World Journal of Medical Sciences 13 (1): 38-48, 2016
ISSN 1817-3055

DOI: 10.5829/idosi.wjms.2016.13.1.101180

Bovine Tuberculosis and Associated Factors among Adult HIV Positive People in Woldya Town, Northeast Ethiopia

[1]Ousman Wendmagegn, [1]Digsu Negese and [2]Tadesse Guadu

[1]University of Gondar, College of Medicine and Health Sciences,
Department of Epidemiology and Biostatistics, P.O.Box 196, Gondar, Ethiopia
[2]University of Gondar, College of Medicine and Health Sciences,
Department of Environmental and Occupational Health and Safety, P.O.Box 196, Gondar, Ethiopia

Abstract: Bovine tuberculosis is among the seven neglected endemic zoonotic disease in developing countries caused by *M.bovis*. Currently, *M.bovis* accounts for only 1% of all human TB in developed countries as compared to 10% in developing world. In Ethiopia the magnitude of bovine tuberculosis in animals at different regions is high. Many studies also show its presence in humans. The risk is high among HIV positive people having contact to domestic cattle and consuming raw or undercooked milk and /or meat. Lack or minimum knowledge and practice about the disease exacerbate the disease transmission to humans. The main objectives of this study were to assess knowledge, practice and associated factors about bovine tuberculosis among adult HIV positive people in woldya town. An Institution based cross-sectional study was conducted from March to December 2014 in woldya town. The data were collected by using interviewer administered questionnaire. A total of 630 HIV positive adults were selected by systematic random sampling. Descriptive statistics and binary logistic regression were employed for the analysis of the data. The study included 630 individuals, but twenty of them were excluded due to different reasons. Among the 610 respondents 67.2% lives in urban area. From the study population 58.2% were females and the mean ages were 36.5 years. The level of knowledge about bovine tuberculosis was found to be 9.3%. A good practice for the prevention of bovine tuberculosis was 50.8%. Women's were less knowledgeable than men, [AOR=0.424 CI (0.223-0.805)]. Individuals who consult veterinarians and public health professionals were more knowledgeable [AOR=9.160 CI (3.890-21.570)]. Training also had positive association for the knowledge of bovine tuberculosis. Food consumption habit influence preventive practice for the transmission of bovine tuberculosis. This study had demonstrated that little knowledge about bovine TB among adult HIV positive individuals. Men, consulting veterinarians and public health professionals and training had positive association with knowledge about bovine tuberculosis. Strengthening One-Health and large scale community based cross-sectional studies are recommended.

Key words: Knowledge · Practice · Bovine TB · HIV positive people · Woldya town

INTRODUCTION

Zoonoses are defined as those diseases and infections naturally transmitted between people and vertebrate animals [1]. Of some 1400 species of infectious disease pathogens of humans, nearly 60% are derived from animal sources and 75% of emerging pathogens are zoonotic [2, 3]. The emergence and re-emergence of zoonoses and their potentially disastrous impact on human health is a growing concern around the globe [4].

Bovine tuberculosis is an infectious disease primarily of cattle, also a zoonotic disease affecting human next to TB infection due to *M. tuberculosis*. The disease characterized by formation of granulomatous lesions (tubercle) classically seen in lungs and draining lymph

Corresponding Author: Tadesse Guadu, University of Gondar, College of Medicine and Health Sciences,
Department of Environmental and Occupational Health and Safety, P.O.Box 196, Gondar, Ethiopia.

nodes. It is transmitted to human directly from animal, consumption of raw or under cooked meat and dairy products. The burden of BTB is rare or sporadic both in cattle and human in developed countries, where the disease in animals was controlled [5- 7].

In most African countries including Ethiopia, bovine TB is prevalent, where effective disease control measures including regular milk pasteurization and slaughterhouse meat inspection are largely absent. The situation exacerbated by high prevalence of HIV infection. Different surveys show that significantly higher proportion of *M.bovis* infection among TB patients with HIV co-infection [8, 9].

A study in woldya municipal abattoir detailed meat inspection showed that 6.12% BTB lesions. After further investigation for molecular analysis both Mycobacterium bovis and *Mycobacterium tuberculosis* were identified [5, 10, 11]. The actual impact of bovine TB on human health is generally considered low in developing countries, which may be based on the rare identification of *M.bovis* isolates from human patient [12].

