

---

---

**Short Communication****The Incidents of Human Brucellosis in  
Al-Ahsaa area, Saudi Arabia****Ahmed M Al Ali and Ahmed M Alluwaimi\***

Central Laboratory, College of Veterinary Medicine and Animal Resources  
\*Dept. of Microbiology and Parasitology,  
College of Veterinary Medicine and Animal Resources,  
King Faisal University  
Al-Ahsaa, Saudi Arabia.

**Abstract :**

Brucellosis is worldwide zoonotic disease. In Saudi Arabia the disease is endemic in almost all the country. The records of human brucellosis in the past five years (2000-2004) were examined to evaluate the extent of the incidents in Al-Ahsaa area. The study examined the possible impact of the compulsory vaccination program which was enforced by the Ministry of Agriculture in reducing the human brucellosis. The records of the years 2000-2004 of human brucellosis was obtained from the Department of Preventive Medicine, Al Ahsaa Health Authority on basis of Age, Sex, Nationality and locations of Al Ahsaa area. The analysis of variance indicated a significant reduction in brucellosis incidents ( $P > 0.001$ ) by year 2004. The incidents of human brucellosis was significantly ( $P > 0.01$ ) higher in males than females. Al-Solimanieh and Al-Arquiqah, a two different locations in Al Ahsaa area, recorded the highest percentage of human brucellosis.

This is the first study that report the human brucellosis in Al Ahsaa area and has confirmed the continuation of brucellosis incidents in Al-Ahsaa area. However, the rate of the disease has decreased with years. The significant decrease in the brucellosis incidents could be due to the enforcing of the vaccination program. The results urge for the stringent enforcement of the animal vaccination program to prevent the transmission of the disease to humans.

**Key Words:** human brucellosis, Al-Ahsaa, vaccination, Saudi Arabia

Human Brucellosis is a worldwide zoonotic disease with half million new cases annually (Pappas, 2006). The annual prevalence rate of the disease could exceeds ten cases per 100,000 (Franco, 2007). Five of ten countries in Asia were reported with highest incidence for human brucellosis. Syria has the highest annual incidence worldwide reaching 1603 cases per million per year followed by Turkey 15000 cases in 2004. In Kuwait, however, the incidents remained still for 20 years ago, 500 case per million (Pappas *et al.*, 2006). In Saudi Arabia, a national survey stated that the prevalence rate in human brucellosis reached 40 cases per 100,000 (Memish, 2001). However, the incidents rate has been reduced to 16.89/100,000 in 2006 (Ministry of Health Annual Report, 2006).

Human brucellosis is a multisystem disease with multi-facets clinical symptoms. The disease is either acute or insidious. The typical clinical sings of human brucellosis are fever, splenomegaly, lymphadenopathy and myalgia (Memish and Venkatesh, 2001; El-Eissa, 1999). Human brucellosis is associated with both humoral and cellular immunity. Although antibody responses play certain role in resistance to brucellosis, cell-mediated immunity (CMI) appears to be the principal mechanism of recovery (Araj *et al.*, 1986; Doganay, 2003).

Previous studies on human brucellosis in Saudi Arabia indicated that the disease incidents recorded a critical points when the reported cases reached 8000 cases (22.5%) (Elfaki *et al.* 2005; Memish and Venkatesh, 2001). The disease was reported in Central (Cooper, 1991) Northern (Fallatah *et al.* 2005) Southern (Malik, 1997; Alballa,1995) Saudi Arabia. Several occupations are the major target of human brucellosis in Saudi Arabia. Brucellosis is considered a major threat for the laboratory workers of the Saudi hospitals (Kiel and Khan, 1993; Memish and Mah, 2001). A study on 1290 abattoir workers indicated that human brucellosis among the veterinarian and veterinary assistants was 5.4% , butchers 8.9% and 1.1% among the administrative personnel (Alsekait, 1993).

Control of human brucellosis in Saudi Arabia is hindered by the importation of thousands of livestock especially during Hajj (Pilgrimage) season each year. The imported livestock are usually allowed without proper verification on brucellosis (Memish, 2001; Al-Eissa, 1999).

