



**REVIEW ON EVALUATING FARMERS' KNOWLEDGE,
AWARENESS, AND PRACTICE ON ZONOTIC DISEASES.**

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LIST OF ABBREVIATIONS

AI	Avian Influenza
CFSPH	Center for Food Security & Public Health
EJVSAP	Ethiopian Journal of Veterinary Science and Animal Production
FMD	Foot and Mouth disease
PPE	Personal Protective Equipment
RVF	Rift Vale Fever
Spp	specious
TB	Tuberculosis
WHO	World Health Organization



ABSTRACT

Micro-organisms transmitted from vertebrate animals including livestock to humans account for an estimated 60% of human pathogens. Micro-organisms can be transmitted through inhalation, ingestion, via conjunctiva or physical contact. Close contact with animals is crucial for transmission. The role of intensity and type of contact patterns between livestock and humans for disease transmission is poorly understood. In this systematic review aimed to summaries current knowledge regarding patterns of human–livestock contacts and their role in micro-organism transmission. Regarding mode of transmission many research work indicts majority of farmers knew rabies as a zoonotic disease contracted via the bite and contact with saliva of a rabid dog. In endemic areas respondents know about anthrax. Likewise, Taeniasis was well known by of farmers as transmitted through ingestion, whereas research work indicts farmers knew half of farmers knew tuberculosis can be transmitted from cattle to humans. However, Brucellosis and Toxoplasmosis were only recognized by a few respondents as transmitted through contact and ingestion, respectively. Majority of the respondents 96.5% and 66.2% knows consumption of raw meat and milk respectively can be a source of infection for zoonotic diseases; on the other hand (99%) and (89.8%) of the respondents consume raw meat and milk. Therefore, continued awareness creation and educating community on way of transmission of zoonotic diseases is mandatory.

Keywords: *awareness, knowledge level, livestock farmers, zoonotic diseases*

1. INTRODUCTION

Now a day zoonotic pathogens are a major contributor to human food-borne diseases in both developed and developing countries, and still a major challenge to human reported to be associated with the persistence of health worldwide (Black *et al.*, 2010). In many countries and especially in developing ones, millions of people are affected by preventable zoonosis such as Rabies, Rift Valley Fever, Brucellosis, Leishmaniasis, Echinococcosis, Tularemia, but still they do not know how to be prevented and treated (WHO, 2005). Zoonotic disease defend as disease transmit from vertebrate animal to human, as the natural world being disrupted and degraded exclusive human population growth increase agricultural practice deforestation extensive animal grazing global trade and travel increasing interaction between animals, humans and wildlife this increase emerging of new zoonotic disease about 75% of the new communicable diseases that have affected humans over the last 10 years (Rajkumar *et al.*, 2016). Exposure has a great impact on farmers to know about zoonotic diseases, the study area are familiar with some diseases like Anthrax, Mastitis, Rabies and bovine tuberculosis. Least of them have knowledge of Brucellosis. However, only a few of them actually knew the route of transmission, treatment and prevention procedure of these zoonotic diseases, the farmers have least knowledge about zoonotic diseases like FMD outbreak in their cattle (Rajkumar *et al.*, 2016)

The low level of smallholder dairy farmers' awareness could be attributed to remoteness, poor extension and accessibility to public and private veterinary services as supported by a low percentage of them indicating that they get information on zoonosis from animal health personnel (Jergefa *et al.*, 2009). moreover as most of the small scale farmers live below the poverty line, they have a little or no educational qualification, so they lack proper knowledge of raising livestock in a healthy manner and exposed to some potential risk factors associated with zoonosis (Rajkumar *et al.*, 2016). When we saw knowledge farmers about zoonotic diseases mostly talked about cattle, and this could indicate the major importance attributed to cattle compare to small ruminants as far as brucellosis is concerned, in fact brucellosis can be transmitted to humans from small ruminants by assisting goats or sheep births (Cash *et al.*, 2018).

More over developing country like Ethiopia compared with developed countries has knowledge Problems associated with sanitary infrastructure can expose them zoonotic

disease like cystercosis (John *et al.*, 2008)). The farmer's demographer and their social structure have great impact on level of awareness about the zoonotic diseases according (John *et al.*, 2008). The proportion of farmers who knew that there is involvement of risk factors from which the animals might contact the infection like overcrowding of livestock, irregular grazing places, poor hygienic condition of livestock, faulty farming practices, improper isolation of diseased animal (Tsfaye *et al.*,2013).