In general the impact is very low in developed countries but relatively very high in developing countries. Currently, M. bovis accounts for only 1% of all human TB in developed countries as compared to 10% in the developing world [13]. In Ethiopia according to (Regassa) 42 mycobacterium identified from 87 sputum and 21 fine needle aspiration of human sample 16.3% were *M.bovis* while 73.8% *M. tuberculosis* [14].

While this fact remains true, people still exercise risky behaviors that predispose them to acquire BTB from animals. These are contact with animals without care, eating raw or under cooked meat and dairy products. This could be due to lack of knowledge or practice for zoonotic transmission of the diseases. So aiming to improve knowledge about these zoonotic BTB, this study was conducted to determine level of knowledge and practice among adult HIV patients on BTB in woldya town and identifying those associated factors.

Studies show that TB due to *M.bovis* in HIV positive individuals is more common than HIV negative individuals. This causes extra pulmonary TB. Different laboratory based research in our country at different areas show that the magnitude or prevalence of BTB both in animals and humans, even though little is done on BTB prevalence in humans. This is because *M.bovis* is among *Mycobacterium tuberculosis* complex (MBTC), that cause TB both in human and animal difficult to isolate by simple laboratory technique [11, 13, 14].

Regarding knowledge and practice about bovine TB, little is done on livestock producers, farmers and residences both in urban and rural settings. But there were no work done about knowledge and practice on highly vulnerable HIV positive peoples while practicing risky behaviors that predispose them for the transmission of the disease. This may be due to lack of knowledge and/or practice about bovine TB.

This study could also be used as an input for stakeholders working on prevention and control of communicable disease especially on TB and HIV for effective intervention for the control of the disease. Therefore, the main objectives of this study are to assess knowledge, practice and associated factors about bovine tuberculosis among adult HIV positive people in woldya town, Northeast Ethiopia.

MATERIALS AND METHODS

Study Area: This study was conducted in woldya town from March to December 2014. The town is located 521 Km from the capital city Addis Ababa, North East Ethiopia. Woldya town is the capital of Northern Wollo zone (Amhara regional state) of Ethiopia at latitude and longitude of 11°50N /39°36E and an elevation of 2,112 m above sea level. Administratively woldya town divided in to 12 kebeles, 8 urban and 4 rural and an estimated population size of 68,047. According to woldya town health office report, there are 6,159 individuals living with HIV AIDS. Among this 2,629 are adults aged 18 years and above. All the adult HIV positive people get service in woldya zonal hospital and Woldya town health center [15, 16, 17].

According to woldya town Agricultural office the number of cattle is 5,881. The cattle managed in semi intensive, small scale and traditional way of farming found both in urban and peri-urban kebeles. The largest ethnic group is Amhara. Other including Tigray and Afar are found in the town. Amharic was spoken as a first language by the majority of the people. The majority inhabitants are Muslims and Orthodox Christians [18].

Regarding health related facilities in the town, there is one zonal hospital, two health centers, four health posts and one non profitable public pharmacy (Red Cross). There are also privately owned health facilities which include, eight medium clinic, two poly clinic, three pharmacies, twelve drug stores and three public veterinary clinics.

Study Design: An institutional based cross-sectional study design was used to undertake this research work among adult HIV positive people in woldya town from March to December 2014.

Source Population: The source population was all HIV positive adults at the age of 18 years and above, attending ART clinic at woldya Zonal hospital and woldya health center.

Study Population: All HIV positive adults attending ART clinic at woldya hospital and woldya health center during the data collection periods.

Inclusion Criteria: All selected HIV positive adults aged 18 years and above, who attend ART clinic in woldya hospital and woldya health center were included.

Exclusion Criteria: HIV positive adults attending ART clinic in woldya hospital and woldya town health center who were physically and mentally ill and unable to give the necessary information at the time of data collection were excluded.

Sample Size Determination: In this study sample size was determined using single population proportion formula. Since there is no study conducted in Ethiopia about knowledge and practice for bovine TB among HIV positive people. This study assumes 50% for prevalence of knowledge and practice on bovine TB to obtain the maximum sample size at 95% certainty and maximum discrepancy of 4% between the sample and source population. Thus a minimum number of 600 adult HIV positive people were the required number in the study. The formula used to calculate sample size is below.

$$n = \frac{\left(z_{\frac{\alpha}{2}}\right) 2\,p(1-p)}{d^2}$$

where:
n = the sample size to be determined
Za/2= the standard normal deviate set at 1.96, which corresponds with the 95% confidence interval
p = the estimated proportion of knowledge and practice of bovine TB in a population=50%(0.5)
d = the proportion of sampling error between the sample and the population = 4% (0.04)
After considering 5% non-response rate, the final sample size was 630.

