

Research Article

# Practice and Understanding of Urban Dairy Farmers Towards Brucellosis at Kombolcha (Amhara Region, Ethiopia): Preliminary Study

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## Abstract

Urban dairy farmers of Kombolcha purchase pure and high-grade Holstein Friesian cows from different corners of the country regardless of being free from or certified from bovine brucellosis. In the study area (Kombolcha), documented report on practice and knowledge of urban dairy farmers towards Brucellosis is absent or not found. Therefore, it is high time to know the practice and understanding of dairy farmers about the zoonotic disease, brucellosis, and avail information to Kombolcha Regio-polytan livestock resource development office for proper support to dairy farmers. The objective of this study is, therefore, to assess the current practice and knowledge of smallholder urban dairy farmers about Brucellosis. The design of the study is cross sectional and data were collected through single-visit-multiple-subjects formal survey technique and analyzed using SPSS software. A total of 96 urban small holder dairy farms (study units) were assessed during the study period. A substantial number of respondents consume raw milk without any sort of heat treatment and do not have information on bovine brucellosis mode of transmissions. All respondents have never heard about transmission of brucellosis from animals to human beings and perform risky practices unknowingly. It is therefore, high time to aware urban dairy farmers about bovine brucellosis.

## Keywords

Calving, Fetal Membrane, Herd, Placenta, Prevalence

## 1. Introduction

Even though bovine brucellosis is endemic to different agro-ecologies of Ethiopia [3], recorded information on how and when brucellosis was introduced in the country is not found. Many serological surveys in the past twenty years have evidenced the wide spread of brucellosis in all major livestock-producing regions of Ethiopia and being endemic across many places of the country [10] denoting the gradual establishment of brucellosis endemicity.

Few studies on brucellosis in Ethiopia has indicated a

prevalence rate ranging from 1.8% [5] to 8.11% [13]. The prevalence estimate of Brucellosis was also observed in central Ethiopia [2] where this study site (Kombolcha) is geographically located. Urban dairy farmers of Kombolcha purchase pure blooded and high-grade Holstein Friesian cows from different corners of Ethiopia regardless of confirmed health certificate being free from Brucellosis. Dairy farmers simply purchase pure and high-grade Holstein Friesian dairy cows based on animals' body condition; their physical ap-

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pearance and milk yield information (oral history). After purchase of animals' farmers mix newly purchased animals to their milking herds without quarantine. In the animal health extension delivery system of Kombolcha, brucellosis vaccination program is absent and testing of dairy cows for this zoonotic disease is not practiced. To this author knowledge, documented report on practice and knowledge of urban dairy farmers of Kombolcha towards Brucellosis is absent or very difficult to find. Therefore, assessing the current practices and knowledge of urban dairy farmers with regard to Brucellosis seems paramount. The aim of this study is, therefore, to assess the current practice and knowledge of smallholder urban dairy farmers of Kombolcha about Brucellosis. The finding of this study will deliver evidence based practical information for the respective urban agriculture livestock development extension service department to discharge its responsibilities in improving the dairy extension service delivery activities in the mandate area.

## 2. Materials and Methods

### 2.1. Study Site

The study was conducted at Kombolcha, South Wollo zone of Amhara region from January to March 2023. Kombolcha is found 375 km North East of Addis Ababa, Ethiopia. Kombolcha has six urban and six peri-urban *kebeles* (local administrative units) with a population of 85,367, of whom 41,968 are men and 43,399 are women. The geographical location and altitude of Kombolcha is 11° 06' N latitude, 39°45' E and 1800 meters above sea level. Kombolcha has an average annual rainfall of 1029 millimeters and the mean annual temperature ranges from 24 to 28°C. The average maximum and minimum daily temperature are 23.9°C and 11.7°C, respectively. The relative humidity of the area ranges from 23.9% to 79%.

### 2.2. Study Design

The design of the study is cross sectional study and data were gathered through direct interviews. Semi structured questionnaire was administered to 96 dairy farms to generate relevant information on practice and knowledge about brucellosis.

