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Zoonotic Disease: Knowledge, Attitude and Practice of Dairy Farm Owner in Wolaita Sodo District, Ethiopia

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Abstract

Background: Zoonotic diseases cause significant health impact for animal and human population. Despite of, Dairy livestock production play a vital role in the economy, it can also be a source of zoonotic pathogen dissemination.

Objectives: It is aimed to assess knowledge, attitude, and practices of dairy farm participants concerning zoonosis.

Materials and Methods: A cross-sectional study was conducted from March, 2022 to August, 2022 in Sodo town, using a questionnaire among dairy farm participants (n=123). The relations between the explanatory variables and the three indexes were assessed based on linear regression analyses.

Results: The overall positive response for knowledge, attitude and practice were 65.34%, 73.90% and 59.34% respectively. Moreover, 92.24%, 85.37%, and 80.49% of them knows eating uncooked meat, drinking raw milk and collecting aborted fetuses and placenta with bare hand as source of infection, respectively. Furthermore, 73.98% showed positive attitude towards risk of acquiring disease through consumption of raw meat and milk. Education level and age were positively and negatively associated with better knowledge, attitude and practice toward zoonoses respectively. Furthermore, farm type and its size and respondent's role and their residence also associated with better practice of zoonotic disease prevention ($p<0.05$).

Conclusions: This result indicated that, education have positive impact on knowledge, attitude and practice about zoonotic diseases control and prevention. Thus organized training programs for the members of the dairy producers' on zoonotic disease might enhance awareness on public health impact of zoonotic disease.

Keywords: Attitude • Dairy farm • Knowledge • Practice • Sodo • Zoonoses

Introduction

Livestock production is important in Ethiopia's agricultural economy. It is contributing a great role in the livelihood of the rural community, particularly; dairy cattle production has a paramount role in Ethiopia economy where livestock and its products are important source of food and income generation. The sector contributed up to 40% of agricultural Gross Domestic Product (GDP), nearly 20% of total GDP, and 20% of national foreign exchange earnings in 2017. Nevertheless, livestock production can also be a source of infection for humans, through direct contact with animals or unsafe using of their product [1], and become a source of zoonotic pathogens.

Zoonotic disease is an infectious disease that has great public health concern and transmitted from animals to humans or from humans to vertebrate animals. It can be transmitted to humans directly or indirectly from animals, either by the consumption of contaminated food and water, exposure to the pathogen during preparation, processing or by direct contact with infected animals or humans. According to world economic forum reports in 2022, it represent a growing threat to public health and about 60% of known infectious diseases and up to 75% of new or emerging infectious diseases are zoonotic in origin [2]. Zoonoses are categorized based on their disease causing agents as bacterial, viral, parasitic, mycotic/fungal zoonosis, their reservoir hosts either animal or human, or the life cycle of disease causing agents.

Developing countries including Ethiopia have a higher incidence and prevalence of zoonoses, and this is attributed to the lack of adequate control mechanism, inadequate infrastructure and lack of adequate information on their significance and distribution. In Ethiopia, 80% of households have direct relations with domestic animals, which favor an opportunity for infection and spread of disease and also rank very high in the health burden of zoonotic diseases due to having a large population of poor livestock keepers. Increased human-animal contact or interaction resulting from changes in human and animal behavior, pathogen adaptability, change in farm practices, livestock production systems and food safety are among the triggering factors for emergence of zoonotic diseases [3].

Knowledge, Attitude, and Practice (KAP) research is widely used in public health and conservation scholarship to collect information about public understanding of a phenomenon (knowledge), evaluative responses to a situation (attitudes), and observed actions or behaviors (practices) among a target population. Zoonotic disease is a great public health concern and a direct human health hazard that may even lead to death and have caused an estimated 2.4 billion cases of illness and 2.7 million deaths in humans per year in addition to their negative effect on human health and most of it affect animal health and decrease livestock production.

These impacts of zoonotic disease are also common in Ethiopia as general and in the study area in particular. The prevention and control of zoonotic diseases include an understanding of the factors affecting the probability that zoonoses will emerge, and the likely pattern of their spread reducing

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risky human-animal interactions, improving the welfare of domestic and wild animals, and refining global surveillance systems for people and animals. Currently, there is inadequate data on the knowledge, attitude and practice of Wolaita sodo community towards zoonotic diseases. So, to overcome the problem and know the knowledge, attitude and hygienic practice of zoonotic disease in the area, the current study needed to conduct and to address the problems regarding zoonotic diseases. Therefore, the objectives of this study were: to assess the knowledge and attitude of community regarding with zoonotic disease in dairy farm in and around sodo town and to evaluate the community practice related with zoonotic disease in dairy farm in and around sodo town.