Sampling Technique: A systematic random sampling technique was used for three months of data collection period. The sampling interval of each participant was determined by dividing the total number of all adult HIV positive adults (N) to the allocated sample size (n). The initial study participant was randomly selected by a lottery system from daily registration book, using a number between one and sampling interval. The subsequent study participant to be included in the study was identified systematically. The selected adult individuals were interviewed at the heath institution. Those refused for the interview were registered as non-respondent.

Variables of the Study

Dependent Variables: Knowledge about bovine TB and practice for the prevention of bovine TB in the study area.

Independent Variables: Socio demographic characteristics (age, sex, residence, ethnicity, religion, marital status, educational status, presence of domestic cattle, type of employment and income), behavioral characteristics (personal and environmental hygiene, consulting professionals, closeness to media, food consumption practice and care for the health of animals) and organizational factor (public education on zoonoses, training and distribution of posters and pamphlets).

Operational Definitions: Knowledge on bovine TB: assessment of what HIV positive peoples who are vulnerable, know about bovine TB. The study participants are said to be knowledgeable if they can correctly respond greater or equal to the mean score to knowledge questions that are provided.

Practice on Bovine TB: Activity of HIV positive peoples which may increase or decrease the risk for zoonotic transmission of bovine TB. The study participant said to have a good practice if they can correctly respond greater or equal to the mean score to practice questions that are provided.

Data Collection Procedures: Data were collected using structured and close ended interviewer administered questionnaire. The entire questionnaire was initially prepared in English by the principal investigator by reviewing different literatures and then translated to the local language Amharic by experienced linguistic personnel. The Amharic version of questionnaire was used for data collection.

Six data collectors and one supervisor were employed and trained for two days about the time of data collection, timely collection and reorganization of the collected data from respective departments and submission on due time. Among data collectors four were health extension workers at certificate level and two nurses of diploma level. The supervisor was BSc in public health.

Data Quality Control: To assure data quality, emphasis was given by performing the following actions: - Care was taken during designing, translating and pre-testing of questionnaire. Before starting the actual survey, the questionnaire was pre-tested on 20 individuals in the town which was not included in the actual study.

Throughout the course of the data collection, interviewers were supervised at the place of data collection. Regular meetings in every other day were held between the data collectors, supervisor and the principal investigator together. At the time problematic issues arising from interviews which was conducted and mistakes found during editing was discussed and decisions were reached. The collected data were reviewed and checked for completeness before data entry.

Data Processing and Analysis: Data were checked, coded and entered in to Epi-Info version 3.5.1 and then exported to SPSS (Statistical Package for Social science) version 20 for further analysis. Descriptive statistics like frequencies and cross tabulations were performed. Binary logistic regression model was fitted to identify factors associated with knowledge and practice about bovine TB. Multivariate analysis was employed to minimize and control the effect of confounding. Variables having p value less than 0.2 (20%) in the bivariate analysis were fitted in to the multivariate logistic regression. 95% confidence interval of odds ratio was computed and variable having p value less than 0.05 in the multivariate logistic regression was considered as significantly associated with the dependent variables.

Ethical Consideration: Ethical approval and clearances was obtained from Institutional Review Board (IRB), Institute of Public Health: University of Gondar. Prior to data collection, the objective of the study was discussed with directors of woldya town zonal Hospital and health center to get permission for data collection. After getting official permission to collect the data in the institution, informed verbal consent was obtained from each study participant after the purpose and significance of the study is explained to them by the data collectors.

Emphasis was given for the confidentiality and privacy of respondents throughout the study period. The study participants were interviewed in a separate place, names and other personal identities which expose them were not included in the data collection sheet. The participants were also informed that the information obtained from them will not be disclosed to the third body. Their participation was voluntarily and informed that they can withdraw the interview at any time they want. Data were collected after obtaining informed verbal consent from each study participant.

RESULTS

In this study 610 individuals were considered on the final data analysis. Among the total sample, 20(3.2%) non respondents, twelve questionnaires found to be incomplete and excluded from analysis. Five individuals were seriously ill and the other three had mental distress that did not give appropriate information had been excluded from the study.

