

## Prevalence Study of Brucellosis in Iranian Military Forces during 2001-2009

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### Abstract

**Introduction:** Brucellosis is an infectious zoonotic disease in humans and domestic animals, which has still remained as public health threat around the world. The purpose of this study was to evaluate the prevalence of Brucellosis in Iranian military forces during 2001-2009.

**Methods:** In this cross sectional observational study, we collected and extracted data from various units of the armed forces in different province of Iran during 2001-2009. The data were arranged based on province and season. Results were analyzed by SPSS version 16.0, and descriptive statistical analysis.

**Results:** 1698 patients from 30 provinces of the Iran were studied. The mean of Prevalence was 29.83 in 100,000 which 55% of them were male. The most cases were significantly reported in spring season rather other seasons ( $p < 0.01$ ). Khorasan Razavi province had the highest prevalence in these years (81%). It also the most prevalence of Brucellosis was related to 2005 (32.94%).

**Conclusion:** This study indicated that, Brucellosis is still considered a dangerous infectious disease with a high percentage of the prevalence in the Iranian military forces. It is necessary to step toward eradicating and controlling of this disease by increasing intersectional cooperation among Ministry of Health and Medical Education, the Health Departments of Iranian military forces and Veterinary Organization and by raising public knowledge and attitude about this disease by conducting various educational plans.

**Keywords:** Prevalence, Brucellosis, Iranian Military Forces.

### Introduction

Brucellosis was predominant in the Mediterranean region and its history has been associated with military campaigns. Brucellosis was recognized as a clinical entity from the times of Crimean war [1]. Brucellosis is an infectious zoonotic disease in humans and domestic animals [2-4], which has still remained as public health threat around the world especially in the Mediterranean region, consist of Iran, Turkey, the Arabian Peninsula, the Indian subcontinent, Mexico, and parts of Central and South America [5]. The transmission of Brucella infection and its prevalence in a region depends upon several factors like food habits, methods of processing milk and milk products, social customs, husbandry practices, climatic conditions, socioeconomic status, and environment hygiene [1, 6].

To the best of our knowledge, no specific study has been conducted on the condition of this disease among the armed forces in Iran. However, several investigations related to Brucellosis epidemiology have been recently carried out in Iran and other countries.

A study showed that the cumulative incidence rate of human Brucellosis in Khoy, northeast of Iran, was 175/100,000 [7]. A seroprevalence study that was carried out in northeast of Iran during 2002-2006 showed that the

prevalence rate of Brucellosis in human was 37/100,000 [8]. In a study conducted by Esmail Nasab et al (2006) on epidemiologic changes of malt fever in Kurdistan province of Iran, it was revealed that the disease had a downward trend in 2006 compare to its Prevalence during 2004 and 2005 [9]. Another research in Zanjan province of Iran indicated that although increasing of Brucellosis Prevalence was observed during 2001 to 2006, but this trend has been decreasing from 2006 to 2008 [10].

Moreover, Sheikh et al (2008) exhibited that the rate of outbreak constituted 42 in 100000 people in 2006 and 36 in 100000 people in 2007. 45 % of the patients were female and 55 % were male. Also in other countries there are several reports related to epidemiology of Brucellosis. Brucellosis remains endemic in most areas of the world although in much of Northern Europe, Australia, the US and Canada it has been eradicated or virtually eradicated from livestock following lengthy and expensive control programs [11]. The countries with the highest incidence of human Brucellosis are Saudi Arabia (32.8/100,000), Iran (29.8/100,000), Palestine (21.5/100,000), Syria (21.0/100,000), Jordan (20.4/100,000), and Oman (16.6/100,000). Bahrain and Cyprus have reported zero incidences [12].

In Serbia, reported cases of Brucellosis decreased from

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324 patients in 1991 to 2 patients in 2008 [13]. Another investigation in eastern areas of Saudi Arabia demonstrated that the rate of outbreak decreased from 13 patients per 100000 people in 1983 to 9 patients in 2006 [14]. Moreover, in a study in Bosnia and Herzegovina it was revealed that Brucellosis outbreak was 33.4 per 100000 people in 2008 [15]. Although, several studies have been conducted on Brucellosis epidemiology around the world but there are a few investigations related to prevalence of this disease in armed forces. For example in one study, it was shown that, out of 1208 soldiers of American army dispatched to Iraq 0.4 % [5 people] were above standard serological level of Brucella [16]. In another investigation on soldiers of American army dispatched to Iraq, cases of contracting Brucella melitensis were reported [13]. Iran include 164.000 km2 and thirty provinces and military forces life in and different provinces according of their jobs. Therefore, considering to the importance of Brucellosis in military forces and whereas no comprehensive study has been conducted, related to the epidemiological revision of Brucellosis in Iranian armed forces, this study is conducted during 2001-2009.

