Acta Scientific Veterinary Sciences (ISSN: 2582-3183)

Volume 6 Issue 2 February 2024

Research Article

Evaluation of Community Knowledge, Attitudes, and Practices Regarding Meat and Dairy Borne Zoonotic Diseases in Arbaminch Town, Gamo Zone, Southern Ethiopia

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Received: August 16, 2023

Published: January 05, 2024

Abstract

One of the most dangerous diseases in impoverished nations, particularly Ethiopia, is food-borne zoonotic infections. From October 2019 to February 2020, a cross-sectional study was carried out in Arba Minch town, particularly in and around the three randomly chosen kebeles (Woze, Delfana, and Mehalketema), to determine the community's awareness of milk- and meat-borne zoonosis and their attitudes toward and practices for controlling those diseases. Data collection methods included both closed- and open-ended questionnaire surveys. 138 responders in total were chosen. By asking respondents both open-ended and closed-ended structured questions during interviews, data was gathered. Each questionnaire was carefully reviewed following the interview. During the final data analysis, questionnaires with any cryptic or unclear responses were disregarded. The final questionnaire responses were entered into the spreadsheet program Microsoft Excel (Microsoft Corporation, USA). Using SPSS version 20, additional descriptive data analysis including frequency, average, and percentage calculations were made. Most survey participants 89.1% had heard of zoonosis. Anthrax (18.8%), taeniasis (45.7%), and bovine tuberculosis (35.5%) were zoonotic illnesses named by the study participants among those that were discussed and known to respond.According to survey participants, zoonotic diseases are transmitted through bites (31.9%), contact (6.5%), ingestion (32.6%), and inhalation (11.6%) of infected animals. About 92.8% and 2.2% of respondents, respectively, drink unpasteurized milk and eat raw meat. In the end, it was determined that, according to the respondents' responses, the community still has a low level of understanding of zoonotic illnesses. Consequently, community education and awareness programs are needed to further enhance the knowledge, attitudes, and practices of the community regarding zoonotic diseases.

Keywords: Arba Minch; Awareness; Community; Knowledge; Meat; Milk; Zoonotic Diseases

Introduction

Zoonosis refers to diseases that are naturally transferrable from vertebrate animals to humans and vice versa [1]. According to the [2], these “zoonosis” or “zoonotic diseases” could be caused by bacteria, viruses, parasites, or other unusual agents. Numerous zoonotic diseases are naturally carried by various farm animals in the cattle industry. Zonotic infections are typically found in dairy animals, raw milk, milk products, meat, and the farm environment but are frequently challenging to diagnose. Humans can contract this zoonosis in a number of ways, including by consuming infected raw milk, coming into touch with sick dairy animals and products, and being around infected farm surroundings [3].

However, the majority of milk-borne zoonosis cases are brought on by drinking contaminated milk. Zoonosis caused by milk is important for both public health and business. They not only result in significant financial losses for the dairy cattle industry, but they also present a significant barrier to the trade of animals and animal products, which could substantially impede socioeconomic development, particularly in developing African nations. These nations frequently lack the infrastructure and financial means to effectively combat animal diseases. Furthermore, farmers in the majority of these nations are not aware of the economic and public health significance of zoonotic illnesses, which further hinders efforts to control these infections [4,5].

The lives of milk producers, farm workers, and their families may be at risk of infection due to a lack of knowledge about milk-borne zoonosis. Since drinking raw milk is widespread in these communities and the majority of smallholder dairy farmers sell their milk to the general public, this exposes them to milk-borne zoonosis even more. Therefore, in order for them to decide on their management, cattle owners must be aware of the hazards associated with milk-borne zoonosis that are common in their locations as well as how they are transmitted [5]. Emergence of diseases with an animal origin, such bird flu or tuberculosis, has highlighted the need for a deeper understanding of animal diseases in terms of their epidemiology, mode of transmission, diagnosis, prevention, and management [6]. In this region of the world, there is very little knowledge about the effects of milk-borne diseases. However, given the quantity of unrestricted milk drunk and the risk involved, a significant impact is almost certainly going to occur. The Ethiopian dairy industry has developed rapidly over the last ten years, but the value of the safety of the milk and milk products produced by farmers and milk processors has received little attention. Recent media attention has been focused on zoonotic diseases and other contagious illnesses that affect both people and animals. Millions of people worldwide, particularly in developing nations, suffer from treatable zoonoses like rabies, rift valley fever, and brucellosis, yet they are still unaware of how to avoid and cure these diseases [7].

