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Some Preliminary Information About the Presence of Q Fever in People of Tthe Tetova, Kercova and Dibra Regions, in Western Macedonia

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Abstract: *Q fever disease is an infection that affects not only the people, but the animals, as well. Q fever is caused by a pleomorphic coccobacillus Coxiella burnetii. Our study is aimed at finding the presence of Q fever infection in people of the three Western Macedonia regions (Tetova, Dibra, and Kercova). The study was carried out in the Laboratory of Virology of the Faculty of Veterinary Medicine – Tirana, Albania, with the use of the ELISA Test, for humans, imported from the German Firm, Serion. A total of 293 serums of people (of the three regions) were tested for the accomplishment of this study, of which, 156 were from females and 137 from males. The number of samples, divided by regions, is: Dibra (males: 29 samples, females: 35 samples), Tetova (males: 73 samples, females: 82 samples) and Kercova (males: 35 samples and females: 39 samples). The assessment of positivity was based on the Cut-off values, the ones over 0.500 OD are positive. We only took out the presence of the infection, by recording the IgG, and not trying to evaluate the pathologic process. It was found that the presence of the infection is at different percentages in total, by regions: Tetova 18.7%, Debar 34.3% and Kercova 43.2%, mainly starting from the age group of 20 year olds and up. We only found one case of a 15 year old female in the Kercova Region, with the presence of IgG. The percentage of the infection varies in different age groups and genders, shown in corresponding tables and charts.*

Keywords: *Q fever, Elisa test, serological, atypical pneumonia, zoonosis.*

Introduction

Q fever is a zoonotic disease caused by Coxiella burnetii, a small intracellular bacterium. The disease is known since 1930 and it is currently quite widely spread throughout the whole world, except Antarctica and maybe New Zealand [10], where its presence has not been truly confirmed [6].

C. burnetii is a pleomorphic, gram-positive bacterium. It is known as an obligate intracellular bacterium, replicating in large numbers, inside the phagolysosome of the eukaryotic phagocyte [7], and [16]. Even though Coxiella was historically considered as a Rickettsia, the gene sequencing analyses classify it as part of the Coxiella genus, Legionellale order, Coxiellaceae family with the Rickettsiella and Aquicella [13].

Even though the plasmids tend to be very important for the virulence, due to common sequences of all isolates of the Coxiella, their biological qualities are still uncertain. The phase variation phenomenon (Phase I and Phase II), found in *C. burnetii* is similar to the smooth and rough lipopolysaccharides (LPS) at the Enterobacteriaceae transition [4].

Q fever is an essentially contagious disease through the air. Humans get infected after they inhale the aerosols coming from infected placenta, body liquids or contaminated dust from garbage and dried placenta materials. The transmission of C. burnetii is mainly related to miscarriages of ruminants and especially miscarriages of the sheep [2]. Some authors describe a seasonal variation of the disease's incidence in humans in the spring and early summer, which is related to spring births and environmental contamination during this period [8] and [14]. The infection doesn't come from a direct contact with a female animal that had a miscarriage. Humans get infected during their processing of the infected wool [1], feces [5] or contaminated clothing with feces [3], etc. C. burnetii causes a quite differing clinic in humans, going from acute types, to fatal chronic infections. The acute infection causes atypical pneumonia or hepatitis flulike symptoms. The outbreak is abrupt, causing high fever of up to 40°C, sharp headaches, weight loss, myalgia and coughing [11]. The hepatitis can also be asymptomatic, whereas the endocarditis is more frequent and it comes as a heavy clinical manifestation in chronic cases of Q fever [12] and [15]. Since the symptoms of Q fever are nonspecific, its early diagnosis based on serological methods, gives way to taking efficient measures to fighting it.

Materials and methods

The stated study was conducted in the Laboratory of Virology of the Faculty of Veterinary Medicine – Tirana, Albania, using the ELISA Test in humans. The ELISA Kit was imported from the German Firm, SERION. The result's aim was to identify the IgG. The blood was taken from people of different pathologies, without any special preferences. It was collected from Tetova, Kercova and Dibra areas. The number of people tested is 293, out of which, 137 are males and 156, females. They are of ages 0 to over 60 years old and, not all of them live in rural areas and in contact with the animals, showing a presence of the infection in them, like it does in rural areas. The blood serum is separated by centrifugation at 6000 rpms in 20 minutes. The serum placed in plastic ampoules was kept frozen at -30°C, until its testing. Positivity was based on the cut-off value, which in this case is over 0.5 OD. The sera were diluted before the test at a ratio of 1:400, in two steps. The first dilution was done at a ratio of 1:100, then the stated dilution, at a ratio of 1:4. The test was conducted based on the protocol of Serion Firm. The study's aim was to identify the presence of the infection in humans, and not interpret the diagnosis' decision.

