

Research Article

Assessment of Knowledge, Attitude, and Practices of Population Towards Brucellosis in Benadir Region, Somalia

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Abstract | A cross-sectional study using random sampling was conducted from May to September 2020 in Benadir region of Somalia, to determine the knowledge, attitude, and practices of population towards Brucellosis. In this study, a total of 120 participants share their knowledge, attitude, and practices towards Brucellosis. Their knowledge regarding causative agent was 37.5% (n=45) and the disease was 45% (n=54), while transmission of animal to human was 43.33% (n=52). The majority of participants would take actions to ensure the animal is healthy when they buy 95% (n=114), all participants would like to receive more information about the disease and majority of participants have good practices when they handling the domesticated animals and their secretions 96.66% (n=116). Populations who are connected with livestock management or eating livestock products are frequently aware of the disease brucellosis. Though, they do not have as considerable knowledge, what is required to help in control it. Veterinarians, health care workers and respective government bodies must take action to increase the level of awareness and considerate by providing programs or any other technique that can be helpful.

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Introduction

Brucellosis is appreciated as one of the neglected and second greatest significant zoonotic disease after rabies categorized by OIE, WHO and FAO as it causes more than half million cases yearly in the globe (Mohamud *et al.*, 2020a). Brucellosis is caused

by gram-negative bacteria “coccobacilli,” from the genus *Brucella*, including different genetically similar strains, such as *Brucella abortus*, *Brucella melitensis*, *Brucella suis*, and others with varying reservoir hosts (Park, 2015). Some occupations like dairy farms, animal breeders, butchers, slaughter house workers, meat packers, laboratory workers, veterinarians show

potential risk of brucellosis (Corbel, 2006). Brucellosis is primarily a reproductive disease in a female and characterized by abortion in the very last trimester and epididymitis and orchitis with common infertility in male animals (Mohamud *et al.*, 2020a). Brucellosis is a multisystem disorder, usually presenting with a wide variety of signs and symptoms. The most common appearance is the fever of unidentified origin. Followed by musculoskeletal system manifestations including arthritis and osteomyelitis and backache (Corbel, 2006). Brucellosis can transmit by direct or indirect contact with diseased animals, consumption of infected animals as well as their products like milk. The *Brucella* organism is most commonly acquired by ingestion, skin contamination and genital inoculation. Respiratory route, intrauterine and venereal transmissions are other possibilities of the organism (Mohamud *et al.*, 2020a). The economic impact of the disease varies depending on the geographical location, livestock species affected, management system adopted, and the capacity of the country's veterinary and medical systems. Brucellosis can cause huge economic losses due to clinical manifestation of abortion, increase mortalities and abortion of adult animals, decrease of milk production, and cause of infertility, also, due to public health threatens brucellosis can cause occupational exposure through the conduct of diseased animals, their tissues or discharges, or the consumption of unpasteurized milk or dairy products (Zeng *et al.*, 2019). Controlling the disease in livestock is an essential task in many countries. The main adopted control strategies include surveillance, vaccination, isolation, and elimination of infected animals, test-and- slaughter and compensation schemes. Currently, several vaccines like *Brucella melitensis* Rev 1, Mucosal vaccine subunit, RB51, S19 are available which is effective in the control of brucellosis (Mohamud *et al.*, 2020b). However, implementing effective control programs is challenging in countries with a low gross domestic product (GDP) and poorly resourced animal health systems (McDermott *et al.*, 2013). As per the study of Mohamud *et al.* (2020a), the prevalence of bovine brucellosis in Benadir region is 0.2%, and in Mogadishu it is 10% (Afrah *et al.*, 2020) which is directly linked to the loss in the economic of the Somalia and livestock plays a crucial role in the GDP of Somalia (Mohamud *et al.*, 2020c) Conducted a survey of brucellosis in bovines and humans in Somalia is reported as 0.6% (Hussein *et al.*, 1978). Human brucellosis in the country needs more attention and

research (Hassan-Kadle, 2015). Though the efforts to control it, the level of awareness, present knowledge, and practice among the limited population is not enough, particularly in the target place, which is an area that is rich in livestock and several people come in close contact with these animals. In response to this problem, our study suggests a number of parameters for assessment of the present situation of brucellosis to take attention and increase awareness about brucellosis as a way to prevent and control it.