According to [8], developing nations like Ethiopia have more sanitary infrastructure issues than industrialized nations do, which puts them at risk of contracting zoonotic diseases. According to [8], the social makeup of farmers and their level of social awareness of zoonotic illnesses are major determinants of that level of awareness. the percentage of farmers who were aware that there were risk factors, such as livestock overcrowding, irregular grazing areas, poor livestock hygiene, poor farming practices, and improper isolation of diseased animals, from which the animals could contract an infection. In many developing nations, where animals serve as a source of transportation, draught power, clothing, and protein in the form of milk, meat, and eggs, there is a direct connection between human populations, animal populations, and the environment. This relationship can result in a substantial risk to the public health with significant economic ramifications in the absence of appropriate care [9]. Studying how the local population views the risk factors, modes of transmission, and life cycle of zoonotic diseases is a critical first step in creating and putting into practice effective disease preventive and control methods.

The knowledge and attitudes of communities toward these infectious zoonotic diseases have not been studied at all, despite the fact that there have been several research on them. Since zoonotic diseases are contagious and can spread from infected animals to humans through animal products, they need to be treated very carefully to prevent further spread and complications. Therefore, this study aims to close the gap by evaluating the community's knowledge, attitudes, and practices regarding meat- and milk-borne zoonosis in Arba Minch town. It also identifies and evaluates local control measures implemented by the community to combat milk- and meat-borne zoonotic diseases.

Materials and Methods

Study area

In Arba Minch Town, the study was carried out between November 2019 and March 2020. The village of Arba Minch is situated in Ethiopia's Southern Rift Valley between 5° 57' N and 37° 32' E longitudes. The region has a sub-humid climate with typical temperatures ranging from moderate to hot (220 c) and is 1285 meters above sea level (m. a. s. l). The area is well-covered in flora, with wood-grass land predominating, particularly along the margins of grazing areas and drainage lines. The most prevalent tree in the area is Acacia spp. The city is situated in the Gamo Zone, 250 kilometers south-west of Awassa and 500 kilometers south of Addis Abeba. Its name means "springs" and it includes the uptown administrative center of Shecha, which is located four kilometers from the residential and commercial districts of Sikela's downtown. Sikela has borders with the Nechisar National Park, Lake Abaya, and Lake Chamo on its eastern side. The Kulfo River also runs through the town's heart before emptying into Lake Chamo. A agricultural method of mixed livestock and agriculture was used [10].

Study population

The study population was animal owners settled in Arba Minch town which comprises of three randomly selected kebeles (Woze, Delfana, and Mehalketema).

Study design

A cross sectional study was conduct from October 2019 to February 2020toassess the community knowledge, attitude and practice on milk and meat borne zoonotic diseases.

Sample size and sampling method

The sample size for this study was calculated using the formula for estimation of single proportion with 95% CI, 5% of desired precision and rate of knowledge on zoonotic disease (10%) was be taken as one component in the formula to calculate the sample size [11].

$$N_0 = \frac{Z^2 P\, q}{e^2}$$

Where

- n_0 = sample size
- P = The estimated proportion of attribute that's present in the population.
- Q = 1-p
- E = desire precision
- Z^2 = the abscisa of the normal curve that cut off an area at tails.

The value of Z is found in statistical tables which contain the area under the normal curve. E.g z=1.96 for 95% level of confidence and based on the above formula the sample size was 138. Three study kebeles were randomly selected from Arba Minch town and individual respondents was also selected randomly and proportionally allotted for each selected kebeles.

