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Epidemiologic Study of Brucellosis in Jiroft, Iran during 2016-2019

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ABSTRACT

Background and objective: Brucellosis in many parts of the world, especially in developing countries, is of great importance in terms of public health and its impact on the socio-economic status of society. The aim of this study was to investigate the epidemiological status of brucellosis in Jiroft County.

Materials and Methods: This descriptive study was conducted using the medical records of patients with brucellosis referred to Jiroft health centers during 2016-2019. Statistical tests were then used to analyze the data.

Results: In the present study, 392 patients with mean age of 44.31 ± 17.29 years were reported to the city health center. Most of the infection cases was reported from the cities of Southern Rudbar (131 patients; 33.4%) and Jiroft (119 patients; 30.4%) and Manoojān city with 19 patients (4.80%) had the lowest number of cases. Furthermore, 151 (38.5%) patients were female and 241 (61.5%) patients were male. The majority of patients (65.34%) expressed the consumption of raw milk as a cause of the disease. Also, 76.30% of patients were rural and the peak of disease was recorded in spring and summer.

Conclusion: Despite the significant decrease, the incidence of the disease is high in some rural areas of Southern Rudbar and Jiroft.

KEYWORDS

Brucellosis, Epidemiology, Jiroft, Iran.

Introduction

Brucellosis is among the most prevalent zoonoses in humans and animals that has long been considered one of the most important diseases. The disease is caused by *Brucella* spp., which are small gram-negative, facultatively intracellular, highly aerobic, and slow-growing bacteria. The most important species of this genus are *B. abortus* and *B. melitensis*, which are a common pathogen of human. Other *Brucella* species include *B. swiss*, *B. canis* and *B.* neotomae (1). In many countries, such as Iran, where economic growth and employment are largely dependent on agriculture and animal husbandry, the disease is also one of the most important concerns of economic growth and its problems are not limited to humans (2). In humans, brucellosis causes symptoms such as high fever, muscle aches, and swelling in the large joints; it also causes infertility and miscarriage in livestock. *Diseases* can be commonly spread to humans through direct contact with livestock and their secretions as well as consumption of unpasteurized dairy products (3). Brucellosis is present in many parts of the world, but most cases are found in the Mediterranean region, the Arabian Peninsula, the Indian subcontinent, and parts of the central and southern US (4). The disease exists in many developing countries but some cases are not recognized. There is no accurate information on the annual incidence of the disease. According to a study carried out in 2003, the average incidence of the disease in the country was 21 cases/100000 individuals. The incidence has also been reported in different regions of the country between 107.5-1.5 /100,000 people. Iran is endemic for brucellosis according to a report by the World Health Organization. In Iran, different strains strains of *B. abortus* and *B. melitensis* are the main causes of human disease (2, 6). In the villages of Jiroft, most families keep their livestock in the stables they built in their homes and have close contact with livestock and livestock products, while many urban families also have a close relationship with villagers and their products. They may become infected by receiving contaminated animal products. Since livestock breeding is one of the important activities of Jiroft people. Therefore, it is necessary to investigate the prevalence of

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this disease in this city.

Materials and Methods

This descriptive study was performed in Jiroft county and the data were collected from patients with brucellosis in health centers including rural and urban health centers, health houses and hospitals. Subjects were enrolled in the study according to the national standard definition, I.e., all individuals with suspected clinical symptoms and a wright test with Titer of 1.80 and a Coombs′ Wright positive test. After receiving their profile and address, they were followed up by the patient's health team and entered into the prepared checklist and analyzed after entering the computer. Descriptive statistics were used to determine the frequency distribution and to answer research questions, to compare and analyze the status of the recorded and identified cases of brucellosis.

Results

In total, 392 patients with brucellosis were identified from different cities of Jiroft County during 2016-2019, among which, 92.6% were new cases. Table 1 shows the relative frequency distribution of patients identified in the county by different cities.

Table 1. Frequency distribution of patients with brucellosis in Jiroft County during 2016-2019.

City	**Number**
South Rudbar	(% 33.4) 131
Jiroft	(% 30.4) 119
Anbarabad	(% 10.70) 42
Qaleh *Ganj*	(% 9.40) 37
Faryab	(% 6.10) 24
Kahnuj	(% 5.10) 20
Monnujan	(% 4.80) 19

Of 932 patients reported to Jiroft Health Center, 151 (38.5%) were female and 241 (61.5%) were male. The mean age of the patients was determined to be 44.31 ± 17.29 years. Table 2 shows the frequency distribution of patients by age group.