The major routes of transmission were shown to be due to drinking of raw milk of infected animals and direct contact with infected animals (Al-Sekait, 1999, Ministry of Health Annual Report, 2006)). The major route of transmission among the hospital employees were processing of brucella

cultures or dealing with infected body fluids (Kiel and Khan, 1993; Memish and Mah, 2001).

The aim of this study was to reveal the actual incidents of human brucellosis in Al Ahsaa area especially after the application of the compulsory vaccination program which was enforced by the Ministry of Agriculture since 1993. This retrospective study was also considered necessary to evaluate the influence of urbanization in the Al Ahsaa area in the last years on the incidents of human brucellosis.

The incidents of human brucellosis of the five consecutive years , 2000-2004, were retrieved from the records of the Department of Preventive Medicine, Al Ahsaa health authority. The data were classified according to age, sex, nationality and locations at Al Ahsaa area. The statistical analysis was performed using SPSS software (SPSS Inc.). The significant differences in the data were examined using the analysis of variance.

The incidents of human brucellosis indicated continuous decrease since year 2000. The analysis of variance on the brucellosis incidents between 2000-2004 indicated significant decrease ( $P>0.001$ ) by year 2004. The details of human brucellosis according to age, sex and nationality are recorded in Table-1. The incidents of brucellosis in the last five years were significantly higher among males ( $P> 0.01$ ) and was restricted to the people between 26-35 years old. The incidents in year 2000 were the highest (94) whereas the incidents in year 2004 were the lowest (37). No distinct variation in the incidents was recorded between the Saudi and the non-Saudi nationals.

**Table ( 1 )**

The human brucellosis incidents in the Al Ahsaa area based on Age, Sex and Nationality from 2000 - 2004

Year	Patient No	Median Age	Medial Age	Range	Sex		Nationality	
					Male	Female	Saudi	Non
2000	94	30	28.7	1.6-85	81	13	54	40
2001	56	29	28.97	1-99	44	12	30	26
2002	41	26	25.4	2-56	32	9	28	13
2003	30	35	32.75	3.6-55	23	7	15	15
2004	37			6-72	29	8	23	14

Al-Solimanieh and Al-Arquiqah were the two locations in the Al Ahsaa area that recorded the highest incidents of brucellosis (Table-2).

The current study examined the incidents of human brucellosis in the last five years in the Al-Ahsaa area. The disease according to the current data recorded consecutive reduction in Al-Ahsaa area during the last five years (2000-2004). Unfortunately, no previous study was conducted on the human brucellosis in the Al Ahsaa area to be compared with the current data. Hence, this study can be considered the first to record the human brucellosis in the Al-Ahsaa area. The significant reduction in human brucellosis in the Al-Ahsaa area correlates with the national reduction of the disease incidents. The incidents of the human brucellosis has dropped from 21.87 per 100.000 in 2002 to 16.89 per 100.000 in 2006 (The ministry of Health Annual Report, 2006). Nevertheless, reports o brucellosis incidents in 2006 in different regions of the country were considerably higher than the Al-Ahsaa. The incidents of brucellosis in Aseer, Qaseem, Hail, Riyadh and Al-Ahsaa were 757, 652, 531, 475 and 37, respectively (The ministry of Health Annual Report, 2006).

**Table ( 2 )**

Distribution of patients with brucellosis in the Al-Ahsaa area, in locations that recorded the highest incidents during 2000-2004.

Number	Place of living	Number of Cases	Percentages
1	Al-Solimanieh	40	18%
2	Al-Arquiqah	35	16%
3	Al-Mahasin	19	8.7%
4	Al-Guiabih	18	8.2%
5	Al-Kaldiah	14	6.4%
6	Al-Askan	13	5.9%