Socio-demographic characteristics of respondents: From the total study subjects 67.2% were urban residents, 58.2% females and 55.4% were married. The mean age of the respondents were 36.5years with standard deviation of 10.1years. The majority (80%) of the study subjects were orthodox Christians (Table 1).

Behavioral Characteristics of Study Participants: Among the respondents who had domestic cattle 98.2% care for the health of their animals. Most of the respondents who had domestic cattle brought their animals to veterinary clinic when they are sick (Table 2).

Organizational Factors of Respondents: Among the study subjects 13(2.1%) were trained about bovine TB. Almost all of the respondents were not accessed to get pamphlets and brochures regarding public health importance of bovine TB. Higher proportion of respondents heard of BTB had got information from animal health experts. The remaining had got from health extension workers, school and physicians (Figure 1).

Knowledge about Bovine Tuberculosis: From the 610 study subjects 553(90.7%) did not heard about bovine TB. The mean score for knowledge questions were 31 with a maximum and minimum value of 32 and 16 respectively. When we consider 31 as a cutoff point 57(9.3%) of the respondents with 95% confidence intervals (16, 32) were knowledgeable. Among the study participants who were

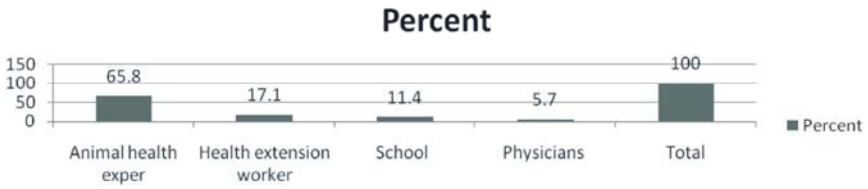

Fig 1: Source of information among respondents about BTB in woldya town, Northeast Ethiopia, 2014.

Table 1: Socio-demographic characteristics of HIV positive peoples in woldya Town, Northeast Ethiopia, 2014.

Variables	Frequency	Percent (%)
Sex		
Male	255	41.8
Female	355	58.2
Age		
18-30	220	36.1
31-45	278	45.6
46-60	101	16.6
60+	11	1.8
Residence		
Urban	410	67.2
Rural	200	32.8
Religion		
Muslim	121	19.8
Orthodox	488	80
Protestant	1	0.2
Marital status		
Married	338	55.4
Single	99	16.2
Divorced/widowed/separated	173	28.4

Table 2: Behavioral factors of respondents about bovine TB in woldya town, Northeast Ethiopia, 2014

Behavioral factors	Frequency	Percent (%)
Care for the health of animals(n=113)		
YES	111	98.2
No	2	1.8
What do you do when your cattle sick		
Bring to veterinary clinic	110	97.3
Use traditional medicine	2	1.8
No thing done	1	0.9
Frequency of hand wash after touching animals and/or animal products		
Sometimes	23	3.8
Always	580	95.1
Do not wash	7	1.1
Cleaning of house of cattle and surroundings		
Sometimes	15	13.3
Usually	26	23
Always	70	61.9
Not clean	2	1.8
Consulting veterinarians and public health professionals about zoonoses		
Yes	37	6.1
No	573	93.9
Habit of drinking of raw milk		
Yes	31	5.1
No	579	94.9
Habit of raw meat consumption		
Yes	84	13.8
No	526	86.2

Table 3: Participant's response to knowledge questions in woldya town, Northeast Ethiopia, 2014

List of knowledge questions	Frequency	Percent (%)
Ever heard about bovine TB(n=610)		
Yes	51	8.4
No	559	91.6
Can bovine TB transmit to human(n=51)		
Yes	45	88.2
No	6	11.8
How can bovine TB transmit to human		
By drinking raw/under boiled milk	33	64.7
By eating raw/under cooked meat	32	62.4
Inhalation	9	17.6
The cause for bovine TB		
Bacteria or Germ	23	45.1
Cold weather	2	3.9
Dust	14	27.5
When cattle show symptoms		
After long time	21	41.2
Within short time	30	58.8
What symptoms of bovine TB in animals		
Emaciation	22	43.1
Lethargy	4	7.8
Low grade fever	3	5.9
Cough	26	50.9
Lymph node enlargement	22	41.3
What symptoms of bovine TB in humans		
Cough	24	47
Weakness	3	5.8
Night sweat	22	43
Headache	7	13.7
Is bovine TB preventable in human		
Yes	40	78.4
No	11	21.6
Can pasteurization of milk prevent bovine TB in human		
Yes	50	98
No	1	2
Can detailed meat inspection minimize risk of bovine TB in human		
Yes	41	80.4
No	10	19.6
Can bovine TB is curable in human		
Yes	35	68.6
No	16	31.4

knowledgeable 88.2% and 45.1% knew that bovine TB is zoonotic and also knew the exact cause of bovine TB respectively (Table 3).

