

Epidemiology of Brucellosis in Korça Prefecture from 2005 to 2012

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Abstract

Aim: Human brucellosis is a serious disease that can result in disabling complications. Brucellosis is still one of the most challenging issues of both health and economy. This study was designed to determine the epidemiological features of brucellosis in Korça prefecture, as this is one of the endemic areas in Albania.

Methods: This is a retrospective descriptive study. Data on socioeconomic and occupational factors and history of exposure to animals and animal products over a 7-year period 2005–2012 were collected in Korça prefecture by using a structured questionnaire.

Results: In total, 737 cases of brucellosis were reported. The incidence rate of brucellosis decreased from 95/100,000 in 2005 to 11/100,000 in 2012. The male-to-female ratio was 1.6 and the disease was most common in individuals aged 40–49 years. 62.8% of cases were from rural areas. Cases occurred throughout the year, with the highest incidence rate between May and August. Among the occupations identified, 37.3% were housewives, 22.6% farmers, 21.3% students, 6.1% shepherds and 12.7% of the patients had other occupations.

Conclusions: Exposure and contact to home-owned animals and consumption of homemade milk and dairy products were identified as probable sources of human brucellosis infection in the districts included in this study conducted in Albania.

Keywords: brucellosis, cattle, dairy products, epidemiology.

Introduction

Brucellosis is one of the common diseases among humans and animals (called zoonoses), and appears in acute, sub-acute or chronic forms. In animals, it often causes damage to the urinary-genital tract, while in humans it usually causes weakness, lethargy, weight loss, fever, and sweating (1). Brucellosis is primarily a disease of domestic and wild animals, and humans are infected by direct or indirect contact with animals through the various modes of transmission (direct contact, inhalation aerosol, food borne). The disease is also called abortion of the cow, Mediterranean fever, Malta fever, Undulant fever, Gibraltar fever and Contagious abortion (2). Brucellosis is an important public health problem in many regions of the world (3-8) and still remains widespread and endemic in the developing countries (9,10). Moreover, it is a common health problem in some Middle Eastern and Mediterranean countries (3-6). The Mediterranean basin has always had cases of brucellosis due to climatic conditions for extensive livestock production in most countries of this region (3,9-11).

Brucellosis is an infectious disease caused by various gram-negative bacteria of the genus *Brucella* (12). This disease is one of the causes of significant economic losses in livestock production due to reproductive disorders and reduced production of affected animals (12).

Brucellosis can be transmitted to humans through contact with animals or their products; it is an occupational hazard to persons engaged in certain professions (e.g., veterinarians, slaughterhouse workers, and farmers) (13). According to WHO, the whole number of diagnosed patients might be 10 to 25 times less than real statistics of occurrence of this disease in community; false diagnosis, especially about chronic brucellosis that is extremely hard to diagnose, can probably be one of the reasons (14). Therefore, its prevention, control and eradication are a major challenge for public health. The aim of this study is to determine the epidemiological status of brucellosis in Korça prefecture over a seven-year period.

Methods

During the 7-year period from 2005 to 2012, 737 cases of brucellosis in Korça prefecture, Albania,

were analyzed. The prefecture of Korça includes the districts of Devoll, Pogradec, Korça and Kolonja. Directorates of public health in these districts collect data on cases of brucellosis from hospitals, laboratories, and health centers on a monthly basis. Cases were defined by clinical symptoms and confirmed by a positive standard agglutination test. Information about gender, age, location, occupational risk, and contact with the animals has been recorded by health professionals. These patients have been treated according to a standard protocol for brucellosis.

Statistical analysis

The statistical analysis of the data was carried out using MINITAB 16.0. Descriptive statistics were used to describe demographic and clinical data.

Results

Overall 737 hospitalized patients were included in the study. The mean age of patients was 37.3 ± 16.6 years. 281 (38.2%) of them were females and 456 (62%) were males. The male-to-female ratio was 1.6:1. The incidence of brucellosis decreased over the period of the study. The highest rate of incidence with 95 cases per 100,000 has occurred in 2005 and the lowest with 11 cases per 100,000 in 2012. The incidence rate of brucellosis shows a significant decreasing trend over the study period, $F\text{-ratio}=39.0$, $P < 0.05$ (Figure 1). About 600 (81.5%) of the patients were residing in rural area whereas 137 (18.5%) patients were residing in urban area. The animal contact rate was 79%, from which 95% (75.5–82.1) in rural cases. The mean age of rural patients was 29.8 years (± 18.9) and that of urban patients was 32.4 years (± 19.3). The most affected age groups were 40-49 years and 50-59 years with 165 (22.4%) and 134 (18.2%) of total cases respectively. The age group >40 years accounted for 57% of total cases.

In this study, 275 patients (37.3%) were housewives, 167 (22.6%) farmers, 157 (21.3%) students, and 45 (6.1%) shepherds and 94 (12.7%) patients had other occupations (figure 3).

467 (63.4%) patients reported livestock contact, 193 (26.2%) manipulation with animals and for 77 (10.4%) patients the home-made dairy products were the most probable source of human infection.