The significant reduction in the incidents of human brucellosis could be due to several factors. The Ministry of Agriculture compulsory vaccination program could be considered as one of the major factors that had plausible impact on reduction of human brucellosis. Since 1993, the authorities of Ministry of Agriculture at different parts of Saudi Arabia enforced a compulsory vaccination law on all animals at risk of infection. Although data on the stringency and comprehensive application on this program are not available, the effect of the program in reducing the incidents of human brucellosis can not be ruled out. Increase in the public health awareness in the last years has had tangible impact on reducing the habits of drinking raw

milk and unsafe contact with the infected animals. Majority of the cases referred to in this study were mainly related to nomads or their expatriate shepherds who seems did not deal with precautionary measures, vaccination, drinking raw milk and animal handling with up most stringency. The continuous practice of unsafe lifestyle with the infected animals could stands behind the increase in the brucellosis incidents in the two locations of Al Ahsaa area, Al-Solimanieh and Al-Arquiqah. The residents of these tow locations are mainly of nomadic origin who were settled in Al Ahsaa many years ago. Despite their settlement, they still own flocks of camel and sheep. Hence, it is not surprising that the brucellosis incidents were higher in these locations than other parts of Al Ahsaa area.

The study indicated higher brucellosis incidents in male than female in the Al-Ahsaa area. Study on human brucellosis in the northern Saudi Arabia was also confirmed the high brucellosis incidents among male than female in a ratio of 1.7:1, whereas, in Tabuk (Northwest) the ratio was 1.8:1 (Fallatah et al., 2005, Elbeltagy, 2001). The high incidents of brucellosis in male was also reported in Egypt , 70% (Jennings, et al., 2007). In reference to age, the incidents in Al-Ahsaa were mainly limited to the ages 28-33 years old. However, the majority of incidents (60%) in the northern area were among 13-40 years old patients (Fallatah et al., 2005). Whereas in Tabuk the median age was 13.9 (Elbeltagy, 2001). The national health report of year 2006 indicated that the incidents of brucellosis was higher among 15-44 years old patients (Ministry of Health Annual Report, 2006).

In conclusion, the study has confirmed the continuous risk of brucellosis in Al-Ahsaa area. The current results emphasize the importance of optimizing the vaccination program and the public awareness activities that assist in complete eradication of the disease.

#### **Acknowledgment**

This project was partially supported by grant from King AbdulAziz City of Science and Technology (KACST). Special thanks for Dr. Sami Al Ali the head of Dept. of Preventive Medicine at the Al Ahsaa Health Authority for his cooperation and Assistance.

---

---

**References:**

1. Alballa, S. R. (1995). Epidemiology of human brucellosis in southern Saudi Arabia. *J Trop Med Hyg.* 98: 185-189.
2. Araj, GF, Lulu AR, Mustafa MY, Khateeb MI. (1986). Evaluation of ELISA in the diagnosis of acute and chronic brucellosis in human beings. *J Hyg (Lond).* 9: 457-69.
3. Cooper, C. W. (1991). The epidemiology of human brucellosis in a well defined urban population in Saudi Arabia. *J Trop Med Hyg.* 94: 416-422
4. Doganay, M., Bilgehan, A. (2003). Human brucellosis: an overview. *Int. J Infect Dis;* 7:173-182.
5. Al-Eissa, Y A. (1999). Brucellosis in Saudi Arabia: past, present and future. *Ann Saudi Med,* 19:403-405.
6. Elbeltagy, K.E. (2001). An epidemiological profile of brucellosis in Tabuk Province, Saudi Arabia. *Eastern Mediterranean Health J.* 7(4/5):790- 798
7. Elfaki, M. G., Al-Hokail A. A, Nakeeb S. M, Al-Rabiah, F. A. (2005). Evaluation of culture, tube agglutination, and PCR methods for the diagnosis of brucellosis in humans. *Med Sci Monit;* 11: MT69-74.
8. Fallatah, S. M., Oduloju A. J, Al-Dusari S. N, Fakunle Y. M. (2005). Human brucellosis in Northern Saudi Arabia. *Saudi Med. J.* 26:1562-1566
9. Franco, M. P. (2007). Human brucellosis. *Lancet Infect Dis.;* 7: 775–86
10. Jennings, G. J., Hajjeh, R.A. Girgis, F. Y., Fadeel, M. A., Maksoud, M.A., Wasfy, M O., El Sayed, N., Srikantiah, N.P., Luby, S. P., Earhart, K., Mahoney , F. J. (2007). Brucellosis as a cause of acute febrile illness in Egypt. *Trans. Roy. Soc. Trop. Med. Hyg.* 101: 707-713.
11. Kiel F. W., Khan M. Y. (1993). Brucellosis among hospital employees in Saudi Arabia. *Infect Control Hosp Epidemiol.* 14:268-272.
12. Malik G. M. (1997). A clinical study of brucellosis in adults in the Asir region of southern Saudi Arabia. *Am J Trop Med Hyg.*56:375-377.
13. Memish Z. A., (2001). Brucellosis control in Saudi Arabia: prospects and challenges. *J Chemother Suppl.;* 1:11-7.
14. Memish Z. A., Venkatesh S. (2001). Brucellar epididymo-orchitis in Saudi Arabia: a retrospective study of 26 cases and review of the literature. *BJU Int.* Jul;88(1):72-6
15. Memish Z. A., Mah M.W., (2001). Brucellosis in laboratory workers at a Saudi Arabian hospital. *Am J Infect Control.* 29:48-52.
16. Ministry of Health Annual Report. (2006). <http://www.moh.gov.sa/statistics/S1427/Chapter%201.pdf>
17. Pappas, G. (2006). The new global map of human brucellosis. *Lancet Infect Dis.;* 6: 91–99.
18. Al-Sekait M. A. (1993). Prevalence of brucellosis among abattoir workers in Saudi Arabia. *J. R. Soc. Health.* 113:230-233
19. Al-Sekait M A. (1999). Seroepidemiological survey of Brucellosis antibodies in the Saudi Arabia. *Ann. Saudi. Med.* 19: 219-222.