**Methods**

In this study, all reported and recorded cases of Brucellosis in health administration of military centers during 2001-2009 were investigated. The inclusion criteria was confirmation disease by physician according of examination and serological tests. Then for collecting data we referred to hygiene & treatment administration of military centers in different provinces in Iran. Then these data were studied and wrapped up based on the variables

of year, province and season. The results were analyzed by SPSS version 16.0, and descriptive statistical analysis.

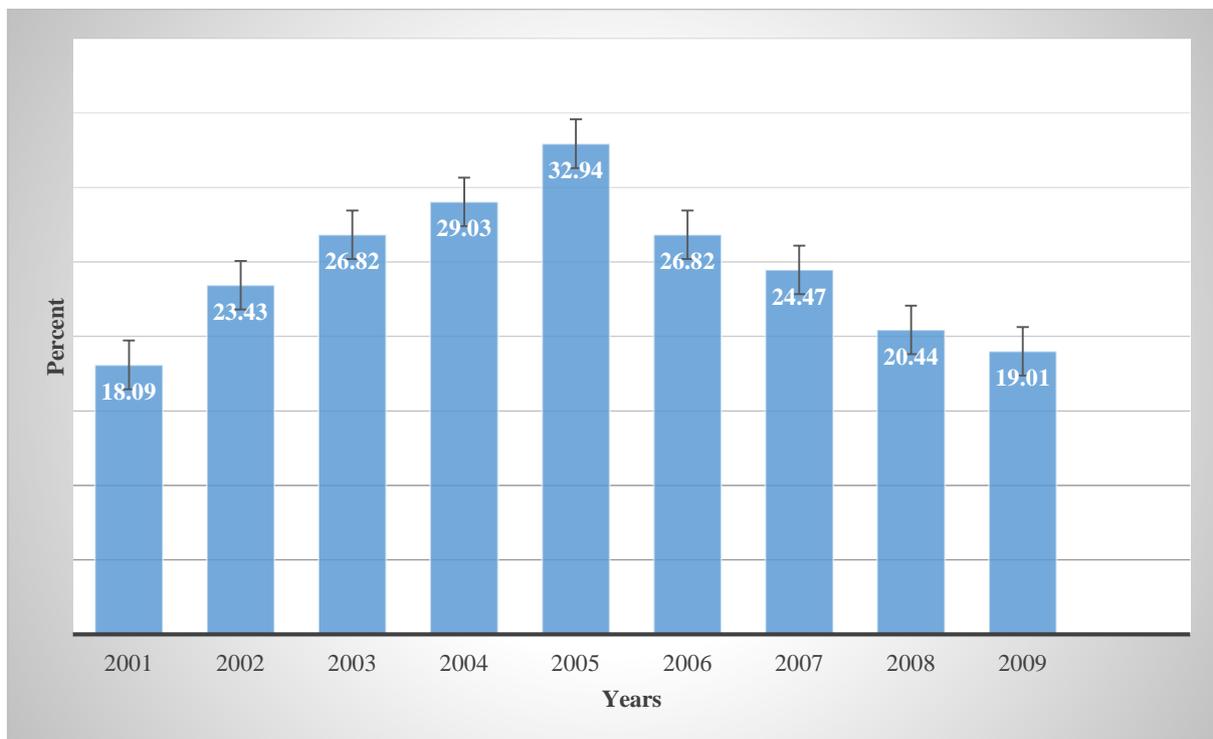
**Results**

Using the obtained information on the reported cases of Brucellosis in armed forces since 2001 to 2009, in this study the rate of prevalence was calculated based on year and city. In this study, 1698 patients in armed forces were studied. In diagram 1, the annual rate of prevalence of Brucellosis in armed forces is depicted and in diagram 2 the rate of prevalence of Brucellosis in armed forces is depicted based on city. On this basis, the highest rate of prevalence during these years was in Khorasan razavi (81 per 100000) and the lowest was in Sistan-Balochestan 8.07 in 100000).

Regarding the seasonal prevalence, as shown on diagram 3, the number of reported cases of the disease based on season during 2001-2009 in the first 6 months of year were more than the second six months. In terms of monthly prevalence, the highest rate was reported in Ordibehesht and Khordad (late April to mid-June).

