

Assessment of Cattle Owner Awareness On Bovine Tuberculosis in and Around Dabat Town, North Gondar, Amhara Region, North West Ethiopia, 2019

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Abstract: Cross sectional study was conducted from November 2013 to April 2014 in and around Dabat district to assess the awareness of cattle owners about bovine tuberculosis and its associated risk factors. The people in this study area have poor awareness on bovine tuberculosis and its zoonotic risk to which only about 24(36%) of respondents were responsive that cattle are affected by tuberculosis which can be transmitted from animal to human. Of the awared cattle owners, only 7.5%(5/67) of the households were found in the thought of tuberculosis transmission by means of milk, meat and saliva and aerosolization in close contact; in case 76%(52/67) of the respondents had the habit of both raw and boiled milk consumption where as 22.4%(15/67) of them were dependent only on boiled state of milk. According to this study the majority of cattle owners were farmers taking care of their farm in almost similar husbandry practice and all cattle herds were kept in indoor barns and 22(32.8%) herds shared the same house with the owners and nearly all herds were allowed mixing with animals from other farms during grazing, watering and medical care. BTB in humans is becoming increasingly important in developing countries, as humans and animals are sharing the same micro-environment and dwelling premises, especially in rural areas. Because most of the small farm holders either sell their milk to local people or consume both as fresh and boiled, risk of milk contamination with *M. bovis* is a potential major health hazard to consumers. So as to be free of this fear, awareness creation on the disease nature and its associated risk factors with intersectoral collaboration between the smallholder farmers, medical and veterinary professionals should be established to evaluate the scale of the problem.

Key words: Bovine • Tuberculosis • Awareness • Zoonotic

INTRODUCTION

In a country such as Ethiopia, where livestock is extremely important for peoples' livelihood, animal diseases can be a threat to animal productivity and thus negatively impact agricultural sector and economic development [1]. Understanding the livestock production, marketing, producers' need and designing workable production strategies are required in order to improve livestock productivity and market access of producers [2].

In response to the increasing demand for animal products and the Ethiopian government' effort to improve productivity in the livestock sector, recent years has shown increased intensive husbandry settings holding exotic and cross breeds. This drive for increased

productivity is threatened by animal diseases that thrive more under intensive settings, such as bovine tuberculosis (BTB), sometimes termed as a diseases of intensification that is already endemic in Ethiopia [1].

Bovine tuberculosis is also one of the most important re-emerging zoonotic diseases in various parts of the world causing major economic losses to livestock and serious constraints for international trade of animal and animal products [3]. The risk of infection for the general public remains very low in industrialized countries with long-standing BTB control programmes, good awareness on its way of transmission among the public and where pasteurization of cow' milk is either mandatory or commonly practiced [4]. However, its zoonotic potential via the habit of consumption of unpasteurized milk

products and its prevalence in Ethiopian cattle, BTB can therefore be a contributing factor to the human burden of tuberculosis (TB) in Ethiopia that was ranked as the 7th highest in the world [1].

Generally in Ethiopia, particularly in and around Dabat town where livestock sectors are highly explored as it has been selected as milk shed/belt area of the Amhara region, effective way of reducing transmission, understanding the risk factors which influence the presence or absence of BTB in cattle herds and knowing the real incidence of *Mycobacterium bovis* (*M.bovis*) on human health are paramount [5]. Hence it is essential to have the knowledge of distribution and risk factors of the disease so as to look for effective control strategy [6]. But Ethiopia has faced huge challenges in controlling tuberculosis mainly due to lack of cattle owners' awareness on the diseases unique nature and less extension of cattle rearing free from the disease. Because of this inconvenience the region has to have strong commitments to put frame works for such highly hazardous diseases control and prevention. As initial, identifying the main problem of the cattle owners' in perspective of bovine tuberculosis in areas like Dabat district where livestock productivity and diseases prevention far apart has to be in place.

Therefore the Objectives of this Study Are:

- ▶ To assess the awareness of cattle owner about bovine tuberculosis on its zoonotic nature in and around Dabat town
- ▶ To assess the knowhow of the public on common contributing factors of the disease endemicity at this particular district.

To assess the status of cattle owner on this disease prevention and extension of rearing animals free of the disease.

MATERIALS AND METHODS

The study was conducted from November 2013 to April 2014 in and around Dabat town in Dabat district.

Study Population: From the four kebeles of the district, 67 households were selected based on their number of animals and the geographical proximity to the town where a dairy cattle rearing is high and intensification is somewhat adopted.