Materials and Methods

Study area, design, period, and population

A Cross-sectional study was conducted in Benadir region of Somalia, which lies among latitude 2.046934 and longitude 45.318161. The normal yearly temperature ranges between 28.7°C-37°C. Benadir is the capital city of Somalia and has the largest population across Somalia and it is probable to have about 2.3 million people and covers an area of around 96,878 km (Mohamud *et al.*, 2020d). The study was conducted for a period of 5 months from May to September 2020, to determine the knowledge, attitude and practices of the population towards brucellosis in Benadir region of Somalia. The study population includes herders, butchers, slaughterhouse workers, meat processing workers and some others as well.

Sample type

Stratified random sampling has been considered in the selection of certain risks related to occupations in this study.

Sample size

The sample size of this study has been calculated by the following formula.

$$n = Z^2 pq / d^2 = Z^2 P(1 - P) / d^2$$

Where;

n=Sample size, Z=Standard deviate, P=Prevalence, Q=1-p, d=Error accepted. The prevalence (P) was calculated as 10%.

With reference to the above-mentioned formula and other studies done previously, we decided that the size of the study sample should be around 120 samples.

Data collection

A pretested and well-designed preformed

questionnaire has been used to collect data for assessing knowledge, attitudes, practices, and misconception of the population towards Brucellosis in Mogadishu, Somalia.

Data analysis

All the data have been entered in Microsoft Excel Spreadsheet-2019 and analysis were done. The analyzed data were presented in frequency and percentages.

Results and Discussion

All figures in below indicates the demographic profile of the participants.

Frequency of respondent based on districts

The overall percentage of questionnaire respondent from different districts of Benadir region is shown in Figure 1. The highest percentage of respondent was found in Deyniile district (27.50%; n=33) and least was seen in Yaaqshiid district, where respondent percentage was 8.33% (n=10).

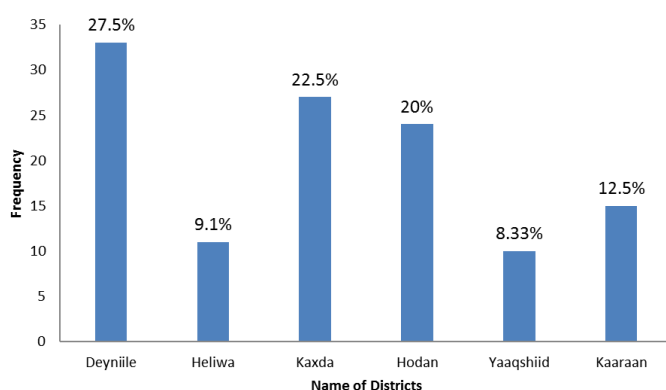


Figure 1: Frequency of participants based on districts.

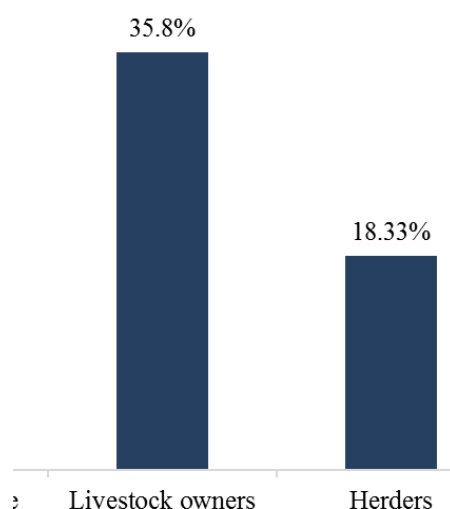


Figure 2: Number of participants based on sex.

Frequency of respondent based on sex

The overall percentage of questionnaire respondent based on sex is presented in Figure 2. The highest percentage of respondent was found in Male (55.8%; n=67) while respondent was 44% (n=53).

