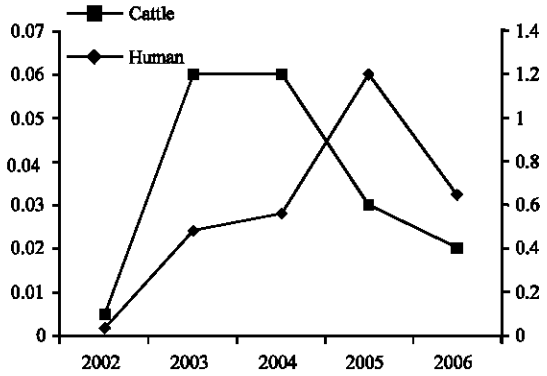

Fig. 2: Alternation of brucellosis prevalence in cattle and human during 2002-2004 (r = + 0.228)

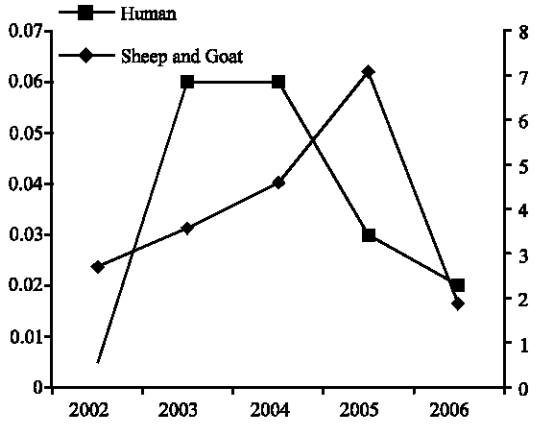

Fig. 3: Alternation of brucellosis prevalence in sheep and human during 2002-2004 (r = + 0.304)

Table 1: Demographic factors among human cases of brucellosis during 2002-2006

	Sex		Place of residency		Age group		
Year	Male	Female	City	Village	0-19 years	20-40 years	>41 years
2002	3	1	-	4	1	1	2
2003	24	23	7	40	8	23	16
2004	30	24	8	46	12	27	15
2005	21	18	7	32	12	16	11
2005	18	14	6	26	7	7	18
Total	96	80	28	148	40	74	62

Table 2: Brucellosis seasonal distribution in Human, Cattle, and Sheep and Goat during 2002-2004

Brucellosis host	Season	Absolute frequency	Relative frequency (%)
Human	Spring and Summer	136	77.3
	Fall and Winter	40	22.7
	Total	176	100.0
Cattle	Spring and Summer	32	47.1
	Fall and Winter	36	52.9
	Total	68	100.0
Sheep and Goat	Spring and Summer	232	66.9
	Fall and Winter	115	33.1
	Total	347	100.0

DISCUSSION

Although, brucellosis is a notifiable disease in some countries of the Middle East, it is often unrecognized and unreported. They are often labeled fever of unknown causes. For these reasons, the actual number of cases of brucellosis is unknown and is believed to be far more than the officially reported figures. In many countries, the awareness of medical specialists in relation to brucellosis is very weak and in most of the cases, public health laboratories are not carrying out diagnostic tests. The countries with the highest incidence of human brucellosis in the region are Saudi Arabia, Iran, Palestinian Authority, Syria, Jordan and Oman (Refai, 2002).

According to the results of this study Prevalence of brucellosis in the Birjand population was much lower than in the above-mentioned reports (in Human 37/100,000, sheep and goat 340/10,000 and cattle 56/10,000). The prevalence of animal brucellosis in Iran reached 44% in 1956 and dropped to 5% following control program that started in 1958. Because of reluctance in control, the reactor rate increased again to 17.4% in 1977. A control program started again in 1983 with consequent decrease of the prevalence to 1.25% in 1987. In 1991, the prevalence rate was 0.85%. The prevalence rate in sheep and goats was 13.7% in 1970, 6.4% in 1980 and 10.18% in 1991. Human cases of brucellosis that recorded in 1988 were 710521 (132.4 /100000) (Refai, 2002).

