Incidental Occurrence and Risk Factors of Brucellosis in Teaching Hospital
Imad I. Al-Sultan, Tarik I.Ali, and Omar E. Ibrahim
Departments of Physiology, Pathology and General Surgery, Faculty of Medicine and Health Sciences, Thamar, Yemen
Faculty of Vet. Medicine, University Malaysia Kelantan
HOD General Surgery, School of Medicine, UCSI University
Faculty of Vet. Medicine, University Putra Malaysia
imad@umk.edu.my

ABSTRACT
Brucellosis is an important public health problem in many developing countries. The disease represents a health problem in Yemen, therefore continued to be notified with increasing frequency in Thamar province. The main theme of reviewing the importance of incidental rate of disease existence is to analyze the demographic features of brucellosis patients hospitalized in a teaching hospital at the period 2005-2007. Total patients under study were 212 at that period. Patients represent a high rate of incidental occurrence 16/1000 of total admission most of them were females 124 (58%) while male cases are 88 (41.5%). The patients from rural areas (68.4%) were of high susceptibility to disease than patients reside at urban regions (31.6%). High risk patients were identified in age group of (11-20) years then in (21-30) year’s old people and at patients of ten years old or less. The frequency of seasonal infection with brucellosis at spring season was more than any other seasons in the year. Analysis of the significance of risk factors of infection in relation to occupation and work of patients indicate that housewife’s with the higher rate of infection (13.7), followed by raw milk drinkers(11.8%), then farmers(8.5%), then Shepherds and health workers each the same rate of infection (7.1%). Butchers and meat handlers represent (6.6%) and was the lowest infection rate.

Keywords: Risk factors, Brucellosis, Occupational disease. Public health

1. Introduction
Brucellosis is an infectious worldwide re-emerging disease of zoonotic nature caused by bacteria of the genus *brucella* (Al-Sous et al., 2004). The disease may have several entities like undulant fever, Malta fever, Mediterranean fever, Ypres fever and Milk sickness. It’s primarily a disease of domestic animals (Cattle, Sheep, Goat, Dogs, Deer, Elk ...etc. (Wilkinson, 1993). Human beings become infected by direct animal contact or with contaminated animal products consumed (Malhotra, 2004). Several species of brucella can cause disease in man like *B.melitensis, B.suis, B.abortus* and *B.canis*, those bacterial species are originally found in brucellosis cases in sheep and goats, pigs, cattle, sheep and dogs respectively (Ettinger et al.,
1995). *Brucella* spp. are dangerous infectious bacteria listed among CDC's category B bioterrorism agents (CDC, 2008; Sidell et al., 1997; Franz et al., 1997). Epidemiological studies confined to incidence and distribution of the disease reported as very high in Saudi Arabia, Oman, and Kuwait but none in Bahrain (Refai, 2002; Araj and Azzam, 1996). In Yemen, animal Brucellosis is an endemic disease, the prevalence rate of disease in man reported among microbiological study 24.5% (Al-Shamahy et al., 2000). The disease is transmitted through contaminated or unpasteurized milk and its products or through contact with infected animals primarily sheep, goats, cattle, and bison or by occupational workers with (placenta, slaughter, carcass) (Malhotra, 2004). Breathing (inhalation) May play role in transmission. Having the bacteria enter the body through skin wounds or abrasion, contamination of skin wounds maybe the problem of persons who work in slaughter houses (butchers) or in the fields of veterinary practice ( sherif, 1998). Direct person to person spread of brucellosis is extremely rare. Mothers who are breast feeding may transmit the infection to their infants. Sexually transmission may also have been reported. Although uncommon, transmission may also occur via contaminated tissue (Julian, 2007). The incubation period of brucellosis is usually from one to three weeks (Wilkinson, 1993) and also reported to be one to six weeks (Sherif, 1998). But could be variable, from one to two months or may take several months (Boschiroli et al., 2001). Brucellosis in humans is a multisystem disease manifested with acute febrile condition or unconstraint. The duration of disease can vary from a few weeks to many months or even years. Patients with brucellosis many present with an acute or insidious fever, sweating, weakness, anemia, headache, muscular and bodily pain, joint pain, lethargy and depression (Wilkinson, 1993). Other clinical symptoms are, hepatomegaly, lymphadenopathy and gastrointestinal trouble. Untreated cases properly develop complication such as arthritis in about 30% of cases, spontaneous abortion of pregnant woman, and gastrointestinal complications (ascetic, diarrhea, hepatic failure) (Nashir, 2006). Genitourinary infection such as orchitis and epididymitis leading to infertility is another important outcome (Boschiroli et al., 2001). Brucellosis diagnosed clinically and by laboratories investigation, bacterial isolation and serological detection of antibodies (Almishad, 2000). The study objectives are to identify the incidence of brucellosis patients hospitalized at a teaching hospital and to analyze the demographic features of brucellosis patients hospitalized between January 2005 and December 2007.