**Discussion**

The results indicated that the prevalence rate of the Brucellosis in Iran since 2001 to 2009 was 24.56% and the most prevalence of disease was related to 2005 year (32.94%). After this year the trend of disease decreased gradually which was probably due to different reasons such as increasing in cooperation between Iran’s veterinary organization (IVO) and Health Ministry on improving in cattle vaccination system as well as promoting in public awareness and pasteurized/sterilized dairy consumption in armed forces [17].



**Diagram1.** Annual prevalence rate of Brucellosis in the Iranian military forces during 2001-2009

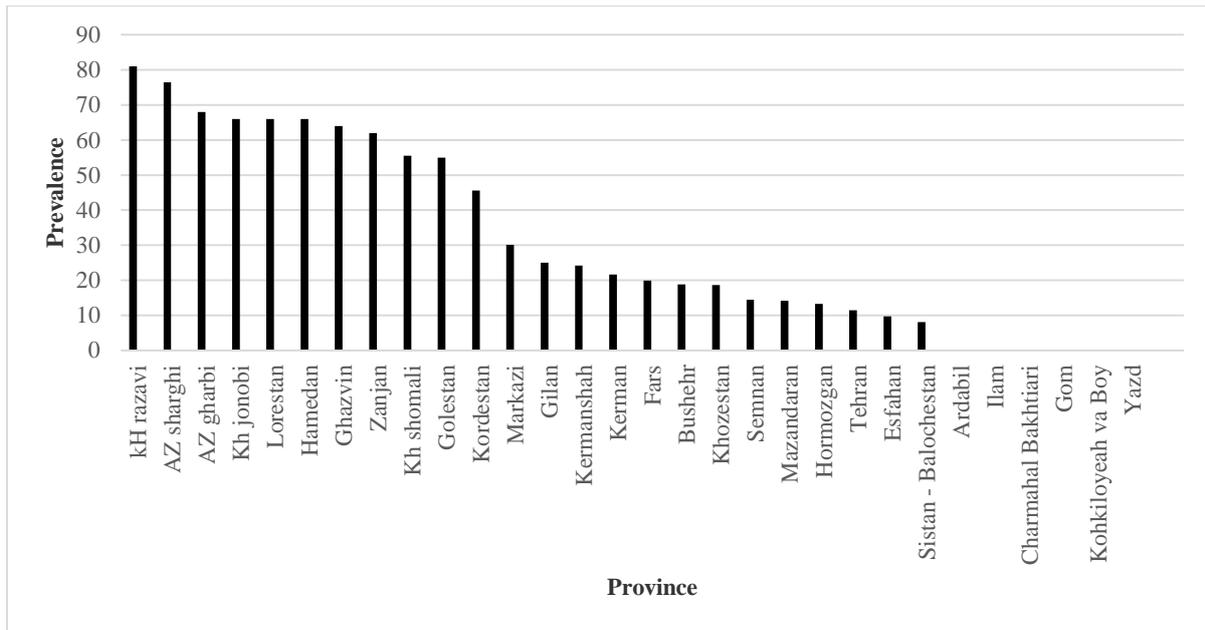


Diagram 2. The prevalence of Brucellosis in the Iranian military forces during 2001-2009 based on province.

