



Review on Status of Small Ruminant Brucellosis in Ethiopia

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Abstract

Brucellosis in small ruminants is mainly caused by *Brucella melitensis* and *B. ovis* and in sporadic cases by *B. abortus*. This disease is mainly characterized by abortion with the development of yellowish, sticky layers on the placenta in females. In male animals, it causes orchitis and epididymitis, and arthritis in both genders. Species of *Brucella* are obligate parasites, requiring an animal host for maintenance. They are small, non-motile, non-sporulating, non-toxicogenic, aerobic, facultative intracellular, gram-negative coccobacilli parasites. The primary route of dissemination of *Brucella* is the placenta, fetal fluids and vaginal discharges expelled by infected animal after abortion or full-term parturition. Brucellosis is readily transmissible to humans, causing acute febrile illness – undulant fever – which may progress to a more chronic form and can also produce serious complications affecting the musculoskeletal, cardiovascular, and central nervous systems. Humans get infected mainly by drinking unpasteurized milk and/or exposure to aborted fetuses, placentas or infected animals and by an occupational risk. Status of small ruminant brucellosis is not well addressed in Ethiopia. Studies conducted indicate that the prevalence of the disease is high in lowlands as compared with middle and highlands. Since brucellosis has no effective treatment; vaccination, test and slaughter, hygiene and awareness creation are the best alternative strategies.

Keywords: Brucellosis; Ethiopia; Small ruminant

Mini Review

Goats and sheep are important domestic animals highly adaptable to broad range of environmental conditions and fulfill a number of economic and social functions. According to statistics from the Central Statistical Agency, Ethiopia has over 39.89 million head of sheep and 50.5 million goats [1]. In spite of the presence of huge small ruminant (sheep and goat) population, Ethiopia fails to optimally utilize this resource as a sector. Among the different factors which limit the economic returns from small ruminants' production, reproductive diseases such as brucellosis are the major ones particularly in the pastoral areas.

Brucellosis is an infectious bacterial disease caused by members of the genus *Brucella*. It is disease of worldwide importance and affects a number of animal species. Brucellosis in small ruminants is mainly caused by *Brucella melitensis* (*B. melitensis*) and *B. ovis* in and sporadic case by *B. abortus*. This disease is mainly characterized by abortion with the development of yellowish, sticky layers on the

placenta in females. In male animals, it causes orchitis and epididymitis, as well as inflammation of the joints and bursa. The consequences of brucellosis in small ruminants are: infertility, a high mortality rate in lambs and kids, mastitis, reduced milk production. The presence of small ruminant brucellosis in Ethiopia is well established similar to other reports elsewhere it imposes tremendous economic loss due to reproductive wastages such as infertility, abortion, stillbirth, and the likes. On the other hand, the pastoralist communities who have daily contact with their animals and use their products in their dietary habits are being infected by brucellosis [2].

The epidemiology of small ruminant brucellosis and its awareness varies from one area to another so control measures appropriate in one area is not necessarily of value in another. Hence, it is essential to have adequate knowledge of the epidemiology and awareness of the disease before contemplating control programmes. In Ethiopia some studies have been conducted on small ruminant brucellosis at different times.

Etiology

Brucellosis is an infectious bacterial disease caused by microorganisms of the genus *Brucella*, a coccobacillus, gram negative, facultative intracellular pathogen, which affects a number of animal species. In small ruminants, brucellosis is mainly caused by *B. melitensis* and *B. ovis* and in sporadic cases *B. abortus*. *B. melitensis* is most commonly infects sheep and goats while *B. ovis* primarily affects sheep. *B. melitensis* is most common source of human brucellosis.

Epidemiology

Small-ruminant brucellosis is common in tropical area where animal production is commonly practiced and almost it has been eradicated from industrialized country like Europe. The prevalence of the disease is most frequently occurred in adult sheep and goats than younger one).

Species and breeds factor- goats are at higher risk of acquiring *Brucella* infection than sheep. This may be due to the greater susceptibility of goats to *Brucella* infection. Male animals are less susceptible to *Brucella* infection than females, due to presence of low concentration of erythritol in male relative to female animals.

Prevalence of small ruminant brucellosis is high in large flock size than small size flock. Mixing different species of animals (sheep/goat/cattle) together has also a great factor to increase incidence of brucellosis [3]. Brucellosis can transmit between animals through direct or indirect contact with diseased animals and their discharges. Ingestion of food and water contaminated with brucella containing uterus discharge, aborted fetus and placenta are the way of getting brucellosis into flocks. The disease can also acquire through venereal transmission between adult and in kids and lambs by milk sucking and by *in vitro* transmission.

Diagnosis

Due to its high accuracy, complement fixation is used as confirmatory test for *B. abortus*, *B. melitensis*, and *B. ovis* infections and it is the reference test recommended by the OIE for international transit of animals.

