



Short Communication

Prevalence of Zoonotic Tuberculosis and Brucellosis in Animals of Quetta and Pishin Districts, Balochistan

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ABSTRACT

Brucellosis and bovine tuberculosis (TB) are a constraint to livestock production in Balochistan. The aim of this study was to determine the prevalence of brucellosis and bovine tuberculosis in cattle, goats and sheep in some primary dwelling districts of Balochistan. Our results showed that brucellosis was found 2.2% positive from Quetta district and 0.6% positive from Pishin district and bovine (TB) was found 0.60% positive from Quetta and none from Pishin district of Balochistan.

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Authors' Contributions

MNS, SS and AK conceived and designed the study. BTB, AT, MMT and MAA collected the samples and conducted biochemical tests. MS, ZA and SAR analyzed the data. BTB, AT and HE wrote the article.

Key words

Brucellosis, Bovine tuberculosis, Goats, Sheep.

Bovine tuberculosis and brucellosis are among the significant zoonotic diseases that pose major public health threats with a great socio-economic effect. They can lead to reduced milk production, low reproduction rate due to abortion, and loss of draft power, which have a negative effect on cash income (Smith *et al.*, 2006). They have been eradicated or controlled in developed countries but have remained prevalent in many developing countries, where livestock farming plays a significant role in food safety. Pakistan is one of the developing countries where the prevalence of zoonotic diseases is alarming (Sadiq *et al.*, 2013).

Both *Mycobacterium bovis* and *Brucella* show themselves as clinical elements with gross obsessive injuries (Grossklaus, 2001). One of the factors that increase the risk of zoonotic tuberculosis is the undiagnosed infected animals. These animals live in close contact with human and other domestic animals by resulting in the highest prevalence rates in zoological collections (Griffith, 1928).

Approximately more than 50 million cattle worldwide

are estimated to be infected with tuberculosis (Fend *et al.*, 2005). It comes fourth in the list of the most significant livestock diseases in the world with huge annual loss of 3 billion dollars in the field of agriculture implementing control programs; a re-emergence of bacterial zoonosis has been reported. The infection persists in livestock and maintained wild reservoirs because new strains which are resistant to the already developed antibiotics arise periodically. This study was designed to assess the prevalence of brucellosis and tuberculosis which are two major livestock farming-related zoonotic diseases in Quetta and Pishin districts of Balochistan.

Materials and methods

Data were obtained from randomly selected animals and sample size was 500 from each Quetta and Pishin districts. Selected animals were of four kind viz. buffalo (Quetta 18, Pishin 18). Bull (Quetta 66, Pishin 12), Cow (Quetta 103, Pishin), sheep (Quetta 185, Pishin 266) and goat (Quetta 180, Pishin 15). Samples were collected by swabs from nasal discharge for Tuberculosis, milk for milk ring test, blood sera for Rose Bengal Antigen test and Serum agglutination test from sheep, goat, cow, buffalo of different breeds including the cross breeds. There was an indiscriminate sampling of different ages and sexes.

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Blood was taken from the vein near the neck region of the animals. In the laboratory, serum was separated by centrifugation at 2500 rpm (503 g) for 15 minutes and stored in refrigerator until laboratory tests were performed. Milk samples were individually collected in sterile tubes, nasal discharge was taken on cotton swabs and kept dipped in tubes containing saline solution. Blood and nasal discharge samples were also numbered in the same way. All the tubes were kept refrigerated at 4 °C until processed.

Two tests, tuberculin and acid fast staining were performed for Tuberculosis with nasal discharge samples. Tuberculin test was performed as per procedures adopted by [Dacso \(1990\)](#), and acid fast staining test was performed after ([Schaeffer and Fulton 1933](#)).

Brucellosis was tested by using Rose Bengal Antigen test with blood sera, Sero-Agglutination Test and milk ring test using milk samples of animals. Rose Bengal test was performed by procedures reported by [Morgan *et al.* \(1969\)](#) and for Milk Ring Test, milk samples and antigen were kept at room temperature for at least 30 min before testing. The test was performed according to [Alton *et al.* \(1998\)](#).

Results

Only 2.2% of the total samples were observed to harbor *Brucella abortus* after diagnosis by using Rose Bengal antigen test and milk ring test in Quetta district. Eleven animals showed positive results while the remaining 489 animals were free from the pathogen. The apparent prevalence found was as follows: 5(n=103) in cow, 2(n=185) in sheep, 2(n=18) in buffalo and 1(n=180) in goat. One positive reactor was found in bull, 1(n=12); whereas none of the calf sera was found positive when tested serologically by sero-agglutination test and rose bengal antigen test using *Brucella abortus* antigen. It showed only 0.60 % of samples collected from Pishin district. Only 3 samples were found positive out of all 500 samples collected from Pishin district. Only samples collected from cow were found positive for *Brucella*.