Sample Size Determination and Sampling Methods:

The survey was conducted on the four conveniently selected kebeles which are representatives of the district in their habit of livestock husbandry. Sixty-seven cattle owners' were selected in favor of getting cattle herds with at least two heads and the four kebeles namely:-Dabaturia, Wokin, Tirko and Dara in that different managemental practices and human to animal interactions were identified to optimize household awareness on BTB.

Study Design and Methodology: Cross sectional study was designed because status of awareness and contributing factors of the disease were defined at the same time. Based on the study design, the selected methodologies for this study were as follows:

Questioner Survey: The study participants of the four kebeles were interviewed with a questionnaire in order to assess their awareness on the zoonotic nature and the risk factors of bovine tuberculosis in association with husbandry practice in the study area, all 67 cattle herd owners were interviewed using pre designed semi structured questionnaires. The owner of cattle in each kebele was interviewed in local language (Amharic) at the time observation of housing, sanitation, light and ventilation was talking place. The socio-demographic characteristics, knowledge and practice about consumption habit of milk/meat were also asked.

Observational Study: Observational study was conducted on the selected households having cattle which have been kept for different purpose. By doing so, husbandry practices and related phenomenon were observed to assess the status of cattle owner on this disease prevention and extension of rearing animals free of the disease.

Data Collection and Analysis: The data of this study were collected by making the study population timely recorded with their socio-demographic factors (Age, educational status, location and so on) and observation of husbandry practices (Management, housing, sanitation, ventilation and lighting). Questioner survey, observation, recording and documentation were used to collect raw data. The collected data were entered to the Microsoft office excel 2007 spread sheet and analyzed by SPSS v20.0. The significance of factor variables and the status

of awareness were computed by Pearson Chi-Square (χ^2) considering p-value less than 0.05 to decide that association was significant.

RESULTS

Result of Questioner Survey: Cattle owners were interviewed according to their willingness to participate and after verbal consent. Interviews were conducted on all sites of the selected kebeles in Amharic language about husbandry/management practices, trading of animals, zoonotic nature of the disease, habit of milk consumption and trading. Of the 67 households; 6(9%) from urban, 10(14.9%) from peri-urban, 51(76.1%) from rural of which 5 in Dabatzuria, 6 in Wokin, 22 in Tirko and 34 in Dara were, as stated in Table 1, interviewed by pre-designed semi structured questioner to assess the knowledge/ awareness on ways of transmission, milk feeding habit and educational level.

Status of the Owner Awareness on the Disease Nature and Ways of Transmission: About 64.2%(43/67) of the respondents did not know about the disease zoonotic nature in that bovine tuberculosis was not considered as it can be transmitted from cattle to human and vice versa. On the other hand, 9% (6/67), 4.5% (3/67) and 7.5% (5/67) respondents were found with the thought of only milk, both milk and meat and with thought of saliva and aerosolization in close contact as means of transmission respectively. In addition to this, 7.5%(5/67) of the interviewed households considered milk, saliva and aerosolization in close contact as the only mean of tuberculosis transmission whereas the same 7.5% (5/67) of the households have been found in the thought of tuberculosis transmission by means of milk, meat and saliva and aerosolization in close contact.

Awareness was high in Dara and Tirko as compared to Dabatzuria and Wokin in which low number of households was interviewed.

Only about 36% (24/67) of the interviewed individuals (Below 50%) were having knowledge of bovine tuberculosis, even though the above mentioned socio-demographic factors were significantly associated with the awareness status of the cattle owner in the investigated area ($p=0.000$) which is less than 0.05 as shown in (Table 2).

Trading, Replacing Habit of Livestock and Habit of Feeding Milk: In the owners' believe, their farms have been established for the purpose of milk production (13.4%, 9/67), both for milk production and drought power (44.8%, 30/67) and for milk production, drought power and fattening (42.8% 28/67). As per the interviewed households, the produced milk can be consumed at home by the family (89.6%, 60/67), sold to local market only (1.5%, 1/67) and can be used for both home consumption and local market (9%, 6/67) as shown in Table 3. Even though the vast majority of the investigated farms utilized the milk for home consumption; 10.5 % (7/67) households practiced either selling freshly (42.9%, 3/7), after boiled (28.6%, 2/7) or both fresh and boiled (28.6%, 2/7) as shown below in Table 3.

