

Brief Review of Anti-Brucella Antibodies Among Saudi Population: Prevalence Prospective

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Brucellosis is a zoonosis affecting animal and human health worldwide. In the last few decades, research has been done to develop *Brucella* vaccines to control the disease in animals while there is no effective vaccine available for human so far. Saudi Arabia is one of the highest prevalence of Brucellosis, involving all age groups and types of the community in the region. Very limited region based studies has been conducted and there is no updated information and current status of Brucellosis is documented in the kingdom. So there is urgent need to address this issue at the kingdom level. Although Brucellosis has been almost eradicated from the developed countries like Australia where the vaccines has been implemented for animals but the country like Saudi Arabia there is still cases of Brucellosis are reported to date. Furthermore, there is no updated knowledge (data) available regarding the number of *Brucella* species prevalent in the kingdom. The aim of the current study is to understand how much work has been done and what are the major issues because of which research conducted in KSA does not meet the standard / criteria like the developing countries.

Introduction

Brucellosis is a zoonosis affects roughly 500,000 human populations annually worldwide. The disease remains endemic in many regions of the world including Latin America, Middle East, Africa, Asia, and the Mediterranean basin [1]. *Brucella* can be attained by humans when they come across directly with fluid discharges from an infected animal, but in endemic regions population usually get infection through the

consumption of unpasteurized dairy products especially the goat's milk and fresh soft cheese prepared with unpasteurized milk. However, human brucellosis is mostly misdiagnosed and underreported because of very common flu-like symptoms. The treatment of human brucellosis requires the extended use of combination of antibiotics [2]. *Brucella* as a facultative intracellular pathogen establishes a close relationship with the immune cells of the host. Through the insurgence of the immune system, the *Brucella* species is able to maintain a chronic infection which mostly makes the treatment and diagnosis very difficult. In the last few decades, a lot of research has been carried out in an attempt to develop safer and more effective *Brucella* vaccines for animals. But still there is no effective and licensed vaccine is available for prevention of human brucellosis. A human vaccine would be useful to protect farmers, veterinarians, animal care workers, laboratory personnel, and general public living in endemic brucellosis areas [3].

Kingdom of Saudi Arabia (KSA) has one of the highest prevalence of brucellosis, involving all age groups and all areas of the community in the region [4]. At present, very little work has been done to prevent or minimize infection resulting from contact with infected animals or the consumption of unpasteurized dairy products. Furthermore no such extensive research (on a large scale in the whole kingdom) has been done to estimate the potential health threat to human and animal population. Previously a study was conducted to access the prevalence of brucellosis in the Al-Medina region of Saudi Arabia. A cross-sectional survey was carried out in 1997 with sampling of 500 households (4000 subjects). The study revealed that the prevalence of brucellosis was 2.6%. The prevalence was reported to increase with age in rural communities and in low socio-economic status areas. There are eight predisposing factors associated with brucellosis. These are the consumption of raw milk, milk products, the keeping of livestock, milking of livestock, animal contact, butchering of raw meat, handling parturient animal and contact with placenta membrane. The overall prevalence of brucellosis among livestock as evaluated by examining blood from a random sample of animals was estimated at 17.4%. This study also concludes that there is a high prevalence of brucellosis in the Al-Medina region of Saudi Arabia and very little has been done to prevent or minimize infections [5].

Another study conducted in Riyadh describes that only within two years period, 30 cases of brucellosis were diagnosed positive from 209 patients who have been reported with a prolonged fever conditions for investigation. The latter included slide and tube agglutination in all cases and an enzyme linked immunosorbent assay (ELISA) in 16. Eleven cases (36.7%) produced negative results by the slide-agglutination screening test were also used at the recommended single serum dilution of 1: 80. This was could be due to the prozone phenomenon as they will gave positive results when further dilution was prepared in the tube agglutination test. "13" of the "16" tested by ELISA were positive for both IgM and IgG and 3 were positive for IgG only [6].