Figure 1. Incidence rate of Brucellosis in Korça prefecture from 2005 to 2012 (Cases /100,000)

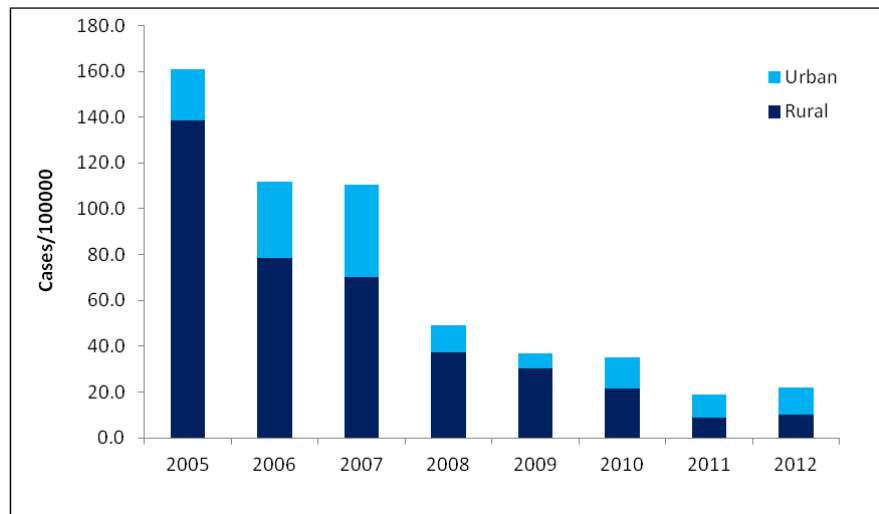
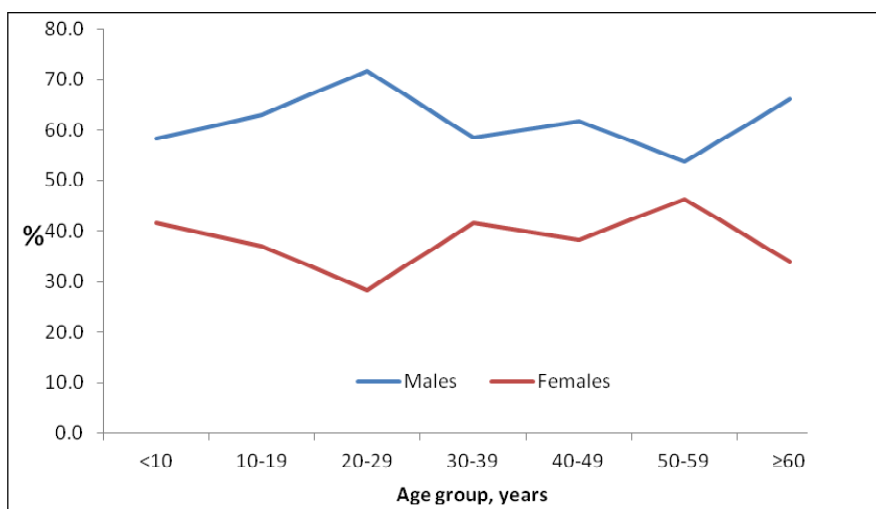
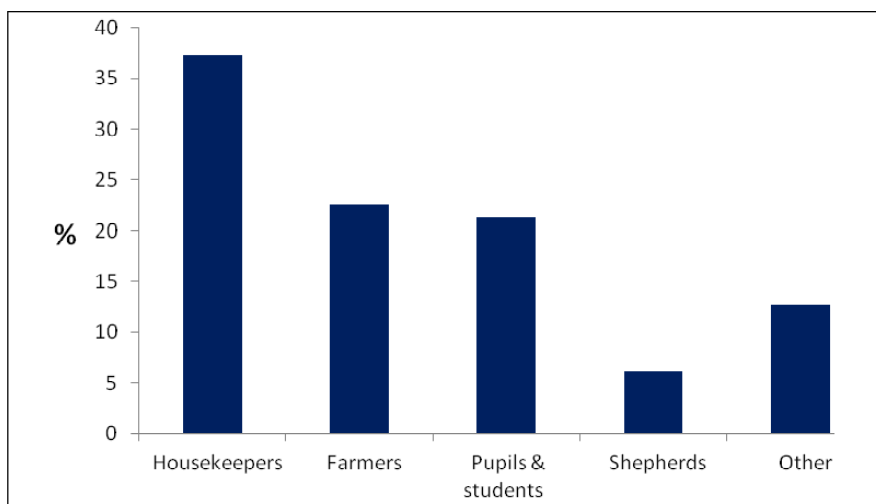


Table 1. Socio-demographic characteristics of hospitalized patients

Variables	Number	Percent
Gender		
Male	456	62.8
Female	281	38.2
Age group (years)		
<10	24	3.3
10-19	81	11.0
20-29	99	13.5
30-39	113	15.4
40-49	165	22.4
50-59	134	18.2
≥60	121	16.4
Residence		
Urban	137	18.5
Rural	600	81.5
Occupation		
Housekeepers	275	37.3
Farmers	167	22.6
Pupils and students	157	21.3
Shepherds	45	6.1
Others	94	12.7
Age (mean ±SD)	37.3 ±16.6	

Figure 2. Distribution of brucellosis cases by age group and gender**Figure 3. Distribution of brucellosis cases by occupation**

Cases occurred throughout the year, with the highest incidence being between May and August.

