

ORIGINAL ARTICLE

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Brucellosis in Kurdistan Province from 1997 to 2003.

Abstract:

Introduction: Brucellosis, one of the zoonotic, with regard to public health and its impact on socio-economical status of society is very significant in all over the world and especially in developing countries. This survey analyzes the epidemiological status of brucellosis in Kurdistan province. **Materials and methods:** This was a descriptive-analytical Study in which 3880 cases of brucellosis from 1997 up to 2003 evaluated. Titer 1:80 or greater using standard tube agglutination method was estimated as a positive result. These data collected from province's laboratories weekly. Patient's data was analysed and described by using SPSS software. **Results:** Three thousand and eighty cases of brucellosis infection have been studied. In this study 2020 (52.1%) were male and 1860 (47.9%) female, 707 (18.2%) citified, and 3173 (81.8%) rural. The highest level of incidence, with 89 cases of infection per 100000, has been appeared in 2003 and the lowest with 17 cases per 100000 in 2000. Housewife with 39.4% had the highest level of occurrence. There was a relationship between sex with age ($p<0.001$) and with place of living ($p<0.05$). **Conclusion:** According to this study, males in villages and bricklayer in cities are the most affected groups. People training, especially villager and women in cities, about transition paths, prevention methods, food supply and delivery supervising could decrease disease prevalence.

Key words: Brucellosis; Epidemiology.

Introduction:

Brucellosis, although almost eradicated in many parts of the world still remains widespread and endemic in the developing countries [1,2]. Moreover, it is common health problem in some Middle Eastern, Mediterranean countries [3-6] and IRAN [7-9]. Brucellosis is an infectious disease caused by various gram-negative bacteria of the genus *Brucella* [10]. This disease is the cause of significant economic losses in livestock production due to reproductive disorders and reduced production of affected animals [10]. A severely debilitating disease requires prolonged treatment with a combination of antibiotics often leaving permanent and disabling sequel, and results in considerable medical expenses in addition to loss of income due to loss of working hours [11]. Brucellosis can be transmitted to

humans through contact with animals or their products; it is an occupational hazard to persons engaged in certain professions (e.g., veterinarians, slaughterhouse workers, and farmers) [12]. According to WHO report, the whole number of diagnosed patients might be 10 to 25 times lesser than real statistics of occurrence of this disease in community; false diagnosis, especially about chronic brucellosis that is extremely hard to diagnose, can probably be one of the reasons [13-15]. However, increasing trend of brucellosis prevalence in Kurdistan province and even all over the country is not concordant with decreasing trend of most of the other communicable diseases. The prevalence rate of brucellosis in different parts of Iran varied from 1.5 up to 107.5 per 100000 in 2003. The highest levels of infection appeared in Hamedan with 107.5,

Kurdistan with 83.5, Azarbaijan Gharbi with 71.4 and Zanjan with 67.1 per 100000 people [13, 16- 18]. Thus, its prevention, control and eradication are a major challenge for public health program. Brucellosis is caused by members of the bacterial genus

Materials and methods:

During the 7-year period from 1997 to 2003, 3880 cases of brucellosis registered in Brucellosis Care Program of Kurdistan province were evaluated. Regional health centre collected all cases of brucellosis data from medical offices, laboratories, hospitals, and health centres, weekly. The data registered and analysed by health group. The cases were defined by clinical symptoms and

Results:

Three thousand and eighty cases of brucellosis from 1997 till 2003 evaluated.

Brucella [11]. The aim of this study is determining epidemiological status of brucellosis in Kurdistan province covering seven-year period.

confirmed by a positive standard agglutination test. Titer 1:80 or greater using standard tube agglutination method was estimated as a positive result. Information about the sex, age, location, occupational risk, contact with the animals recorded by health staff. These patients treated according national standard protocol for brucellosis. Finally, the data entered to SPSS11 software, and analysed with T test and χ^2 .

The highest rate of prevalence with 89 cases per 100000 has occurred in 2003 and the lowest with 17 per 100000 in 2000 (see Figure 1).