There have been also indications that human brucellosis is widely distributed in Saudi Arabia. In order to access the nationwide prevalence survey in the south of KSA, samples of 4900 subjects was selected randomly for a house-to-house survey. Investigations were comprised of interviews, clinical examinations and blood sampling for determinations of antibody titre. Blood samples were first screened for *Brucella* antibodies by a microplate agglutination test to access the exposed rate. Reactive sera were further analysed by the standard tube agglutination and 2-mercaptoethanol tests. Laboratory tests results showed that a significant proportion of the population in the southern region (19.2%) had serological confirmation of exposure to *Brucella* antigen, and 2.3% had active disease. It was clearly evident from the results that direct contact with domestic

animals and their consumption of raw products were recognized as the main risk factors [7]. On the other hand, a retrospective study conducted by collecting the records of all 26 adult patients with brucellosis symptoms at a tertiary hospital in Riyadh, KSA from 1983 to 2000. The results revealed that positive blood culture, high agglutination titres of 1:320 and positive clinical manifestations of brucellosis were the kept the main criteria for diagnosing brucellosis. Among these cases, epididymitis or epididymo-orchitis was diagnosed on the basis of a typical history of gradual onset of scrotal pain and findings of enlarged tender testes and epididymis [8].

Another study conducted by Fallatch and co-workers described the analysis of the clinical features, laboratory findings, treatment provided and complications noticed among brucellosis patients at the Northern Area Armed Forces Hospital, Hafr Al-Batin, KSA. During this study they recovered and reviewed the all patients from January 1995 to December 2001 with a clinical diagnosis of brucellosis in which *Brucella* agglutination titre was found 1:160 or greater from the Medical Records. They also dig out the information from the old files regarding age, gender, occupation, history of raw milk or milk products intake, presenting symptoms and physical signs. They also noticed the results of routine laboratory tests, treatment given, outcome of treatment and complications. This study also concludes that brucellosis is an endemic in Northern Saudi Arabia as compared to other parts of the Kingdom. They also have shown that the clinical and laboratory features and their response to therapy were also similar [9].

Another study one hundred and fifty seven (157) children were admitted in hospital with symptoms of brucellosis at Abha, Saudi Arabia. Ninety two percent (92%) was found the history of animal contact, usually with goats or sheep or also taking in of their milk products or raw milk or raw liver. Brucellosis is a common childhood problem in southwestern Saudi Arabia as compared to other parts of the country and the Middle East. It was also found that in every child from an endemic area presenting with a febrile illness and a history of animal contact [10]. Another study from the same region, one hundred four (104) Saudi patients with symptoms of brucellosis who were presented to Abha General Hospital in the Asir region of southern Saudi Arabia was studied. All the patients had *Brucella melitensis* infection; “61.5%” were females while “38.5%” males. Their mean age was “32” years. Most of the patients (61.5%) lived in the lowland and the majority of them were shepherds (84.6%). A history of raw milk intake was an important and major factor observed in these disease transmission (84.6%) among these population followed by a close animal contact (73%) and mainly the consumption of raw liver (63.3%). This study also showed the effectiveness of several drug combinations in the treatment of brucellosis and the low relapse rate if the treatment is prolonged [11].

Brucellosis is considered the most important zoonosis in Saudi Arabia, with a high prevalence among man and livestock. A natural survey of “23,613” subjects was conducted in 1997, to assess the seroprevalence of brucellosis in Saudi Arabia. These investigations mainly included interviews, clinical examination and blood sampling for antibody determination. The results of this study concluded that the seroprevalence of brucellosis was “15%”. The seroprevalence was increased by increased in age and was found higher in rural areas and among people in high risk occupations. Direct contact with household animals and consumption of their raw products of animal origin were recognized as the main risk factors for these diseases [12]. The prevalence of brucellosis among abattoir workers in Saudi Arabia was determined through a randomised multi-stage sampling of 1200 abattoir workers. Diagnosis was made by both blood culture and standard

tube agglutination test. The overall prevalence of brucellosis was observed “4%” among the abattoir workers. Furthermore, Infection was more common among butchers (8.9%), veterinarians and veterinary assistants (5.4%), and administrative personnel (1.1%) [13].

