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Seroprevalence And Risk Factors of *Coxiella burnetii* For Q Fever in Vellore District, Tamil Nadu.

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Abstract

Background: Q fever is an infection remain under-diagnosed and rarely reported due to limited data on seroprevalence and lack of diagnostic facilities in India. The aim of this study was to investigate the seroprevalence of Q fever infection in Vellore district, Tamilnadu. **Methodology:** A descriptive cross-sectional serosurvey was conducted from September 2017 to February 2018 in seven urban and seven rural areas of Vellore districts of Tamil Nadu. Serum samples were collected from 536 healthy individuals and tested by Enzyme-linked immunosorbent assay (ELISA) for Q Fever (QF) antibodies at the Christian Medical College (CMC), Vellore. **Results**: Of the 537 participants, 188 (35%) were males and 349 (65%) were female. The median age of participants was 42 years (IQR 31-54 years). The majority were either farmers or housewives. Exposure to Q fever is infection was observed in more than 1/3rd of the population surveyed. Q fever infection, including Agriculture & non-agriculture labourers 9.2% (16/172) Housewives 6.1% (14/226), Service/business 4% (2/54), Student 2% (1/48) and Unemployed 3%(1/37). Q fever was the commonest among the three diseases surveyed. The seroprevalence of QF was higher in rural areas than in urban areas. **Conclusion**: Q fever is an infection are common in the Vellore district and prevalence is higher in rural than urban areas.

Keywords
Q fever, *Coxiella burnetii,* Vellore

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INTRODUCTION:

Q fever is a widespread zoonosis of public health importance caused by *Coxiella burnetii,* an obligate gram-negative intracellular bacterium (1) Q-fever was first described in 1937 by Derrick. It is a zoonosis with a worldwide distribution (2) Q fever causative agent of abortion in livestock and febrile illness in humans. Domestic ruminants such as cattle, sheep, and goats are the main reservoirs of the disease. (3, 4) *Coxiella burnetii* has two different antigenic phases: phase I and phase II. Such an antigenic difference is important in the diagnosis. In acute cases of Q fever, the titer of antibody against phase II is usually higher than phase I antibody. Acute disease is mostly diagnosed via an increase in the antibody titer within three to four weeks of the onset of the disease. In comparison, in chronic cases, the titer of antibody is higher against phase I compared

to phase II. This increase in the titer of antibodies against phases I and II may persist within months to years after the first infection of this disease (5).
The high prevalence of this disease among older men reflects the occupational risk of this disease (5). Moreover, previous studies have revealed that exposure to livestock and domestic animals were regarded as a crucial risk factor in the dissemination of Q fever in human societies (6-7). Animal husbandry workers, farmers, laboratory staff, veterinarians, the park rangers, butchers, and slaughterhouses workers, who are exposed to the reservoirs of the disease, are at higher risk of the infection (8)

METHODS:

Study population

The descriptive cross-sectional serosurvey was carried out from September 2017 to February 2018. Seven (rural) villages and seven Urban (town) are in the Vellore district were selected for serosurvey. The selected urban and rural areas are as depicted in **Table 1**. In each area, one individual from one household was enrolled after obtaining informed consent. Clotted blood samples were collected in red-capped serum tube, (BD Vacutainer, Franklin Lakes, NJ, USA) from eligible, consenting adults (> 18 years old) who had no history of fever in the past 3 months.

Laboratory analysis.

The serum was separated by centrifuging in a refrigerated centrifuge (Eppendorf Centrifuge 5804 R, Eppendorf, Hamburg, Germany) at 3000 rpm for 10minutes at 4^{o}C. IgG antibodies to Coxiellaburnetii (Coxiellaburnetii phase II virision/serion, made in Germany) as per manufacturer's recommendation. The assay was carried out in an automated ELISA equipment, EUROIMMUNE Analyzer (EUROIMMUN AG, Seekamp 31, 23560Luebeck, Germany). The serum samples were diluted into 1:100 dilution. Absorbance was read at 405 to 620 nm using Euroimmunemicrotiter plate reader. Samples having OD of >0.6 were considered as positive, and those below 0.6 were reported. In each test run, positive and negative controls were included.
Statistical analysis was performed using Stata 14.2 (StataCorp, College Station, TX). The seroprevalence rates were weighted to account for the discrepancy between the CoPanFlu-RUN subset and the general population. Associations between C. burnetii–seropositive specimens and age, gender, and geographic subdivision were determined using weighted chi-square tests.

