

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 characterized mainly 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 sexes. Species of *Brucella* are obligate parasites, requiring an animal host for maintenance. They are small, non-motile, non-sporulating, non-toxigenic, aerobic, facultative intracellular, gram-negative coccobacilli parasites. Sexually mature and pregnant animals are more prone to *Brucella* infection. 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.

Key words: Brucellosis • Ethiopia • Small Ruminant

INTRODUCTION

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 [1], Ethiopia has over 39.89 million head of sheep and 50.5 million goats.

In spite of the presence of huge small ruminants (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 [2].

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 [3, 4].

The presence of small ruminant brucellosis in Ethiopia is well established [5-10] 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 [4].

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 programs. In Ethiopia some studies have been conducted on small ruminant brucellosis at different times. Therefore, the objective of this paper was to review the status of small ruminant brucellosis in Ethiopia.

Small Ruminant Brucellosis

Etiology: Brucellosis is an infectious bacterial disease caused by microorganisms of the genus *Brucella*, a coccobacilli, gram negative, facultative intracellular pathogen, which affecting 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 [11, 12].

Epidemiology

Geographic Distribution: 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 [3].

Host Risk Factors

Age Factor: The prevalence of the disease is most frequently occurred in adult sheep and goats than younger one). Sexually mature and pregnant animals are more prone to *Brucella* infection and brucellosis than sexually immature animals of either sex [6, 9].

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 [6, 9].

Sex: Male animals are less susceptible to *Brucella* infection than females, due to presence of low concentration of erythritol in male relative to female animals [6].

Flock Size: 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 [9].

Transmission: Brucellosis can transmitted 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 [3].

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 [13].

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 [5], to 12.35% in Afar region [6] 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 (Table 1). 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 [6, 9]. 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 [15]. 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 [16]. 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* [15]. In endemic countries humans get

Table 1: Prevalence of brucellosis in small ruminants in different parts Ethiopia at different time

Region	Number of animal tested	Serological Prevalence	Source
Tigray (Tselemti district)	558	1.79	[7]
Somali	1854	0.07	[5]
Oromia (Jimma)	804	4.7%	[9]
SNNP (S. omo)	619	0.26	[5]
Dire dawa	424	2.6	[14]
Afar	1190	12.35	[6]
Oromia (Yabelo)	283	8.1**	[8]

** -confirmed by c-ELISA, Others by CFT

infected mainly by drinking un-pasteurized 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 [4, 17-19]. 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 [20].

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 [13, 15].

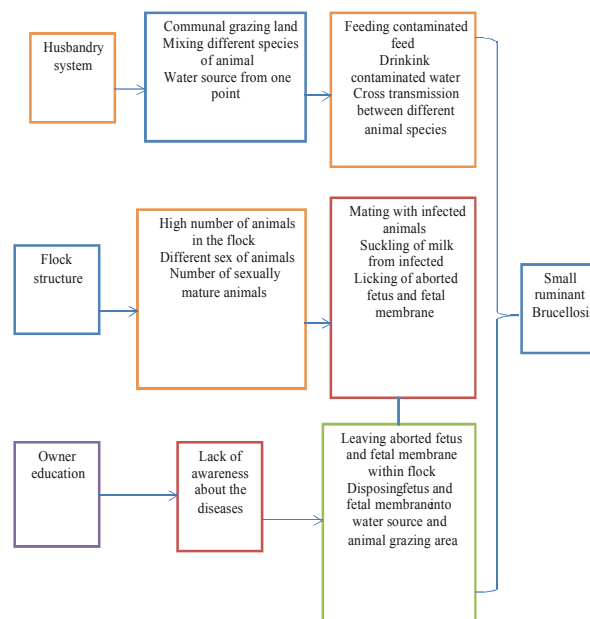
CONCLUSION AND RECOMMENDATION

Small ruminant brucellosis is the one commonest bacterial infection that affect healthy of small ruminant throughout world, especially in developing country with extensive management system. The disease has high economic impact by reducing reproductivity and productivity of the animal and have zoonotic importance. The status of small ruminant brucellosis is not well studied in Ethiopia and much is remained to address the problem. Hence, the following points are recommended as they are very important to design strategy of control and eradication of the disease.

More researches to be done on small ruminant brucellosis to know its status and economic and public effect.

- The government, Public health officers and Veterinarians have to work together to reduce its economic and zoonotic impact.
- Eradication programmes should be enforced in order to protect human health.

Conceptual Frame Work on Small Ruminant Brucellosis: Distal factors intermediate factors proximal factors outcome.



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