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Investigation of Brucellosis Information and Applications of Animal Breeders: The Case of Erdemli

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ABSTRACT

Objective: Lack of information about brucellosis can affect patient's health-seeking behaviors and thus cause constant infectation in semi-urban communities. This study aimed to determine the knowledge level of brucellosis of dairy cattle breeders and evaluate the information about brucellosis in 83 people living in 21 different villages and neighborhoods of Erdemli district.

Materials and Methods: In the study, in this cross-sectional study, face to face interviews and data were collected using a 30 question questionnaire to investigate the level of knowledge about individuals about brucellosis. Data were evulated by using SPSS 21.0 statistic program.

Results: While 72.3% the individuals do not know that brucellosis causes disease in humans, 56.6% do not know that it causes disease in animals. Participants said that 56.6% had heard of the about brucellosis before and those who heard said that they had heard from 13.3% of their relatives or neighbors. A majority of the participants (56.6 %) had heard about Brucella, 72.3% of individuals do not know that brucellosis causes disease in humans and 56.6% of the participants do not know that Brucella is an animal disease. It was determined that 65 (73.8%) of the participants did not make cheese from raw milk, 66 (79.5%) did not consume cheese fresh, and 74 (89.2%) did not make butter from raw milk cream. The individuals who participated of in the study 32.5% had bovine animals and 67.5% had small ruminants; the rate of aborted animals is 30.1% in the last year. The total proportion 20.5% was of stillbirths, the rate 51.8% was infertile animals.

Conclusion: In the present study infertility, stillbirth and abortion numbers of individuals who had not heard of brucellosis before were higher than those who had heard and who took the necessary precautions. It is a fact that the herd can threaten all other animals in rapidly spreading infectious diseases such as brucellosis. Therefore, providing the necessary incentives for the establishment of modern business facilities in areas where animal husbandry is intensive, if this is not possible, raising the level of knowledge by providing various trainings to individuals dealing with dairy cattle breeding will contribute to the national economy.

Keywords: *Animal breeders, Brucellosis, Education*

INTRODUCTION

Brucella continues to pose problems in many regions of the world, especially in developing countries, and has been one of the most common zoonotic diseases in the past 15 years (Franco et al., 2007; Nicoletti, 2002). Throughout the world, especially in the Mediterranean region (Portugal, Spain, southern France, Italy, Greece, Turkey, North Africa), the Middle East, Eastern Europe, are highlighted as high-risk zones. It is estimated that

there are 500,000 new cases of brucella annually all over the world (De Bolle et al., 2015). Brucellosis is a common zoonotic disease in humans and subacute or chronic diseases caused by Brucella bacteria that can be transmitted to humans by meat, milk, urine, body fluids and infected animal's pregnancy material (Gotuzzo et al., 1992; Baysal and Ustaçelebi, 1999; Gurturk et al 1999; Bilgehan, 2000; Ilhan et al. 2008). Brucella species are Gram negative, facultative, intracellular coccobacilli, non-spore-forming, non-capsule and non-motile bacteria. In the Brucellaceae family, there are six important species that cause infections and are not specific to the host but can easily breed and infect humans under appropriate conditions (Yuce and Cavus, 2006).

Brucellosis is a disease characterized by nonspecific symptoms and may affect all organs and systems that may present with hematologic, gastrointestinal, skin, genitourinary, cardiovascular, respiratory, osteoarticular and neurological disorders. Due to their intracellular nature, Brucella bacteria are able to survive and proliferate and become chronic in mononuclear phagocytic cells (Dhauk and Nöckler, 2011). Molecular methods have been used in the routine diagnosis of brucellosis in recent years. Various serological and biochemical tests are currently used in practice. However, the exact result takes a long time, so in recent years molecular methods are more preferred for diagnosis, biotyping and species separation of Brucella (Bricker et al., 2003).

Brucellosis is seen in high rates in countries with border neighbors. At the same time, as the majority of the population of this country provides livelihood with livestock, significant economic losses are experienced in the national economies (İzgür, 2007). Brucellosis has become the most important focal point in the world. It seems that this disease is difficult to control and is constantly increasing, becoming a serious public health problem. Brucellosis settles in various tissues and organs of animals, causes offspring and infertility (Young et al., 2000; Bosilkovski et al., 2009).

