



Knowledge, Attitudes and Practices Related To Brucellosis Among Community In Selected Districts Of West Shewa Zone, Oromia, Ethiopia

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Abstract

Brucellosis is a bacterial disease caused by various *Brucella* species, which mainly infect cattle, swine, goats, sheep and dogs. Humans generally acquire the disease through direct contact with infected animals, by eating or drinking contaminated animal products or by inhaling airborne agents. The aim of this study is to assess the livestock farming communities' knowledge, attitude, and practices related to brucellosis in Ada`a Barga, Dandi and Gindeberet districts of Oromia, Ethiopia. A cross sectional survey was carried out from August 2022 to September 2022 using a structured questionnaire to investigate knowledge, attitude, and practice regarding brucellosis among livestock farming community in the study areas. Out of 384 respondents, 111 (28.9%) indicated that, they had heard of brucellosis previously and the majority 273 (71.1%) do not heard about the brucellosis. Respondents with a lower level of education were less likely to have heard of brucellosis compared to those with a higher level of education ($P=0.003$). The majority of respondents don't know that human can be infected with brucellosis 70.3%, and only 29.7 % know that human can be infected with brucellosis ($P= 0.001$). Majority of the respondents (79.9%) need information about brucellosis and preferred to receive it through training and via veterinarian. About 36% of those who heard about brucellosis believe that any family members may at risk of acquiring brucellosis. Concerning practices of brucellosis among respondents, 54.2% of the respondents wash their hands every times after milking there cows and 24.5% responds that, they wash their hands sometimes because, there are no clean water and no soap. Therefore Awareness creation and training programs of brucellosis causative agents, transmission, and treatment, prevention and control methods should be provided to the communities in the study districts.



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Introduction

Brucellosis is a bacterial disease caused by various *Brucella* species, which mainly infect cattle, swine, goats, sheep and dogs. Humans generally acquire the disease through direct contact with infected animals, by eating or drinking contaminated animal products or by inhaling airborne agents. Most cases are caused by ingesting unpasteurized milk or cheese from infected cattle's, goats or sheep [1,2].

Brucellae are Gram-negative, non-spore-forming, non-motile coccobacilli and facultative intracellular parasites that cause a chronic disease that usually persists for life [3,4]. Four common species can infect humans, including *B. abortus*, *B. melitensis*, *B. canis* and *B. suis*, and less commonly is *B. inopinata*. The symptoms of brucellosis include joint and muscle pain and sweating. The disease is transmitted from animals to humans through direct contact with infected animals, ingestion of infected food products, or inhalation of aerosols [5]. New epidemiological aspects of brucellosis, including its emergence in new regions as well as its growing transmission from animals to humans, are of great significance [6,7].

Brucellosis is one of the most common zoonoses transmitted by animals, and human brucellosis has severe public health consequences in endemic areas. The expansion of livestock industries and urbanization, as well as a lack of hygiene measures in animal husbandry and food handling, all contribute to brucellosis remaining a public health risk [2].

Brucellosis is more prevalent in the young population, with 60% of cases in persons aged 13-40 years, 16% in those aged 40-60 years, and 2.5% in 60 years and older. Brucellosis may be more common in children in developing countries because of a shortage of pasteurization [8].

Brucellosis is an important zoonosis and is neglected in some parts of the world (Zhan et al., 2019, [3,9]). Brucellosis is endemic in most developing countries and manifests as a febrile illness that is sometimes indistinguishable from malaria or typhoid fever; hence, it may not be recognized in clinical and laboratory settings [10,11,12]. It is quite prevalent in Middle East [13] and east African countries [14].

In Ethiopia, although information on how and when brucellosis was introduced to the country is not established, the disease remains endemic. Several serological surveys have showed that, brucellosis is an endemic and widespread disease in urban, peri-urban, highland and lowland, extensive and intensive farming, smallholder farms and ranches of the country [15,16,17,18,19]. The pooled seroprevalence estimate of brucellosis at national level in Ethiopia was 2.6% in cattle, 4% in goats, 3% in sheep and 3% in camels [20]. In humans, the disease is often underreported as being misclassified as typhoid fever or malaria given similar clinical manifestations and infection is acquired by consuming unpasteurized milk or through direct contact with the infected animals or their aborted fetuses or placentas [21,22]. Due to limited studies have been conducted, A better understanding of the knowledge, attitude, and practices regarding brucellosis could increase the understanding of brucellosis risk factors for livestock and humans, influence local awareness programmes and inform policy on brucellosis control strategies in livestock farming community of West Shawa zone, Central Ethiopia

Objectives

- To assess brucellosis related knowledge, attitude and prac-

tices among livestock farming community in Gindeberet, Dendi and Ada`aBarga Districts of West Shawa zone, Oromia Regional State, Ethiopia.