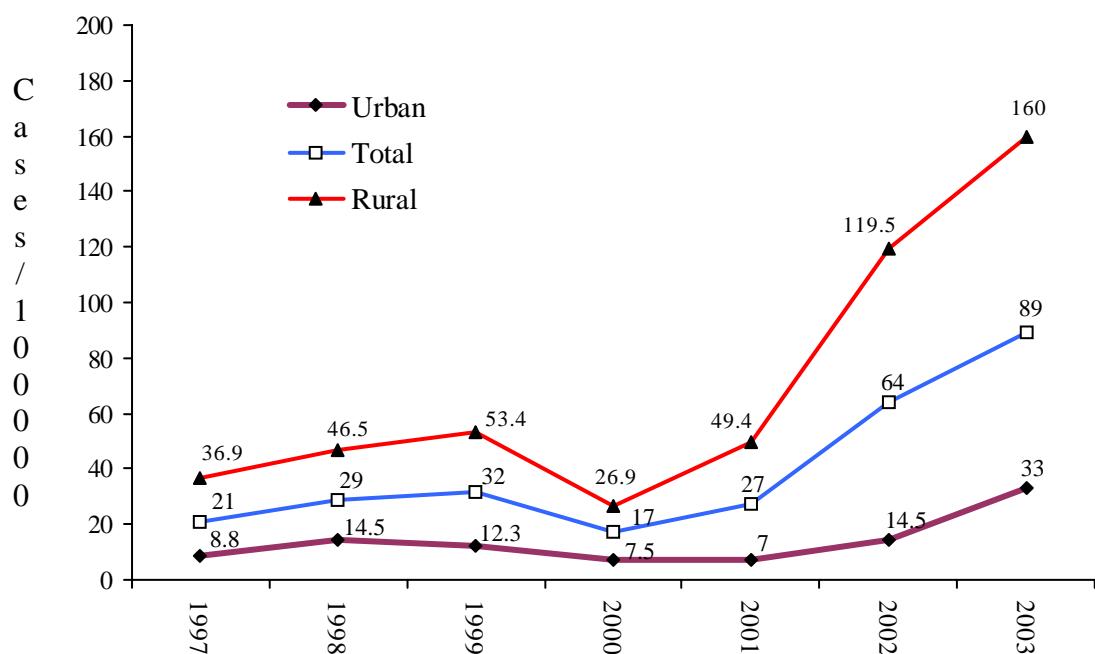


Figure 1: Brucellosis prevalence rate in Kurdistan province from 1997 to 2003
(Cases/100000).

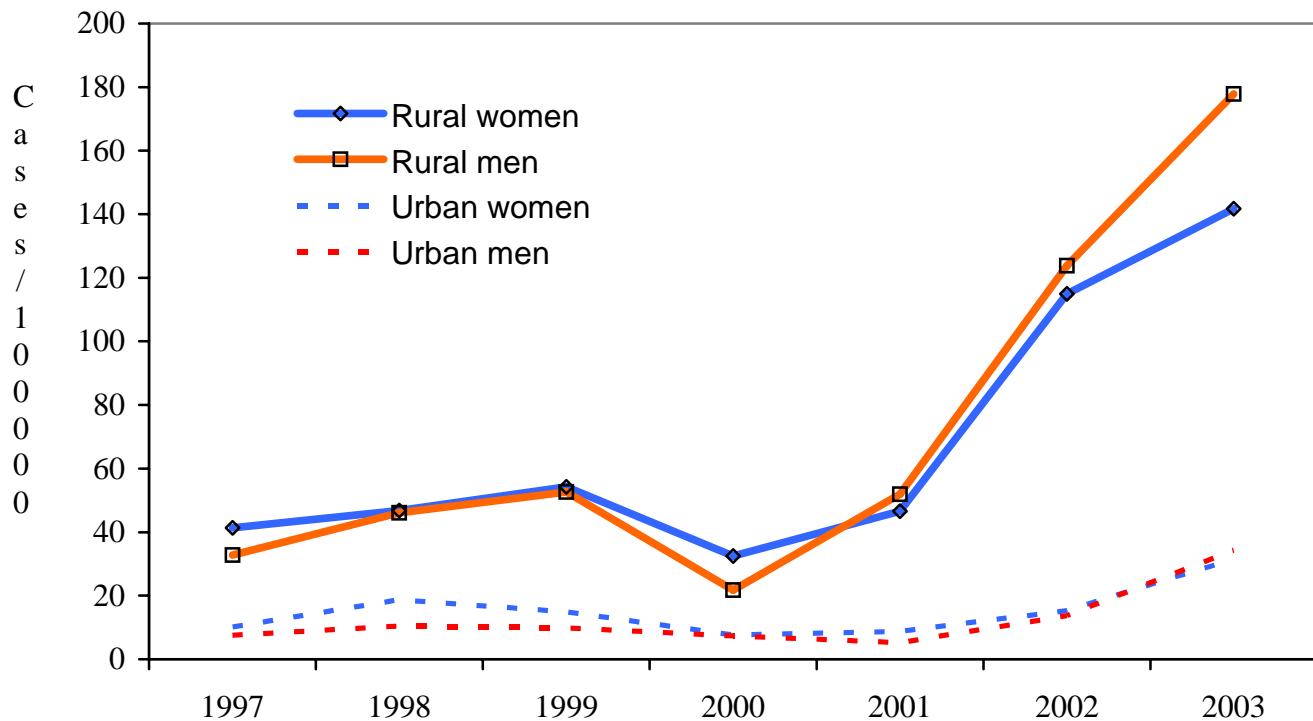
In this study, 1860 cases (47.9 %) were female, and 2020 cases (52.1%) males. 3173 (81.8%) patients were rural. In the female group, 1484 patients (79.8%) were living in villages. There was a significant relationship