Study methodology

Data was collected using an interviewer administered questionnaire. The questionnaire was tested on a few selected farmers the study areas of Woze, Dilfana, and, Mehalketema Kebele and the easiness of completion of the questionnaire and ambiguity of questions was noted and subsequently revised before a large-scale interview of the farmers (Annex 1).

Data Management and Analysis

Each questionnaire was carefully reviewed following the interview. During the final data analysis, questionnaires with any cryptic or unclear responses were disregarded. The final questionnaire responses were entered into the spreadsheet program Microsoft Excel (Microsoft Corporation, USA). The statistical package for social sciences (SPSS 20.00) for Windows was used to analyze the data and produce descriptive statistics (frequencies/proportions) about participants' awareness and knowledge of zoonosis, their transmission, and risk factors, with a focus on milk- and meat-borne zoonosis. To see the correlation between the variables with the requisite precision of 5% and 95% confidence intervals, the chi-square test was also performed.

Result and Discussions

Demographic information

According to the current study, there were more men than women in the town, and the majority of respondents were between the ages of 15 and 35 (Table 1). Regarding family size and educational background, more participants had more than one household with both illiterate and literate educational backgrounds. ($p > 0.05$) There was no statistically significant difference between the factors (Table 1).

Variables	Category	Frequency	Prevalence in %	X^2	P-Value
Sex	Male	77	55.8%	4.441[a]	0.350
	Female	61	42.2%		
	Total	138	100.0%		
Marital status	Single	20	14.5%	15.039[a]	0.058
	Married	107	77.5		
	Divorced	11	8.0%		
	Total	138	100.0%		
Age	15 years	0	0.0%	0.045[a]	0.833
	15-35	96	69.6%		
	>35	42	30.4%		
	Total	138	100.0%		
Family size	Single	20	14.5%	0.243[a]	0.622
	>1	118	85.5%		
	Total	138	100.0%		
Educational status	Illiterate	41	29.7%	3.686[a]	0.0596
	Literate	41	29.7%		
	Elementary	20	14.5%		
	High school	18	13.0%		
	preparatory	6	4.3%		
	Graduates	12	8.7%		
	Total	138	100.0%		
Occupational status	Hose wife	37	26.8%	25.766[a]	0.174
	Farmers	56	40.6%		
	Student	15	10.9%		
	Gove.t employee	13	9.4%		
	Self-employee	15	10.9%		
	Health professionls	2	1.4%		
	Total	138	100.0%		

Table 1: Demographic characteristics of the study Participant.

Perception towards zoonosis among respondents

The majority of study participants, 135 (978%) had raw meat, while a significant portion of respondents, 128 (92.8%), had consumed raw cow milk. However, 94 (68.1%) of respondents were unaware that drinking raw cow milk could be a source of sickness (Table 2-4).

The majority of responders (89.1%) were aware that local zoonosis causes several diseases. Only 10.1% of those who participated in the interview with respondents said they were unaware of zoonosis (table 5). According to the results of the survey, respon-

Variable	Yes/No response	Frequency	Prevalence in %	X^2	P-Value
Drink raw cow milk	Yes	128	92.8%	13.754[a]	0.017
	No	10	7.2%		
Raw milk cause health problem	Yes	44	31.9%	0.812[a]	0.368
	No	94	68.1%		
Eat raw meat	Yes	135	97.8%	0.147[a]	0.702
	No	3	2.2%		
Eat raw meat cause health problem	Yes	90	65.2%	0.147[a]	0.702
	No	48	34.8%		

Table 2: Overall respondent Knowledge on consumption habit.

		Frequency	Percent	X^2	P-Value
Milk and meat born disease	Anthrax	26	18.8%	18.173[a]	0.052
	Tuberculosis	49	35.5%		
	Taeniasis	63	45.7%		
	Total	138	100.0%		
Food poisoning can be caused by pathogenic microbes	Yes	46	33.3%	12.448[a]	0.029
	No	92	66.7%		
	Tota	138	100.0%		

Table 3: Knowledge of the community on meat born disease.