- To inform policy makers so that pertinent actions are taken to prevent the transmission of the disease in animals as well as to humans.

Materials and Methods

Study area

West Shawa Zone is a zone in Oromia Region of Ethiopia located west of Addis Abeba the capital city of Ethiopia. Based on the 2007 Census conducted by the Central Statistical Agency of Ethiopia (CSA), West Shawa Zone has a total population of 2,058,676, of whom 1,028,501 are men and 1,030,175 women; with an area of 14,788.78 square kilometers, West Shawa has a population density of 139.21 (https://en.wikipedia.org/wiki/West_Shewa_Zone#:~:text=Demographics,a%20population%20density%20of%20139.21).

Gindeberet district is located in West Shawa Zone of Oromia Regional State, Ethiopia. The major town of the district Kachisi is found 183 km west of Addis Ababa the country's capital city. This district has an estimated total population of 204,413, of whom 105,369 are men and 99,044 are women; 7,805 or 3.82% of its population are urban dwellers [23]. The district is divided into two agro-ecological zones, locally called *badda*, or highland (temperate), which comprises 40% of the total area and has an altitude ranging between 1,500 and 2,604 metres (4,921 and 8,543 ft) above sea level, and *badda-dare*, or midland (moist subtropical), which comprises 60% and has an altitude between 1,000 and 1,500 metres (3,300 and 4,900 ft) above sea level. The *badda* agro-ecological zone is much cooler and receives more rainfall than the *badda-dare*. The district topography includes plateau, hilly and sometimes steep slopes. It has low rainfall variability with 12.1% coefficient of variation, and receives most rainfall during long rainy season (June to September) [24]. The cultivated area covers 40.8% of the woreda (of which 32.7% of the total area is planted in annual crops), while 36.1% is pasture, 1.3% forest, 9% shrubland, 8.8% degraded on non-arable land, 2% is covered by bodies of water, and all other categories of land makes up the remaining 2% [25].

Dendi is a district in Oromia Region, Ethiopia. Part of the West Shawa Zone, Dendi is bordered on the south by the Southwest Shawa Zone, on the west by Naannawa Ambo, on the north by Jeldu, and on the east by Ejerie. The administrative center of this woreda is Ginchi; other towns in Dendi include Olonkomi. Elfata Aanaa was separated from Dendi. The 2007 national census reported a total population for this woreda of 165,803, of whom 83,988 were men and 81,815 were women; 25,322 or 15.27% of its population were urban dwellers ([https://en.wikipedia.org/wiki/Dendi_\(woreda\)](https://en.wikipedia.org/wiki/Dendi_(woreda)))

Ada`aBarga district is part of West Shawa Zone located at a distance of 60 km, West of Addis Ababa, capital city of Ethiopia. This district has an estimated total population of 129,889, of whom 65,871 are men and 64,018 are women; 14,284 or 11.00% of its population are urban dwellers [23]. It receives an average annual rainfall ranging from about 887 to 1,194 mm. The minimum, medium and maximum daily temperatures of the area are 10, 15 and 25°C, respectively. The major soils of the Ada Barga district are: Platy 44%, red 39% and brown (mixture) 17%. The district is situated at an altitude ranging from 1400 to 3,270 m.a.s.l (meters above sea level) and comprises of 29%

highland (>2300 m.a.s.l), 34% midland (1500 to 2300 m.a.s.l) and 37% lowland (< 1500 m.a.s.l) areas as per Zonal Basic Data, 2000. The livestock species reared in the district include cattle, sheep, poultry, equines and goats [26].

