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Review

A review of *Brucella* seroprevalence among humans and animals in Bangladesh with special emphasis on epidemiology, risk factors and control opportunities

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ABSTRACT

Brucellosis is a neglected bacterial zoonotic disease in many countries affecting both humans and animals. The aim of this paper is to review published reports of the seroprevalence of brucellosis in humans and animals (cattle, buffalo, sheep, goats and dogs) in Bangladesh. The prevalence studies are based primarily on the following serological tests: rose bengal plate agglutination test (RBT), plate agglutination test (PAT), tube agglutination test (TAT), mercaptoethanol agglutination test (MET), standard tube agglutination test (STAT), slow agglutination test (SAT), milk ring test (MRT), indirect enzyme-linked immunosorbant assay (I-ELISA), competitive ELISA (C-ELISA) and fluorescent polarization assay (FPA). Seroprevalences of brucellosis were found to be affected by the sensitivity and specificity of serological tests employed. Brucellosis prevalence varied based on occupations of people (2.5–18.6%) and species of animals (3.7% in cattle, 4.0% in buffalo, 3.6% in goats and 7.3% in sheep). The prevalence of brucellosis in humans was reported in livestock farmers (2.6–21.6%), milkers (18.6%), butchers (2.5%) and veterinarians (5.3–11.1%) who have direct contact with animal and its products or who consume raw milk. According to published reports brucellosis does affect people and livestock of Bangladesh. There is an immediate need for a concerted effort to control and eradicate brucellosis from domesticated animals in Bangladesh.

Contents

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1. Introduction

Brucellosis is a bacterial zoonotic disease of humans and animals throughout the world. It is caused by Gram-negative bacteria belonging to the genus *Brucella*. This disease is endemic in the Middle East, Mediterranean countries, Asia, Africa and Central and South America (Corbel, 1997). Domesticated animals such as cattle, buffalo, sheep, goats, swine and dogs are hosts of *Brucella*. Species of *Brucella* that cause disease in domesticated livestock are: *B. abortus* (cattle and buffalo), *B. ovis* (sheep), *B. melitensis* (sheep and goats), *B. suis* (swine) and *B. canis* (dogs). Brucellosis is primarily a disease of the reproductive tract of animals. The mammary gland is a very important source for transmission of *Brucella* because of its predilection for supramammary lymph nodes and associated shedding in milk. The pathogen causes abortion, infertility, retention of placenta, birth of weak and dead calves and reduced milk yield in animals (Radostits et al., 2007). Clinical signs of mastitis are seldom detectable in naturally infected cattle and goats. Transmission of *Brucella* to humans results from direct contact with the infected animal, consumption of unpasteurized milk and milk products (Corbel, 2006; Mantur et al., 2006). Undulant fever, weight loss and night sweats are the major symptoms of brucellosis in humans. Human brucellosis is mainly an occupational disease affecting animal caretakers, livestock farmers, artificial inseminators, abattoir workers, meat inspectors and veterinarians due to frequent exposure to infected animals (Corbel, 2006). Close contact with animals may occur when humans assist animals during parturition or abortion or handling of stillbirth. It is also common for farmers to separate the placenta manually and they are likely exposed to tissues infected with *Brucella*. Farmers and people working in abattoirs frequently have small lesions on their hands that could be the entry point for *Brucella* from infected tissues. Inhalation of *Brucella* has been reported in slaughterhouse workers where the concentration of *Brucella* can be high due to aerosol generation (Sammartino et al., 2005). Dairy farmers who milk animals by hand have a greater chance of becoming infected from the *Brucella* infected animals (Sammartino et al., 2005). Meat inspectors and artificial inseminators who do not take adequate biosafety precautions while performing their jobs are at risk of contracting *Brucella* from the infected animals (Sammartino et al., 2005).

Transmission of brucellosis in animal results from ingestion of contaminated feeds and water, inhalation of aerosolized bacteria, sexual intercourse and direct contact with infected placenta and uterine discharges (Corbel, 2006; Radostits et al., 2007). Vertical transmission of *Brucella* is also reported from infected cattle or dam to calf, lambs or kids. There are two main factors associated with an animal's susceptibility to *Brucella* infection. First, brucellosis primarily affects sexually mature animals (Havas, 2011; Sammartino et al., 2005). Second, susceptibility dramatically increases during pregnancy (Havas, 2011; Sammartino et al., 2005). Uterine discharge and placenta expelled from infected animals are the main sources of transmission of *Brucella* to humans and animals. Understanding the mode of transmission of *Brucella* is important because it plays a key role in the disease epidemiology. Major risk factors of animal infection are the husbandry practices, local habits, and management of the herd/flock. The size of the herd, housing methods and