In this context, our study was carried out in order to determine the knowledge level of brucellosis of the animal breeders living in the district of Erdemli and to determine their educational needs. The aim of this study was to determine the level of knowledge of brucellosis among people living in various villages and neighborhoods in the district of Erdemli. As the people of the district are of Yoruk origin, the tradition of going up to the highlands and grazing in the pasture still continues. It is known that brucellosis is more common in settlements where animal breeding and milk processing techniques performed by traditional methods. In our study, abortus, stillbirth and infertility levels were high in the animals of animal breeders who had not heard of brucellosis before. This situation causes animal breeders to suffer economic losses and endangers the health of consumers. For this reason, it is important to determine the information levels of brucellosis and to provide trainings on this subject in the regions where animal husbandry is widespread.

MATERIALS and METHODS

This is a cross-sectional epidemiological study to determine the knowledge level of animal breeders about brucellosis, a zoonotic disease. In this study, 83 different animal producers living in 21 different settlements in Erdemli district were interviewed. The study was conducted with all animal breeders involved in dairy cattle without discrimination. All of the participants were informed about the method and purpose of the study and they were carried out on a voluntary basis. Before starting the study, ten individuals were pre-tested and the questionnaires were prepared by completing thirty questions.

The research, ethical approval and necessary permission was obtained from Mersin University Non-Clinical Research Ethics Committee and related institutions for conducting the research. After giving information about the purpose and method of the research, written consents were obtained from the participants. The questionnaire form was presented to the people who agreed to participate in the research by face to face interview method.

With the help of SPSS 21.0 statistics program, percentage and frequency values in categorical data obtained from the questionnaire and average values in continuous variables were calculated and the results are presented in tables and figures.

RESULTS

As a result of the study, 83 animal breeders living in 21 different settlements were interviewed. The average age of animal breeders is 50.98. In addition, 10 (12%) are women and 73 (88%) are men. The 80 (96.4%) participants knew how to read and write, while 3 (3.6%) did not know to read and write. The total number of sheep and goats is 6133 (67.5%) and the number of cattle is 512 (32.5%). Of the

individuals dealing with dairy cattle, 47 (56.6%) have not heard of this disease before, the rate of those who have heard of the disease from relatives and neighbors is 13.3%. While all the breeders who heard of brucellosis disease knew that brucellosis caused disease in the animal; the number of people who knew that they had illness was found to be 23 (27.7%). It was determined that the number of people who informed an authorized person "when it was aborted?" was 39 (47%) and the number of those who did not confuse the herd with other flocks was 66 (77.1%). When the level of knowing brucellosis was investigated by looking at the number of animals, no statistically significant difference was found in Table 1 ($p>0.05$).

Table 1. Evaluation of Brucellosis knowledge levels according to the number of animals

Number of Animals Raised	Breeders knowledge of Brucella disease				Total
	Yes		No		
	n	%	n	%	
1-20 animals	14	38.9	22	61.1	36
21-50 animals	6	46.2	7	53.8	13
51 and above animals	16	47.1	18	52.9	34
Total	36	43.4	47	56.6	83

Table 2. Abortion incidence rates in animals by number of animals

Number of Animals Raised	Abortion in animals				Total
	Yes		No		
	n	%	n	%	
1-20 animals	3	8.3	33	91.7	36
21-50 animals	4	30.8	9	69.2	13
51 and above animals	18	52.9	16	47.1	34
Total	25	30.1	58	69.9	83

Table 3. Investigation of infertility levels by number of animals

Number of Animals Raised	Infertility cases in animals				Total
	Yes		No		
	n	%	n	%	
1-20 animals	9	25	27	75	36
21-50 animals	9	69.2	4	30.8	13
51 and above animals	22	64.7	12	35.3	34
Total	40	48.2	43	51.8	83

Of the 25 (30.1%) animal breeders, 196 (30.1%) animals had abortion in the past year and it was found that 71 (17%) animals of 17 (20.5%) animal owners still gave birth. When the abortion rate of animal breeders according to the number of animals was investigated, a statistically significant difference was found in Table 2 ($p<0,005$).