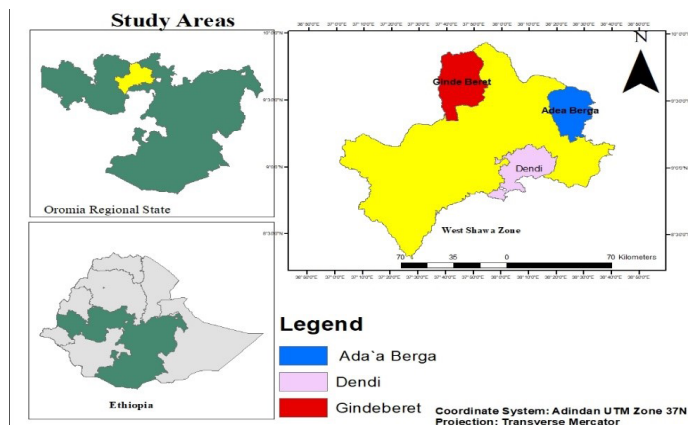


Figure 1: Study Area.

Study Population

The population of the study was livestock farming community in the Gindeberet, Dandi and Ada`a Barga districts of West Shawa zone, Oromia, Ethiopia.

Study Design

A cross sectional survey was carried out from August 2022 to September 2022 using a structured questionnaire to investigate Knowledge, Attitude, and practice regarding brucellosis and associated risk factors among livestock farming community in the study areas.

Sample Size Determination

To the best of literature review of the researcher, no previous documented works were conducted on of the knowledge, attitudes and practices regarding brucellosis among the farming community in the study areas. Therefore, in this study, sample size was determined depending on the expected 50% prevalence in the knowledge gap, and 0.05 desired absolute precision according to Thrusfield formula [27].

$$N = \frac{1.96^2 Pexp (1 - Pexp)}{d^2}$$

Where N= required sample size,

P exp = expected prevalence,

D= desired absolute precision, 1.962 = z-value for 95% confidence interval.

P exp = proportion (0.5) is the expected prevalence of community members with knowledge on cause/symptom or mode of transmission brucellosis, d = level of precision at 5%.

$$N = 1.96^2 \times 0.5 \times 0.5 / (0.05)^2 = 3.8416 \times 0.25 / 0.0025 = 384.16 = 384$$

Sampling procedures/methods

A total of 384 questionnaires was collected through face-to face and telephone interviews from the livestock farming community in Gindeberet, Dandi, and Ada`a Barga districts purposively depending on their number of livestock and tradition of consuming raw milk and meat. Five representative kebeles from each district was purposively selected with the help of the dis-

trict agricultural office and animal health expert. Households was randomly selected for interview from the total fifteen kebeles (five from each district) using simple random sampling depending on the data obtain from each kebeles about total population in the village and numbers of kebeles.

A standardized, structured questionnaire mainly close-end questions was used to gather information from livestock farming community on KAP concerning brucellosis in animals, potential routes of transmission to humans, and practices regarding dealing with suspected or aborted animals and processing and consumption of milk and dairy products. The questionnaire covered parents' socio demographic data and awareness regarding brucellosis causes and mode of transmission. Before face-to-face interview, verbal consent was obtained from the respondents by explaining objectives of the survey and expressing importance of the data to the society. Considering the high illiteracy rate, verbal consent was considered as appropriate. An information sheet and informed consent document was used by the interviewers to explain the study process and purpose and to obtain consent. This study was voluntary and anonymous.

Data analysis

After the data collection, it was revised, coded, and fed into the statistical software IBM SPSS version 20 (SPSS, Inc., USA). A p-value less than 0.05 were considered as statistically significant. Descriptive analysis based on frequency and percent distribution was carried out for all variables and the univariant relationship between participants' data and their awareness level was tested depending on those heard of brucellosis previously using the Pearson chi-square test.

Results

Socio-demographic characteristics of respondents

Out of 384 participants, 138 (35.9%) of them were from Gindeberet, 115 (29.9%) from Ada`a Barga and 131 (34.1%) were from Dandi districts. Occupation, educational status and marriage were positively related with those heard about brucellosis. Majority of the participants were farmers 300(78.1%), and trader 70 (18.2%), while 80.5% were males and 19.5% were females (Table 1).