Statement	Yes/No response	Frequency	Prevalence in %	X^2	P-Value
Washing udder can reduce milk contamination	Yes	69	50.0%	10.231[a]	0.001
	No	69	50.0%		
Food handlers with un hygienic practice source of microbial contamination	Yes	76	55.1%	0.002[a]	0.961
	No	62	44.9%		
Freezing of milk and meat slow down microbial growth	Yes	110	79.7%		
	No	28	20.3%		
Raw white cheese has high risk of poisoning	Yes	41	29.7	2.115[a]	0.146
	No	97	70.3		
	Total	138	100%		

Table 4: Knowledge of milk and meat handling in the study area.

dents reported receiving more knowledge on zoonosis from veterinarians than from human health professionals (25.4%), media (22.5%), friends (9.4%), books (5.1%), and schools (4.3%), respectively (Table 6). The data's statistical analysis revealed a statistical difference (P = 0.643) (Table 6).

In contrast to a previous report from Addis Abeba, where 100% of respondents were aware of zoonotic disease, the current study in the study region indicated that 89.1% of participants had less information of zoonotic disease [12]. Additionally, their source of information was found to be distinct from reports made by [13] from the Arsi-Negele district, which showed that they learned about zoonotic diseases through personal observation (32.7%) and talking to elders (34.7%).

The current investigation demonstrated a rather poor degree of understanding regarding the methods of zoonotic disease transmission to humans. As a method of transmission for rabies and taeniasis, respectively, [14] from Jimma observed that dog bite (94.3%) and ingestion of raw or undercooked meat (82.3%).

Disease transmitted from animal to human					
	Yes/no respond	Frequency	Prevalence in %	X^2	P-Value
Disease transmitted from animal to human	Yes	123	89.1	15.381[a]	0.119
	No	15	10.1		
	Total	138	100		
Inhalation		16	11.6		
Contact		9	6.5		
Ingestion		45	32.6		
Biting		44	31.9	15.039[a]	0.058
Ingestion and biting		24	17.4		
Total		138	100%		

Table 5: Knowledge of community on zoonotic diseases.

Source of information	Yes/No Respond	Frequency	Prevalence in %	X^2	P-value
Did you get sick from handling of animal	Yes	54	39.1	3.778[a]	0.151
	No	84	60.9		
	Total	138	100		
Information about zoonotic disease	Yes	113	81.9	0.762[a]	0.683
	No	25	18.1		
	Total	138	100		
From where you get information	Friend	13	9.4	9.688[a]	0.643
	Vet	37	26.8		
	Media	31	22.5		
	School	6	4.3		
	Books	7	5.1		
	Health professional	35	25.4		
	Vet and health professional	9	6.5		
	Total	138	100		

Table 6: Source of information on zoonotic diseases.

It is easier to evaluate information in Addis Abeba than it is in the current study region. These may be related to differences in educational attainment, as 81.6% of respondents from Jimma were enrolled in basic education. The results of this study's investigation into knowledge regarding zoonotic disease transmission from animal to human were more accurate than those obtained by [15], who estimated that it was 15.5% in the Jimma zone. The variance may be a result of the respondents' varying levels of education, as roughly 45.4% of them from various research areas did not attend formal education.

[13] revealed that, in accordance with the current study, 58.20% and 57.1% of study participants from the Arsi-Negele district, respectively, had a practice of consuming raw meat and unpasteurized milk. [16] reported a lower result from Arusha and Tanga in Tanzania, which showed that 40% and 16.3% of people, respectively, drank unpasteurized milk and raw meat. This diversity may result from their distinct habitats (urban and rural) and cultural differences among communities from various localities and nations about the use of food with an animal origin. In the Mana and Limmukosa districts of the Jimma Zone, a smaller (18.8%) number of respondents shared a shelter with animals, according to [15].

Question	Source	Frequency	Prevalence in %	X^2	P-value
Where do you obtain a meat	Local market	26	18.8	3.224[a]	0.199
	License butcher	112	81.2		
	Total	138	100		
Where do you obtain raw milk	Home	117	84.8	3.407[a]	0.492
	Cooperative	2	1.4		
	Café	19	13.8		
	Total	138	100		
Do you think milk and meat obtained hygienic	Yes	50	36.2	8.353[a]	0.015
	No	88	63.8		
	Total	138	100%		

Table 7: Source of obtaining meat and milk in the study area.