Ethiopia being one of the developing countries is exposed to the fate of animal diseases related health risks. In some part of Ethiopia there were reports about the habits of eating raw meat and milk, handling milk and meat products and contacting risk animals and their exudates but there were few reports on zoonosis evaluating the specific knowledge, and practice of the peoples about zoonotic disease, Therefore, the objectives of this review is evaluating farmers' knowledge, awareness, and practice on zoonotic diseases.



2. LITERATURE REVIEW

2.1. Evaluation of Knowledge of Farmers on Zoonotic Diseases

Know a day zoonotic pathogens are a major contributor to human food-borne diseases in both developed and developing countries, and still a major challenge to human reported to be associated with the persistence of health worldwide. In Africa, it is estimated that infectious diseases account for up to 68% of all deaths especially in vulnerable groups such as children and people infected with HIV/AIDS (Black *et al.*, 2010). In many countries and especially in developing ones, millions of people are affected by preventable zoonotic diseases such as, Rabies ,Rift valley fever, Brucellosis, Leishmaniasis, Echinococosis, Tularemia, but stile they do not how to be prevented and treated (WHO,2005).

According to Rajkumar *et al.* (2016) as most of the small scale farmers live below the poverty line. They have a little or no educational qualification, so they lack proper knowledge of raising livestock in a healthy manner and exposed to some potential risk factors associated with zoonosis. The current study indicated significant difference on knowledge of the farmers among urban and per urban area were heard about zoonoses of Rabies; taeniasis, anthrax, bovine tuberculosis and brucellosis and mode of transmission listed zoonotic diseases by the farmers while animal bite, contact, ingestion and inhalation were indicated mode of zoonotic with significantly higher in urban area than per urban settlers (Rajkumar *et al.*, 2016). The proportion of farmers who knew that there is involvement of risk factors from which the animals might contact the infection like overcrowding of livestock, irregular grazing places, poor hygienic condition of livestock, faulty farming practices, improper isolation of diseased animal was 69.7% (Tesfaye *et al.*, 2013).

Tanjia (2018), revealed that knowledge of farmers to zoonotic diseases varies with exposure farmers knew that there are certain diseases in their area which might be zoonosis as per their conception like FMD, Anthrax, Tetanus and Rabies were reported as the top zoonotic diseases, However, only a few of them actually knew the route of transmission, treatment and prevention procedure of these zoonotic diseases

Also Tesfaye *et al.* (2013) finding stated that because exposure higher proportion of farmers responded rabies due to dog bite (94.3%) and inhalational route and consumption of raw milk and meat as a transmission route of bovine tuberculosis from cattle to humans.

According to the findings of Tesfaye *et al.* (2013) the variations in the presence of knowledge gap from place to place and between city and rural residents. Such variability could be due to the difference in the farmers' educational status, their access to media and other public health information services and the prevalence of the diseases in the specific area most of the time the source of information was mass media, electronic media, family and friends, school and Teachers which is similar with Sisay *et al.*, (2012), Majority of the farmers get information about zoonotic diseases from family and friends as well as from school or more than one sources. When comparing the farmers knowledge zoonotic diseases could occur from small ruminant, farmers mostly talked about cattle, and this could indicate the major importance attributed to cattle compare to small ruminants as far as brucellosis in concerned, in fact brucellosis can be transmitted to humans from small ruminants by assisting goats or sheep births (Cash *et al.*, 2018). However little known about the transmission from goat or sheep milk, which could also demonstrate the low awareness of brucellosis and its zoonotic health implication in the study area. Other studies in Tanzania reported findings in which farmers did not perceive the products from animal origin to be dangerous (Mangesho *et al.*, 2017).

2.1.1. Evaluation the knowledge of farmers on milk born zoonosis

Gran (2003), has reviewed that most household producers in Punjab about 69.6% of the respondents drink raw milk and 55.6% of the respondents knew diseases can be transmitted through consumption of contaminated milk for improved hygienic practices and precaution at all levels of milk processing value chain. According to Neeta, *et al.* (2014) of the study farmers had knowledge that milk can be contaminated, of which quoted reason to be improper handling and unclean utensils significant. knowledge regarding milk borne diseases, most commercial (76.2%) and smallholder dairy farmers (61.2%) indicated that the most important route of contracting milk-borne zoonosis is through ingestion of infected raw milk which is differ from Kafkas (2015) low percentages of commercial (47.6%) and smallholder dairy farmers (43.9%) the different indicated that they got information on zoonosis from animal health personnel.