Status of small ruminant brucellosis in Ethiopia

Studies conducted on small-ruminant brucellosis in Ethiopia have indicated that sero-prevalence of the disease is varied from place to place ranging from 0.07 % in Somali region to 12.35% in Afar region which might be due to the differences in animal production and management systems as well as reasonably difference in agro-Ecological conditions of the study places and see [4].

Reports indicated that the prevalence of small-ruminant brucellosis was much higher in area where farmers practice the communal use of grazing land than in clan-based flock/herd segregation areas. This might be due to mixing animals from various areas in communal grazing system and watering points.

Public importance of small ruminant brucellosis

Since there is close contact between humans and their livestock, which sometimes share the same housing enclosures, brucellosis is a significant health risk for the entire community.

Brucellosis is readily transmissible to humans, causing acute febrile illness undulant fever which may progress to a more chronic form and can also produce serious complications affecting the musculoskeletal, cardiovascular, and central nervous systems.

Brucellosis is a zoonotic bacterial disease caused by *Brucella* spp. and is primarily a disease of animals whereas humans are accidental hosts [5]. The disease is one of the most widespread zoonotic and is endemic in many countries.

It is also considered a neglected zoonotic by the WHO. There are six identified species and numerous biotypes. From these species *B. melitensis* causes disease primary among sheep and goats and is also the most pathogenic for humans.

The bacteria show a strong host preference although cross-species infections happen, particularly with *B. melitensis*.

Control and prevention

Control of brucellosis can be achieved by using vaccination to increase the population's resistance to the disease.

The *B. melitensis* REV 1 vaccine is an attenuated strain of *B. melitensis* and an effective method to reduce the prevalence of brucellosis among whole flocks or herds.

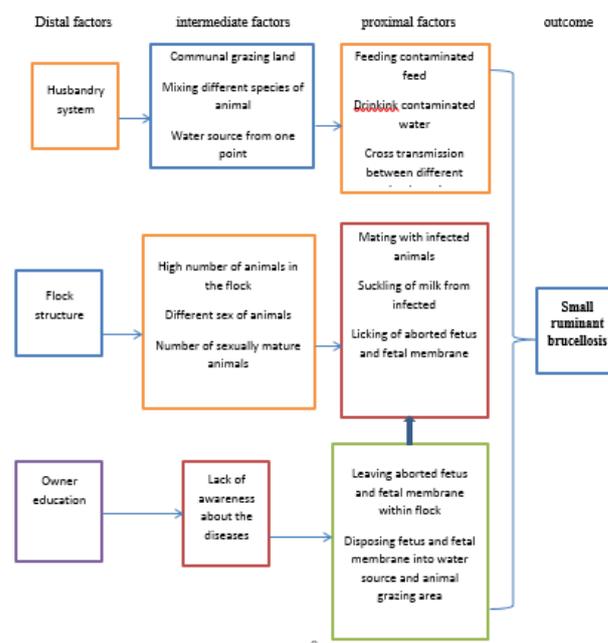


Figure 1: Conceptual frame work on small ruminant brucellosis.

Conclusion

In endemic countries humans get infected mainly by drinking unpasteurized milk/cheese and/or exposure to aborted fetuses, placentas or infected animal's discharges and causes acute febrile illness-undulant fever-which may progress to a more chronic form and can also produce serious complications affecting the musculoskeletal, cardiovascular, and central nervous systems due. There is an occupational risk to veterinarians, abattoir workers and farmers who handle infected animals and aborted fetuses or placentas. Brucellosis is one of the most easily acquired laboratory infections, and strict safety precautions should be observed when handling cultures and heavily infected samples, such as products of abortion.

References

1. Deepthi K, Pandiyarajan T, Karthikeyan B (2013) Vibrational, giant dielectric and AC conductivity properties of agglomerated CuO nanostructures. *J Mater Sci Mater Electron* 24: 1045-1051.
2. Priyanka KP, Joseph S, Thankachan S, Mohammed EM, Varghese T (2013) Dielectric properties and AC conductivity of nanocrystalline titania. *J Basic Appl Sci* 2: 105-108.
3. Sharma R, Sarkar A, Jha R, Sharma AK, Sharma D, et al. (2019) Sol-gel mediated synthesis of TiO₂ nanocrystals: Structural, optical and electrochemical properties. *Int J Appl Ceram Technol* 17: 1400-1409.
4. McCormick MA, Slamovich EB (2003) Microstructure development and dielectric properties of hydrothermal BaTiO₃ thin films. *J Eur Ceram Soc* 23: 2143-2152.
5. Wang Q, Varghese O, Grimes CA, Dickey EC (2007) Grain boundary blocking and segregation effects in yttrium-doped polycrystalline titanium dioxide. *Solid State Ion* 178: 187-194.