The participants of only 20 (24.1%) had previously received information about brucellosis. In addition the animal producers of 64 (77.1%) performed barn disinfection after birth; used gloves 40 (48.2%) for the birth of each animal, 79 (95.2%) wash their hands before milking animals and 59 (71.1) before milking the animals the animal has been found to wash its udder. Based on these data, infertility 237 (49.4%) of 40 (48.2%) was detected in animal owners. When the infertility numbers of animal breeders are analyzed, a statistically significant difference was found between them a statistically

significant difference was found between Table 3 ($p<0.05$).

The participants of 65 (73.8%) did not make cheese from raw milk; 66 (79.5%) did not consume cheese freshly. It was determined that 74 (89.2%) did not make butter from raw milk cream. In parallel, 77 (92.8%) of the participants have not had brucellosis disease and treatment before. The number of those who immediately added the new animal to the herd was found to be 44 (53%), while the number of those who immediately used the milk of the low or stillbirth was 9 (10.8%) and the number of those who immediately brought the low or stillbirth to the herd was 54 (65.1%). The number of people who think that the vaccine protects brucellosis is 68 (89.1%).

DISCUSSION

Brucella disease which is an important public health problem worldwide is one of the important zoonotic diseases neglected by the World Health Organization (OIE, 2009). Brucellosis is an important health problem in regions where animal husbandry, widespread in our country and its morbidity is quite high. Brucellosis is characterized by offspring, infertility, stillbirth and various clinical symptoms in animals such as sheep, cattle and pigs. In addition to causing serious infections in humans, it is an infectious disease that causes economic losses (Badur, 1970; Bilgehan, 2000).

In our study, the participants of 43.4% stated before that they had heard of brucellosis. In a study done in animal breeders in Tajikistan 31% of the participants stated that they heard and know brucellosis (Grahn, 2013). In a study conducted in Uganda this rate was 99.3% (Kansiime et al., 2004), in a study conducted in Italy this rate 74.6% (Angelillo, 2001) and in a study conducted in Kars province this rate 66% (Akkuş et al., 2011). The participants of 86.7% stated that the source of information about the disease is professional. Information about brucella disease appears to be obtained from professional individuals, but compared to other studies, the rate of hearing brucella disease is low. It is very important for the eradication of the disease that professional community organizations, health personnel and academic institutions provide information and counseling services to the society about brucellosis.

Considering the level of knowledge about the ways of transmission of the disease the number of animal breeders who have heard of brucellosis disease 43.4%, while all of these animal breeders know that brucella is a disease only in animals; it causes disease in humans do not know of 72.3%. In the study of it was found that 80% of the participants could count joint pain and fever as symptoms and 4.5% of them knew at least one symptom (Lindahl, 2015; Babaoğlu and Demir, 2017). The animal breeders of 77.1% had disinfected the barn after birth; 49.4% had infertile animals; 30.1% of the offspring in the last year. It was seen that 20.5% had stillbirth. In other studies, 34% offspring, 31% stillbirth, 66.7% vaccinate animals but 15.7% do not know how to protect animals from brucellosis, 30.7% do not properly dispose of their abort determined (Babaoğlu and Demir, 2017). In our study, the participants of 81.9% did not believe in the protection of the vaccine.