Practice of Respondents for the Prevention of Bovine Tuberculosis: The mean score of study subjects for the practice in the prevention of bovine TB was 11.85 with the minimum and maximum value of 9 and 16respectively. Respondents who scored above the mean were 310(50.8%) had good practice for the prevention of BTB where as individuals who scored below the mean were 300(49.2%) exercised poor practice. Among the milk users 23(6.4%) drink raw milk and the other 18(5%) drink sour milk (Table 4).

Socio-demographic and Behavioral Factors: Comparison between respondents who were knowledgeable and not knowledgeable has been made for difference in factors associated with it.

Bivariate analysis showed that there was statistically significant association between knowledge of BTB and sex, age, residence, type of employment and owning of

Table 4: Participant's response to practice questions in woldya town, Northeast Ethiopia, 2014

List of practice questions	Frequency	Percent (%)
Do you drink raw milk(n=362)		
Yes	23	6.4
No	339	93.6
Do you boil raw milk		
Yes	348	96
No	14	4
How do you process sour milk		
After boiling	69	19
Without boiling	25	7
Do not process	268	74
Do you share the same house with your cattle (n=113)		
Yes	23	20.4
No	90	79.6
Ever utilized municipal abattoir		
Yes	37	6.1
No	573	93.9
Ever slaughtered sick animal		
Yes	24	3.9
No	586	96.1
Do you eat raw/under cooked meat		
Yes	56	9.2
No	554	90.8

Factors Associated with *Knowledge* of Respondents about Bovine Tuberculosis

Table 5: Socio-demographic and behavioral factors associated with knowledge of BTB among adult HIV positive peoples in woldya town, 2014

	Knowledge of BTB			Odds Ratio
Variables	K	NK	COR(95%CI)	AOR(95%CI)
Sex				
Male	37	218	1.00	1.00
Female	20	335	0.352(0.199-0.622)	0.424(0.223-0.805)*
Age				
18-30	17	203	1.00	
31-45	24	254	1.128(0.590-2.157)	
46-60	16	85	2.248(1.085-4.656)	
Residence				
Urban	27	383	1.00	
Rural	30	170	2.503(1.444-4.341)	
Employment				
Government employee	7	50	3.240(1.084-9.681)	
Farmer	26	130	4.629(1.947-11.003)	
Student	1	9	2.571(0.285-23.211)	
Unemployed	7	162	1.00	
Presence of domestic cattle				
Yes	20	93	2.674(1.485-4.813)	
No	37	460	1.00	
Consulting veterinarians				
Yes	12	1	19.578(9.409-40.737)	9.160(3.890-21.570)**
No	45	552	1.00	1.00
Training				
Yes	12	1	147.2(18.714-1157.817)	38.474(4.080-1157.817)*
No	45	552	1.00	1.00

Note: 1=Reference **=P<0.001 *=P<0.05

N= Knowledgeable NK= Not knowledgeable

Factors associated with preventive practices of respondents about BTB

Table 6: Socio-demographic and behavioral factors associated with preventive practices of BTB among adult HIV positive people in woldya town, 2014

	Preventive practice of BTB			Odds Ratio
Variables	GP	PP	COR(95%CI)	AOR(95%CI)
Sex				
Male	114	141	1.00	
Female	196	159	0.656(0.475-0.906)	
Educational status				
Can't read and write	144	89	1.00	
High school(9-10)	22	38	2.795(1.553-5.031)	
Preparatory(11-12)	12	16	2.157(0.975-4.771)	
Certificate	4	7	2.831(0.806-9.948)	
Diploma and above	16	24	2.427(1.223-4.817)	
Marital status				
Single	53	46	1.00	
Married	153	185	0.694(0.176-2.740)	
Divorced	75	40	0.967(0.255-3.665)	
Widowed	25	24	0.427(0.108-1.675)	
Separated	4	5	0.768(0.184-3.206)	
Frequency of hand wash				
Sometimes	17	6	2.833(1.101-7.288)	
Always	290	290	3.778(0.648-22.017)	
Do not wash	3	4	1.00	
Cleaning house of cattle and surroundings				
Sometimes	8	7	0.875(0.046-16.744)	
Usually	10	16	1.600(0.090-28.566)	
Always	12	58	4.833(0.282-82.780)	
Not clean	1	1	1.00	
Consulting veterinarians				
Yes	9	28	3.443(1.596-7.426)	
No	301	272	1.00	
Habit for raw milk consumption				
Yes	24	7	1.00	1.00
No	286	293	3.512(1.490-8.280)	20.708(2.422-177.031)*
Training				
Yes	4	9	2.366(0.721-7.767)	
No	306	291	1.00	

