



The Prevalence of Brucellosis in Adults in Northeastern Region of Turkey

Gulhan Arvas¹, Yasemin Akkoyunlu^{2,*}, Mustafa Berktas³, Bulent Kaya⁴, Turan Aslan²

¹ Igdir University, Medical Technology Vocational Training School, Department of Clinical Microbiology, Igdir, Turkey

² Bezmialem Vakif University, School of Medicine, Department of Infectious Diseases and Clinical Microbiology, Istanbul, Turkey

³ 100. Yil University, School of Medicine, Department of Clinical Microbiology, Van, Turkey

⁴ Igdir State Hospital, Department of Paediatrics, Igdir, Turkey

*Corresponding author: Yasemin Akkoyunlu, Bezmialem Vakif University, Department of Infectious Diseases and Clinical Microbiology, Vatan Cad. 34093 Fatih/Istanbul, Turkey. Tel:+90-5326247817, Fax: +90-2125332326, E-mail: yaseminakkoyunlu@gmail.com.

ABSTRACT

Background: Brucellosis is prevalent in the Mediterranean basin, the Indian subcontinent, the Arabian peninsula, and in parts of Central Asia, Africa, Central and South America. However it continues to be one of the major health problems in developing countries, including Turkey.

Objectives: The current study aimed to determine the incidence of brucellosis, which is previewed to be very common in the northeastern region of Turkey, in order to emphasize the problem.

Materials and Methods: Seroprevalence of brucellosis was examined in sera of 2913 patients who referred to Igdir State Hospital between February and December of the year 2010 by Standard Tube Agglutination Test method.

Results: Results were statistically evaluated using chi-square trend analysis method. Significantly high level (1/40 dilution) of specific antibodies were detected in 525 (18 %) patient sera ($P = 0.111$).

Conclusions: We hope that Turkey will be one of the brucellosis-free countries in near future with highlights from the current and further studies.

Keywords: Brucellosis; Seroprevalence

Copyright © 2013, Ahvaz Jundishapur University of Medical Sciences; Published by Kowsar Corp.

►Article type: Research Article; Received: 03 May 2012, Revised: 20 Jun 2012, Accepted: 03 Jul 2012; DOI: 10.5812/jjm.5147

►Implication for health policy/practice/research/medical education:

The present study underlines the mutual problem, brucellosis between four neighboring countries.

►Please cite this paper as:

Arvas G, Akkoyunlu Y, Berktas M, Kaya B, Aslan T. The Prevalence of Brucellosis in Adults in Northeastern Region of Turkey. Jundishapur J Microbiol. 2013;6(3):262-4. DOI: 10.5812/jjm.5147

►Copyright © 2013, Ahvaz Jundishapur University of Medical Sciences; Published by Kowsar Corp.

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/3.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

1. Background

Brucellae are primarily animal pathogens, infecting humans after contact with infected animals or their body products (1, 2). Brucellosis exists in animals worldwide. In animals bacteria localize in the placenta, cause contagious abortion, and also reproduce in mammary glands where they shed for long periods in milk. Additionally, they can be present in uterine discharges, feces and urine. Human brucellosis presents when the bacteria enter the body via abrasions of the skin, via the alimentary tract or most commonly, via the respiratory tract. The disease is prevalent in the Mediterranean basin, the Indian subcontinent, the Arabian peninsula, and in parts of Central Asia, Africa, Central and South America (1). However it continues to be one of the major health problems in developing countries, including Turkey. Acute cases are more commonly seen in spring and summer. Even though, in Turkey, morbidity due to brucellosis is quite high, but as a consequence of early diagnosis and strict follow up its mortality is rather low (3). However, the treatment of the disease leads to loss of time, labour, and results in economical burden.

2. Objectives

The current study aimed to determine the incidence of brucellosis which was previewed to be very common in the northeastern region of Turkey in order to emphasize the problem.

3. Materials and Methods

In this retrospective cross sectional study, seroprevalence of brucellosis was examined in sera of a total of 2913 adult patients (18 years of age and older) who referred to Igdir State Hospital between February and December of the year 2010. Igdir State Hospital was the only second-line hospital with 250 beds in this city. The existence of brucellosis antibody was investigated in sera samples taken from patients by Standard Tube Agglutination Test method (STA, Wright's Agglutination Test). The sera samples were diluted up to 1/640 dilution in microplates, and then brucella test antigen was added to wells. The microplate was incubated in oven at . The wells, in which agglutination was seen, were accepted as positive. The attained results were statistically evaluated by chi-square trend analysis method. The research protocol of the study was approved by the Local Ethics Committee according to the Helsinki declaration.

4. Results

During the study period, 2913 patients older than 18 years who referred to Igdir State Hospital were tested us-

ing STA. Of those patients, 889 were men and 2024 were women. At the end of the survey, significantly high level (1/40 dilution) of specific antibodies were detected in 380 (18,8 %) women and 145 (16,3 %) men with a total of 525 (18 %) patient sera ($P=0.111$) (Table 1). Positive test results were found in 2 (% 0,4) at 1/40 dilution, in 3 (0,6 %) at 1/80 dilution, in 216 (41,1 %) at 1/160 dilution, in 303 (57,7 %) at 1/320 dilution and in 1 (0,2 %) at 1/640 dilution ($P=0,258$). There was no significant difference between the positivity distribution, and general positivity rates between men and women ($P=0.25$).