Similarly according to Addo *et al.* (2011) study indicates the knowledge of farmers about milk borne zoonosis might be due to the educational status and life experience, of the respondents indicated that 61.3% of respondents do not know any milk borne diseases, this might be reducing hygienic cares during handling and consumption of raw milk, Tuberculosis and typhoid fever were first and second known diseases of the respondents; 21.3%, 15.2% of the farmers knows tuberculosis and typhoid fever as milk borne zoonosis disease respectively. Brucellosis was the least known diseases, only 2.2% know it which is more similar with Girma (2017), 75.9% of the urban respondents thought diseases can be transmitted through consumption of cow milk, and 1.8%, 26.8%, and 26.8% of urban respondents knew brucellosis, TB and typhoid, among the diseases transmitted by row milk, respectively.

Also Mihiret (2012) reported that 5.6% of the respondents were aware of the zoonotic importance of brucellosis can occur drinking of row milk in and around Dire Dawa Ethiopia But Dawit *et al.*(2013), reported in contrary to the present findings being none of the respondents from Jimma knew about zoonotic importance of brucellosis. In the finding of Fetene (2011) of only 3.5% of the respondents knew that pasteurization as means of prevention of milk born zoonosis. Similarly, 61.3% of the respondents knew boiling as means of prevention of milk borne zoonosis. The unpasteurized or un-boiled milk have been reported to be associated with brucellosis and bovine tuberculosis, Ingestion of infected raw/unpasteurized milk was cited as the most possible way of contracting milk-borne zoonosis large amounts of *Escherichia coli*, *Staphylococcus aureus*, *Candida albicans* and other health hazard microbes have been reported in raw milk (Chahota 2003).

2.1.2. Evaluation the knowledge of farmers on meat born zoonosis

Amenu *et al.* (2010) argue that level of knowledge of farmers varies in urban and rural areas, and also their living standard about meat borne zoonotic diseases 96.3 % of respondents knew that raw meat help in transmission of disease to humans but stile they eat raw meat.

but the study subjects when asked about their knowledge about food poisoning on consumption of spoiled or contaminated meat or meat products showing extremely low level of knowledge, majority of respondents 85.8% farmers responded were not knowing that contaminated meat or meat products product can spread disease (Tesfaye *et al.*, 2013). More

over developing country like Ethiopia compared with developed countries has knowledge Problems associated with sanitary infrastructure can expose them zoonotic disease like Cystercosis (Tesfaye *et al.*, 2013).

Including our country hunting of wild animal is common in farmers commodity according to Kirkemo and Handeland (2004), knowledge of the causes of zoonotic infections only 11.8% of the hunters had knowledge of the possible cause of such infections the remaining have no knowledge. Amazingly some farmers they did not believe animals can cause disease to humans they did not fear any disease that affected animals, they simply eat meat from dead animal as the result they are more exposed but they said that “We have been living with these animals for many years and we slaughter them when they are about to die (Mangesho *et al.*, 2017). When some farmers of Echoed at auction markets in Endulen, Wasso, and Loliondo in the Ngorongoro district was asked “Why do you think meat inspection is done?, and how much meat inspection can have positive impact on reducing zoonotic diseases, they said it was because the government wanted revenue, complaints by local animal health officials on the unwillingness on the part of commodity for meat inspection before local ceremonies were very common across the sites (Mangesho *et al.*, 2017).