About 76% (52/67) of the respondents had the habit of both raw and boiled milk consumption where as 22.4% (15/67) of them were dependent only on boiled state of milk. According to the survey, 70% (47/67) of the farm owners inherited from their family and the remained established their farm by purchasing either from known farm (23.9%, 16/67) or from the market without known origin (6%, 4/67). For stock replacement; 83.6% (56/67) of the respondent accustomed purchasing new animals of which 44.8% (30/67) was with poor body condition selected merely on their history of productivity.

Result of Observational Study

Husbandry/managemental Practice: The investigation showed that 80.6% (54/67) of the farm were in the trend of extensive farming and 19.4% (13/67) were

Table 1: Awareness status of cattle owners in the four kebeles

Kebele	No. of household interviewed	Status of awareness on bovine TB%	
		Yes/awarded	No/not awarded
Dabatzuria	5	4(6%)	1(1.5%)
Wokin	6	3(4.5%)	3(4.5%)
Tirko	22	7(10.5%)	15(22%)
Dara	34	10(15%)	24(36%)
Total	67	24(36%)	43(64%)

Table 2: Association of socio-demographic factors with awareness to zoonotic nature of bovine tuberculosis among interviewed individuals.

Socio-Demographic factors	Number-of respondents	Awareness -status on BTB		X ²	p-value
		Yes (%)	No (%)		
Age of respondents				69.171	0.000
<20	2	0	2(3%)		
20-30	16	6(9%)	10(15%)		
>30	49	18(27%)	31(46%)		
Educational status				73.346	0.000
Illiterate	15	6(9%)	9(13%)		
Primary education	43	12(18%)	31(46%)		
Secondary education	7	4(6%)	3(4.5%)		
Higher education	2	2(3%)	0		
Urbanization				72.038	0.000
Urban	6	3(4.5%)	3(4.5%)		
Peri-urban	10	7(10.5%)	3(4.5%)		
Rural	51	14(21%)	37(55%)		
TB history of the household				68.785	0.000
With human TB	7	3(5%)	4(6%)		
Without TB history	60	21(31%)	39(58%)		
Habitofmilk consumption				68.149	0.000
Raw	0	0	0		
Boiled	15	6(9%)	9(13%)		
Both raw and boiled	52	18(27%)	34(51%)		
Each total	67	24(36%)	43(64%)		

Table 3: Status of cattle holder practices

Types of practices	Purpose/status of practices	No of households participated
Farm establishing	For milk production only	9(13.4%)
	For milk production and drought power	30(44.8%)
	For milk, drought power and fattening	28(42.8%)
Milk production	For home consumption only	60(89.6%)
	For local market only	1(1.5%)
	For both home consumption and local market	6(9%)
Milk selling practices	Selling freshly	3(42.9%)
	Selling after boiled	2(28.6%)
	Selling both as fresh and after boiled	2(28.6%)
	Total seller	7(10.5%)

undergoing with semi-intensive farming/production system. With almost the same husbandry practice, all observed cattle herds were kept in indoor barns and 32.8% (22/67) herds were sharing the same house with the owners. Nearly all herds were allowed mixing with other animals from other farms during grazing, watering and medical care.

Among the contributing factors of the diseases, drainage, lighting, ventilation and sanitation status were assessed for the housing/barns on each owner's farm based on presence/absence of drainage canal, presence/absence of light, condition of aeration and cleanness. From the result recorded, the drainage, ventilation and sanitation were mostly poor in that only 14 farms (20.9%) showed good sanitation, 17(25%) farms were having good ventilation and only 15(22.4%) of the farms were having optimum light effect.

DISCUSSION

This study stated that awareness of cattle owners about the disease zoonotic nature is low (36%, 24/67) which agrees with the study of Amini and Aklilu. [7], Firaol *et al.* [8] and Tigre *et al.* [9] who indicated 35%, 37.1% and 29.7% respectively. The awareness on BTB zoonotic nature in this study is associated with consumption of raw milk, meat and aerosol of close contact with cattle which is similar to the report of Wilkins *et al.*, [10]. As this finding indicated, 76% (52/67) of the respondents had the habit of both raw and boiled milk consumption where as 22.4% (15/67) of them were dependent only on boiled state of milk which is slightly higher than the study conducted in Wuchale Jida district which indicated that 52.1% (49 of 94) households' had habit of consuming raw milk. This fact could be as a result

of difference on awareness of this zoonotic disease and educational level of the investigated cattle owners in which only 7 (10.4%) and 2 (3%) of them were taking secondary and higher education respectively. Such type of habit is dangerous because the zoonotic risk of BTB is highly associated with consumption of raw milk and meat products as well as via aerosol of close proximity [11] and even the consumption of contaminated milk products possesses more risk than infected meat products since badly infected carcasses are mostly seen and condemned [12].