Results and Discussion

Based on what was said above, the testing of the sera taken from people of different ages, starting at 0 to over 60 year olds, showed the presence of the infection based on age groups, which is presented in the tables below. We emphasize that, not having a particular principle in determining the age groups of persons tested and as we only wanted to identify the present or past presence of the infection, the division in age groups was done this way: 0-20, 20-40 and over 40 years of age, for both females and males.
The results acquired from this serological test are shown in the respective tables and charts.

Table 1: Results from ELISA-Serion serological tests, for people in Tetova

Area (Tetova)	Age groups	Tests in total/Positive				Remarks
		Males	Posit-%	Females	Posit-%	
	0-20	20	0-0%	26	0-0%	
	20-40	16	2-15.5%	18	6-33.3%	
	Over 40	37	13-35.1%	38	8-21%	
	Total	73	15-20.5%	82	14-17%	

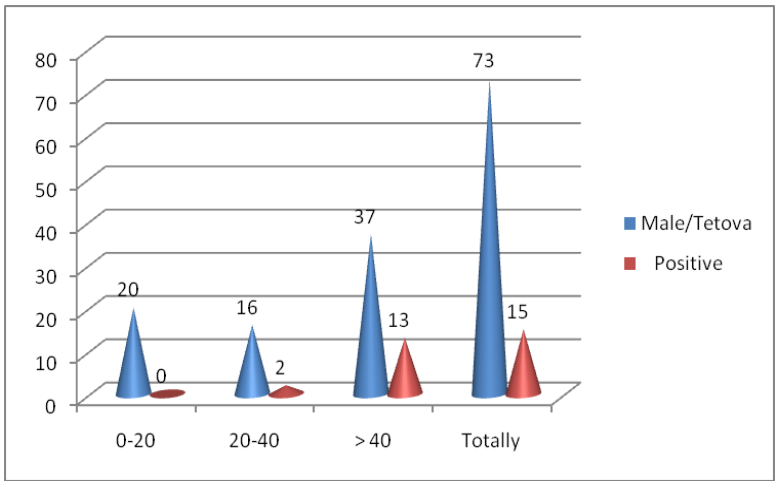

Chart 1: Positivity in males based on age groups in Tetova

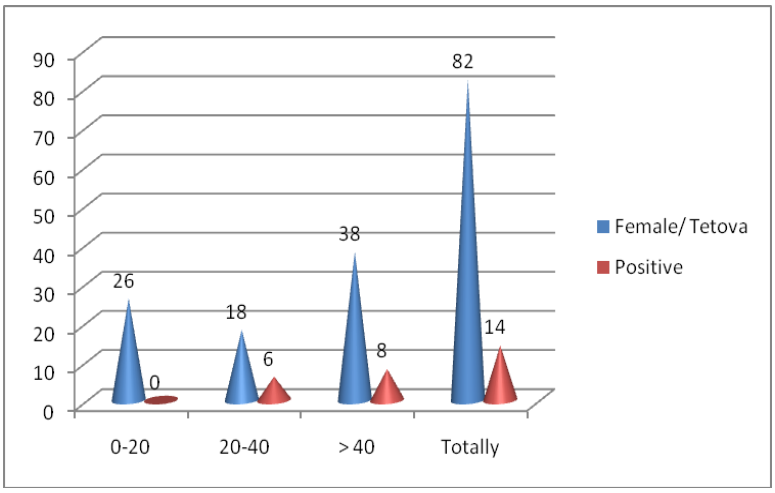

Chart 2: Positivity in females based on age groups in Tetova

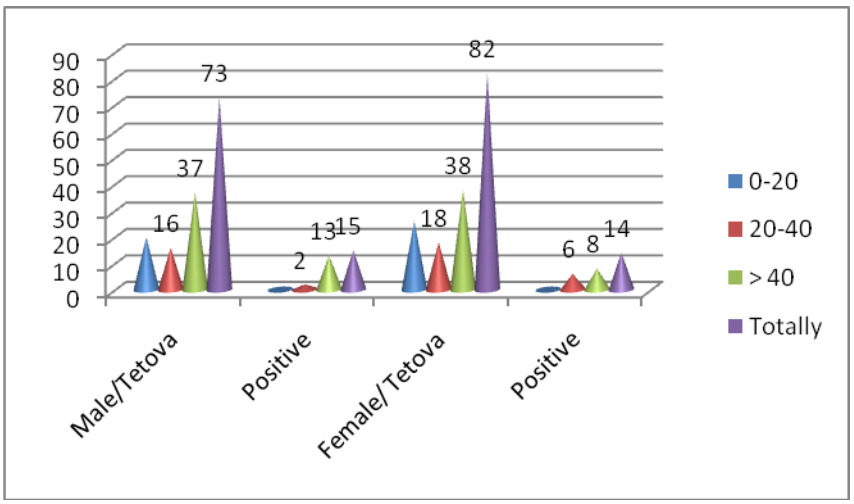

Chart 3: Comparative positivity in males and females in Tetova

Area (Dibra)	Age groups	Tests in total/Positive				Remarks
		Males	Posit- %	Females	Posit-%	
	0-20	3	0-0%	3	0-0%	
	20-40	4	1-25%	4	1-25%	
	Over 40	22	10-45.4%	28	10-35.7%	
	Total	29	11-37.9%	35	11-31.4%	

Table 2: The result from the ELISA Serion serological test, for people in Dibra

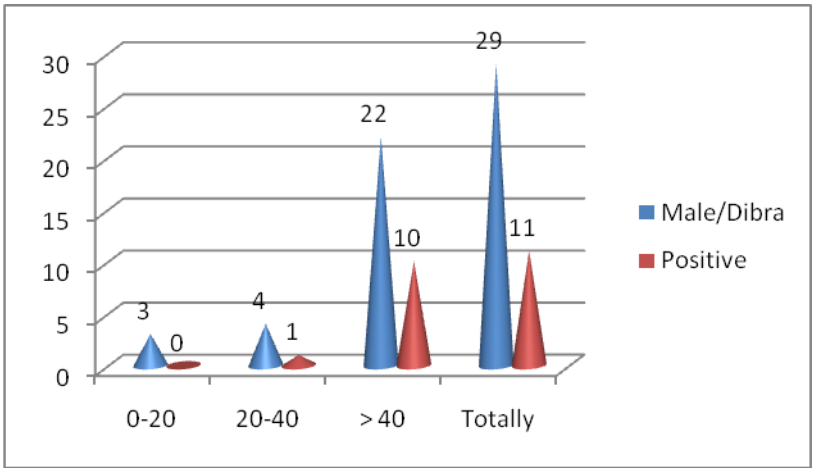

Chart 4: Positivity in males based based on age groups in Dibra

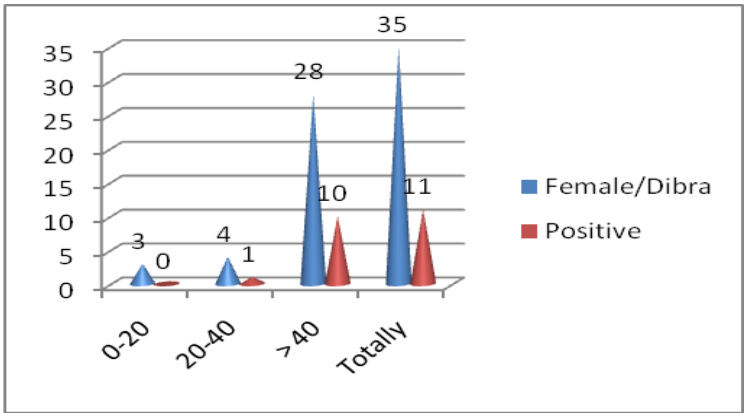

Chart 5: Positivity in females based on age groups in Dibra

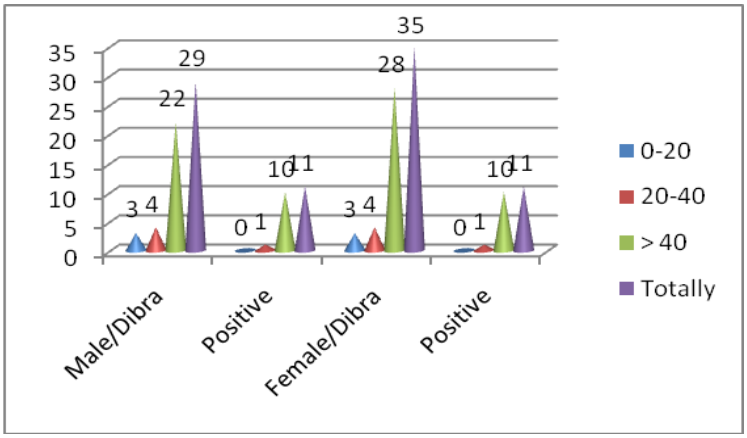

Chart 6: Comparative positivity in males and females based on age groups in Dibra