Conclusions

Research is totally ignored in KSA, although the government announced the vision 2030 but it seems like it's just a golden slogan but nothing happened on the ground since its inception. Although some radical steps has been taken in entertainment sector but not in the education, health and research. The kingdom has been gifted with various natural resources but its exploration is not appropriate. To the best of our knowledge, there is not a single laboratory/research establishment in the kingdom that cultures *Brucella* either for research or diagnosis purposes. There are various reasons behind this. Although, Kingdom did hired hundreds of specialists in various disciplines from abroad in the past but they can only work according to the guidelines and priorities already set by the government officials in the kingdom. The existing system doesn't allow the expatriates to work freely and establish such facilities for such research work. In this context, there is no documented evidence of authentic number of *Brucella* species isolation, identification and their prevalence status in the kingdom. The locals don't have the awareness about *Brucella*, its transmission routes and what preventive measures could be taken to protect themselves from this pathogen. There is no proper guideline available at national level which could be useful to control *Brucella* infections. We strongly reinforce the proposition underlined previously [13], which describes for a optimal planning for a national brucellosis control program in Saudi Arabia, ministerial co-ordination must be established with formulation of inter-governmental veterinary agreements between the Saudi government and the relevant authorities of animal exporting countries. A comprehensive national survey on animal marketing is required on priority basis. Furthermore, the golden principles were already demonstrated in 1989 [14] along with the detailed history of brucellosis and the real picture of public health in the KSA. According to this report, the health protection was made impossible due to various unavoidable factors in the kingdom: (i) the local custom of drinking raw and warm milk of sheep, goats, and camels, (ii) the animal reservoir of infection in the country complicated by importation of live animals both for sacrifice during Hajj periods and to increase commercial flocks, and (iii) by uncontrolled movements of humans and stock across political borders.

Bibliography

1. Pappas, G., Papadimitriou, P., Akritidis, N., Christou, L. & Tsianos, E. V. (2006). The new global map of human brucellosis. *Lancet Infectious Diseases*, 6(2), 91-99.
2. Ariza, J., Bosilkovski, M., Cascio, A., *et al.* (2007). Perspectives for the treatment of brucellosis in the 21st century: the Ioannina recommendations. *PLoS Medicine*, 4(12), 317.
3. Luna-Martínez, J. E. & Mejía-Terán, C. (2002). Brucellosis in Mexico: current status and trend. *Vet. Microbiol.*, 90(1-4), 19-30.
4. Al-Sekait, M. A. (2000). Epidemiology of Brucellosis in al Medina region, Saudi Arabia. *J. Family. Community. Med.*, 7(1), 47-53.
5. Al-Sekait, M. A. (1992). Epidemiology of Brucellosis in Northern Saudi Arabia. *Saudi. Med. J.*, 6, 29-31.

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6. Kambal, A., Mahgoub, E., Jamjoom, G. & Chowdry, M. (1983). Brucellosis in Riyadh, Saudi Arabia. *Trans. R. Soc. Trop. Med. Hyg.*, 77, 820-824.
7. Al-Balla, S. R. (1995). Epidemiology of Human brucellosis in Southern Saudi Arabia. *J. Trop. Med. & Hygiene.*, 95, 185-189.
8. 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.*, 88(1), 72-76.
9. 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.
10. Benjamin, B. & Annobil, S. H. (1992). Childhood brucellosis in southwestern Saudi Arabia: A 5 year experience. *J. Trop. Pediatr.*, 38(4), 167-172.
11. Malik, G. M. (1997). Aclinical study of brucellosis in adults in the Asir region of southern Saudi Arabia. *Am. J. Trop. Med. Hyg.*, 56(4), 375-377.
12. Al-Sekait, M. A. (1999). Seroepidemiology survey of brucellosis antibodies in Saudi Arabia. *Ann . Saudi. Med.*, 19(3), 219-222.
13. Al-Sekait, M. A. (1993). Prevalence of Brucellosis among abattoir workers in Saudi Arabia. *J. R. Soc. Health.*, 113(5), 230-223.
14. Kiel, F. W. & Khan, M. Y. (1989). Brucellosis in Saudi Arabia. *Social Science and Medicine.*, 29(8), 999-1001.