## بحث مختصر

## الحمى المالطية (البروسيليا) في الإنسان في محافظة الأحساء

أحمد محمد العلي وأحمد محمد اللويحي\*

المختبر المركزي، كلية الطب البيطري والثروة الحيوانية  
قسم الأحياء الدقيقة والطفيليات، كلية الطب البيطري والثروة الحيوانية  
جامعة الملك فيصل، الأحساء، المملكة العربية السعودية

## الملخص :

الحمى المالطية (البروسيليا) من الأمراض المنتقلة من الحيوان إلى الإنسان واسعة الانتشار في العالم. تعتبر البروسيليا من الأمراض المستوطنة في اغلب مناطق المملكة. تناولت الدراسة حالات البروسيليا في الخمس السنوات الماضية (٢٠٠٠ - ٢٠٠٤) في محافظة الأحساء. استهدفت الدراسة معرفة مدى الإصابات بين البشر في المحافظة وإمكانية تأثير البرنامج الإلجباري لتطعيم القطعان الذي ترضه وزارة الزراعة على عدد الإصابات. تم الحصول على اعداد المرضى المصابين بالبروسيليا من سجلات قسم الطب الوقائي لمديرية الصحة بالأحساء وقد تم تصنيف المعلومات على أساس العمر، الجنس، الجنسية والأماكن المختلفة في الأحساء. لقد أظهر التحليل الإحصائي (الوسيط الحسابي باستخدام التباين الأصغر عند ٥%) انخفاضا واضحا ( $P > 0.001$ ) في عدد المصابين في عام ٢٠٠٤. كما أظهر التحليل الإحصائي زيادة عالية في الإصابة بين الرجال دون النساء ( $P > 0.01$ ). كما أن عدد الإصابات البشرية في كل من السلمانية و الرقيقة، منطقتان في الأحساء، أعلى من أي جزء آخر من الأحساء.

الدراسة وثقت لأول مرة الإصابة البشرية للبروسيليا في الأحساء و أكدت على استمرار هذه الإصابات و إن كان عددها تناقص في السنوات الأخيرة من الدراسة. أن تناقص عدد الإصابات قد يؤكد على فاعلية برنامج التطعيم الإلجباري للبروسيليا لقطعان الحيوانات التي تطبقه وزارة الزراعة. نتائج هذه الدراسة تؤكد الاستفادة القصوى من هذا البرنامج من خلال التشديد على تطبيقه و توسيع المستفيدين منه.

## الكلمات المفتاحية :

الحمى المالطية في الإنسان، الأحساء، التطعيم، المملكة العربية السعودية.