RESULT AND DISCUSSION:

In this study, 537 serum samples were taken from five groups, determined as occupations exposed to the risk of Q fever infection, including Agriculture & non-agriculture labourers 9.2% (16/172) Housewives 6.1% (14/226), Service/business 4% (2/54), Student 2% (1/48) and Unemployed 3%(1/37) those who referred to the seven rural and seven cities of Vellore district in Tamil Nadu. Out of all the studied cases, 6% (21/349) were male, 7% (13/188) were female. Also, 6% (13/219), 5% (16/318), we're living in urban, rural, and nomadic areas, respectively. The mean (± SD) age of the tested subjects was 40.54 (±13.55) years old ranging from 18 to 78 years of age. This serological study has shown that Q fever infection was widely spread in sheep, cattle, and goats in the Vellore area. An overall prevalence of 6.3 % was very significant given that Q fever has never been reported in the area and in many parts of Ghana. The presence of Q fever infection in all countries neighbouring Ghana, namely Burkina Faso (9, 10)

CONCLUSIONS:

This study has shown that the results from Q fever ELISA vary according to the centre in which they are carried out. This has implications for the interpretation of such tests, raises questions regarding the validity of using serological criteria alone as a means of diagnosing chronic Q fever, and affects the interpretation of epidemiological studies. We recommend that all results are interpreted according to the clinical picture and particular caution is applied in the interpretation of chronic serological profiles. In order to further our understanding of Q fever infection we propose that an international standard of Q fever serological investigation be developed.

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REFERENCE:

1. Eldin C, Mélenotte C, Mediannikov O, et al. From Q fever to Coxiella burnetii infection: a paradigm change. Clin Microbiol Rev 2017; 30:115–90.
2. Maurin M, Raoult D. Q fever. Clinical. Microbiol Rev 1999; 12(4): 518–553.
3. Van den Brom R, Vellema P. Q fever outbreaks in small ruminants and people in the Netherlands. Small Ruminant Research. 2009; 86(1):74–9.
4. Mobarez AM, Amiri FB, Esmaeili S. Seroprevalence of Q fever among human and animal in Iran; a systematic review and meta-Analysis. PLOS Neglected Tropical

Diseases. 2017; 11(4):e0005521. https:// doi.org/10.1371/journal.pntd.0005521 PMID: 28394889

5. Anderson A, Bijlmer H, Fournier PE, Graves S, Hartzell J, Kersh GJ, et al. Diagnosis and management of Q fever—United States, 2013. MMWR Recommendations and reports: Morbidity and mortality weekly report Recommendations and reports/Centers for Disease Control. 2013; 62(RR-03):1–30.
6. Bailey MS, Trinick T, Dunbar J, Hatch R, Osborne J, Brooks T, et al. Undifferentiated febrile illnesses amongst British troops in Helmand, Afghanistan. Journal of the Royal Army Medical Corps. 2011; 157 (2):150–5. PMID: 21805764
7. Esmaeili S, Pourhossein B, Gouya MM, Amiri FB, Mostafavi E. Seroepidemiological survey of Q fever and brucellosis in Kurdistan Province, western Iran. Vector-Borne and Zoonotic Diseases. 2014; 14 (1):41–5. https://doi.org/10.1089/vbz.2013.1379 PMID: 24359427
8. Centers for Disease Control and Prevention. Q fever USA: CDC; 2013 [updated March, 2015]. Available from: http://www.cdc.gov/qfever/.
9. Ki-Zerbo G.A., Tall F., Nagalo K., Ledru E., Durand G., Patey O. (2000) Rickettsiosis and Q fever in pyretic patients hospitalized at the Bobo- Dioulasso Hospital (Burkina Faso). Medecine et Maladies Infectieuses 30, 270–274.
10. Dean A.S., Bonfoh B., Kulo A.E., Boukaya G.A., Amidou M., Hattendorf J. et al. (2013) Epidemiology of brucellosis and Q fever in linked human and animal populations in Northern Togo. PLoS ONE 8, e71501. https://doi.org/10.1371/journal.pone.0071501