Frequency of respondent based on occupation

The overall percentage of questionnaire respondent based on occupations is presented in Figure 3. The highest percentage of respondent was found from livestock owner (35.80%; n=33), followed by butcher (21.6%; n=26), slaughter-house worker (20%; n=24), and least was from herders which was (18.33%; n=22).

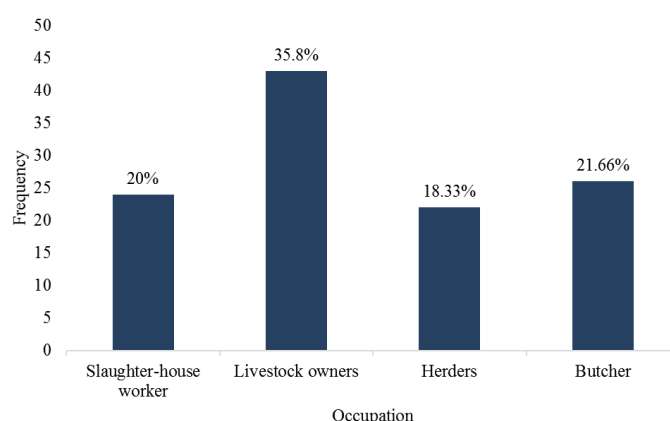


Figure 3: Frequency of participants based on occupations.

Frequency of livestock based on type in the study area

The overall percentage of questionnaire respondent based on Types of livestock is presented in Figure 4. The highest percentage of respondent was found in cattle handler (43.33%; n=52) and least was seen in mix livestock handler respondent was only 3.33% (n=4).

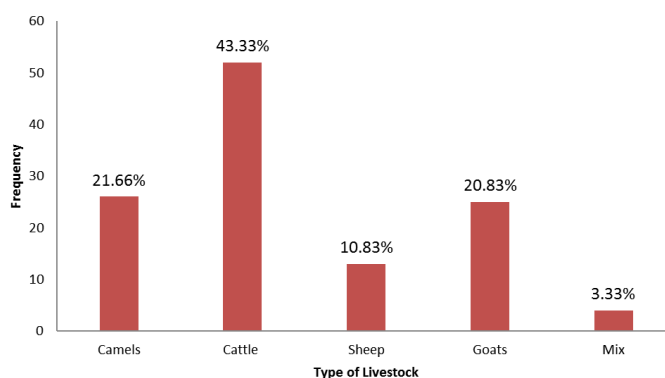


Figure 4: Number of different types of livestock in study area.

On the basis of knowledge, most participants have no knowledge about the bacteria Brucella. Only 37.5% (n=45) of people heard about the bacteria Brucella, and 44% (n=54) about disease Brucellosis. In terms of transmission of Brucellosis from animal to human

also only 43.33% (n=52) was found. Regarding the vaccination of the animals, in the study area peoples are found much aware, only 39.16% (n=47) people do vaccination to their animals against Brucellosis. The overall details of the knowledge among the people of the study area is presented in Table 1.

Based on the attitude of respondent, 95% (n=114) take actions to assure the animal is healthy when they buy a new animal, while 5% (n=6) participants don't care about such things. All the participants would like to receive more information about brucellosis (Table 2).

The majority of participants wash their hands after milking their livestock i.e. 96.66% (n=116) while 3.34% (n=4) do not wash their hands. In selling the livestock's products it was found that 69.16% (n=83) owner sells only fresh products. In the aspect of drinks

raw milk and nutritional changes after boiling milk, only 44.16% (n=53) found who boiled the milk before drink and 45% (n=54) of people believe boiling milk can change the nutritional values. The overall details regarding the practices adopted in the study area is shown in Table 3.

The study of assessing the knowledge regarding this disease among the high-risk population was never done before in Somalia. Educating the population among the zoonotic diseases reduces the potential risk of livestock handling populations and it will be easy to control.

The present study is related to the knowledge and facts concerning brucellosis among labors and traders who are directly or indirectly linked with the livestock businesses that require contact with animals in Benadir region of Somalia. The overall knowledge

Table 1: Knowledge regarding brucellosis.