2.1.3. Evaluation of knowledge of farmers on contact and other forms of transmission zoonosis

Jones (2015) finding goes in line with the conclusion that so many unknown factors in the knowledge about livestock contact and zoonotic microorganism transmission; it is very hard to optimize interventions, minimizing effects of a future outbreak on public health, however some suggestions on intervention can be given for the occupational setting in case of an animal outbreak, Personal Protective Equipment (PPE) use by cullers should be reinforced, especially in case of infectious micro-organisms that can be inhaled

Mosalagae (2011) stated that Due to lack of knowledge several high risk practices were commonly reported among the farmers more over developing world, the most reported was assisting in calving and disposing aborted fetuses without wearing protective gloves, as result they are more exposed to zoonotic diseases like brucellosis, this study shows that the knowledge of brucellosis is poor among dairy farmers in the urban, peri urban and surrounding rural areas of Bishoftu Ethiopia, this lack of knowledge could explain the fact

that the majority did not use protective gloves when assisting with calving, nor would they use them when dealing with cows having an abortion or aborted materials. Also Similar results have been reported from Tajikistan, Egypt and Jordan, suggesting that the use of gloves is not common practice in many lower income countries this could in part be due to lack of access to protective gloves (Lindahl *et al.*, 2015).

In developing country people share common house as result they are more exposed to zoonotic diseased during an outbreak of avian influenza among poultry, there is a possible risk to people who have contact with infected birds or surfaces that have been contaminated with secretions or excretions from infected birds, Avian influenza (AI) is a disease peculiar to avian species; it has been reported recently to have caused diseases in human through close contact with infected chicken, approximately 1.5 million birds have died or been depopulated as a result of avian influenza infection among poultry in Nigeria (Ocholi 2006).

Ocholi (2006) finding is similar with Schnitzler (2009) an who stated that , one human fatal case was reported in the country ,there were four recorded outbreaks in Edo State from 2006 to 2008, three of which occurred in farms in Benin City, during this period the live poultry markets did not report cases of bird flu.

2.2. Evaluation of Awareness of Farmers on Zoonotic Diseases

John *et al.* (2008) investigation indicated that farmer's demographer and their social structure have great impact on awareness about the zoonotic diseases according was due to poor communication between veterinarian and human health-care professionals and lack of involvement of educated family members in farming activities and also awareness level of the farmers differ exposure experience. This coincides with the findings of Pfukenyi *et al.*, (2010) in Tanzania; brucellosis, anthrax, tuberculosis and rabies were also reported to be the top four zoonosis known by smallholder dairy farmers but the level awareness on anthrax and rabies observed in this study could be attributed to periodic vaccination campaigns that are launched annually by the Department of Veterinary Services in small-scale, communal and commercial farming areas.

The study of Tesfaye *et al.* (2013) indicated a relatively lower level of awareness of diseases which do not occur frequently the respondents in the study area as compared to the report for Rabies (97.1%) followed by Taeniasis (83.4%), Anthrax (55.4%), Bovine Tuberculosis

(29.1%) and Hydatidosis (4%) in Jimma, Southwestern Ethiopia. Girma *et al.* (2012) research has reviewed that level of awareness of the respondents differ from place to place, in Addis Ababa mentioned 100% respondents awareness of Rabies as a zoonotic disease, followed by Anthrax (94.27%), Taeniasis (89.06%), Bovine Tuberculosis (88.54%) and Brucellosis (49.48%).

John *e al.* (2008) described more farmers are well informed about zoonotic diseases during vaccinate their animals. Hence, highly fatal zoonosis like Rabies and Anthrax overshadow other zoonosis that rarely causes death. This agrees with Pfukenyi *et al.*, (2010) who reported that on , pet zoonosis in the country showed that a high proportion of pet owners were well informed on rabies as a zoonosis during vaccination their animals but a relatively smaller proportion of them were aware of other pet zoonosis. According to Amenu *et al.* (2010) the level of awareness to prevention and treatment to zoonotic disease among all respondents is low, for the prevention of zoonotic disease, 42.8% and 46.8% responded that it could be prevented by vaccinating animals and by consuming cooked animal products respectively.

2.2.1. Evaluation of awareness milk borne zoonosis

Ameni and Erkihun (2000) the level of awareness of farmers, the difference in awareness of milk borne zoonosis is due various circumstances present in the study area. But most of the variation in developing country, that remoteness lack of health facilities, poor extension services, low training status on rearing and handling animals and low literacy rate had been reported as major contributors to low level of awareness among smallholder dairy farmers. The low level of smallholder dairy farmers' awareness could be attributed to remoteness, poor extension and accessibility to public and private veterinary services as supported by a low percentage of them indicating that they get information on zoonosis from animal health personnel (Jergefa *et al.*, 2009).

