

Epidemiology of Brucellosis in Gjirokastra District, Albania

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Abstract: *Brucellosis is recognized as a clinical and health problem in underdeveloped countries. The aim of this study is to present the epidemiological features and clinical aspects of brucellosis, in the district of Gjirokastra during the period 2002-2011. Cases were defined by clinical symptoms and were tested by a standard agglutination test. The socio-demographic information, location, occupational risk, contact with the animals is recorded by health personnel. Overall 2678 patients were included in the study. The mean age of patients was 39.7±21.3 years with a range 2 – 83 years, 56.4% of them were males. 69% of patients live in rural area. Patients of age group 25-60 years of age account for 57.3% of the total cases. Most affected were housewives (34.4%) cases, farmers with 608 (22.7%) cases, followed by students with 316 (11.8%) cases and children with 254 (9.5%) cases. The majority of brucellosis cases in this study were attributed to direct contact with animals or their products.*

Keywords: zoonosis, rural, complication, control strategy

1. Introduction

Brucellosis is one of the world's most widespread zoonoses (1) caused by gram-negative bacilli of the genus *Brucella* (*Brucella abortus*, *B. suis*, *B. melitensis* and *B. canis*) (2). Brucellosis in humans (mainly caused by *B. abortus* and *B. melitensis*), is characterised by continued, intermittent or irregular fever, headache, weakness, profuse sweating, chills, arthralgia, depression, weight loss and generalised aching. In the countries where food hygiene prevents food-borne brucellosis, the disease is largely occupational and the majority of cases are males between the ages of 20 to 45 years. In the populations where food-borne brucellosis is common, such as nomadic societies, children account for a high proportion of acute cases (3). Brucellosis in animals presents as a sub-acute to chronic disease affecting a range of domestic and wildlife species and is a leading cause of abortion in livestock (4). It is a systemic disease that can involve any organ or system of the body. However, the most common manifestation is fever. Human brucellosis usually manifests as an acute or subacute febrile illness which may persist and progress to a chronic form (5). Generally, human infection occurs through consumption of poorly prepared meat and dairy products in the form of milk, cheese and butter but can also arise through exposure to animals and carcasses due to occupation (6). In humans, brucellosis caused by *B. melitensis*, which mainly causes infection in goats and sheep, is the most clinically obvious (7). Brucellosis is a re-emerging zoonotic disease that causes more than half a million infections to humans every year. The disease is common in most developing countries although its prevalence often remains unreported due to low suspicion index by health workers and insufficient capacity to correctly diagnose the disease in humans. Brucellosis is a major concern for most of the countries in the Balkans. Recent published studies highlight the tendency of geographical expansion of Brucellosis in almost the Balcan countries (8). The incidence in Serbia is

reported to be 3.3 per 100 000. This incidence was lower than in most of the Balkans and Mediterranean countries. In Macedonia, an incidence of 18.6 and 24 per 100 000 was reported in 2007 and 2008, respectively (9). In Albania, the brucellosis has an early origin. The first case in humans was discovered in 1925 in the district of Gjirokastra which currently remains the most problematic district all over the country, in terms of brucellosis infection in animals and in humans, but also because of the fact that brucellosis is ranked being the first bacterial infectious disease (10-12). In Albania, an incidence of 25 per 100 000 inhabitants was reported in 2008 (13). In Bosnia and Herzegovina, the incidence increased from 3.8 to 33.43 per 100 000 (14). Brucellosis represents a significant public health concern in neighboring countries Albania and Macedonia. In Albania (15) brucellosis is spreading in north east area of the country while the main reasons for persistence of the disease in Macedonia are not only husbandry practices and traditional food and living habits (16) but also an inadequate strategy of brucellosis control (17). The cross border migration of people and animals between these countries facilitates the spread of old and creates new zoonoanthropotic foci of brucellosis in the region. Rural and peri-urban agriculture also carries risks, including that of increased transmission of zoonotic diseases (18). Possible major source of infection with brucellosis might include marketed foods in urban and peri-urban areas, and contacts with animals and home consumption in rural areas. The aim of this study is to present the epidemiological features and clinical aspects of brucellosis, in the district of Gjirokastra.