between relationship between the number of cases of brucellosis and sex in relation to place of living ($p<0.05$). (See Figure 2 and table 1).

Table 1: Relationship between patient's sexes with place of living in Kurdistan province from 1997 to 2003.

sex	Place of living		Urban		Rural		Total	
	N	%	N	%	N	%	N	%
Males	331	46.8	1689	53.2	2020	52.1		
Females	376	53.2	1484	46.8	1860	47.9		
Total	707	100	3173	100	3880	100		

(P=0.002, Df=1, X2=9.527)

**Figure 2: Brucellosis prevalence rate per sex and place of living in Kurdistan province from 1997 to 2003 (Cases/100000).**

The mean age of patients was 30.03 years (± 18.03). The mean age in rural patients was 29.76 years (± 17.99) and in urban 31.22 years (± 18.17). There was a significant

relationship between the number of cases of brucellosis and age in relation to sex ($P<0.001$). (See Table Num.2).

Table 2: Relationship between age group and sex in brucellosis patients in Kurdistan province from 1997 to 2003.

Age group (year)	sex		Females		Males		Total	
	N	%	N	%	N	%	N	%
Less than 15	405	21.8	601	29.8	1006	25.9		
16 to 24	377	20.3	466	23.1	843	21.7		
25 to 44	631	33.9	490	24.3	1121	28.9		
45 to 54	239	12.8	173	8.6	412	10.6		
More than 55	208	11.2	290	14.4	498	12.8		
Total	1860	100.0	2020	100.0	3880	100.0		

(P=0.000, Df=4, X2=82.936)

In this study, 1527 patients (39.4%) were housewife, 809 (20.8%) farmers, 802 (20.6%) students, and 203 (5.2%) shepherds and 539 (14%) patients had been from other occupation. 2410 (62.1%) patients had the livestock contact, 1406 (36.2%) had no

contact and the status of 64 (1.7%) patients were unknown. Patients with the age range of 25-44 had the highest rate of contact history. Brucellosis diagnosis trend per months is in the Figure 3.

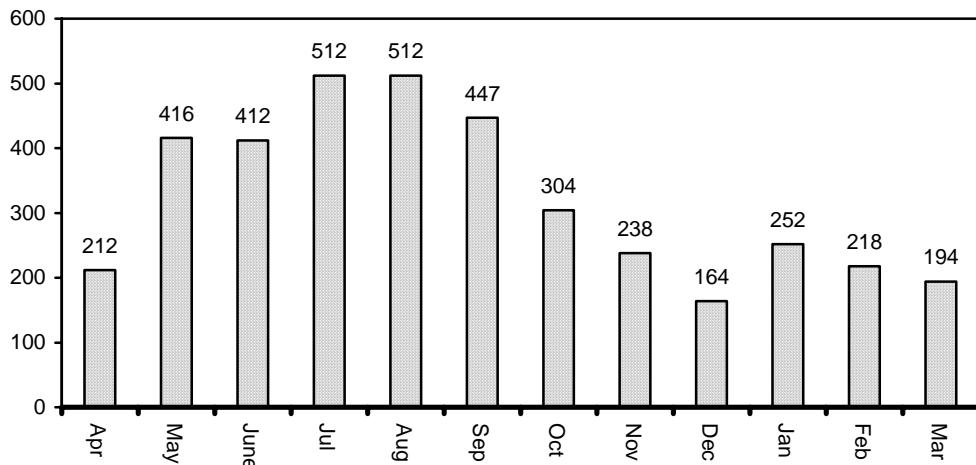


Figure 3: Frequency of brucellosis patients in different months of year in Kurdistan province from 1997 to 2003.