Table 3: The result from the ELISA Serion serological test, for people in Kercova

Area (Kercova)	Age groups	Tests in total/Positive				Remarks
		Males	Posit- %	Females	Posit-%	
	0-20	4	0-0%	3	1-33.3%	
	20-40	6	3-50%	8	5-62.5%	
	Over 40	25	11-44%	28	12-42.8%	
	Total	35	14-40%	39	18-46.1%	

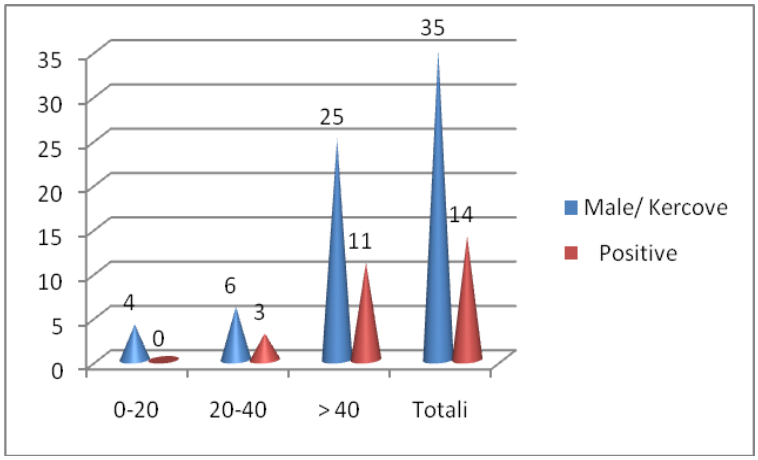

Chart 7: Positivity in males based on age groups in Kercova

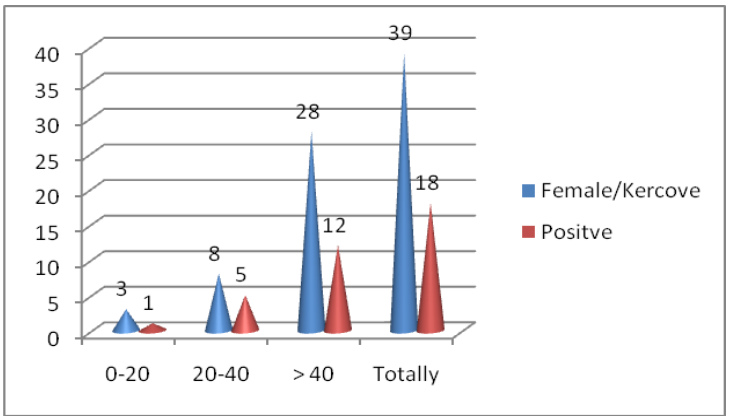

Chart 8: Positivity in females based on age groups in Kercova

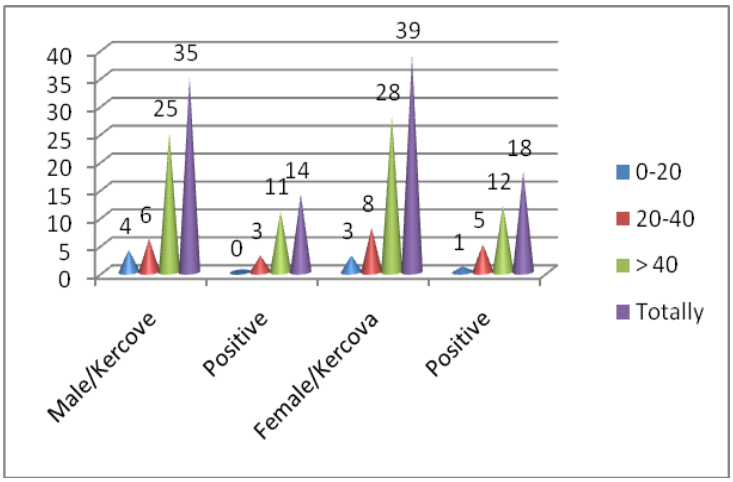

Chart 9: Comparative positivity in males and females in Kercova

The above shown information shows clearly the presence of Q fever infection in humans of the three regions. It is worth stating that this infection is present in both males and females, but of course at different percentages, in respective genders. Also, during the interpretation of the shown tables above, it can be observed the fact that the infection is hardly present within the age groups of 0-20, in all three regions. In this case, only one single case results differently, in the Kercova region, where a 15 year old girl has the infection. We were unable to get detailed information about this person. Nevertheless, it must be stated that the tested number in this region, for the age group of 0-20 females is small and it lets us think that in further researches there could be more cases of this age group. This is solely based on the fact that during the testing of animals in this area, their infection percentages resulted to be high. This fact is also supported by the results of other age groups where the infection percentage there is almost relatively higher than in other regions. Other factors, such as social, economical, etc. aren't to be excluded. By the interpretation of the above tables, we also notice that besides the age group of 0-20, in other age groups like, 20-40 and over 40, the infection percentage is different in different areas. Thus, for example, we realize that as far as the male gender is concerned, the lowest infection percentage comes from age groups of 20-40 year olds in the Tetova region where, out of 16 tested people, the positivity level is 15.5%, while in the same age group of the Kercova region, this level of infection is 50%. Meanwhile, in the Dibra region, this infection percentage is at a level of 25%. Thus, in the age group of over 40, where in this case the higher infection percentage is 45.5% in the Dibra region, in other regions the percentage is a bit lower in Kercova, with 44% and low in Tetova with 35.1%.

If we take the total number of tested males of the three regions, the result once again shows the highest infection percentage in the Kercova region, with 40%, followed by the positivity of the Dibra region, with 37.9% and last comes the Tetova region, with the lowest percentage of around 20.5% of tested people. However, we observe a very interesting moment of this infection percentage, against the total of tested males. Even though, the number of tested males in the Dibra region is lower, 29 persons as well as the absence of the infection in the age group of 0-20, the infection percentage is higher than the one in the Tetova region where 73 male persons were tested and close to that in Kercova, with about 40%, in which region the number of serologically tested people is about half of that in the Tetova region. Based solely on this serological test, we are unable to say why it is so, what are the reasons to such an infection level, maybe further studies on this will give a clearer picture, that we think will be an important contribution towards this.