Note: 1=Reference *=P<0.05

GP= Good practice PP= Poor practice

domestic cattle. Among behavioral factors consulting veterinarians and closeness to media had significant association on knowledge of BTB. Among the respondents Training was the only significant value from organizational factors.

In multivariate analysis from socio-demographic factors only sex had significant association (P-value <0.05) with knowledge about BTB. Being female had lower knowledge than male (AOR=0.424 CI (0.223-0.805)). Among behavioral factors consulting veterinarians had higher significant association for the knowledge of bovine TB (AOR=9.160 CI 3.890-21.570). Training had also higher significant association with knowledge of bovine TB (Table 5).

Socio-Demographic and Behavioral Factors: Bivariate analysis showed that there was statistically significant association between preventive practice of BTB and sex, educational status, marital status, type of employment, owning of domestic cattle and income. From behavioral factors personal and environmental hygiene, consulting veterinarians, habit of raw milk consumption, habit of raw meat consumption and closeness to media had significant association with preventive practice of bovine TB. Training was the only organizational factor having significant association in the preventive practice of BTB among respondents (Table 6).

In multivariate analysis from all associated factors affecting preventive practice of BTB the only independent variable having statistical significance was food consumption behavior. Those who had not a habit of raw milk consumption were twenty times higher in their good practice for prevention of BTB (Table 6).

DISCUSSION

This study revealed that among the respondents nearly one in ten was knowledgeable about bovine TB and associated factors among adult HIV positive people in woldya town, Northeast Ethiopia. Among knowledgeable respondents 45.1% knew the exact cause of bovine TB. Study in Ghana showed that 88% of livestock keepers had knowledge about bovine tuberculosis but only 2.7% of them knew the exact cause of bovine tuberculosis [19]. Another study in Jimma zone knowledge about bovine tuberculosis among small holder dairy farmers, traditional farmers and city residences was 29.1% [20]. The main reason for their difference in the level of knowledge about bovine tuberculosis could be nearest approach to animal heath assistances and veterinarians, so that they could consult animal health professionals for the health care of their animals and zoonoses.

Among respondents who were knowledgeable 48% knew that how bovine tuberculosis can transmit to humans. Ninety eight percent of knowledgeable respondents also knew that pasteurization of milk can prevent transmission of bovine tuberculosis to human. Study in Ghana 34% knew that how bovine TB can transmit to human and 69% of knowledgeable respondents knew that pasteurization of milk can prevent bovine tuberculosis transmission to humans [19].

In bivariate analysis being a female is less likely to had knowledge than male. Older age (46-60) years were knowledgeable than younger's. Rural residence had more knowledge about bovine tuberculosis than urban residence. Regarding the type of employment being farmer had more knowledge about BTB followed by government employee than the others (private employees, merchant, daily laborer and student). This study disagree with another study in Jimma zone, city residences had more knowledge than farmers [20, 21]. This could be due to city residences mostly did not have domestic cattle to approach animal health experts for their animal health care and zoonoses as well.

Consulting veterinarians and training had positive association with knowledge of BTB. In this study 6.1% of respondents consult veterinarians and 98.2% who had domestic cattle care for the health of their animals. A study in India show that 21.67% of the respondents discuss with veterinarians for zoonotic disease including bovine TB and 90% of them check the health of their animals [22]. The difference in the proportion of consulting veterinarians in this study and another study in India could be the respondents were all livestock keepers in case of India, but respondents in this study were both livestock keepers and non-livestock keepers.

Preventive practices of respondents about bovine TB showed that 50.8% had good practice for the prevention of bovine tuberculosis in humans. Among milk users in this study 6.4% drink raw milk. Studies in Ghana among livestock keepers 40.6% of them consume raw milk. Another study in Arsi zone, Ethiopia 55.4% of small holder farmers drinks raw milk [19, 23].