Jergefa *et al.* (2009) finding is similar with Munyeme *et al.*, (2010) who stated that, awareness level different for depending on varies reason could be due to historically predominant emphasis on disease surveillance in commercial farms compared to communal and small-scale farming areas remoteness, lack of health facilities, poor extension services, low training status on rearing and handling animals and low literacy rate have been reported

as major contributors to low level of awareness among smallholder dairy farmers on the African countries.

According to Neeta *et al.* (2014) awareness regarding to controlling milk borne diseases by making pasteurization, Present study showed that 1/3rd participants consume raw milk, and very less reported convenience and taste as primary reason. Consumption of raw milk is a preventable cause of food borne illness, making pasteurization of raw milk an important public health tool for food-borne disease prevention.

The finding of Amenu *et al.* (2010) creation of awareness has shown a great importance in reducing milk borne zoonotic diseases. When we saw the level of awareness difference between the commercial to smallholder dairy farmers results of study showed that commercial dairy farmers were generally more aware of cattle zoonosis compared to smallholder dairy farmers and the same trend was observed with regard to milk-borne zoonosis (Munyeme *et al.*, 2010),

2.2.2. Evaluation of awareness of meat borne zoonosis

In developing country several factors have been reported to associate with the incidence of food-borne and zoonotic diseases these factors include: manly poor sanitation and open defecation (Kebede *et al.*, 2009). The level awareness different comparing meat borne zoonosis with other zoonotic according to Ameni and Erkihum (2007) the awareness of other possible ways of contracting milk-borne zoonosis such as ingestion of infected meat and regular contact with infected animals and afterbirths was low awareness of transmission of zoonotic disease by consumption of meat (96.3%) and milk (51.3%) were also reported by Amenu *et al.*, (2010) in Arsi-Negele District, Ethiopia.

According John *et al.* (2008) the overall awareness among different studies for the common zoonotic diseases could be due to variations in educational status, various sources and frequencies of information provided, living style between study areas remoteness, lack of health facilities, poor extension services, low training status on rearing and handling animals and low literacy rate have been reported as major contributors to low level of awareness, where in Addis Ababa, as a capital city, information might be acquired more easily than in the current study area Majority (93.2%) of respondents responded that disease could transmit

from animal to human. This figure was higher as compared to the 81.6% respondents reported from Arsi Negele district of Arsi zone (Amenu *et al.*, 2010)

Also Kuma *et al.* (2013) from Mana and Limmukosa Districts of Jimma Zone responds 15.6%, South West Ethiopia Educational status, access to media might be the reasons for such variation. Tesfaye *et al.* (2013) reviewed that, Raw/undercooked meat consumption as a vehicle for transmission of taeniasis to humans was indicated by 82.3% respondents in Jimma, Southwestern Ethiopia. The awareness farmers very low as result they are exposed to zoonotic diseases ,according to Minnesota Department of health, eating contaminated food, such as undercooked poultry, eggs, or beef, raw fruits, vegetables, and milk, results in transmission of zoonotic diseases (Neeta 2014).Including our country hunting of wild animal is practice in farmer's commodity Very few participants were aware of the existence of zoonotic infections that could be transmitted by handling, processing, or eating bush meat now day wildlife as source of zoonotic emerging infectious Diseases.(kirkemo 2004).Astatistically significant difference was also found between the groups in terms of awareness of the existence of zoonosis in wild animals in Nigeria, as 76.5% of hunters thought that there were none, compared to 42.9% of traders (kirkemo 2004).

Including cystercosis and other zoonotic has more public health and economic significance in, low awareness and improper disposal of sewage are major factors for higher prevalence of Cystercosis in developing countries (Tesfaye *et al.*, 2013).

2.2.3. Evaluation awareness of farmers on contact and other form of transmission zoonosis

Awareness on practices that prevent zoonotic transmission and contagious spread among humans is low to moderate (Fatiregun and Saani 2008).

According to John *et al.*, (2008) variation in level of awareness occur duet various reason farmers demographer and their social structure have great impact on awareness about the zoonotic diseases.