2. Materials and Methods

This is a prospective study including all confirmed cases of brucellosis, in the district of Gjirokastra during the period 2002-2011. Cases were defined by clinical symptoms and were tested by a standard agglutination test. The socio-demographic information, location,

occupational risk, contact with the animals is recorded by health personnel.

Statistical Analysis

Statistical analysis of data was performed using Medcalc 12.1. Descriptive statistics were used to describe demographic and clinical data. Pearson's Chi-square test was used to compare qualitative clinical data between patients. The t-test was used to compare the age between males and females. Linear regression was used to estimate the trend of brucellosis over the study period. A p-value \leq 0.05 was considered as a significant.

3. Results and Discussion

Overall 2678 patients were included in the study. The mean age of patients was 39.7 ± 21.3 years with a range 2 – 83 years. 1168 (43.6%) of them were females and 1510 (56.4%) males, (table 1). The majority of patients 1844 (69%) patients live in rural area. Patients of age group 25-60 years of age account for 57.3% of the total cases. Most affected were housewives with 921 (34.4%) cases, farmers with 608 (22.7%) cases, followed by students with 316 (11.8%) cases and children with 254 (9.5%) cases. The lowest frequency of the disease was observed among veterinarians with 29 (1.1%) of cases. 1181 (44%) of patients were hospitalized. The mean duration of hospitalization was 27.4 ± 16.5 days (range 3 – 29). The most frequent clinical sign was fever observed in 98.5% of the total number of patients, followed by fatigue (81.3%), arthralgia (71.3%), sweats (62.3%), myalgia (46.7%), anorexia (44.5), headache (40.5%) (figure 1). Overall, 644 (54.5%) of hospitalized patients manifested complications such as spondylarthritis (19.1%), exacerbation of the disease (15.8%), toxic hepatitis form doxycycline used for treatment (12.1%), arthritis of the coxofemoral joint (9.9%), orchitis (8.9%) (table 2). The results showed that the majority of patients were belong to age group 25-60 years old (57.3%) and 56.4% of them were males. The high risk groups include the active population, which is similar with other studies findings (5). The vast majority of cases live in rural area. The vast majority of families in rural communities breed cattle, sheep and goats. It means that the majority of cases had a history of consumption dairy products or contact with animal material. Brucellosis is often a disease of rural communities associated with animal husbandry. The prevalence of disease in domestic animals is an important predictor of disease in humans. Brucellosis is more common in men than women (19). A high proportion of patients in our study (34.4%) were housewives who are the housekeepers and then farmers (22.7%) followed by students (11.8%) and children (9.5%). The proportion of male patients was greater than female patients amongst students and children. This could be due to a greater risk of exposure amongst boys, with household responsibilities such as shepherding of livestock being carried out boys. The most common brucellosis signs are fever, sweats, anorexia, fatigue, arthralgia, myalgia. Osteoarticular involvement, especially spondyloarthritis is the most common form of localized brucellosis among adult patient while arthritis were more common among young patients. Arthritis was more

common in bigger joints, coxofemoral (9.9%) and knee (3.6%). Less affected were the hand joint, radiocarpal arthritis (0.2%) and foot joint talokrural arthritis (0.6%). Many authors report similar findings with our study (20, 21). Hepatotoxicity was manifested in 12.1% patients. Pneumonia (8.9%) was the main respiratory complication. Orchitis occurred in 89% of adult patients (22, 23). Neurological symptoms were rarely reported in the initial manifestation of brucellosis, even though many patients had a prolonged duration of infection on presentation. In our study neurobrucellosis was found in 2% and depressive syndrome in 2.4% of adult patients (24). Sepsis occurred in 3% of patients whereas exacerbation of the disease in 15% of the patients. Brucella infection commonly causes mild hematologic abnormalities such as anemia and leukopenia. Thrombocytopenia is far less common (31).