Generally lowest level of knowledge about bovine tuberculosis and relatively much higher good practice for the prevention of the diseases among adult HIV positive peoples could be due to different reasons. Respondents may share a good practice from other individuals without appropriate knowledge. Both health professionals and veterinarians may work more for the public on the practice rather than doing on knowledge for bovine tuberculosis related to other food borne disease. The other possible reason could be traditionally or culturally a good practice for the prevention of bovine tuberculosis may have a valuable place in their culture and/or individuals may like to do such a good practice naturally from innate.

CONCLUSIONS AND RECOMMENDATIONS

The level of knowledge about bovine tuberculosis among HIV positive peoples in Woldya town was low. Therefore, this study was demonstrated that little knowledge about bovine TB among adult HIV positive individuals that could create a major public health problem for the prevention the disease. Knowledge about bovine tuberculosis was more in men, those who were consult veterinarians or public health professionals and those who took training about zoonoses.

A good preventive practice of bovine tuberculosis in this study was 50.8%. Among the milk users in this study very few drink raw milk. This is low when compared with another study in Ghana and Arsi zone, Ethiopia.

Food consumption habit influence preventive practices of bovine tuberculosis. Those who had not a habit of raw food consumption were in a good preventive practice for bovine tuberculosis. Based on the above conclusions, the following recommendations were made to respective stakeholders:

To Policy Makers:

- Health education should include common zoonotic disease including bovine tuberculosis for a better knowledge about the disease.

- One-Health for the control and prevention of zoonoses and new emerging disease should be strengthened.

To Concerned Ngos, Woldya Town Health and Agricultural Office:

- There should be a collaboration of woldya town health and agricultural office for combating zoonotic disease by creating awareness through health education.
- Emphasis should be given for training about zoonoses for health professionals and the community at large.

To the Community at Large:

- There is a need to improve social status of women in the community.
- The communities should accustomed consultation of both veterinarians and public health professional concerning zoonoses.
- Bad habit of food consumption should be avoided.

To Researchers:

- Large scale community based cross-sectional study should be done.

ACKNOWLEDGEMENTS

We would like to thank University of Gondar, College of Medicine and Health Sciences, Institute of Public Health for the grant provided to us to do this` research. We wish also to express our profound gratitude to personnel of Faculty of Veterinary Medicine for their unreserved guidance, valuable suggestions and voluntariness to do this research.

REFERENCES

1. WHO, 2005. The Control of Neglected Zoonotic Diseases. Contract No.: Report of a Joint WHO/DFID-AHP Meeting with the participation of FAO and OIE. Geneva.
2. MEJ TLLSW, 2001. Risk factors for human disease emergence: Philosophical Transactions of the Royal Society of London, pp: 983-9.
3. WHO, 2004. Water borne Zoonoses, Identification, Causes and Control.
4. MEJ W, S.G.S., 2005. Host range and emerging and re-emerging pathogens. Emerg Inf Dis., pp: 11.
5. Berg, S.R., Firdessa, M. Habtamu, E. Gadisa, A. Mengistu and L. Yamuah, 2009. The burden of mycobacterial disease in Ethiopian cattle: implications for public health. PloS one, 4(4): e5068. PubMed PMID: 19352493. Pubmed Central PMCID: PMC2662418. Epub 2009/04/09. eng.
6. Katale, B.Z., E.V. Mbugi, S. Kendal, R.D. Fyumagwa, G.S. Kibiki, Godfrey and P. Faussett, 2013. Bovine tuberculosis at the human-livestock-wildlife interface: is it a public health problem in Tanzania? A review. The Onderstepoort journal of veterinary research. 2012; 79(2):463. PubMed PMID: 23327384. Epub /01/19. eng.
7. Palmer, M.V. and W.R. Waters, 2011. Bovine tuberculosis and the establishment of an eradication program in the United States: role of veterinarians. Veterinary medicine international. 2011; 2011:816345. PubMed PMID: 21647341. Pubmed Central PMCID: PMC3103864. Epub /06/08. eng.
8. Muller, B., S. Durr, S. Alonso, J. Hattendorf, C.J. Laisse, S.D. Parsons, 2013. Zoonotic Mycobacterium bovis-induced tuberculosis in humans. Emerging infectious diseases. Jun; 19(6):899-908. PubMed PMID: 23735540. Epub 2013/06/06. eng.
9. Bugwesa, Z., Katale, Erasto, V. Mbugi, D. Esron, Karimuribo, D. Julius, Keyyu, Sharon Kendall, S. Gibson, Kibiki, Peter Godfrey-Faussett, L. Anita, Michel, R. Rudovick and Kazwala, 2013. Paul van Helden and Mecky I Matee1. Prevalence and risk factors for infection of BTB in indigenous cattle in the seregenti ecosystem, Tanzania. BMC Veterinary Research, 9: 267.
10. Firdessa, R., R. Tschopp, A. Wubete, M. Sombo, E. Hailu and G. Erenso, 2013. High prevalence of bovine tuberculosis in dairy cattle in central Ethiopia: implications for the dairy industry and public health. PloS one. 2012: 7(12):e52851. PubMed PMID: 23285202. Pubmed Central PMCID: PMC3532161. Epub /01/04. eng.
11. Aylate, A., S.N. Shah, H. Aleme and T.T. Gizaw, 2012. Bovine tuberculosis: prevalence and diagnostic efficacy of routine meat inspection procedure in Woldya municipality abattoir north Wollo zone, Ethiopia. Tropical animal health and production. 2013 Mar; 45(3):855-64. PubMed PMID: 23080340. Epub /10/20. eng.
12. W.A., 2006. The situation of tuberculosis and tuberculosis control in animals of economic interest. Tuberculosis, 86: 6.