Materials and Methods

Study area

The present survey carried out from March, 2022 to August, 2022 in and around Sodo town in the Wolaita Zone (Figures 1 and 2). The study site is located 390 km south of Addis Ababa and is found at 6°54′N latitude and 37°45′E longitude with an elevation between 1650 and 2980 meters above sea level. The district is bounded by the Damot Gale district to the north, Humbo district to the south, Damote Woyde district to the east and Damote Sore district to the west; the annual rainfall and temperature of the area are 1000-1200 mm and 26-35 °C, respectively. The site is classified under a mid altitude ("Woyina dega" in the local Amharic language) agroecological environment. The dry season lasts from September to February, and the rainy season remains from March to August. The livestock population of the region was estimated to be 1,097,710 cattle, 150,383 sheep, 185,250 goats, 60,055 equines, and 734,924 poultry.

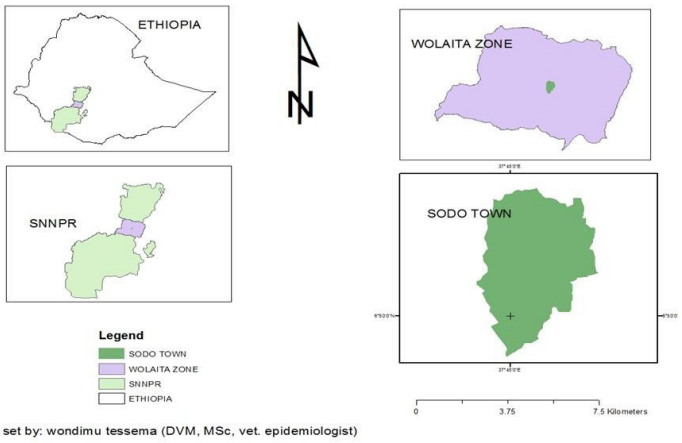

Figure 1. Map of study area.

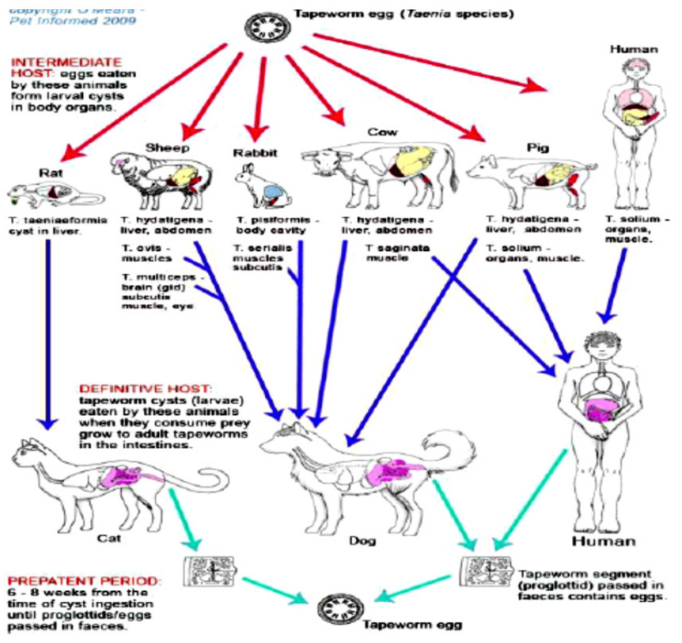

Figure 2. The life cycle of *Taenia* tapeworm.

Study population, design and sampling technique

The study population was the farmers belonging to woliata sodo town. The target population comprised of dairy farm owners residing in and around sodo town. Cross-sectional questionnaire-based study design and random sampling technique were employed to select households for this study. A list of households owning dairy farms was obtained from Sodo town agricultural office, livestock and fishery sector. A random sampling technique were used to select the households for the purpose of this study and a random survey of 123 urban and per-urban dairy farmers who are actively involved in dairy production were conducted.

Sample size determination

The sample size for collecting the questionnaire data were determined by using formula as indicated by Bonnet and Arifin [4]. The required sample size was calculated using an expected Cronbach's α of 0.7 with a significance level = 0.05; confidence interval of 95%; 17 response items (for knowledge sub-scale); and an expected dropout rate (incomplete information rate) of 20%. A total of 123 dairy farmers were used during the survey.

Data collection method

Dairy farmers were visited and the questionnaires are administered to randomly selected sample of the population in the study area. A close-ended questionnaire were developed and pre-tested to assess knowledge, attitudes and practice towards zoonotic disease, a questionnaire was developed to measure participants' knowledge about zoonotic disease, attitudes related to zoonotic disease risk, and practices used to prevent zoonotic diseases risks from livestock products and birth products. The demographic and farm characteristics questionnaire included information on gender, age, education, primary livelihood activity, respondent's role, residential area, farm size, farm type and others.