As far as the female gender is concerned, it is of interest to state the fact that besides the presence of the infection in the age group of 0-20, a case of a 15 year old female, it tells us that the presence of the infection is high in the Kercova region, considering its high level of 42.8% in the age group of over 40 year olds, which compared to the same age group of the other regions, it is 1.5 times higher than that of Dibra region and over 2 times as high than that of Tetova region. Besides the above mentioned high levels in this region, there's also observed a very high level of infection in the age group of 20-40, reaching the levels of 62.5%, while in the other regions it is almost half of this, for the same age group. In this case, we think that in the Kercova region, it is due to the high levels of the infection in animals (over 25% in sheep), and due to the other fact of this age group, especially from rural areas, working in farming, meaning that women of these age groups have more contact with the animals and they look after them more, especially small livestock (sheep and goats), compared to men.

This information acquired by us, is also supported by other authors, like [8] and [14], who mention the fact that the highest infection rates in humans happen during the period of livestock birth (small ruminants). This evidence of our particular case is not directly related to the seasonal infection percentage, but we see the phenomenon observed by the above mentioned authors, indirectly related to the fact that since the women of this region have more contact with the animals and since they help them more during their difficult births, therefore favorable conditions for more frequent infections are created for this age group. Based on us, this is why the higher infection percentage is found in this age group.

By reviewing the table contents on the total infection percentages, in females and by comparing it to males, we find an interesting clue, that with the exception of the Kercova

region, where the infection in females is higher than that in males of other regions, this level of infection goes in the opposite direction, meaning that the total number of infected males is higher than females. This evidence also corresponds to the statistical data of CDC in US, where the infection percentage in males is 2 times as high as that in females [17].

Conclusion

As a conclusion, our study tells us that there are higher levels of infections in humans of the three above mentioned regions, there where levels are higher in animals, as well. It can be found mainly in the age groups, starting from 20 and all the way to older age groups. There is only one case that resulted positive within the age group of 0-20. We think that the presence of the infection in humans has to do with numerous factors, but maybe, based on the evidence from the Kercova region in particular, the main factor may be the contact with the animals. Our opinion is that other factors play a role towards this, such as the social one, economical, those of traditions, etc. Anyhow, we think that the presented evidence on the presence of the infection in humans is an important contribution to serve the humanity, which still doesn't have a view of this infection's extension in people and still doesn't have any information on the role of this infection in different pathologies in people of Western Macedonia. Other studies, related to a greater extent of this infection in humans and animals, will further enrich the knowledge on this infection in our region.

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