The results of this survey show that brucellosis prevalence is more prevalent in sheep. Animal brucellosis had an increasing prevalence during 2002 to 2005 and decreasing prevalence at 2006. Prevalence of human brucellosis increased considerably during 2002 to 2003 and the highest prevalence was observed in 2003 and 2004 and it decreased during 2005-2006. According to graphs no 1-3 statistical analysis showed that Pearson correlation coefficient of cattle and sheep brucellosis, cattle and human, human and sheep brucellosis are positive and incomplete. Correlation between cattle and sheep brucellosis is stronger than correlation between Sheep and human brucellosis and correlation between sheep and human brucellosis is stronger than correlation between cattle and human brucellosis. Probably higher correlation between sheep and human brucellosis is due to consumption of sheep raw milk, cheese and meat or direct contact with sheep in Birjand.

Our findings show that human brucellosis is more common in males than females. The disease in 20-40 years age group is more frequent and the most of the patients lived in villages. Most of the human brucellosis cases had referred to medical centers in spring and summer.

The prevalence of brucellosis increases with age; this has been observed in the Jordan, Lebanon and Kuwait (Dajani *et al*., 1989; Araj and Azzam, 1996; Mousa *et al*., 1998). Another study in Iran showed that the Prevalence was highest among those aged 10-19 years (27.7%) and disease is more common males than among females. That study showed that the incidence has a seasonal pattern with a maximum number of cases during the spring and early summer period (Salari *et al*., 2003).

Eradication of brucellosis has been a goal for many countries, with success in several countries in northern Europe such as the UK. Those countries that do eradicate infection cannot afford to be complacent as the threat of reintroduction is ever present through the movement of livestock. In order to control brucellosis, comprehensive surveillance, pre and post import testing is of paramount importance (England, 2004).

Control of brucellosis requires elimination of infected animals and vaccination of healthy ones in order to reduce the risk for those in regular contact with animals and to have brucellosis-free animal products. Human brucellosis acquired from milk is preventable and requires making pasteurization of milk and dairy products obligatory. Nevertheless, public health education is important in preventing the transmission of brucellosis from animals to humans.

REFERENCES

Al-Eissa, Y.A., 1990. Probable breast-milk borne brucellosis in a young infant. Ann. Trop. Paediat., 10: 305-307.

Al-Eissa, Y.A., 1999. Brucellosis in Saudi Arabia: Past, present and future. Ann. Saudi Med., 19 (5): 401-405.

Araj, G.F., 1991. Human brucellosis: A classical infectious disease with persistent diagnostic challenges. Clin. Lab. Sci., 12 (4): 207-212.

Araj, G.F. and R.A. Azzam, 1996. Seroprevalence of antibodies among persons in high-risk occupations in Lebanon. Epidemiol. Inf., 117: 281-288.

Corbel, M.J., 1997. Brucellosis: An overview. Emerg. Inf. Dis., 3: 213-21.

Cutler, S.J., A.M. Whatmore and N.J. Commander, 2005. Brucellosis new aspects of an old disease. J. Applied Microbiol., 98 (6): 1270-1281.

Dajani, Y.H., A.A. Masoud and H.F. Barakat, 1989. Epidemiology and diagnosis of human brucellosis in Jordan. J. Trop. Med. Hyg., 92: 209-214.

England, T., L. Kelly, R. Jones, A. MacMillan and M. Wooldridge, 2004. A simulation model of brucellosis spread in British cattle under several testing regimes. Prevent. Vet. Med., 63: 63-73.

Greenfield, R.A., D.A. Drevets, L.J. Machado, G.W. Voskuhl, P. Cornea and M.S. Bronze, 2002. Bacterial pathogens as biological weapons and agents of bioterrorism. Am. J. Med. Sci., 323: 299-315.

Mousa, A. *et al*., 1998. The nature of human brucellosis in Kuwait: A study of 379 cases. Rev. Inf. Dis., 10: 211-7.

Refai, M., 2002. Incidence and control of brucellosis in the Near East region. Vet. Microbiol., 90 (1-4): 81-110.

Roberts, A. and C. Kemp, 2001. Brucellosis (Mediterranean fever, Gibralter fever, Malta fever, Cyprus fever, undulant fever, typhomalarial fever). J. Am. Acad. Nurse Practitioners, 13 (3): 106-107.

Ruben, B. *et al*., 1991. Person-to-person transmission of Brucella melitensis. Lancet, 337: 14-5. 2-6.

Salari, M.H., M.B. Khalili and G.R. Hassanpour, 2003. Selected epidemiological features of human brucellosis in Yazd, Islamic Republic of Iran: 1993-1998. Eastern Mediterranean Health J., 9: Nos 5/6.