Data analysis

All the collected data are coded and entered into micro soft excel. The questionnaires were checked for completeness before entering the data in to SPSS Statistics for Windows Version 20.0 statistical software (released 2011). Descriptive statistics such as frequencies, distribution and percentages are used to summarize the data. The association of demographic characteristics of the respondents and knowledge, attitude and practice were analyzed using general linear models. A knowledge, attitude and practice were prepared adding up farmer's regarding specific questions and sub-questions. A score 1.0 was awarded if the participant could choose the correct, agree and successful answers and no score granted for an incorrect, disagree and failure replies. The internal consistency of the subscales was assessed by Cronbach's α coefficient, where a Cronbach's $\alpha \geq 0.7$ was considered as acceptable. A value of Cronbach's $\alpha > 0.8$ was an indicator of good reliability and Cronbach's α between 0.7 and 0.8 indicated adequate reliability. Subscales with Cronbach's α value below 0.5 indicated unacceptable internal consistencies. Pearson's correlation coefficient was used to measure the relationship between subscales. Coefficient values between 0.8 and 1.0 indicated a very strong relationship, 0.6 to 0.8 indicated a strong relationship, 0.4 to 0.6 a moderate relationship, 0.2 to 0.4 weak relationships and a value between 0 and 0.2 indicated very weak to no relationship.

Results

Socio-demographic characteristics

A total of 123 dairy farmers were interviewed; study participants were in different characteristics. More than half of the participants were farm owners

(65.85%) and women (58.54%). Detail information on the characteristics of respondents is stated in Table 1.

Knowledge on zoonotic diseases

Out of the 123 respondents, 114(92.68%) know about zoonotic disease and 29.27% of the participants do have training about zoonotic disease. The detailed information used in the building of knowledge score is mentioned in Table 2.

Attitude and practices on zoonotic disease

Among the respondents, 73.13% of the respondents understood that assisting animals during delivery and collecting aborted fetuses and placenta with bare hand exposes to disease risks; however, only 17.07% of them wear protective hand gloves in assisting animal delivery. Detail information and questions involved in the construction of attitude and practice scores are showed in Table 3.

Internal consistency

Cronbach's α was calculated for subscale. The knowledge and attitude subscales had good internal consistency reliability with Cronbach's α of 0.711 and 0.756, respectively. The practice subscale had a Cronbach's α of 0.255 and thus lowers than the minimum acceptable value of 0.7, indicating that this subscale showed inadequate internal consistency reliability. The overall Cronbach (knowledge, attitude, practice sections) was estimated at 0.831.

Uni-variable analysis

Sex, primary livelihood activity and educational status are associated with the zoonotic knowledge score ($p<0.05$). The detailed results of univariable analyses are displayed in Table 4.

Multivariable analysis

The education level ($p<0.05$), which was positively associated with the zoonotic disease knowledge score, attitude and practice scores and age of farmer ($p<0.05$), which was negatively associated, were the significant parameters. The detailed results of multivariable analysis are presented in Table 5.

Correlation between knowledge, attitude and practice

Through correlation analysis, the Pearson's correlation coefficient (r) indicated that there was a moderate positive association between responding correctly in the knowledge section and having the desired attitude ($r2 = 0.644$, $p = 0.000$). There was a positive but weak relationship between correctly responding in the knowledge section and self-reported good practice ($r2=0.207$, $p=0.021$). Good practices were also positively associated with the desired attitude ($r2 = 0.329$, $p=0.000$).

Discussion

General KAP of study participants toward zoonotic disease

Dairy livestock keepers play an important role in the economy of any country, especially developing country like Ethiopia. The economical contribution is not only by generating income to the owners but also by

Table 1. General characteristics of study participants in KAP study relating to zoonotic diseases.

Demographic Characteristics				Farm Characteristics			
Variable	**Category**	**Number**	**(%)**	**Variable**	**Category**	**Number**	**(%)**
Sex	Female	72	58.54	Farm size	Medium	48	39.02
	Male	51	41.46		Small	75	60.98
Age	Between 18 and 35	30	24.39	Farm type	Intensive	78	63.41
	Between 36 and 50	54	43.9	Floor type	Semi-intensive	45	36.59
	Greater than 50	39	31.71		Concrete	84	58.54
Primary livelihood activity	Farming	69	56.1	Drainage	Muddy soil	39	41.46
	Other	54	43.9		Have	108	24.39
					Don't have	15	43.9
Educational	College	30	24.39	Barn cleaning	Once per day	19	31.71
	High school	48	39.02		Twice per day	78	56.1
	Elementary school	21	17.07		Trice per day	21	9.76
	Illiterate	24	19.51		Above a day	12	34.15
Respondent	Farm worker	42	34.15	Calf house	Common	54	19.51
	Farm owner	81	65.85		Separate	69	17.07
Residence	Peri-urban	36	29.27	Major Breed	Crossbred	72	58.54
	Urban	87	70.73		Local	51	41.46

Table 2. Frequency for knowledge score answers relating to zoonotic diseases.