The current study has demonstrated that in Arba Minch town, animal health and human health personnel had low levels of perception about zoonosis and the hazards associated with zoonotic illnesses. As documented in a previous study [17,18], the habit of consuming uninspected backyard slaughtered meat was also observed to be very high. This could be as a result of the general public's low level of awareness regarding the significance of utilizing inspected meat due to cultural views that raw meat is preferable to cooked meat and the widely practiced tradition of consuming raw meat in the nation. Due to greater awareness, all study participants use milk that has been pasteurized or boiled more frequently. Our findings suggest that the groups taking part in our study had different perceptions of the risk of zoonosis.

Question	Prevention method	Frequency	Prevalence in %	X^2	P-Value
How do you prevent zoonotic disease	Avoiding drinking raw milk	6	4.3	9.550[a]	0.298
	Avoiding eating raw meat	15	10.9		
	Vaccination and treating of Animal	71	51.4		
	Avoiding contact with suspected animal	19	14.8		
	Avoiding drinking raw milk and eating raw meat	27	19.6		
	Total	138	100		

Table 8: Knowledge on prevention methodsof zoonotic diseases.

Additionally, the current study's rate of frequently mentioned zoonotic diseases was found to be lower than that of a study from Addis Abeba by [12], which listed rabies (100%), anthrax (94.27%), taeniasis (89.06%), bovine tuberculosis (88.54%), and brucellosis (49.48%) as known diseases by the respondents.

The discrepancy may result from varied ways that the community accesses information about zoonotic illnesses. The respondents' different income levels and varying levels of zoonotic disease awareness may be the causes of this discrepancy. In the Mana and Limmukosa districts of the Jimma Zone, [15] found that 100% of respondents had slaughtered an animal in their backyard, which is consistent with the current data. The present investigation found that there was a lack of community understanding about zoonotic disease and its route of transmission. Low levels of awareness existed regarding the spread of zoonotic diseases from animals to humans and vice versa. Communities in the research area also showed poor behaviors that might be risk factors for the majority of zoonotic infections.

The community's common habits include failing to minimize contact with diseased animals, consuming raw meat and unpasteurized milk, living in the same home as animals, backyard animal slaughter, giving raw offal to dogs, and more. Therefore, ongoing community education and government officials' sensitization to the need to raise public knowledge of zoonosis is essential.

These findings imply that human health professionals' poor standing may be a risk factor for their reduced risk perception and zoonotic awareness at work. This could be explained by the fact that human health professionals receive less training and education about zoonosis and the hazards associated with zoonotic illnesses than do animal health professionals. This study revealed patchy awareness and poor perception of zoonosis by human health workers, which was consistent with other studies conducted in Ethiopia [8].

Most human health professionals were aware of zoonotic illnesses like rabies, anthrax, or tuberculosis, but they were much less aware of *Cysticercusbovis* and brucellosis. Few human health professionals are aware of the risk of direct transmission, such as that caused by aerosols or direct touch, although the majority are aware of the risk associated with consuming animal products like milk and meat.

As they were unlikely to take the proper precautions or wear protective clothing when dealing with abortions or calves who had diarrhea and during on-farm activities like milking, cleaning the cowshed, or slaughtering cattle, their lack of awareness put them at an increased risk of contracting zoonosis. Although human health professionals may be aware of the risks associated with consuming raw milk or meat, the habit of eating raw or undercooked meat is nonetheless widespread, particularly among communities of livestock keepers [19]. Not only do human health professionals lack awareness and expertise of zoonosis, but so do veterinary field staff and staff in medical facilities. This demonstrated the lack of emergency preparedness for a zoonotic outbreak.

Zoonosis are not included by standard differential diagnoses or in the package of information provided to human health professionals. Similar to the previous example, zoonosis such as brucellosis and leptospirosis are not included in the standard testing and differential diagnostic procedures in human health facilities, which may lead to underreporting of the diseases and improper treatment [6,20]. Inadequate communication between veterinary and human health care experts and a general lack of data on zoonosis in Ethiopia were the main causes of the limited understanding at these levels.