From the result recorded, the drainage, ventilation and sanitation were mostly poor in that only 14 farms (20.9%) showed good sanitation, 17(25%) farms were having good ventilation and only 15(22.4%) of the farms were having optimum light effect. But according to Admasu *et al* [13], there was high prevalence of BTB in those owners who manage their cattle with poor sanitary condition. This finding showed that control of bovine tuberculosis in Dabat district has not yet practiced since *M. bovis* can survive for several months in the environment, particularly in cold, dark and moist conditions. At 12-24°C (54-75°F), the survival time varies from 18 to 332 days, depending on the exposure to sunlight [14]. It also known that cattle-to-cattle transmission can be facilitated by poor ventilation systems in barns and sheds and the herd density [15]. The link between animal and human tuberculosis has long always been known to be strong, as shown by several works which demonstrated, the cross-adaptability of the tubercle bacilli from animal to human [16] because bacteria are shed through feces, milk, discharging lesions, saliva and urine; likewise, transmission happens by different routes [15].

On the other hand, different and poor understanding about the ways of transmission in this study were the main issue which will be strongly addressed in the near future because reporters like Abubakar *et al*, [10] confirmed as most rural African populations, consumption of raw milk and milk products and close association between animals and farmers are common and this encourages exposure to *M. bovis* through both alimentary and respiratory routes or humans can acquire the *M.bovis* infection from cattle directly by erogenous rout or direct contact with material contaminated with the secretion of an infected animal [17, 18]. It has also estimated that the zoonotic transmission of *M.bovis* is responsible for 10-15% of human TB cases in developing countries [19].

However, the risk of infection for the general public remains very low in industrialized countries with

long-standing bovine TB control programmes and where pasteurization of cows' milk is either mandatory or commonly practiced [4].

According to this study majority of cattle owners were farmers taking care of their farm in almost similar husbandry practice and all cattle herds were kept in indoor barns and 22 (32.8%) herds shared the same house with the owners and nearly all herds were allowed mixing with animals from other farms during grazing, watering and medical care. This result strengthens the fear of current finding of Munyeme *et al*. [20] which stated that BTB in humans is becoming increasingly important in developing countries, as humans and animals are sharing the same micro-environment and dwelling premises, especially in rural areas.

According to this survey, 70% (47/67) of the farm owners inherited farm from their family and the remained established their farm by purchasing either from known farm (23.9%, 16/67) or from the market without known origin (6%, 4/67). This result also showed poor knowledge and attitude of the cattle owner in case of rearing animals free of bovine tuberculosis because the course of disease is slow, taking months or years to kill an infected animal, an animal can spread the disease to many other herd mates before it begins to manifest clinical signs [21].

For stock replacement; the study indicated as 83.6 % (56/67) of the respondents accustomed purchasing new animals of which 44.8% (30/67) was with poor body condition selected merely on their history of productivity, however animals in poor body condition are likely more susceptible to tuberculosis infection, or tuberculosis positive animals develop a poor body condition score as a result of being infected by *M. bovis* and large numbers of organisms may be shed in the late stages of infection from earlier asymptomatic and anergic carriers [14].

CONCLUSIONS AND RECOMMENDATIONS

Among the interviewed cattle owners, only 24(36%) were having knowledge of bovine tuberculosis and its zoonotic risk. Because most of the small farm holders either sell their milk to local people or consume both as fresh and boiled, risk of milk contamination with *M. bovis* is a potential major health hazard to consumers. Furthermore, the cattle owners' poor understanding of BTB exacerbates the situation in this particular area because *M. bovis* can be transmitted to humans through inhalation of the cough spray from infected animals and ingestion of infected animal products mainly of milk. As majority of the cattle owners were farmers and had no

enough educational background on many factors influencing the occurrence of bovine tuberculosis, this area is at greater risk of perpetuating the disease endemicity in particular and risky for Ethiopia in general.

Based on the above conclusions the following recommendations are forwarded:

- Awareness creation of cattle holders on risk factors of this disease should be in place so as to minimize the disease zoonotic effect and its burden on livestock productivity.
- The responsible organ of the district and government of Ethiopia in general have to plan and implement such dangers disease surveillance to restrict its impact.
- To this effect, intersectoral collaboration between the smallholder farmers, medical and veterinary professionals should be established to evaluate the scale of the problem.

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