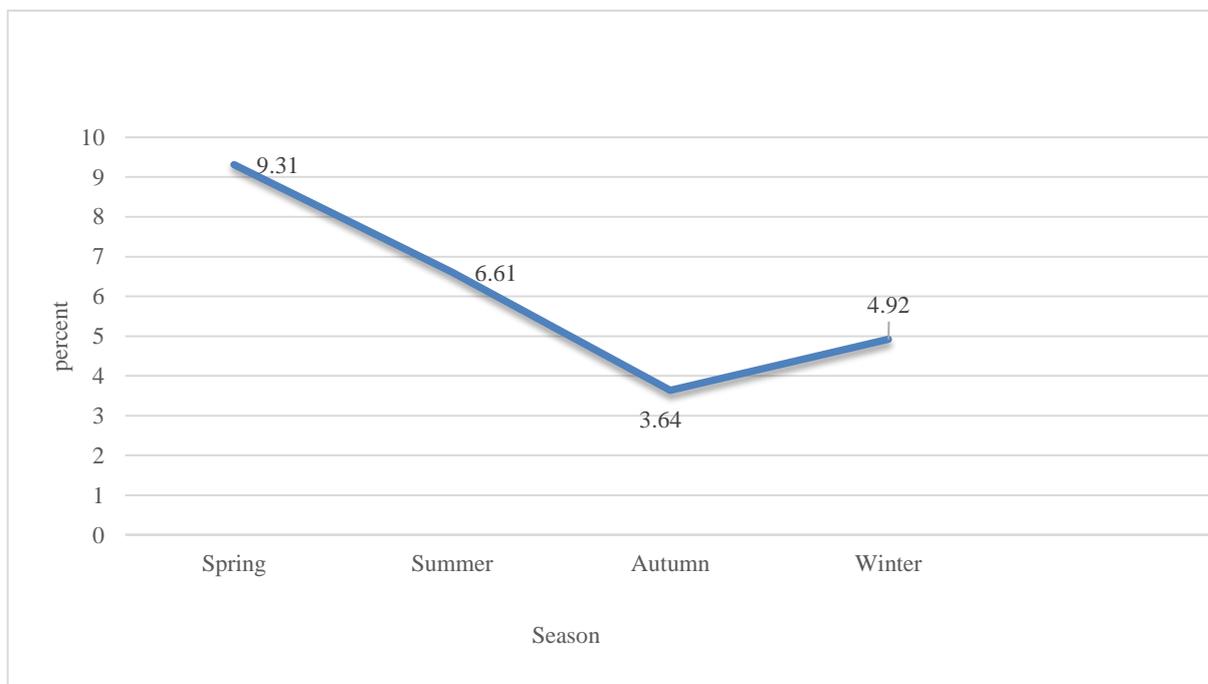


Diagram 3. The prevalence of brucellosis in the Iranian military forces during 2001-2009 based on season (per hundred thousand population).

These results of present study was similar to the findings of other studies in Iran and other countries. Dastjerdi et al. (2012) reported that the prevalence of Brucellosis decreased from 17.1% in 2006 to 8.2% in 2009 [18]. The results of Saiini MR, et al (2008) and Noori N, et al (2008) studies in different provinces of Iran exhibited that although an ascending trend was reported since 2001 to 2005, the reported cases gradually decreased from 2006 onward [10, 19]. This disease don't limited to our country and is more prevalent in western parts of Asia, India, Middle Eastern, Southern European, and Latin American countries. Worldwide, reported prevalence of human brucellosis in endemic disease areas varies widely, from <0.01 to >200 per 100,000 population. For example, Egypt, Jordan, Oman, Saudi Arabia, and Syrian Arab

Republic reported a combined annual total of more than 90,000 cases 100 000 people of human Brucellosis. According of Mathur study (2008) prevalence rate of human Brucellosis in India is reported 8.5% cases 100000 population [1]. Zhang et al (2014) is shown nationwide surveillance data indicated that the total prevalence rate of human brucellosis in China increased from 0.92 cases/100 000 people in 2004 to 2.62 cases 100 000 people in 2010. That indicated human brucellosis is considered an important public health problem in China [20]. In Turkey the reported prevalence rate had risen to over 18 000 cases, or 25.6 cases 100000 in 2004 year that is less than present study (29.03) in this year [21]. In European countries human Brucellosis has become a rare disease. For

example in Germany in the years 2002 and 2003 only Thirty-one cases reported of this disease [22]. The result of the present study showed that over the armed forces there is a significant difference between Khorasan razavi and some of provinces such as Tehran, Isfahan, Semnan and Sistan - Bloochestan provinces ( $p=0.01$ ) in terms of the prevalence of the disease according to geographical areas. The high Prevalence of Brucellosis in Khorasan razavi and some other provinces can be due to high number of traditional farms in these provinces, therefore consumption of dairy products produced from non-pasteurized milk seems higher than other provinces considering to high rate of Brucellosis in cattle of these provinces.

The statistical results of this study demonstrated that there is a significant relationship between season and the rate of prevalence ( $p=0.01$ ). One of the points that matters about epidemiology of Brucellosis is its relation to different seasons of the year. Based on that, in offspring seasons increasing in the case number of the disease among cattle is observable which has a direct effect on human. According to the present study the highest and lowest rate were reported in spring and autumn, respectively (Diagram 3). Considering that cattle offspring happens more in spring, probably one of the most important factors in spreading the disease is contact with vestiges of placenta or aborted placenta and secretion of contaminated cattle [10]. Several studies in Iran and other countries also confirm our finding which the highest rate of the disease has occurred in the first six months of the year especially in spring [10, 13, 14, 23-25].

## Conclusion

The findings of the present investigation revealed that the prevalence of human Brucellosis in Iranian military forces has increased and decreased during before and after 2005 respectively. It is still an uncontrolled serious public health problem in many developing countries including Iran. Therefore several intervention strategies such as increasing Health education programs about transmission ways of Brucellosis such as consumption of non-pasteurized of dairy products is necessary for military personnel.

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