Discussion:

Annual brucellosis prevalence rate is about 1 to 75 per 100000 people in Mediterranean regions and Meddle East [7, 13]. However, this rate has approached 550 per 100000 people in endemic regions [3, 5, 6, 19]. In this study, the lowest rate of outbreak has occurred in 2000 and the highest in 2003. Prevalence rate in Iran is about 132 per 100000 [18]. Kurdistan province's rate is lower than national average rate. It is interesting that the prevalence rate in 2000 is lower than previous years but increased in following years. Alteration of descriptions and changes in brucellosis data collection systems in the province can be one of the reasons. In Perez-Rendom study, has been done in Spain in 1992, prevalence rate was 66.27 per 100000 in males and 38.2 per 100000 in females [19]. In endemic regions, young males were more infected by brucellosis [20]. In this study, 47.9% was females and 52.1% males. In others study the ratio between males and females was reported as 1.8 to 1 [21], 1.05 to 1 [22] and

in our study it was 1.01 to 1. In another study [23], the proportion of males was 4 times more than females. May be the reason is that in our society. In addition to males, females are cooperating in caring livestock, milking and stable cleaning, too. Although in Kurdistan province, more than 60 percent of population live in cities, brucellosis prevalence in rural areas was always more than cities and 81.8% of patients were rural. But in other study the this is less than ours; for example, in Saudi Arabia's study it was 63.5% [20, 21], in Turkey's survey 58.7% [22], and in Babel 60.8% [24]. It is predictable because rural population are often stockbreeder and have direct contact with livestock. Using non-pasteurized dairying products in villages is more common than cities. However, disease transition paths in villages are significantly different from cities. There is also a suggestive relationship between sex and place of living, brucellosis prevalence in females is more than males in cities, and it is more common among males in villages.

Contact with livestock is probably a path of transition for females too in rural areas; as, in current living conditions of villagers, males have more contact with livestock and its products. Nevertheless, in cities females through cooking have more contact with livestock products and they are more infected. In this survey, mean age range was 30.03 years which was lower than similar study (36.9 years in Babel, 40.2 years in Turkey, and 33.8 years in Arabia) [21, 22, 24]. In our survey, the percentages of peoples younger than 15 and older than 45 years were higher than other similar surveys [19, 21, 22, 24]. Probably, its reason is that in Kurdistan province younger people are working as stockbreeders. Brucellosis

mostly occurred in spring and summer [9, 25]. In other study, have been done in Iran [16, 18, 24] and all over the world [19, 22, 23, 25], most of infections have been diagnosed in spring and summer; concerning incubation period of disease, contact with animal brucellosis might be traced to previous months (i.e. parturition session). Farmers are more affected but, as females are mostly cooperating in stockbreeding tasks, homemaker females are also greatly affected. In villages, students also take share in stockbreeding tasks and help their parents, so the prevalence rate is also high among them. In other surveys, contact with livestock and husbandry are also forming some of risk factors.

Conclusion:

However, prevalence rate of brucellosis in Kurdistan province is lower than IRAN, but people training, especially villager and women, about transition paths, prevention methods, food supply and delivery supervising could decrease disease prevalence.

References:

1. Lee M, Fung K. A case of human brucellosis in Hong Kong. *Hong Kong Med J*. 2005;11:403-6.
2. Bingol A, Togay-Isikay C. Neurobrucellosis as an exceptional cause of transient ischemic attacks. *Eur J Neurol*. 2006;13:544-548.
3. Perez-Avraham G, Yagupsky P, Schaeffer F, Borer A, Caiserman S, Riesenbergs K. Zoonotic infections as causes of hospitalization among febrile Bedouin patients in southern Israel. *Transactions of the Royal Society of Tropical Medicine and Hygiene*. 2001;95:301-3.
4. Lithg-Pereira PL, Mainar-Jaime RC, Alvarez-Sanchez MA, Rojo-Vazquez FA. Evaluation of official eradication-campaigns data for investigating small-ruminant brucellosis in the province of Leon, Spain. *Trans R Soc Trop Med Hyg*. 2001;51:215-25.
5. Gad M.O, Kambel R.A. Evaluation of brucella Enzyme Immunoassay Test in comparison with bacteriological culture and agglutination. *J Infect*. 1998;36:197-201.
6. Wendell H.H. Modern chemotherapy for brucellosis in human. *Rev of Infec Dis*. 1990 Nov-Dec;12(6):87-89.
7. Al-Freih HM, Al Mohaya SA, Al Mohsen MF, Ibrahim EM, Al-Sohaibani M, Twum-Danso K, et al. Brucellosis in Saudi Arabia: diverse manifestations of an important cause of pyrexial illness. *Ann Saudi Med*. 1986;6:95-7.
8. Six W, Rosegger H, Schneeweiss H, Withalam H. Serological investigation in Nigeria for anthroponozoonos in human sera. *J Hyg Epidemiol Microbiol Immunol*. 1987;31:493-5.
9. Al-Balla SR. Epidemiology of human brucellosis in southern Saudi Arabia. *J Trop Med Hyg*. 1995;98:185-9.
10. Acosta-González R.A, González-Reyes I, Flores-Gutiérrez G.H. Prevalence of *Brucella abortus* antibodies in equines of a tropical region of Mexico. *Can J Vet Res*. 2006 October;70(4):302-304.
11. Smits H.L, Kadri M. Brucellosis in India: a deceptive infectious disease. *Indian J Med Res*. 2005 November;122:375-384.
12. Chomel BB, DeBess EE, Mangiamele DM, et al. Changing trends in the epidemiology of human brucellosis in California from 1973 to 1992; a shift toward foodborne transmission. *J Infect Dis*. 1994;170:1216-23.
13. World Health Organization. Human health benefits from livestock vaccination for brucellosis: case study. *Bull World Health Organ*. 2003 Dec;81(12):867-76.
14. Havas A. Problems and new development in treatment of acute and chronic brucellosis in man. *Acta Trop*. 1980;37:281-6.
15. Wiseri S. Brucellosis in united states present and future. *JAMA*. 1980;244:2318-22.
16. Haji-Abdolbaghi M, Rasoli nejad M, Loti B. The epidemiological study of clinical, diagnostic and cure situation of 505 patients affected by brucellosis. *Medical college J*. 2001;4:34-46.
17. Young EJ. An overview of Brucellosis. *Clin Infect Dis*. 1995;21:283-290.

18. Centers For Disease Control. Epidemiology status of Brucellosis in IRAN 2003. Tehran: Centers For Disease Control; 2004.

19. Perez-Rendon Gonzalez J, Almenara Barrios J, Rodriguez Martin A. The epidemiological characteristics of brucellosis in the primary health care district of Sierra de C diz. Aten Primaria. 1997 Apr 15;19(6):290-5.

20. Al-Sekait MA. Prevalence of brucellosis among abattoir workers in Saudi Arabia. J R Soc Health. 1993;113:230-3.

21. Elbeltagy KE. An epidemiological profile of brucellosis in Tabuk Province. East Mediterr Health J. 2001 July-September;7(4,5):790-798.

22. Gur A, Geyik MF, Dikici B, Nas K, Cevik R, Sarac J, Hosoglu S. Complications of brucellosis in different age groups: a study of 283 cases in southeastern Anatolia of Turkey. Yonsei Med J. 2003 Feb;44(1):33-44.

23. Serra Alvarez J, Godoy Garcia P. Incidence, etiology and epidemiology of brucellosis in a rural area of the province of Lleida. Rev Esp Salud Publica. 2000 Jan-Feb;74(1):45-53.

24. Hasanjani Roushan MR, Mohrez M, Smailnejad Gangi SM, Soleimani Amiri MJ, Hajiahmadi M. Epidemiological features and clinical manifestation in 469 adult patients with brucellosis in Babol, Northern Iran. Epidemiol Infect. 2004 Dec; 132(6):1109-14.

25. Alton GG, Jones LM, Angus R.D, Verger J.M. Techniques for the brucellosis laboratory. Paris; INRA; 1988.

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