In a ducat diseases surveillance, recode ,reporting occurrence of zoonosis has its own impact on the awareness according to Lau (2008) awareness avian influenza vary, the reasons are the following:

- ✓ since the 2006–2008 epidemic avian influenza in poultry farms recorded no reported human cases, it could have caused farmers to quickly relax the practice of these measures;
- ✓ due to few reported bird flu cases in farms, as such awareness of these measures perhaps must have been forgotten because usage might have stopped shortly after the epidemic recession;
- ✓ (human disease is rare, so a case definition for identification has not been established

Garine *et al.* (2011) has reviewed that ,the awareness level different among Cattle owners with exposure according to in Chiredzi district anthrax is well known and also the farmers in this community knows contacting animal dead by anthrax can cause disease to human named the kudu as another animal species affected by anthrax, hence, the recent wildlife and cattle anthrax outbreaks in the district have probably increased their awareness, in another hand, in Gwanda, another low-anthrax-risk district, cattle outbreaks were last reported in 1987 with no human outbreaks reported and this could probably account for their low awareness, similarly Rift Valley fever in cattle and wildlife at a wildlife/livestock interface in the southeast low veld of Zimbabwe, where the Chiredzi district is located, could probably account for the high awareness of these diseases by cattle owners in this district (Garine *et al.*, 2010)

Awareness about rabies was good among livestock farmers, comparing with others which may be due to the fact that dog bite is common in India due to a huge population of stray dogs and we always go for post-exposure vaccination. (Ananthnarayan 2013).

According to Beigel (2007) suggesting that human bird flu is unknown to the respondents, this perhaps would best explain the poor awareness of the none pharmaceutical measures such as isolation of sick persons, staying at home to avoid public places, wearing face masks and hand gloves when handling sick birds.

2.3. Practice of the Respondents on Zoonotic Disease

poor practices which could predispose to most zoonotic diseases, the communities in the study areas also indicated Common practices performed by the community includes, fail to limit contact with infected animals, consumption of raw meat and unpasteurized milk, sharing the same house with animals, backyard animal slaughtering, raw offal feeding to dog etc. (EJVSAP 2017).

According to Avery (2004) Study area farmers of around 48.2% respondents showed as they avoid contact with infected animals, among respondents, 68.5% consumed raw meat while 52.3% respondents revealed consumption of unpasteurized milk. About 34.4% respondents shared the same house with different species of animals while 97.4%.

2.3.1. Practice of the farmers on milk borne zoonotic disease

Consumption of milk and milk product is high in the farmer's community including other urban areas ingestion of infected raw unpasteurized milk was cited as the most possible way of contracting milk-borne zoonosis (Chahota *et al.*, 2003). The finding of Millogo (2008) only 61.3% of respondents know that boiling of milk prior to consumption is the best approach to prevent milk-borne diseases especially in low income communities milk can prevent milk born zoonosis the others consume raw milk and milk product. despite being aware of the most possible way of contracting milk-borne zoonosis, dairy farmers consume raw milk at household level and sell raw milk to the local public (Khan and Usmani, 2005). Cooling milk after milking reduces the risk for the growth of both pathogenic and spoilage bacteria (Quinn *et al.*, 2002) which is Similarly with Millogo *et al.*, (2008) smallholder dairy farmers in spite of selling raw milk to the local public lacked cooling facilities.

Recent study, overall very limited bio-security measures were reported in the study area none of the farmers used detergents or disinfectants while cleaning teat or cow's udder before milking. (Tigabu *et al.*, 2015) As observed in studies Hidayet and Mehmet (2004) all smallholder dairy farmers studied practiced hand milking with a relatively higher percentage of them milking cows in open kraals, which constitutes one of the direct methods of milk contamination. Similarly studies conducted by Bonfoh *et al.* (2006) and Ghazi *et al.*, (2010) noted that cleanliness of the milking area and containers play a vital role in determining the quality of milk. Thus improper milking practices used by the livestock owners in rural areas constitute an important risk factor for exposure to zoonotic infection; some of these microorganisms contaminating milk may include those that are potentially zoonotic such as *Salmonella* spp, thus the milking practices used in smallholder dairies constitute an important risk factor for exposure to zoonotic pathogens.