Frequency of those heard about brucellosis with district

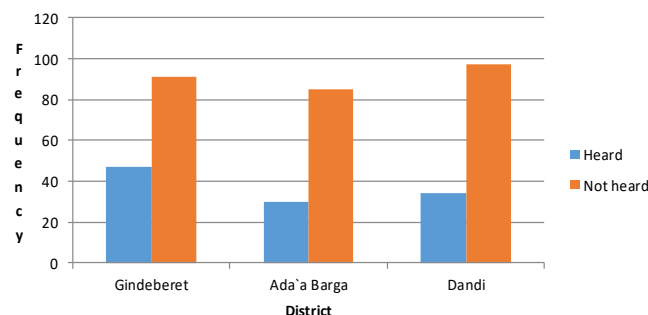


Figure 2: Frequency of those heard about brucellosis with district in West Shawa Zone.

Knowledge of brucellosis among respondents

Out of 384 respondents, 111 (28.9%) indicated they had heard of brucellosis previously and the majority 273 (71.1%) do not heard about the brucellosis. Table 2 shows the responses to some of the knowledge questions about brucellosis among the respondents. The main sources of information on brucellosis

were veterinarian (56.8%; 63/111), Media (radio and television (29.7%; 33/111), training (7.2%; 8/111), neighbor (5.4%; 6/111) and family member (0.9%; 1/111). The majority of respondents don't know that human can be infected with brucellosis 70.3%, and only 29.7 % know that human can be infected with brucellosis.

Table 1: The socio-demographic characteristics of respondents.

Variable	Category	Frequency		p-value
		Number	Percentage	
District	Gindeberet	138	35.9	0.249
	Ada`a Barga	115	29.9	
	Dandi	131	34.1	
Age	17-27	47	12.2	0.388
	28-37	117	30.5	
	38-47	121	31.5	
	48-57	69	18.0	
	57	30	7.8	
Sex	Female	75	19.5	0.346
	Male	309	80.5	
Occupation	Farmer	300	78.1	0.044
	Trader	70	18.2	
	Civil Servant	10	2.6	
	Religious	1	0.3	
	Teacher	3	0.8	
Education Status	Illiterate	125	32.6	0.003
	Read and Write	120	31.3	
	Elementary	84	21.9	
	High school	40	10.4	
	Diploma	13	3.4	
	Degree	2	0.5	
Marriage	Single	36	9.4	0.001
	Married	342	89.1	
	Widow	5	1.3	
	Divorced	1	0.3	
Family Size	1-5	241	62.8	0.426
	6-10	141	36.7	
	>10	2	0.5	

Table 2: Knowledge about brucellosis among the respondents.

Variables	Category	Frequency		p-value
		Number	Percentage	
Heard about the brucellosis as an animal disease	Yes	111	28.9	
	No	273	71.1	
Sources of information(N=111)	Training	8	7.2	0.000
	Veterinarian	63	56.8	
	Media	33	29.7	
	Neighbor	6	5.4	
	Family	1	.9	

Which animal species can become infected	Don't know	246	64.1	0.000
	All	57	14.8	
	Cattle	70	18.2	
	Cattle, Sheep and Goats	11	2.9	
Knows that human can be infected with Brucellosis	Yes	114	29.7	0.000
	No	270	70.3	
Knows the spread occurs between animals	Yes	157	40.9	0.000
	No	227	59.1	
Know how human can be infected from an animal	Don't Know	175	45.6	0.000
	Aborted fetus and Placentas	99	25.8	
	Milk and Meat	26	6.8	
	Milk	20	5.2	
	Milk and Offal	12	3.1	
	Physical contact	12	3.1	
	Meat	12	3.1	
	Milk, Offal and aborted fetus	28	7.3	
Know if there is any treatment for brucellosis in cows/sheep/goats	Yes	58	15.1	0.000
	No	326	84.9	
If any treatment, what kind and for how long	No treatment	326	84.9	0.000
	Antibiotic for 3 days	39	10.2	
	Traditional remedy	19	4.9	
Know if there exist any vaccination for Brucellosis	Yes	7	1.8	0.000
	No	377	98.2	
Know person told they have brucellosis	Yes	87	22.7	0.619
	No	297	77.3	
Cows/ sheep/ goats told they have brucellosis	Yes	59	15.4	0.000
	No	325	84.6	
Cattle been vaccinated against any disease	Yes	272	70.8	0.000
	No	112	29.2	
Which disease	Doesn't Vaccinate their animals	115	29.9	0.000
	Anthrax	80	20.8	
	Anthrax and Black Leg	73	19.0	
	Anthrax and LSD	36	9.4	
	Anthrax, Black leg and LSD	25	6.5	
	AHS	5	1.3	
	Anthrax, AHS	3	.8	
	Anthrax, Black leg, Pasturollosis	8	2.1	
	Black leg	21	5.5	
	Black leg and LSD	15	3.9	
LSD	3	.8		