Table 1. Wright's Agglutination Test Results According to Gender ($P=0.11$)

	Positive, No. (%)	Negative, No. (%)
Male (n: 889)	16.3 (145)	83.7 (744)
Female (n:2024)	18.8 (380)	81.2 (1644)
Total (n:2913)	18 (525)	82 (2388)

5. Discussion

A study from Turkey, using spatial analyses including local and global spatial auto correlation methods, indicates that human brucellosis is a serious public health concern in the southeast region of Turkey and that the region urgently requires implementation of precautionary measures. A strong relationship was detected between brucellosis and higher animal population ($P < 0.05$) in that study according to the data obtained from Turkish Ministry of Health and Turkish Statistical Institute. Additionally, the study provided the suggestions that underlying risk factors should be investigated further, particularly where the cluster is observed.

The relationship was thought to be associated with the possibility attributed to the two transmission routes (occupational or food-borne) taking part in the human disease incidence in rural area, as both could be deeply related to the size of the local animal population. Further investigations regarding other possible risk factors (e.g. disease prevalence of animal population, livestock vaccination coverage and local customs) would give some new evidence of local animal population association with epidemiology of human disease.

In a study among suspected brucellosis cases from Malaysia, 184 sera from 16 hospitals were evaluated and the seropositivity of brucellosis was only 5.4 % which suggests that the seroprevalence of brucellosis among individuals who have contact with infected animals in Malaysia is low (1). In another study from Tanzania, the overall seroprevalence of antibodies to *Brucella abortus* was 5.5 % among volunteers in various occupations whereas it was significantly higher ($P < 0.05$) among personnel employed in high risk jobs such as butchering, cleaning and slaughtering animal parts (2).

In a study from Iran, a neighboring country, the seroprevalence of brucellosis in patients with fever was 39.5 % (5). This high rate is also important for Turkey, because of uncontrolled animal transportation and consumption of milk and milk products.

The seroprevalence of brucellosis in livestock and in humans are 28 % and 40% respectively in Yafran, Libya. It was observed that more seropositive humans had a history of raw milk consumption than having direct contact with livestock (71%, 58%, $P < 0.02$) (6).

Relatively higher seroprevalence (18%) values in the current study can be explained by population's characteristics which is mostly composed of farmers and villagers. This suggests that the seroprevalence of brucellosis among individuals who have contacted with infected animals in Turkey is rather high. To lower the seroprevalence of the brucellosis, the number of the infected animal population should be controlled. The result of no differentiation between percentages of male and female seropositivity indicates that contact with animal and animal products makes no difference between the genders.

On the other hand, result of the current study shows that 90% of those 18% seropositive population present high levels of seropositivity with 1/160 dilutions and over. We suggest that population living in this region does not use antibiotherapy properly. They generally discontinue the treatment due to migratory life. Even though they complete their treatment, they get in contact with the infected material once again, so the immune system continues to be alert and reinfection or relapse occurs.

According to the test results, the prevalence of brucellosis in the northeastern region of Turkey is one of the major public health problems. Existing region of Turkey has borders with three different countries; Iran, Armenia and Nakhichevan. Therefore, they should all together fight against the disease by controlling brucellosis in animals through immunization, surveillance and screening of all animals in endemic areas. There are live vaccines for *B. abortus* and *B. melitensis*, but they are not recommended for human use as they can cause infection (7). Measures should be taken, such as controlling animal transportations, improving public awareness upon processing and consuming milk and milk products and also paying attention to co-operation between sectors. There are some reports of more than one case of brucellosis in a household; therefore, to diagnose human brucellosis

earlier antibody investigation of index case's contacts is recommended (7).

Effective eradication campaigns in the European Union have significantly reduced the incidence of brucellosis, with many countries being given brucellosis-free status (8). We hope that Turkey will be one of them in near future with the highlights from the current and further studies.

Acknowledgements

This study was presented as a poster presentation at 22nd ECCMID 2012 in London.

Financial disclosure

All authors declare that they have no conflict of interest.

Funding/support

None declared.

Authors' Contribution

None declared.

References

1. Jama'ayah MZ, Heu JY, Norazah A. Seroprevalance of brucellosis among suspected cases in Malaysia. *Malays J Pathol*. 2011;**33**(1):31-4.
2. Swai ES, Schoonman L. Human brucellosis: seroprevalence and risk factors related to high risk occupational groups in Tanga Municipality, Tanzania. *Zoonoses Public Health*. 2009;**56**(4):183-7.
3. Ceran N, Turkoglu R, Erdem I, Inan A, Engin D, Tireli H, et al. Neurobrucellosis: clinical, diagnostic, therapeutic features and outcome. Unusual clinical presentations in an endemic region. *Braz J Infect Dis*. 2011;**15**(1):52-9.
4. Demirel R, Erdogan S, Sözen MA. Determination of high risk regions of human brucellosis in Turkey using exploratory spatial analysis. *Türkiye Klinikleri tıp Bilimleri Dergisi*. 2009;**29**(1):25-35.
5. Salari MH, Khalili MB, Hassanpour GR. Selected epidemiological features of human brucellosis in Yazd, Islamic Republic of Iran: 1993-1998. *East Mediterr Health J*. 2003;**9**(5-6):1054-60.
6. Ahmed MO, Elmeshri SE, Abuzweda AR, Blauo M, Abouzeed YM, Ibrahim A, et al. Seroprevalence of brucellosis in animals and human populations in the western mountains region in Libya, December 2006-January 2008. *Euro Surveill*. 2010;**15**(30).
7. Alavi SM, Motlagh ME. A Review of Epidemiology, Diagnosis and Management of Brucellosis for General Physicians Working in the Iranian Health Network. *Jundishapur J Microbiol*. 2012;**5**(2):384-7.
8. Pappas G, Papadimitriou P, Akritidis N, Christou L, Tsianos EV. The new global map of human brucellosis. *Lancet Infect Dis*. 2006;**6**(2):91-9.