Table 2. Frequency distribution of patients with brucellosis by age groups in Jiroft County

Age groups (Years)	**Number**
14 >	(% 3.6) 14
29-15	(% 18.10) 17
44-30	(% 28.10) 110
59-45	(% 30.10) 118
74-60	(% 15.30) 60
75 <	(% 4.80) 19

Given the importance of different occupations in the incidence of this disease, the information on the frequency distribution of the disease based on the different occupations is given in Table 3. As indicated, most cases of disease were seen in housewives, farmers and ranchers.

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Table 3. Frequency distribution of patients by occupation

Occupation	Number(percent)
housewife	(% 40.10) 157
The farmer	(% 17.10) 67
Farmer-Farmer	(% 10.20) 40
Husbandman	(% 8.90) 35
Housekeeper-rancher	(% 8.20) 23
student	(% 3.30) 13
Worker	(% 2.60) 10
Employee	(% 2.60) 10
Free	(% 1.80) 7
Unemployed	(% 1.50) 6
Child	(% 1.00) 4
Unknown	(% 0.8) 3
student	(% 0.5) 2
Driver	(% 0.5) 2
Others	(% 0.5) 2
Butcher	(% 0.3) 1
Livestock worker	(% 0.3) 1

According to the patients, 84.4% of the patients had a history of contact with livestock and 80.40% of had a past consumption of non-pasteurized local dairy products, most of whom reported consumption of raw milk (65.34%). In this study, most cases were found in rural areas (76.3%) and only a small number of cases were in urban areas. (19.10%).

Table 4. Frequency distribution of patients with Brucellosis by *place* of *residence*

Living area	Number
rural	(% 76.30) 299
Urban	(% 19.10) 75
Nomadic	(% 13.10) 12
Moving	(% 1.50) 6

Figure 1 shows the frequency distribution of patients with brucellosis in the months of 2014-2015. Most of the cases occurred in May (13%) and June (12.20%).

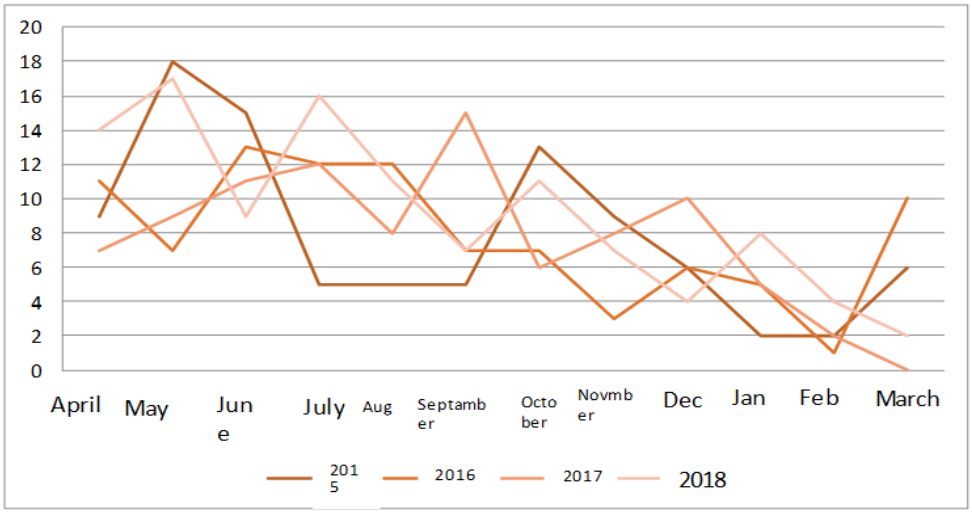

Figure 1. Frequency distribution of patients with brucellosis in Jiroft County in different months during 2016-2019

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Discussion

Brucellosis is one of the most important zoonotic diseases, many of which remain undiagnosed. It is estimated that even in advanced countries of the world, only 4-10% of cases of brucellosis are diagnosed. Overall, the number of reported cases of the disease in the world is about 10-20 times lower than the definitive cases (7). The highest incidence of brucellosis was found in the southern city of Southern Rudbar (33.4%) and the lowest incidence was recorded from Manoojān (4.80%). It seems that the incidence of the disease is higher in the cities of Southern Rudbar and Jiroft as compared to other cities, where the risk factors are higher. However, a significant difference between the incidence of the disease in different cities of the county is contemplated and requires a more detailed epidemiological evaluation of the disease in each of the infected cities. The prevalence of the disease in male (61.5%) was higher than that of female (38.5%), which seems to be due to more male exposure to risk factors. In one study, most of the patients with brucellosis were male in Sina Hospital of Kermanshah (8).