Discussion

An overall prevalence of 2.2% from Quetta District and 0.60% from Pishin district of Brucellosis was observed in the study area based on serological tests. The current results unlikely indicated very low prevalence of brucellosis and Tuberculosis in sheep, cow, buffalo, calf, bull, and goats. In 1990, the incidence of Brucellosis was found obtained after surveying in state dairy farms of Rawalpindi and Chaklala and the obtained result suggested that the incidence of brucellosis was higher in cow than buffalo. The incidence was 3% in 168 cows while no buffalo was found to be positive after 374

buffaloes were tested by using milk ring test ([Naeem *et al.*, 1990](#)). Likewise in Quetta district in 2011, 200 milk samples taken from cattle and buffalo were tested by using Milk ring test and i-ELISA. The result obtained after milk ring test showed a higher prevalence in cattle which was 4.6% compared to buffalo showing 1.7% positive case. The results were different from the results obtained by i-ELISA also maintained a higher proportion of cattle being infected than buffalo. The overall prevalence of zoonotic Brucellosis was noted to be high and alarming with higher prevalence in state dairy farms ([Shafee *et al.*, 2011](#)). The data revealed low prevalence (2.2%) of the disease in the area and this prevalence was lower than previously reported (3.97%) and (8.5%) positive cases in cattle and buffalo using Rose Bengal plate test and serum agglutination test by [Faqir \(1991\)](#), who also reported the presence of brucellosis in cattle and buffalo in the same area after screening 680 animals and (8.5%) positive cases in buffalo and cattle by [Muhammad *et al.* \(2012\)](#) who also reported the presence of brucellosis in cattle and buffalo in the same area after screening 200 animals. Out of total 780 samples collected from Quetta, which were cattle (n=405) and buffalo (n=375) in the current study, it is observed that sera-prevalence is relatively higher in female animals as 3.72% and 3.88% using rose Bengal test and ELISA respectively as compared to the male animals showing only 0.6% ([Shafee *et al.*, 2011](#)) which is much lower than the previous reported studies. The current study shows a reduced prevalence of only 2.2%. This profound reduction in occurrence in recent years may be associated with different measures taken against the diseases in livestock department. According to article published in official site of Balochistan Government in 2014, a number of dispensaries, veterinary hospitals, insemination centers, and disease investigation centers are currently functioning in many districts of Balochistan.

Only 0.6% of prevalence was observed for tuberculosis, from Quetta district and no prevalence was observed from Pishin. Only 3 samples were found positive from Quetta district as reported by [Khan *et al.* \(2009\)](#) previously who studied the prevalence of tuberculosis in Quetta district. It is also observed a very low percentage of only one buffalo infected out of a sample size of (n=100) but unlike the present result, he found the occurrence to be greater in buffalo than cow which is quite opposite than the result of this study. Two of the infected animals were cow and one was buffalo. This result was in accordance with the result of [Javed *et al.* \(2006\)](#) who also reported a higher percentage of tuberculosis in cattle than buffalo. He used Tuberculin Test in 328 animals from two dairy farms in Punjab. Another observation from the study carried out

in the research states that all the infected animals were of higher age which were of age above than 5 years.

Conflict of interest statement

We declare that we have no conflict of interest.

References

- Alton, G.G., Jones, L.M., Angus, R.D. and Verger, J.M., 1998. *Techniques for the brucellosis laboratory*. Institut National de la Recherche Agronomique, Paris.
- Dacso, C.C., 1990. In: *Clinical methods: The history, physical, and laboratory examinations*. (eds H.K. Walker, W.D. Hall, J.W. Hurst) (3rd ed.). Butterworths. Boston: Retrieved 26 October 2015.
- Faqir, M., 1991. *Sero-epidemiological survey of bovine brucellosis associated with reproductive disorders in Quetta district, Balochistan*. M.Sc. thesis. Anim Reprod, Lahore, pp. 80-81.
- Fend, R., Geddes, S., Lesellier, H.M., Vordermeier, L.A.L., Corner, E., Gormley, E., Costello, R.G., Hewinson, D.J., Marlin, A.C., Woodman and Chambers, M.A., 2005. *J. clin. Microbiol.*, **43**: 1745–1751. <http://dx.doi.org/10.1128/JCM.43.4.1745-1751.2005>
- Griffith, A.S., 1928. *J. Hygi.*, 28: 198-218. <http://dx.doi.org/10.1017/S0022172400009542>
- Grossklaus, D., 2001. *Berlin. Munch. Tierarz. Wochens.*, **114**: 420-427.
- Javed, M.T., Usman, M., Irfan, M. and Cagiola, M., 2006. *Veterinarskiarhiv*, **76**: 193-206.
- Khan, M.S., Khan, S. and Godfrey-Faussett, P., 2009. *Trop. Med. Int. Hlth.*, **14**: 1437–1441. <http://dx.doi.org/10.1111/j.1365-3156.2009.02260.x>
- Morgan, W.J., Mackinnon D.J., Lawson J.R. and Cullen, G.A., 1969. *Vet. Rec.*, **85**: 636–641.
- Muhammad, A., Mansoor, M. and Arshed, M.J., 2012. *Pak. Vet. J.*, **32**: 147-155.
- Naeem, K., Akhtar, S. and Ullah, N., 1990. *Pak. Vet. J.*, **10**: 154-156.
- Shafee, M., Rabbani, M., Sheikh, A.A., Ahmad, M.D. and Razzaq, A., 2011. *Vet. Med. Int.*, **2011**: 1-3. <http://dx.doi.org/10.4061/2011/945439>
- Sadiq, N. K., Stefan, N., Muhammad, G., Mazhar, Q., Saima, S., Zahid, S. M., Sabira, T., Mina, E. and Azra, K., 2013. *Pakistan J. Zool.*, **45**: 93-100.
- Schaeffer, A.B. and Fulton, M., 1933. *Science*, **77**: 194. <http://dx.doi.org/10.1126/science.77.1990.194>
- Smith, A.R., Pryer, K.M., Schuettelpelz, E., Korall, P., Schneider, H. and Wolf, P.G., 2006. *Taxon*, **3**: 705-731. <http://dx.doi.org/10.2307/25065646>