### 2.3. Sample Size

Participants of this study were small holder urban dairy farms operating at Kombolcha. The office of Kombolcha urban agriculture and livestock development department was approached to provide list of urban small holder dairy farms that constituted the sampling frame. Sample size was determined based on an unknown prevalence of brucellosis (assumed to be 50%) with defined precision of 10% and 95% level of confidence [4]

$$n = \frac{Z^2 P(1-p)}{d^2}$$

Where,

n = sample size;

Z= level of confidence (95%)

P= expected prevalence (50%)

d = precision (10%)

From the sampling frame ninety-six small holder urban dairy farms were randomly selected in proportional manner using randomization in MS Excel. Selection of farms was conducted with the help of animal production experts assigned in the area to ensure cooperation and volunteer participation of dairy farmers.

### 2.4. Data Collection

Data were collected through single-visit-multiple-subjects formal survey technique [6]. Semi-structured questionnaire was prepared in English and translated in to Amharic language by the researcher. Before commencement of the actual survey, a preliminary visit was made by the author with assigned animal production experts to get verbal consent of small holder dairy farmers and give a brief description on the research objective and potential benefit of the study. Collected data includes socio-economic characteristics of dairy farmers and their practice and understanding about brucellosis.

### 2.5. Data Analysis

Collected data were coded and entered into MS-Excel sheet computer software and analyzed using Statistical Package for Social Sciences (SPSS) software (version 20). Descriptive statistics (frequencies and percentages) were applied for demographic characteristics, herd management practices and farmers practice and knowledge/ understanding about bovine brucellosis.

## 3. Results and Discussion

### 3.1. Socio-Demographic Characteristics of Respondents

A total of 96 urban small holder dairy farms (study units) were assessed during the study period, out of which 86.85% of the dairy farms were owned by male and 47.92% by females. Dairy farm owners preferred to employ males as an animal attendant rather than females due to the labor demanding routine farm activities. Demographic characteristics of respondents in terms of gender, marital status, age and level of education are presented at Table 1. Regarding the educational level of respondents, 41.7% of respondents had no formal education, 47.8% reached intermediate level and 10.3% has completed high school education. Most of the respondents are in their active working age group where 16.7% of them are 26-32 years

old, 47.9% of them are 33-39 years old; and 29.2% of them are 40-47 years old, respectively.

**Table 1.** Demographic profile of respondents (N=96).

| Variables          | Category     | N  | %    |
|--------------------|--------------|----|------|
| Gender             | Male         | 84 | 87.5 |
|                    | female       | 12 | 12.5 |
| Marital status     | Single       | 25 | 26   |
|                    | Married      | 71 | 74   |
| Age (years)        | 18-25        | 6  | 6.3  |
|                    | 26 – 32      | 16 | 16.7 |
|                    | 33-39        | 46 | 47.9 |
|                    | 40-47        | 28 | 29.2 |
| Level of education | Illiterate   | 9  | 9.4  |
|                    | Read & write | 31 | 32.3 |
|                    | Grade1-4     | 36 | 37.5 |
|                    | Grade 5-8    | 10 | 10.3 |

| Variables | Category   | N  | %    |
|-----------|------------|----|------|
|           | Grade 9-12 | 10 | 10.3 |

### 3.2. Farmers' Practices and Knowledge

All interview respondents of this study wash their hands before and after milking of cows. They do also wash cow's udder and dry it with small clean towel before milking (Table 2). During the study period, 34.4% of respondents had consumed raw milk without any sort of heat treatment prone to a risk transmission of brucellosis, if the disease is present in the herd. From herd reproductive management practices perspective, unfortunately all interviewed respondents don't assign specific delivery space (area) for their cows during parturition, disinfect parturition space with recommended disinfectants after delivery, wear hand gloves at the event of delivery assistance, prohibit attendants having cut (deep scratches) in their hands during assist of calving, handle aborted fetus by wearing hand gloves (plastic bags), respectively (Table 2). After assisted delivery, most respondents (88.5%) wash their hands with soap and water while 11.5% of respondents wash their hands with only tape water (without soap).