Attitude of brucellosis among respondents

Attitude regarding brucellosis of the total 384, 54.7% (n = 210) most regularly talk to veterinarian about animal health issues, and the remaining talk to family member, neighbor, traditional healers and Village chief. About 36% of those who heard about brucellosis believe that any family members may at risk of acquiring brucellosis. 50.8% of the livestock farming communities are quite serious if there cattle get brucellosis, and only 19.3% are very serious if there cattle get brucellosis (Table 3).

Practices of brucellosis among respondents

Concerning practices of brucellosis among respondents, 54.2% of the respondents wash their hands every times after milking there cows and 24.5% responds that, they wash their hands sometimes because, there are no clean water and no soap. 12.2% of the respondents buried the dead fetus and the majority of them 62.5% through away the dead fetus for dog and 25.3% through away on field (Table 4).

Table 3: Attitude of brucellosis among respondents.

Variables	Category		Frequency		p-value
			Number	Percentage	
Believe any family members are at risk of acquiring brucellosis(N=111)	Yes		40	36.0	0.000
	No		71	64.0	
If yes, which family member (s)(N=111)	No risk of acquiring brucellosis		71	64.0	0.000
	Female		32	28.8	
	Male		3	2.7	
	Male and female		5	4.5	
If an animal get Brucellosis, how seriously considered	Cattle	Not Serious	115	29.9	0.000
		Quite Serious	195	50.8	
		Very Serious	74	19.3	
	Sheep/Goat	Not Serious	55	14.3	0.000
		Quite Serious	149	38.8	
		Very Serious	180	46.9	
Need more information on Brucellosis	Yes		307	79.9	0.020
	No		77	20.1	
How like to receive that information	no need for information		75	19.5	0.000
	Media		34	8.9	
	Training		135	35.2	
	Via Veterinarian		117	30.5	
	Via Veterinarian and Media		23	6.0	
With whom talk about animal health issues	Veterinarian		210	54.7	0.000
	Family member		96	25.0	
	Neighbor		65	16.9	
	Traditional Healer		4	1.0	
	Village chief		9	2.3	
What to do if suspect an animal being sick	Contacted a veterinarian		377	98.2	0.411
	Contacted traditional healers and Veterinary clinic		7	1.8	

Table 4: Practices of brucellosis among respondents.

Variables	Category	Frequency		p-value
		Number	Percentage	
Wash hands after milking the cows	Every times	208	54.2	0.201
	Frequently	63	16.4	
	Sometimes	94	24.5	
	Never	12	3.1	
	Rarely	7	1.8	

If sometimes, rarely, never, why?(N=114)	No clean water	85	74.6	0.000
	No soap	15	13.2	
	Not important	14	12.3	
What to do with dead fetuses (calf, lamb, kid)	Buried	47	12.2	0.006
	Through away for dog	240	62.5	
	Through away on field	97	25.3	
Any specific actions to protect when dealing with cows having abortion or with placenta/ dead fetuses	Using gloves	17	4.4	.024
	Using clothes	3	.8	
	Using rope	45	11.7	
	Wash hands	319	83.1	
What to do if suspect an animal having Brucellosis(N=103)	Seek veterinary assistance	69	67.0	0.458
	Sell the animals	13	12.6	
	Slaughter the animal	15	14.6	
	Treat the animal	6	5.8	
Take any actions to assure the animal is healthy	Yes	272	70.8	0.000
	No	112	29.2	
If yes, how? (N=272)	Buy from persons trusted	73	26.8	0.000
	Trust in own experience	112	41.2	
	Physical Appearance	51	18.8	
	Use veterinary inspection	36	13.2	
Drink fresh milk	Yes	255	66.4	0.001
	No	129	33.6	
If no, what to do with raw milk before consumption	Boil it	129	100	
Does the nutritive value change after boiling the milk?	Yes	322	83.9	0.371
	No	62	16.1	

Discussion

This study shows that the knowledge, attitude and practice of brucellosis is poor among livestock farming community in Ada`a Barga, Dandi and Gindeberet districts of Oromia Regional State central Ethiopia. Gindeberet district farming communities is a better knowledge when compare with the Ada`a Barga and Dandi districts. However, the farming communities in Dandi districts contacted veterinarian if they suspect an animal being sick and practically they buried the dead fetus and boil the fresh milk before drink it.

