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A Review on Ruminant and Human Brucellosis in Somalia

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Abstract

This review article aims to describe the prevalence of brucellosis in ruminants and humans in Somalia and also guides policy makers to draw sound decisions regarding brucellosis control policies. It is concluded that brucellosis is of no public health importance in Somalia. Nevertheless, it is suggested that a stronger inter-sectoral collaboration among veterinary, medical and public health professionals at the federal and country level in terms of one-health approach should be promoted.

Keywords

Brucellosis, Domestic Ruminant, Human, One-Health, Review, Somalia

1. Introduction

Brucellosis is a worldwide bacterial zoonotic disease affecting both animals and humans. It causes heavy economic losses to the livestock industry and also poses serious human health hazards. The disease is caused by members of genus *Brucella* that are gram-negative, facultative intracellular, coccobacilli, non-motile and non-spore-forming bacteria [1]-[5]. The genus *Brucella* currently consists of ten classified species [5]-[7]. In humans, *Brucella melitensis* is considered the most virulent species followed by *B. suis*, *B. abortus* and *B. canis*. However, several of other species are also pathogenic for humans [1] [7].

Brucella infection is transmitted by direct or indirect contact with infected animals. The organism is most frequently acquired by ingestion. Respiratory route, conjunctival and genital inoculation, skin contamination, intrauterine and venereal transmissions are other possibilities of the organism [1] [8]. Humans can become infected indirectly through contact with infected animals or by consumption of animal products. Person-to-person transmission is extremely rare. Vertical transmission, breastfeeding, blood transfusion or tissue transplantation

has been reported. Sexual transmission of the disease and accidental self-inoculation with live *Brucella* vaccine strains can result disease in humans [1] [8]-[10].

Clinically, in general, the animals do not exhibit overt systemic illness. The disease is characterized by abortion, retained placenta, uterine infection, foetal death, mummification and delayed maturity. Infertility, arthritis, hygroma and other conditions are also reported. After the first abortion, the animals will deliver normally but they continue to shed large numbers of the bacteria into the environment [1] [11]-[13]. The clinical signs of human brucellosis are not specific and can be acute febrile illness to chronic disease with severe complications. In pregnant women, the brucellosis may lead to abortion in early pregnancy and in men may lead to orchitis and epididymitis [5] [8].

The diagnosis of brucellosis is confirmed by bacteriological isolation and identification of the causative organism. However, this method is complicated and time-consuming [4] [14]. Presumptive diagnosis can be made by serological tests. The most commonly used serological tests which are suitable for screening herds and individual animals are: Rose Bengal test (RBT), standard agglutination test (SAT), complement fixation test (CFT), enzyme linked immunosorbent assay (ELISA) and milk ring test (MRT) [14] [15].

In Somalia, there is a little information of animal and human brucellosis. The serological investigations and bacteriological isolations of *Brucella* carried on the country are very scarce. The first report on the isolation of *Brucella* strains in the country were recorded by Andreani and his colleagues in 1982 [16]. In spite the disease is reported in all domestic ruminants of the country, Somali people lack awareness about the zoonotic potential of the disease with their existing habit of raw milk consumption and close contact with domestic animals. This review article aims to describe an overview on brucellosis situation of the country and supports brucellosis interesting researchers to more understand the disease situation in the country. It also guides policy makers to draw sound decisions regarding brucellosis control policies.

2. Brucellosis in Somali Ruminants

2.1. Camel Brucellosis

Very few serological investigations of camel brucellosis in Somalia were available. However, no *Brucella* strains were isolated from camels in the country. Salim Alio and his colleagues in 1985 were tried to isolate *Brucella* from 75 camels taken at random in Mogadishu abattoir but no strains were isolated [17]. Andreani *et al.* (1982) carried out sero-agglutination test on 250 serum samples from camels slaughtered at Mogadishu and Kisimayo abattoirs and camel herds kept on free range in the South of the country (Upper and Lower Jubba and Benadir regions). They found that 26 of 250 (10.4%) sera tested reacted against *Brucella* infection [16]. In central regions of Somalia, Baumann and Zessin investigated serologically 1039 camels for brucellosis using SAT and CFT and found 1.9% and 0.3% positives respectively [18]. In 2008, Ghanem *et al*. carried out 1246 camel serum samples from Awdal, Waqoyi Galbed and Togdheer regions of the North Somalia using RBPT and indirect-ELISA for detection of brucellosis. The overall seropositive animals were 49 camels by RBPT and 39 camels by i-ELISA. Thus, the prevalence was 3.9% and 3.1% respectively. They also found that the locality, herd size, rearing with other ruminants and contact with other camels are the four risk factors affected the seroprevalence of camel brucellosis on animal level. On herd level, only herd size and rearing with other ruminants showed a significant association with seropositive cases of camel brucellosis [19].

