

Infectious agents, *Leptospira* spp. and *Bartonella* spp., in blood donors from Cajamarca, Peru



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ABSTRACT

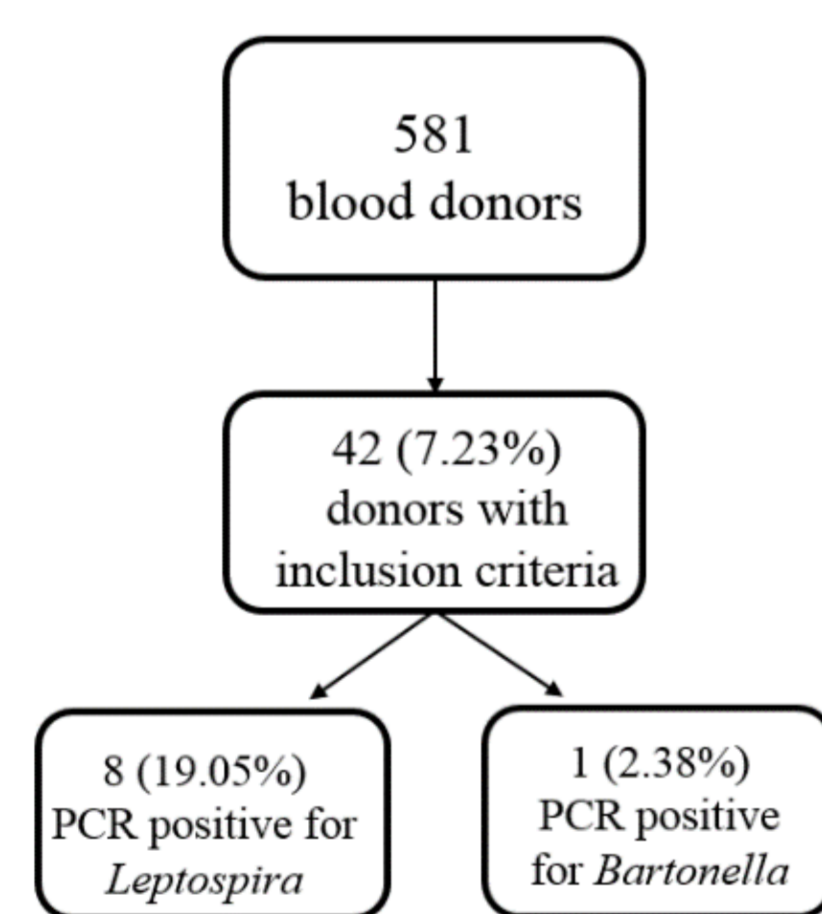
In blood banks the sought for a series of relevant pathogens able to be transmitted by blood transfusions is widely implemented; however the presence of a series of pathogens in blood bank donations remained understudied. This is the case of some bacteria such as *Leptospira* spp. or *Bartonella* spp. *Bartonella* species are blood-borne, re-emerging organisms, capable of causing prolonged infections in animals and humans. Meanwhile, Leptospirosis is recognised as an emerging public health problem worldwide. Both infections are considered neglected tropical diseases.

OBJECTIVE

The aim of the present study was to examine the prevalence of *Bartonella* spp. and *Leptospira* spp. in blood donors in Cajamarca, in the Northern of Peru, and give a description of the epidemiological factors associated.

RESULTS

During the study period, a total of 581 blood donors were received in the Regional Hospital of Cajamarca. From these, 42 (7.23%) blood donors met at least one of the inclusion criteria and consequently were included in the analysis. From these 8 (19.05%) samples were positive for presence of *Leptospira* spp. And 1 (2.38%) for *Bartonella* spp., which after sequencing was classified as *B. bacilliformis*. (Figure 1)



Blood Bank Service from the Regional Hospital of Cajamarca. This Hospital is located in the capital of Cajamarca Department which is placed in Northern Peru, had a size greater than 35,000 Km² and a population of 1.500.000 people approximately, with great climatic diversities.