Conclusion and Recommendations

Local expertise in both animal and human health workers is limited to a small number of zoonosis, which includes anthrax, tetanus, and tuberculosis. This is due to lack of information communication system, absence refreshment awareness creation training platform and lack of attention towards the existing foodborne zoonotic diseases in the study area. A significant conclusion is that animal and human health workers in Arba Minch town and chosen kebele have a poor understanding of zoonosis and the hazards associated with zoonotic illnesses. Much can be done to improve the knowledge and skills of various health workers through education and training. As a result of the aforesaid conclusion, the following recommendations are made

- Awareness should be created to the community on foodborne zoonotic diseases using different plate form.
- Concerning zoonotic illnesses, information should be exchanged among veterinary, public health, agriculture, and policymakers to provide best control option.
- Animal and human health workers in the Arba Minch area should educate the community on zoonosis and the risks associated with zoonotic illnesses during their routine work.

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Annex 1 Questionnaire format

Date of Sample collection_____

That all information is confidential and will be used for statistical purposes only

Section A. Demographic information

Background

To begin, I would like to ask you some general background questions.

Owners Name: _____ Address (Kebele) _____

A1. Sex?

a) Male b) Female

A2. Marital status

a) Single b) Married c) Divorced

A3. Age?

a) 15 years b) 15 – 35 years c) > 35 years

A4. Family size

a) Single b) More than one

A5. Educational Status

a) Illiterate b) Read and write (Literate) c) Elementary

d) High school e) Preparatory f) Graduates of some college/university

A6. Occupational status

a) Housewife b) Farmers c) Students

d) Government employee e) Self-employee f) Health professionals

Section B. Consumption habit

B1. Did you drink raw cow milk? Yes No

B2, If your answer in above is yes, Do you think drinking raw cow milk could cause serious health problems? yes no

B3. Did you eat raw meat? Yes No

B4. If your answer in above is yes, Do you think eating raw meat could cause serious health problems? Yes No

Section C: knowledge of the community on food borne disease

C1. What sort of milk and meat borne diseases you know? Can you name any?

……

C2. Which one is/are quite dangerous from the above mentioned?

……

C3. Do you know that food poisoning can be caused by pathogenic microbes? Yes No

Section D. Knowledge of Milk and meat handling practice

D1. Do you think washing udder of cow with water and soap reduce milk contamination during milking? Yes No

D2. Do you think food handlers with unhygienic practice could be the source of microbial contamination? Yes No

D3. Do you know keeping milk and Meat at refrigerator temperature will slow down the microbial growth and multiplication? Yes No

D4. Do you know white cheese processed from raw milk has a high risk of food poisoning? Yes No

Section E. Knowledge of community on zoonotic disease

E1. Do you know a disease that is transmitted from animal to humans? Yes No

E2. If yes choose some of them?

a. Rabies b. Anthrax c. Taeniasis d. Bovine tuberculosis e. Brucellosis f. if other specify……

E3. How are diseases transmitted from animals to humans?

a. Inhalation b, By contact c, Ingestion d, Bite of infected animals

E4. Have you ever been get sick from handling of animal? Yes No

E5. Have you ever received information from any source about diseases that you can get from animals? a. Yes b. No

E6. If yes, from where?

a. Friends and relatives b. Veterinarians c. Medias

d. School/collage/ university e. Books f. Health workers

Section F. Source of obtaining milk and meat

F1. Where do you obtain the meat? a. Local market; b. licensed butchers c. supermarket.

F2. Where do you obtain raw milk? a. home b. cooperatives c. café d. local market

f3. Do you think the milk and meat obtained hygienic? a. Yes b. No

Section G. prevention method

G1.how to prevent of zoonotic disease

a. Avoiding drinking raw milk b. Avoiding eating raw meat c. Vaccinating and treating animals

b. d. Avoiding contact with suspected animals e. Washing hands after handling animals