The participants of 7.2% were diagnosed with brucellosis and treated. This rate 59.8% in Uganda (Kansime et al., 2004), 5.2% in a study in Kars (Akkuş et al., 2011) and 40.9% in a study in Van in the past was diagnosed and treated with brucellosis (Kuşaslan et al., 2017). It is a fact that developed countries are known as a chronic disease of developing and underdeveloped countries. In the study area, it was determined that most people do not know how to protect their animals from brucellosis. In our study, 21.7% of the participants made cheese from raw milk; 20.5% of the fresh consumed cheese; It was determined that 10.8% made from butter raw milk cream. It was found that the risk for consumption of raw dairy products of 84.5% was much higher a study conducted in Kars (Akkuş et al., 2011). In a similar study conducted in Van province, it was determined that raw milk and dairy products of 13.6% were consumed fresh by the participants (Kuşaslan et al., 2017). One of the ways of transmission of Brucellosis is the body secretions of the infected animal. It is known that individuals with impaired skin integrity in contact with these secretions are also at risk (Kılıç et at., 1994). When the individuals participating in our study were examined; risky behaviors such as milking by hand, not cleaning the breast of the animal before milking and not using gloves at birth are common. However, 51.8% of the participants used prenatal or postnatal gloves, 95.2% were washing their hands before and after milking and 71.1% were washing their breasts before milking the animals. In a study, it was found that 35.6% of those assisting birth did not use gloves (Kuşaslan et al., 2017). In the study conducted in Kars, it was stated that 44% of the participants did not use gloves

(Kansime et al., 2004). The rate of animal breeders who applied to the veterinary surgeon after stillbirth or 92.8% abortion; abortion and stillbirth in 10.8% of the animal's immediate use of milk, while 98.8% of the participants take care of the herd. While most of the developed countries have eradicated the disease, in developing and underdeveloped countries, the disease causes significant health problems and economic losses. In our study, the high level of veterinary cooperation of animal breeders is pleasing while it is known that the cattle that produce bacteria with their milk for weeks and even months after abortions, stillbirths and the calves that throw off spring. Due to Brucellosis begin to disappear 30-40 days after the abortion date. As a result of our research it was seen that the animal breeders of 22.9% mixed the herd with other herds while 53% did not keep the herd apart from the other herds. They were buying a new animal and 65.1% immediately added the low and stillbirth animal to the herd (Özcan and Şahin, 2012). According to the data obtained from the study, 39 (47%) people inform a competent person when they are abort. Inadequate reporting of suspected cases of abortion and stillbirth, such as abort, indicates that the fight against brucellosis still does not reach the desired levels. It was determined that animal breeders did not show the necessary care when adding animals to the herd. It is understood that brucella disease causes big losses in livestock economy. Diseases in humans are caused by direct contact with the infected animal and consumption of raw dairy products obtained from this animal (Akdeniz et al., 2000; Seleem and Boyle 2010). The fact that animal breeders who are at high risk for brucellosis does not have sufficient information about the transmission, symptoms and ways of infection increases the importance of the problem. Not only animal breeders, but also animal breeders are at risk for brucellosis. Disinfection of the barn, keeping the abort materials away from the herd and destroying them as necessary is important in preventing the spread of the disease. It is possible to prevent the epidemic by washing the hands of the people who make milking with the disinfectants. The transition between animals changing the titles after each milking with milking machines fighting with the village people in the fight against the disease and showing the necessary attention by separating the suspicious animal from the herd.

CONCLUSION

As a result, brucellosis should be considered primarily in long-term fever and joint pain in individuals working in animal farms. Brucellosis is a rapidly spreading infectious disease. It is a fact that an infected animal that will be brought to one of the village households or enterprises will soon threaten all the village animals. The study looking at the data the individuals only of 24.1% included in the sample stated that they had received information about brucellosis before. However, disease and economic losses can be prevented by simple training on brucellosis. During our study, most of the participants stated that they wanted to learn about brucellosis. As the findings of the fight against disease are specific, their complications are high, they cause loss of labor force and they can affect large masses, especially in endemic regions, relevant professional organizations should cooperate and develop a common national struggle program against epidemics.

In developing countries, efforts are needed to establish an infrastructure, such as training in the risks of brucellosis, to people. Training and informative brochures should be organized for the consumer, especially about the consumption of risky products. Between the public health and veterinary sectors in providing health education and information about the cause, symptoms, transmission and prevention of brucellosis for better management of the disease. The need for cooperation is emphasized. The most important transmission route is the consumption of milk and dairy products without pasteurization. To be protected from brucella is to be careful in the control of milk and dairy products. Following this will be the control of animals with the reservoir of the brucella and the decrease in the incidence of brucella in humans.

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