4. Conclusion

The most affected patients were housewives and farmers followed by and young adults and children with predominance among males which has implication for tailored strategies in brucellosis control and prevention. The majority of brucellosis cases in this study were attributed to direct contact with animals or their products since housekeepers and farmers were the highest groups of patients. Osteoarticular involvement was a common form of focal brucellosis.

Results of the current study show that brucellosis in the district of Gjirokastra is an occupational disease that has a high impact on individuals who because of their profession or the way of living are in direct contact with animals and their products. Since a large proportion of patients were living in urban areas the study hints that dairy products sold in the market are made of unpasteurized milk. In order to decrease the incidence of brucellosis in humans, it is very necessary implementation of a promotional campaign for the education of persons at risk. Moreover, the relevant veterinary authorities should implement efficient measures to control the prevalence of brucellosis in cattle and small ruminants.

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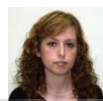
Table 1: Sociodemographic characteristics of patients

Variables	N	%
Gender		
Male	1510	56.4
Female	1168	43.6
Age (mean±SD)	39.7±21.3	
Age group total, years		
0-14	162	6.0
15-24	433	16.2
25-60	1535	57.3
> 60	548	20.5
Residence		
Rural	1844	69.0
Urban	834	31.0
Profession		
Housewife	921	34.4
Farmer	608	22.7
Student	316	11.8
Children	254	9.5
Shepherd	163	6.1
Slaughterhouse	139	5.2
Dairy producer	99	3.7
Merchant	40	1.5

Veterinarian	29	1.1
Teacher	35	1.3
Cooker	35	1.3
Other	37	1.4
Hospitalization		
No	1497	56.0
Yes	1181	44.0

Sepsis	19	3.0
Exacerbation	102	15.8

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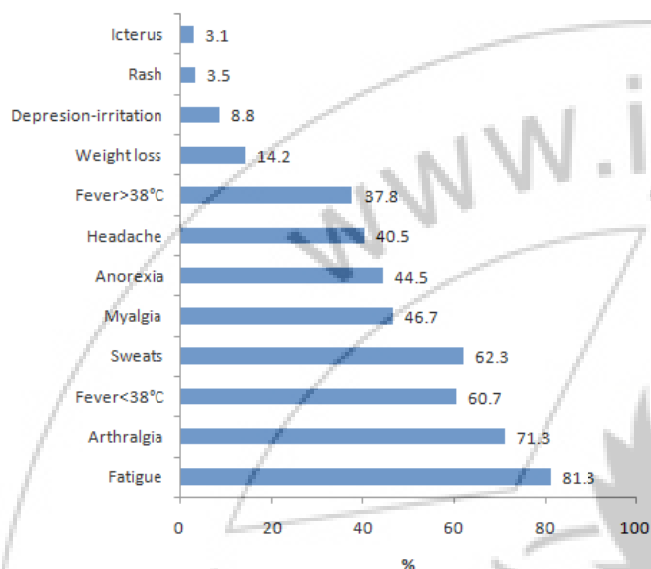


Figure 1: Frequency of signs and symptoms

Table 2: Frequency of complications

Complications	N	%
Osteoarticular		
Coxofemoral arthritis	64	9.9
Scapulohumeral arthritis	7	1.1
Knee arthritis	23	3.6
Radiocarpal arthritis	1	0.2
Talokrural arthritis	4	0.6
Polyarthritis	15	2.3
Maxillary sinusitis	6	0.9
Spondyloarthritis	123	19.1
Respiratory		
Pleuritis	4	0.6
Pneumonia	57	8.9
Neurological		
Mielitis	2	0.3
Neurobrucellosis	13	2.0
Genitourinary		
Urinary Infection	40	6.2
Orchitis	57	8.9
Gastrointestinal		
Hepatitis	78	12.1