Where milk is produced under poor hygienic conditions and is not cooled, the main contaminants such as lactic acid producers which cause rapid souring, Lactic acid has an inhibitory effect on Milk production practices such as lack of appropriate milking places and milking techniques influence the level of milk contamination at farm level. (Grimaud *et al.*, 2007). Including the study area in Zimbabwe more farmers' villages which are currently limited electricity supply, but cooling requires electricity. but cultured pasteurized milk and naturally soured raw milk from three smallholder dairies in Zimbabwe (Mhone 2010) ,and this emphasizes the need for improved hygiene practices at all levels in this dairy sector but it may also be important to investigate other possibilities such as the lacto peroxidase system to prevent bacterial growth (Kussendrager and Hooijdonk 2000) .Ashford *et al.* (2001) stated that in countries where bovine tuberculosis is common and pasteurization of milk has not been practiced widely, an estimated 10-15 percent of human tuberculosis cases are caused by *Mycobacterium bovis*. In Ethiopia, raw white cheese, prepared from raw milk, is customarily consumed in raw form together with “*Injera*” and “*key wot*” or “*doro wot*”. Cheese has frequently been identified as being contaminated with infectious pathogens like *L. monocytogenes*; therefore consumption of such contaminated milk and milk products constitutes a public health risk in smallholder communities. (Tigabu *et al.*, 2015)

In Zimbabwe, especially in the most vulnerable groups such as young children, the elderly and people living with HIV /AIDS, which is prevalent in the region, *Mycobacterium bovis*, *Brucella abortus*, *Bacillus cereus* and *Campylobacter* spp. are other pathogenic microorganisms found in milk and milk products in sub-Saharan Africa (Bonsu *et al.*, 2000). Direct consumption of milk locally collected by farmers and informally commercialized could increase the risk of brucellosis infections in humans, if domestic animals are infected with brucellosis poor prophylactic practices regarding brucellosis were observed in Uganda, a study that confirmed the presence of *Brucella* in cattle reported a high risk of human brucellosis associated with informally marketed milk (Hoffman *et al.*, 2016). Regarding practices posing a risk for brucellosis transmission from animals to humans, consumption of raw milk has been previously described as one of the most risky practices (Kozukeev *et al.*, 2006).

2.3.2. Practice of the farmers on meat borne zoonotic disease

There is deep rooted practice of raw meat consumption in Ethiopia, reported by large proportion of respondents raw meat consumption (69.1%) in Jimma, Southwestern Ethiopia (Tesfaye *et al.*, 2013). Individuals have the chance to consume more raw meat in different social ceremonies such as wedding and other local holy days, where raw meat is one of the major food items served almost everywhere in the country, raw meat consumption is practiced in some parts of the world as a cultural heritage passed through many generations (Tesfaye *et al.*, 2013). This coincides with the findings of Sua´rez and Santizo (2005) countries like Russia, Cuba and many social groups on the African continent are known to consume raw and/or undercooked meat

Raw meat is considered a delicacy Ethiopia, usually in the form of ‘*kitfo*’ (raw minced meat, usually beef) or ‘*tere siga*’ (raw strips of meat), where it is often eaten on special occasions such as religious festivals and other celebrations., who have lengthy fasting periods throughout the year which are celebrated afterwards by participating in slaughter of animals with family and the local community, and consuming the raw meat fresh from the slaughtered animal. Processing of raw meat and animal products can expose humans to brucellosis infection through cuts and abrasions in the skin (Amenu *et al.*, 2010).

According to Amenu *et al.* (2010) reported that 58.2% and 57.1% respondents consumed raw meat and milk in Arsi-Negele Ethiopia District which similar with. Kuma *et al.*, (2013) reported that ,56.8% respondents consumed raw food of animal origin in Mana and Limmukosa Districts of Jimma Zone, in South West Ethiopia. Backyard slaughtering of livestock is very common practice of in Ethiopia farmers used backyard slaughter. this activities’ are more expose them to zoonotic disease ,in one study conducted in Arsi-Negele district of Ethiopia, respondents revealed about the sources of meat for home consumption from butchery 15.3%, slaughtered at home 59.2% and backyard slaughtering 94.9% (Amenu *et al.*, 2010). practice of raw meat consumption was a widespread health problem human taeniasis in the study area with prevalence of 56.7%. (Taylor 2007)

2.3.3. Practice of the farmers on contact and other forms of transmission zoonotic diseases

Almost all farmers were sharing the same shelter with animals due to their living standard in Mana and Limmukosa districts of Jimma Zone, they are exposed zoonotic disease like bovine

tuberculosis (Tirsit *et al.*, 2013). Including Ethiopia and other developing countries farmers more poorly practice to use protective clothing, usage of masks, wearing of boots during contact infected animal with hands (HalidouKazienga *et al.*, 2016). Among all the respondents veterinary health care workers were known about the disease brucellosis, but the farmers has less awareness around Dire-Dawa of Ethiopia , who reported that 5.6 percent of the respondents were aware about the zoonotic significance of brucellosis (Mihiret 2012).