The results of the KAP study shows that the majority of livestock farming community in the study areas had never heard of the disease brucellosis (71.1%) in which similar results have been shown in a study from Addis Ababa 96.1% (Edao *et al.*, 2018), Tajikistan 85 % [28], and Pakistan 80% [29]. In contrast to this finding, a study in Uganda showed a high awareness of brucellosis among the community participants [21]. Similar results have been shown in Egypt where the majority of the farmers were aware of brucellosis which the authors explained by an endemic situation of brucellosis in the study area [30]. The low awareness of brucellosis in this study might be explained by lower community awareness about the disease in the study areas as compared to Egypt [31].

Respondents who married were more likely to have heard the disease brucellosis when compared to single individual's; it may due to they get an opportunity to heard about the disease from different training, media and veterinarian in which they get information about how to keep themselves and their

children's from different diseases. Respondents with a lower level of education were less likely to have heard of brucellosis compared to those with a higher level of education. So the livestock farming community with a lower level of education are thus likely at higher risk of contracting brucellosis. This is also supported by a study conducted among livestock owners and its public health impact in Punjab, Pakistan [29].

As per respondents, it was almost as common to discuss animal health issues with veterinarians as it was with family members or friends. The majority of the respondents contacted a veterinarian if suspect an animal being sick. This is in line with findings from a study conducted in Egypt where most respondents would contact veterinarian if they suspected brucellosis infection among their livestock [30]. In the current study it was shown that participants who mainly consulted veterinarians regarding animal health issues were more likely to have heard of brucellosis compared to those who mainly consulted a family member or a friend. The well-established relationship between many veterinarians and livestock owner could be useful if implementing information campaigns as part of a future control strategy. About 79.9% of the respondents wanted more information about brucellosis and the majority preferred to receive it through training and via veterinarian.

A majority of the respondents were assure during buy a new animal by trust in own experience and buy from person trusted, only small number seek veterinary inspection. In this study, 66.4% of the respondents drink fresh milk which is the main predisposing factor for brucellosis and only 33.4% does not drink fresh milk for themselves and their children in which they

boil the milk before drink it. The practices concerning brucellosis in districts after milking the cows was good in which most of them wash their hands every times (54.2%) and frequently (16.7%) but 24.5 % wash their hands sometimes after milking the cows due to no clean water and no soap for their hands.

One of the limitations of this study is that the sample size (female/male) did not match, since it included 309 males compared to 75 females. This could mainly be attributed to fact that males were more concerned about the study and completed the questionnaire more conscientiously, compared to females. On the other hand, due to rainy season and security problems related to political instability limited number of districts surveyed.

Conclusion and recommendations

This cross-sectional study has assessed the knowledge, attitude, and practices of Ada`a Barga, Dandi, and Gindeberet districts livestock farming communities towards brucellosis. The study revealed that educational and marital status of the respondents was significantly associated with their knowledge on the brucellosis. The respondents of the study area had low level of basic knowledge about brucellosis and undertake insufficient actions to protect themselves when dealing with animals having an abortion or with placenta/dead fetuses. A vast majority of the respondents drink fresh milk without boil it which resulting in a main predisposing factor for brucellosis. However, a majority of the respondents wanted more information about brucellosis in which preferred to receive it through training and via veterinarian.

Therefore, based on the above conclusion, the following recommendation is forwarded;

- Awareness creation and training programs of brucellosis causative agents, transmission, and treatment, prevention and control methods should be provided to the communities in the study districts.
- National program concerning Brucellosis should be created and implement throughout the country.
- The animal owners should be seriously considered if an animal get brucellosis or see any clinical signs related to brucellosis and should be contact veterinarian.

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