2. Methodology

Inpatients confirmed with physicians’ diagnosis as brucellosis after clinical and laboratory investigations. The information were taken in person from the patients after filling special form with many questionnaires. The data collected and analyzed by using the percentages rates of the categorical variable and continuous variables according to standard statistical procedures. The number of cases screened to illustrate the percentages rates of brucellosis annually (2000-2007) were 520, while those cases analyzed to determine the demographic features of patients (2005-2007) were 212.
3. Results

Brucellosis infected inpatients monitored at the years 2005 - 2007 was 212 cases, with incidence rate of 16 /1000 of total admission, females were 124 cases (58.5%) while the males 88 case (41.5%). The male to female ratio was (1:1.3). The number of reported cases since 2000-2007 at the hospital records is shown in (Fig.1 a, b) and according to their annual percentages incidences. Patients mean length stay at hospital was 8 days. The sociodemographic features extracted from questioners and personal interaction with hospitalized cases indicates that, the mean of age groups was 25 years and median age was 14 years. This data is representing a standard deviation of 5 years of age. The high risk age group was identified from 11-20 years then age group of 21-30 years, followed by less than 10 years old patients (Fig.2). The relationship of patients with brucellosis disease and their nature of work shown in (Fig.3) were the rates of infection was the highest in housewife’s and its lowest at dairy milk producer and fresh milk consumers. The patients of brucellosis who reside at the rural areas are more in number than those who live in urban areas, (Fig.4). The onset of infection and appearance of symptoms showed a seasonal pattern with highest incidence at spring time (Fig.5).

4. Discussion

Brucellosis has been recognized as one of the most common and important zoonotic disease in the eastern Mediterranean region (Refai, 2002; Refai, 1999). For comparative purposes the number of brucella infected cases reported by health offices monitoring surveillance was 480 cases. The females infected were more than males due to increase of contact and more mix up with animals as most of infected females patients are working in the farms and housewives. Another significant risk factor promotes for infection or transmission of bacterium related to occupation likewise housewives and drinking fresh none pasteurized milk which is in accord with (Al-Shamahy, 2000). In reviewing hospital records, the rise in the number of brucellosis cases was noticed at 2005 and this was in agreement with reports published by health office (surveillance unit) when 480 cases reported. The female cases more than male cases due to increase of contact and mixed with animals, and most females were housewife or farmer. Significant risk factors for infection related to occupation or social status like housewife, drinking fresh milk, a finding in agreement with (Young, 1991; A-Shamahy et al., 2000). The later describe the woman stand as a high risk for infecting herself and her family particularly her baby. Farmer, shepherder, butcher works as either main source for infection or secondary carrier. All previously mentioned occupation many lead to contact with animals, drink fresh milk or its products and contact with slaughters or viscera of animals. This conclusion confirmed by Araj (2005). One of the most significant risk factor for infection related to seasons. The seasonal pattern in this study is similar to several other studies that have shown a similar seasonal pattern (Young, 1995; Virella, 2003)). The increase rate of incidental infection in spring is believed to be linked to delivery (parturition) season of sheep and goats which provide great possibility for direct contact with vaginal discharge, fetuses and placenta of aborted fetuses and animal offal’s which may play a major role in increasing risk of exposure to infection (Stephen and Feldman,
Cases come from rural regions were more than urban areas resulting from risk of their occupation. Less number of cases reside in urban areas are due to less human contact with animals on the contrary to the finding seen in the co-opposite of rural individuals.

5. Conclusion

It was concluded that successful prevention of human’s brucellosis dependent on prevention of animal brucellosis. This fact lead to implement health education programs which are important to focus on risk factors in promoting infection. Performing a case control study and using vaccination to stop spread of infection are also other measures to limit and control the disease.

References


![Number of Brucellosis Cases](image1.png)
![Percentage of Brucellosis Cases](image2.png)

Fig. 1. (a) Number of brucellosis cases in a teaching hospital in the years 2000 -2007.
(b)Percentage of brucellosis cases at the hospital.
Fig. 2. The percentage rates of inpatients with brucellosis infection and their occupations or work skills.

- 20.3% Dairy Production
- 13.7% Not Known
- 11.7% Breeding Cattle
- 9.8% Butchers
- 8.5% Shepherders
- 7.1% Health Workers
- 7.1% Farmers
- 6.6% Students
- 6.1% Drinking Fresh Milk
- 5.7% Housewife
- 3.3% Others

Fig. 3. Sociodemographic features of hospitalized brucellosis cases extracted as percentage rates between 2005-2007 in the teaching hospital.
Fig. 4. Percentage rates of recorded hospitalized brucellosis cases according to region or location of living.

- Urban areas: 31.6%
- Rural areas: 68.4%

Fig. 5. Illustrate the distribution of Brucellosis cases according to seasonal incidence.

- Spring: 46.80%
- Summer: 18.90%
- Autumn: 18.20%
- Winter: 16.10%