2.2. Cattle Brucellosis

The prevalence of bovine brucellosis in the country was firstly carried out by Wernery *et al*. (1976) and *Brucella* strains were firstly isolated by Andreani *et al.* (1982) from milk of an infected cow. The isolated strain was B. abortus biotype 6 [16] [20]. Wernery *et al.* (1976) carried out 5056 serum and 576 milk samples from cattle of Southern parts of the country (Mogadishu, Gedo and Lower Jubba regions) and used SAT and CFT, and MRT respectively for the presence of *Brucella* infection. The overall prevalence of regions under investigation was 9.5% by SAT and 12% by MRT. They found marked differences in regional distribution of bovine brucellosis. The highest sero-prevalence (16%) was recorded in the cattle population of the Mogadishu city, and Gedo and Lower Jubba regions are comparable to each other, 4.8% and 5.4% respectively. Husbandry methods and herd size are the main reasons for these regional differences [20]. In 1978, Hussein and his colleagues tested 902 sera from government and municipal cattle farms and 2184 from nomadic herds by using SAT and revealed 2.7%

and 11.9% positives respectively [21]. Andreani and his colleagues (1982) examined 660 cattle serum samples by SAT and found 15.45% of positivity [16]. In 1983, Wiegand and Marx reported 3% of 197 cattle serum samples were infected with *B. abortus* and not with *B. melitensis*, tested with agglutination test, using one time *B. abortus* test solution and the other time with *B. melitensis* test solution [22].

2.3. Sheep and Goat Brucellosis

Small ruminant brucellosis in Somalia is of little information. Falade and Hussein (1979) tested 250 goat serum samples obtained from Mogadishu abattoir and examined by five tests including: RBPT, SAT, 2-Mercaptoethanol test (2-ME test), Cooms Antiglobulin test (AGT) and Rivanol test. The results found were 2.8%, 2.8%, 1.6%, 5.6% and 3.6% of the total number of samples examined respectively [23]. Andreani *et al*. (1982) examined 250 sheep and 340 goats from Mogadishu and Kisimayo abattoirs and small ruminants kept on free range in the South of the country (Upper and Lower Jubba and Benadir regions) and the results revealed were 7.2% in sheep and 5.3% in goats by using SAT [16]. Wiegand and Marx (1983) reported prevalence of 1.3% (1 out of 74) in goats of Lower Juba region [22]. Ghanem *et al*. (2009) documented prevalence of 4% and 3.1% in sheep, and 4.9% and 3.9% in goats in three main regions of Northern Somalia (Awdal, Waqoyi Galbed and Togdheer) by using RBPT and i-ELISA respectively [24].

3. Human Brucellosis in Somalia

Information on this disease in the country is very scarce. Hussein *et al*. (1978) conducted a survey of brucellosis in bovines and humans in Somalia. They investigated 353 human serum samples using SAT and revealed 0.6% positive [21]. Wiegand and Marx reported (1983) no *Brucella* infection out of 11 human blood sera tested [22]. The microbiology department of Royal Hallamshire Hospital in United Kingdom was isolated *Brucella melitensis* unexpectedly from cerebrospinal fluid sample of a patient from Somalia [25]. Human brucellosis in the country needs more attention and research.

4. Recommended Strategies for Prevention and Control of Brucellosis in Somalia

Eradication of brucellosis by test-and-slaughter is impracticable in developing countries including Somalia because of limited resources to compensate farmers whose animals are slaughtered during such screening programs. Also there is no national programme proposed for prevention and control of brucellosis in the country. The main obstacles limiting the control of the disease are: security of the country, shortage of funds, laboratory facilities and trained manpower. The recommended strategies have been proposed as follows:

- The best method for preventing human brucellosis is the control and elimination of the infection in animals.
- Pasteurization of milk is another protective mechanism of human brucellosis.
- Development of a national veterinary extension services to promote awareness about brucellosis, its impact on livestock production and zoonotic risks by posters, leaflets and other mass media.
- Increasing the resistance to infection of animals in populations through mass vaccination strategy.
- Effective disease surveillance at the country level.
- Biosecurity measures should reduce risks of further infection.

5. Conclusion and Recommendations

In conclusion, this review article indicated that the knowledge of brucellosis is still very scanty and of no epidemiological importance in Somali people. *Brucella* infection exists within the livestock of the country, and Somalis people drink raw milk and have a close association of domestic animals which are the risk factors of the disease. The study recommends an educational program and leaflet to aware the people at risk of *Brucella* infection, further studies of serological diagnosis and bacteriological isolation of the disease and collaboration among veterinary, medical and public health professionals in terms of research and extension services ("One Health" approach).

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