CONCLUSIONS

The introduction of molecular tools in the *Leptospira* and *Bartonella* screening in blood banks is need to be routinely implemented, in order to avoid possible post-transfusion infections. An evaluation of the appropriateness of current Blood Service guidelines for the management of leptospirosis and bartonellosis both in the risk areas and in those placed in nearby regions must be reevaluated.

METHODS

The study was conducted between March to May of 2014. All Healthy blood donors were recruited, at the time of their voluntary blood donation. Inclusion criteria (Figure 1). Total samples of 3 mL of venous blood from blood donors were collected in tubes containing EDTA and citrate, stored at 4°C. The DNA was extracted from 200 µL of blood samples using a commercial extraction.

Amplification of a *Bartonella* spp.-specific 16S rRNA gene fragment : A 438 bp fragment of the 16S rRNA gene was amplified both in blood samples.

Detection of *Leptospira* spp.: Specific multiplex PCR able to detect all described pathogenic *Leptospira* species (*L. interrogans*, *L. borgpetersenii*, *L. weilii*, *L. noguchii*, *L. santarosai*, *L. meyeri* and *L. kirschneri*) was carried out using primers G1 (5'-CTGAATCGCTGTATAAAAGT) and G2 (5'-GGAAAACAATGGTCGGAAG), and primers B64-I (5'-CTGAATTCTCCATCTCAACTC) and B64-II (5'-GCAGAAATCAGATGGACGAT) as described previously.

The inclusion criteria were:

- Blood donors arriving to the Blood Bank of the Regional Hospital of Cajamarca, between 18-55 years of age, with absence of signs and / or symptoms of unspecified illness (absence of fever, chills, jaundice, and myalgia in the last four weeks), who freely signed an informed consent, accepting participation in the study;
- All blood donors included in the study met at least one of the following inclusion criteria: exposure to water sources, waterlogging or other potentially contaminated water collections, such as irrigation canals (ditches), pools, ponds, lakes, rivers;
- Exposure to drains, latrines or management of wastewater contaminated with urine of rodents and other animals;
- Activities with occupational risk, such as farmers, ranchers, garbage collectors, recyclers, cleaning ditches, water and sewer workers, plumbers, veterinarians, agricultural technicians who treat animals, slaughterhouse workers;
- Development of recreational and adventure sports that are related to potentially contaminated water sources (rivers, lakes, ditches, ponds and other) activities;
- Living in rural and marginal urban housing with overcrowding or poor or absent sanitation.

		General (42) N (%)	<i>Leptospira</i> positive (8) N (%)	<i>Bartonella</i> positive (1) N
Gender	Male	26 (62)	5 (62.5)	0
	Female	16 (38)	3 (37.5)	1
Age	Median	33.1	29.6	28
	18-30	23	6 (75)	1
	31-40	7	1	0
	41-50	8	0	0
	>50	4	1	0
Type of Home	Urban	18 (42.8)	4 (50)	0
	Rural	24 (57.2)	4 (50)	1
	overcrowding ¹	12 (28.6)	4 (50)	0
Occupation ²	Farmer-Rancher	25 (59.5)	4 (50)	1
	Student	6 (14.3)	1 (12.5)	0
	Health personnel	2 (4.8)	2 (25)	0
	Others	9 (21.4)	1 (12.5)	0
Travel ³		7 (16.6)	3 (37.5)	0
Animal ⁴	Bovine	19 (45.2)	3 (37.5)	1
	Porcine	12 (28.6)	2 (25)	1
	Ovine	2 (4.8)	0	0
	Poultry	9 (21.4)	0	0
	Canine	26 (61.9)	6 (75)	0
	Feline	19 (45.2)	4 (50)	1
Other	Backwaters ⁵	19 (45.2)	5 (62.5)	0
	Septic pit latrine ⁵	32 (76.2)	8 (100)	0
	Rodents ⁵	22 (52.4)	6 (75)	1
	Skin wounds ⁶	17 (40.5)	5 (62.5)	0

1.- More than 3 persons by bedroom 2.- One farmer also report to be student, while other 4 also reported other parallel activities. 3.- Travel to *Leptospira* endemic zone (prior 4 weeks) 4.- Regular contact with livestock and companion animals 5.- Contact during 4 weeks prior to donation. 6.- During the 4 weeks prior to donation

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