Discussion

The annual brucellosis incidence rate is about 1 to 75 per 100,000 people in Mediterranean regions and Middle East (13-17). However, this rate has approached 550 per 100,000 people in endemic regions (18-20). In this study, the highest rate of incidence has occurred in 2005 and the lowest in 2011. The incidence rate in Albania is about 15 per 100,000 (10,11). Korça prefecture's rate is higher than national average rate but the incidence rate of brucellosis shows a significant decreasing trend over the study period. This is due to the fact that in year

2004 began the brucellization of animals in the region of Korça. In the years 2007, 2008 and 2009 it was observed a decrease in positive cases up to 7 out of 8 animals. This evidences that the situation has improved in the Korça region, but neither the risk can be considered as passed, nor the zone as immunized (21).

Many studies show that in endemic regions, young males were more likely to be infected by brucellosis (20). In this study, 38.2% were females and 62.8% males, displaying ratio male: female 1.6 to 1.

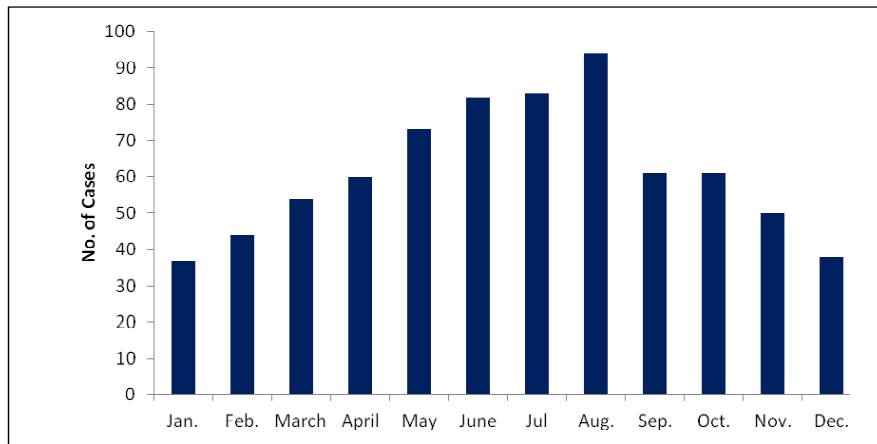
Findings are similar to other studies that report the ratio between males and females about 1.8 to 1 (16-20). In another study (22), the proportion of males was four times higher than females. In addition to

males, females are cooperating in caring livestock, milking and stable cleaning, too.

In Korça prefecture, about 62 percent of population lives in the rural area and the incidence of brucellosis in rural areas was always higher than in the urban area and 81.5% of patients were rural. The above finding is predictable because rural populations are often stockbreeder and have direct

contact with livestock. Using non-pasteurized dairy products in villages is more common than cities. However, disease transition paths in villages are significantly different from cities. There is also a suggestive relationship between gender and place of living, since brucellosis incidence rate among females is higher than among males in cities, while it is more common among males in villages. Contact with

Figure 4. Monthly distribution of brucellosis cases in Korça prefecture, 2005-2012



livestock is probably a path of transition for females too in rural areas; as in current living conditions of villagers, males have more contact with livestock and its products. Nevertheless, in cities, females have more contact with livestock products through cooking, resulting in possible infection.

In this survey, the mean age was 37.3 years, which is similar to other studies (15-20). Infections were reported in all age groups, but they occurred predominantly in the age group 31-50 years. This shows that infection occurs through occupational exposure and farm workers are predominantly men belonging to this age group.

In our study, 13.5% of patients belong to the age group 21-30 years. Probably, the reason might be that in Korça prefecture younger people are working as stockbreeders.

Brucellosis occurred mostly in spring and summer. In the studies conducted in other countries (23), most of the infections have been diagnosed in spring and summer; concerning the incubation period of disease, the contact with animal brucellosis might be traced to previous months i.e. parturition season.

Farmers are more affected but, as females are mostly cooperating in stockbreeding tasks, female homemakers are also affected. In villages, students also take part in stockbreeding tasks and help their parents, so the incidence rate is also high among them. In other surveys, contact with livestock and husbandry is identified as a risk factor.

Consistent with previous research (24), our study found that the principal modes of transmission were consumption of dairy products made from unpasteurized milk and occupational contact with infected animals.

Brucellosis is a zoonosis, so in order to avoid human infections it is very important to implement measures in the veterinary sector, as well as public health education activities. At the beginning of 2010, a control program - a mass vaccination program, was introduced. Thousands of cattle and small ruminants were vaccinated and it is expected that the implementation of these measures will yield good results (25). In addition to vaccination, the general population, especially villagers and women should be educated about the risk associated with the

contact with infected animals and consumption of raw milk and its products, about the transmission

route, food supply and delivery and prevention methods.

Conflicts of interest: None declared.

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