While men normally undertake the slaughtering of animals, none of whom wore gloves, the whole family can be involved in handling of the butchered carcass exposing members, including children, to blood and raw animal products. Brucella only survives for very short periods in meat (CFSPH.2009).Bonfoh *et al.*(2006) stated that some respondents wetting their fingers in the bucket milk during milking is also a hygiene problem, especially if the person does not have clean hand, this practice was often observed at farms when it was not clear whether the respondents washed their hands before milking Unsurprisingly, the study of Díez and Coelho (2013) found that all farmers were engaged in at least one risky practice conducive to transmission of Brucella to other animals and to humans , knowledge about the disease and preventive herd management practices have previously been identified as the most important factors needed for minimizing the disease risk in animals according to Kahn and Line (2010) contaminated fetal materials and dead animal body discard them into the open environment, outside the boundaries of their compound, or even feed them directly to dogs.

Developing country has low level of sanitary practice, this practice provide favorable condition that the pathogen has been recovered from fetuses or other organ parts or the whole ,that have remained in a cool environment for over two months, this also could present a transmission risk to both other animals and humans in the area (Kahn and Line, 2010). Exposure to zoonotic diseases vary with type species of animal production in farm and spatial exposure relationships within contact with farm animals can lead to disease in farmers or others that come into contact with infected farm animals for example, Glanders primarily affects those who work closely with horses and donkeys, close contact with cattle can lead to cutaneous anthrax infection, whereas inhalation anthrax infection is more common for workers in slaughterhouses, tanneries and wool mills. close contact with sheep who have recently given birth can lead to clamydiosis, or enzootic abortion, in pregnant women, as

well as an increased risk of Q fever, toxoplasmosis, and listeriosis in pregnant or the other wise immune compromised., Echinococcosis is caused by a tapeworm which can be spread from infected sheep by food or water contaminated with feces (Kahn and Line, 2010) he also reviewed that occupation it has impact on zoonotic, high attack rates have been demonstrated among abattoir workers, herdsman and veterinary personnel all who have extensive contacts with animal tissues during their work.

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3. CONCLUSIONS AND RECOMINDATIONS

The review was undertaken with the objective of is evaluating farmers' knowledge, awareness, and practice on zoonotic diseases. Livestock farmers were well aware of rabies, but the knowledge toward other zoonotic diseases was low to medium. Even the farmers did not hear the name of cystercosis and Echinococosis. Livestock holders were mostly not aware of the risk of contracting zoonotic pathogens from consuming contaminated raw milk, meat, and eggs. In addition, proper disposal of infected milk or dairy products, aborted materials, and use of hygienic procedures during milking and milk storage are extremely important steps in successful control of zoonotic pathogens.

Zoonotic diseases have a direct effect on human and animal health and production, but this may influence the economy of the country by being barriers to trade, increased cost of marketing the product to ensure it is safe for human consumption and the loss of market because of decreased consumer confidence. In spite of its utmost importance, awareness to livestock farmers regarding their needs to be stressed on because due to lack of awareness most of them go undiagnosed and uncontrolled. Even though the government is practicing most disease control schemes including vaccination, organization of animal health camps but preponderance over the issue of improving awareness among the livestock owners could become a mile post in prevention and control of zoonotic diseases. During my senior seminar work I reviewed different research papers focus on my title with in and across country, from the work I want to recommend depends on what observe.

- ✓ Both researches, Governmental and nongovernmental organization must work collaborate to solve the problem of farmers 'on knowledge, awareness, attitude and practice on zoonotic diseases at grass root level ..
- ✓ Veterinarian, human health professionals and the other staff members must work hard to solve the knowledge, awareness problem of farmers on zoonotic diseases
- ✓ Human health extension workers with Keble leader must work about sanitary keeping of feed and feeding material and keeping the surrounding well sanitation including making of toilet
- ✓ Veterinarian and human health workers must work hard to create awareness not to Consummation of row meat and milk.

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