The incidence of males was found to be higher in male than females in Arak. (9) In Kashan, Qazvin and Gonbad Kavous, the incidence of disease in males was slightly higher than females (10, 11). There are many reasons such as animal husbandry and animal slaughter by these people. In other studies, however, the disease rate was reported to be higher in women as compared to men. In Isfahan, for example, the ratio of female to male patients was found to be greater than two. Perhaps because in developing countries such as Iran, women have also been in contact with livestock (12). The distribution of the disease among different age groups in the city shows that most cases were in the age group of 45-59 years (30.1%) and in the age group of 30-44 years (28.1%). In Gonbad-e Kavus, the most cases (26.2%) were reported to be belonged to the age group of 29-20 years (11). In Isfahan, most of the cases were in the age group of 15-20 years and in general, under 40 years of age were the most active group of the community in terms of occupation. In Iran, most cases of this disease occur in this age group (12). The reason for the difference in our study may be linked to the higher age of high risk population due to animal husbandry. In Turkey, 53.4% of patients were reported to be in the age group of 13-34 years (13).

The most common occupations were recorded for housewives (40.1%) and ranchers (17.1%). In rural areas of Iran, housewives are usually responsible for livestock affairs, including grazing and feeding, milking, stables cleaning, various dairy products, etc. Thus, naturally, rural women who call themselves housewives are actually farmers and ranchers. Therefore, livestock breeding and farming, which is the predominant occupation of villagers in the province, has an important role in the development of this disease.

According to the patient’s declaration, consumption of raw milk seems to be the most important contributor to the disease transmission (65.34%). However, according to patients' statements, the contribution of each dairy product to the disease cannot be accurately determined. But it is important that patients properly understand the role of unpasteurized dairy products in the transmission of the disease. Direct contact with livestock as well as consumption of unpasteurized dairy products are the most important routes of disease transmission (7, 9).

In the Isfahan, consumption of raw or unpasteurized milk and other traditional dairy products, especially in the mountainous areas of the province, where traditional livestock is common and traditional milk and dairy products are widely produced and consumed, has been one of the most important routes of disease transmission. The most prevalent cases were in the provinces (12) in the northern part of Iran, where eating fresh cheese (22.4%), keeping livestock (11.3%), working in a laboratory (8.1%) and veterinary specialist (1.5%) were the most important risk factors for the disease (14). On the other hand, 63.6% of patients reported a history of consuming unpasteurized dairy products in Turkey (13).

The villagers are engaged in animal husbandry and farming. In addition to direct contact with livestock, traditional dairy products are common in rural households, so It seems likely that most cases of disease in rural areas.

In Isfahan, the most cases of the disease were found in rural areas, where the rate of the infection in the rural population was about ten times higher that of the urban population (9). Contact with livestock is one of the most important routes of disease transmission. In rural areas where most people are in contact with livestock, the prevalence of the disease is higher (7, 14). In general, in many countries there is a direct relationship between the country's livestock population and human disease (15).

Most of the cases were in May, June and July and the least cases were in February and January. Overall, most cases were found in spring and summer and the least in autumn and winter. Since spring and summer are usually the longest seasons for lactation in livestock and consequently dairy products and exposure to livestock are higher in these seasons, so most cases are found in these seasons. This is consistent with the findings of many other researchers (8, 14).

Despite the high prevalence of brucellosis in Kerman province, no significant studies have been done on this disease. Farming and animal husbandry are the main occupations of the villagers of the province, therefore, it is necessary to have wider and more effective coverage of livestock vaccination, disease care, monitoring of livestock slaughter, monitoring of livestock imports, adequate supervision of the dairy products, and public education for all levels of society, especially in high-risk areas of the province.

It is also necessary to enable the villagers to control risk factors. In the high risk areas of the province, it is important to educate colleagues in rural health centers and homes about brucellosis. On the other hand, because in our country, information on livestock and human beings is examined in two separate ministries, so a useful and effective link between the two can help to better analyze the disease process.

The two separate ministries are responsible for animal and human disease control. Therefore, establishing a useful and effective inter-organizational relationship can help to assess the disease correctly.

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