Statement	Frequency		Percent	
	Yes	No	Yes	No
Have you ever heard about the bacteria <i>Brucella</i> ?	45	75	37.5%	62.5%
Have you heard of the disease Brucellosis?	54	66	45%	55%
Can a human being infected with Brucellosis?	57	63	47.5%	52.5%
Do you know how brucellosis is transmitted from animal to human?	52	68	43.33%	56.6%
Do you know if there is any national program concerning Brucellosis?	23	97	19.1%	80.9%
Do you know if there is any treatment for Brucellosis in cows/sheep/goats?	34	86	28.33%	71.67%
Do you know if there exists any vaccination for Brucellosis in livestock?	45	75	37.5%	62.5%
Have you been told by the veterinarian that some of your sheep/goats or cows have had Brucellosis?	53	67	44.16%	55.84%
Are your cattle vaccinated against brucellosis?	47	73	39.16%	60.84%

Table 2: Attitude regarding brucellosis.

Statement	Frequency		Percent	
	Yes	No	Yes	No
If you buy a new animal, do you take any actions to ensure the animal is healthy?	114	6	95%	5%
Would you like to receive more information on brucellosis?	120	0	100%	0%

Table 3: Practice regarding brucellosis.

Statement	Frequency		Percent	
	Yes	No	Yes	No
Do you wash your hands after milking livestock?	116	4	96.66%	3.34%
Do you sell fresh milk or dairy products on a regular basis?	83	37	69.16%	30.84%
Do you drink raw milk? "Without boiling/pasteurizing."	53	67	44.16%	55.84%
Does the nutritional value change after boiling milk?	54	66	45%	55%
Do you boil the milk before selling it or consuming it?	111	9	92.5%	7.5%
Have you had any abortions or stillbirth among your cattle during the last year?	31	89	25.83%	74.17%

about the bacteria was 37.5% among participants, while 45% of participants were heard the disease brucellosis. Almost 71.67% was knowledgeable about the treatment while 62.5% was knowledgeable about animal vaccination. This study regarding knowledge about brucellosis is nearly to a meta-analysis conducted by [Zhang *et al.* \(2019\)](#). Participants might have heard of the disease but do not have a clear understanding of it. Most of participants (80.9%) denied their knowledge about any national programs about brucellosis. Majority of participants 95% would take actions to ensure the animal is healthy when they buy an animal. All participants would like to receive more information about brucellosis, this high level of interest indicates that animal handlers would like to protect against brucellosis.

The majority (96.66%) of the participants wash their hands after milking livestock and 55.84% drink milk only after pasteurization. Raw milk was still being consumed, which could potentially be decreased through educating people on the benefits of boiling milk. Most households reported home slaughter of livestock. Slaughtering of infected animals is considered as a high risk, as the persons conducting slaughter and handling contaminated meat may be exposed if precautions are not taken ([Galinska and Zagórski, 2013](#)). The lack of a clear-cut policy to identify risk factors is the most critical reason for disease persistence in many countries ([Ning *et al.*, 2013](#)). A small portion of participants provided information that was misleading or contradicting.

Conclusions and Recommendations

Populations who are connected with livestock management or eating livestock products are frequently aware of the disease brucellosis. Though, they do not have as considerable knowledge as what is required to do for controlling it. Veterinarians, health care workers and respective government bodies must take action to increase the level of awareness and considerate by providing programs or any other technique that can be helpful.

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Novelty Statement

The study presents the overview of recent scenario of knowledge, attitude, and practice of zoonotic diseases like Brucellosis and as far we know this is the first time such survey was done for Brucellosis in Benadir region of Somali.

Author's Contributions

SAM design the study and collect data. OSAJ and YAM performed statistical analysis. AIM prepare the draft, and PM finalize the manuscript and provide critical comments and review. All authors read the manuscript and agree to be responsible for any aspect of the manuscript.

Limitations

The limitations we faced were time limitations and sample size were small.

Conflict of interest

The authors have declared no conflict of interest.

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