13. Etchechoury, I.G., Echeverria Valencia, N. Morcillo, M.D. Sequeira, B., Imperiale and M. López, 2010. Molecular typing of Mycobacterium bovis isolates in Argentina: First description of a person-to-person transmission case. Zoonoses and public health, 57: 7.
14. A.R., 2005. Study on Mycobacterium bovis in animals and human in and around Fiche, North Shewa zone, Ethiopia.
15. Central Statistical Agency (CSA), 2008. Report on livestock and livestock characteristics; vol. II, Agriculture sample survey 2008/09.
16. Demissie, Z., 2003. Trends of HIV infection and profiles of voluntary HIV counseling and testing (VCT) service users in seven branch clinics of the Family Guidance. Association of Ethiopia. EPHA Abstract, pp: 8.
17. National Meteorology Service Agency, 2006.
18. Central Statistics Authority (CSA) (20010/11): Agricultural sample survey 2010/2011. Vol. II. Report on livestock and livestock characteristics. Statistical Bulletin. Addis Ababa, Ethiopia.
19. Addo, K.K., G. Mensah, N. Nartey, G.K. Nipah, D. Mensah and K.G. Aning, 2011. Knowledge, Attitudes and Practices (KAP) of Herdsmen in Ghana with respect to Milk-Borne Zoonotic Diseases and the Safe Handling of Milk. J Basic Appl Sci Res., 1(10): 7.
20. Tesfaye, D., D. Fekede, W. Tigre, A. Regassa and A. Fekadu, 2013. Perception of the public on the common zoonotic diseases in Jimma, Southwestern Ethiopia. International Journal of Medicine and Medical Sciences, 5(6): 7.
21. Franco, M.M., A.C. Paes, M.G. Ribeiro, J.C. De Figueiredo Pantoja, A.C. Santos and M. Miyata, 2013. Occurrence of mycobacteria in bovine milk samples from both individual and collective bulk tanks at farms and informal markets in the southeast region of Sao Paulo, Brazil. BMC veterinary research. 2013; 9:85. PubMed PMID: 23618368. Pubmed Central PMCID: PMC3650655. Epub /04/27. eng.
22. Kuma, T., B. Deressa, F. Alem and W. Tigre, 2013. Farmer's Awareness and Practices on Rabies, Bovine Tuberculosis, Taeniasis, Hydatidosis and Brucellosis in Mana and Limmukosa Districts of Jimma Zone, South West Ethiopia. World Applied Sciences Journal, 23(6): 6.
23. Tschopp, R., B. Abera, S.Y. Sourou, E. Guerne-Bleich, A. Aseffa and A. Wubete, 2013. Bovine tuberculosis and brucellosis prevalence in cattle from selected milk cooperatives in Arsi zone, Oromia region, Ethiopia. BMC veterinary research. 2013; 9:163. PubMed PMID: 23941112. Pubmed Central PMCID: PMC3751185. Epub /08/15. eng.