**Table 2.** Practices of dairy farm workers.

| Practices   | Category      | N (%)       |
|---|---------------|-------------|
| Wash udder before milking                                     | Yes           | 96 (100%)   |
| Wash hands before and after milking                           | Yes           | 96 (100%)   |
| Consume raw milk  | Yes           | 33 (34.4%)  |
|   | No            | 63 (85.6%)  |
| Cleaning feed and water trough                                | Once per day  | 37 (38.5%)  |
|   | Twice per day | 59 (61.5 %) |
| Share calving space with other milking animals                | Yes           | 96 (100%)   |
| Disinfect calving space after parturition                     | No            | 96 (100%)   |
| Wear gloves during delivery assist                            | No            | 96 (100%)   |
| Cover hand cuts before contact with placental membrane        | No            | 96 (100%)   |
| Wash hands with soap and water after assisting delivery       | Yes           | 85 (88.5 %) |
|   | No            | 11 (11.5%)  |
| Dispose aborted fetus/placenta wearing gloves or plastic bags | Yes           | 17 (17.7%)  |
|   | No            | 79 (82.3%)  |

From farmer's knowledge point of view, only 12.5% of dairy farmers are aware that brucellosis can be contracted from affected dairy cows. In this study, the number of farmers

who knew about brucellosis as a zoonotic disease is higher than the finding of [9] in India (4.8%) and [1] in Pakistan (3%). Majority of farmers in this study (87.5%) don't have infor-

mation how brucellosis can be transmitted and higher than the findings of [11] in Tajikistan (15%), [8] in Ecuador (30%) and [12] in Ethiopia (48%). The finding of this study is in contradiction to the result of [7] in Senegal where none of the farmer knew about brucellosis. All participants of this study do not disinfect calving space with recommended disinfectants after parturition, wear gloves during assisting delivery and cover hand cuts before contact with placental membrane, respectively. This denotes that all farmers perform at least one risky practice that can expose them to brucellosis infection

(Table 3). Also, dairy farmers don't know that handling aborted fetus and/ or placental membrane without protective hand gloves as well as consumption of raw milk as risk factors in the transmission brucellosis from animals to human beings. As evidenced in this survey, farmers seem to be at risk of bovine brucellosis and consequently exposed to sterility of males due to the inappropriate handling of afterbirths and aborted fetal membranes. Overall, small holder dairy farmers of Kombolcha have poor knowledge about bovine brucellosis.

**Table 3.** Knowledge/ understanding about Brucellosis among dairy farm workers.

|   | Response | N (%)       |
|---|----------|-------------|
| Disease transmission from cows to humans  | Yes      | 12 (12.5 %) |
|   | No       | 84 (87.5 %) |
| Heard about Brucellosis as human disease  | No       | 96 (100%)   |
| Raw milk consumption as one way of Brucellosis transmission from animal to human  | No       | 96 (100 %)  |
| Aborted fetus or placental membrane contact with bare hands as one way of Brucellosis transmission from animal to human | No       | 96 (100 %)  |

**Table 4.** Correlation matrix among different variables.

| Variables   | Educational level | Handle aborted fetus wearing gloves or plastic bags | Consume raw milk |
|---|-------------------|---|------------------|
| Educational level                                   | 1                 |   |                  |
| Handle aborted fetus wearing gloves or plastic bags | 0.331             | 1   |                  |
| Consume raw milk                                    | 0.027*            | 0.058   | 1                |
| Get diseases from animals                           | 0.119             | 0.032*  | 0.136            |

## 4. Conclusion

One of the current dangers in the urban dairy farms of Kombolcha emanates from importation of brucellosis through purchase of high upgraded dairy cows (Holstein and their crosses) from different corners of Ethiopia. Besides, practices posing risk of Brucella transmission like disposing aborted fetuses or after birth and assisting parturition without protective gloves could be lack of resources used for personal protection such as gloves and antiseptics. Based on this preliminary study, dairy farms seem to be at risk of contracting bovine brucellosis being unaware about this zoonotic disease. It is therefore high time to consolidate urban dairy farmers' knowledge and understanding about bovine brucellosis through training of owners and attendants,

and delivery of proper animal health extension services to address the shortcomings in knowledge and practices of dairy farmers of Kombolcha. On top of this, surveillance of bovine brucellosis in the study area seems relevant to follow its detail status.

## 5. Limitation of the Study

Even though this study generates important information on the knowledge and understanding of dairy farmers of Kombolcha towards brucellosis, the limitation of this study is small sample size that could affect the power and external validity of the result making it impossible to generalize findings of this study to wider application.

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## Author Contributions

Mekonnen Yirga is the sole author. The author read and approved the final manuscript.

## Conflicts of Interest

The author declares no conflicts of interest.

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