Item No_	Knowledge Subscale Contents	Correct Response	
		No	%
K1	Do you know about zoonotic disease	114	92.68
K2	Training about zoonotic disease	36	29.27
K3	Eating uncooked meat can transmit diseases from animals	111	90.24
K4	Drinking of raw milk can transmit diseases from animals	105	85.37
K5	Get infection from environment contaminated from secretions of sick animal	81	65.85
K6	Disposing aborted fetuses into the environment can spread the diseases	90	73.17
K7	Contact during animal abortion can cause a public health problem	63	51.22
K8	Collecting aborted fetuses and placenta with bare hand	99	80.49
K9	Assisting animals during parturition with bare hand	102	82.93
K10	Family or farm member sick with disease of animal origin	12	9.76
K11	Transmission of diseases through milk or meat	108	87.8
K12	Mention three diseases that transmitted from animals to humans	54	51.43

Table 3. Frequency table for attitude and practices relating to zoonotic diseases.

Item No	Attitude Subscale Contents	Agree Responses		Item No	Practice Subscale Content	Success Response	
		No	%			No	%
A1	Assisting animals during delivery with bare hand exposes you to disease risks	90	73.17	P1	Drinking of milk after boiling (pasteurization)	75	61
A2	Collecting aborted fetuses & placenta with bare hand exposes you to disease risks	90	73.17	P2	Eating of meat after Cooking	66	53.66
A3	Animal health care providers can handle zoonotic disease outbreaks very well	87	70.73	P3	Separating house of animals	78	63.42
A4	Animal diseases are dangerous for people	93	75.61	P4	Assist animal delivery with protected hands	21	17.07
A5	Zoonotic diseases can be treated	96	78.05	P5	Washing hands with soap after assisting delivery	120	97.56
A6	Zoonotic diseases can be prevented	100	81.3	P6	Avoid any contact with aborted material	78	63.42
A7	Zoonotic diseases can be controlled	99	80.49	-	-	-	-
A8	Meat and milk borne diseases are fatal	93	75.61	-	-	-	-
A9	Risk of disease from drinking raw milk and eating raw meat	91	73.98	-	-	-	-
A10	Only sick cattle could be source of milk and meat borne disease	70	56.9	-	-	-	-

Table 4. Uni-variable linear regression analysis, demonstrating the influence of explanatory variables on the outcome variables.

Variable	Category	No_	Knowledge Correct Response			Attitude Agree Response			Practice Successes Response		
			Mean	Cofe.	p-value	Mean	Cofe.	p-value	Mean	Cofe.	p-value
Gender	Overall	123	65.3	-	-	73.9	-	-	59.3	-	-
	Female	72	69.7	51.2	0	84.7	14.6	0.03	61.9	5.13	0.16
	Male	51	67.6	-	-	70	-	-	67	-	-
Age	18-35	30	71.2	5.71	0.26	80.2	4.99	0.47	62.8	12.8	0.01
	36-50	54	57.8	-	-	67.1	-	0.01	55	-	0
	> 50	39	76.9	19.1	0	85.4	18.1	-	75.6	20.5	-
PLA	Farming	69	70.9	19.1	0	82	9.33	0.07	62.1	4.69	0.24
	Others	54	66.4	-	-	72.7	-	-	66.8	-	-
Educational status	Illiterate	24	52.2	28.5	0	58.1	21.3	0	53.8	15.6	0.03
	Elementary	21	80.8	13.7	0.01	79.5	22.4	0.02	69.5	13.9	0.05
	High school	48	66	23.3	0	80.5	33.2	0.04	67.5	13.2	0.04
	College and above	30	75.6	-	-	91.4	-	-	67.2	-	-
Respondent status	Worker	42	65.6	6.07	0.09	79.5	3.42	0.48	70.8	12.5	0.01
	Owner	81	71.7	-	-	75.6	-	-	58.2	-	-
Resident	Per urban	36	72.3	7.37	0.06	81.7	8.64	0.11	58.3	12.2	0
	Urban	87	65	-	-	73	-	-	70.6	-	-
Farm size	Medium	48	72.3	7.23	0.06	84.3	15	0	70.7	12.5	0
	Small	75	65	-	-	70.9	-	-	58.2	-	-
Farm type	Intensive	78	70.4	3.44	0.36	80.4	6.08	0.24	56.7	15.5	0
	Semi-intensive	45	66.9	-	-	74.3	-	-	72.2	-	-

Table 5. Multivariable linear regression analysis demonstrating the influence of explanatory variable over the outcome variables.

Variables		Adjusted R^2	p-Value
Knowledge score	Age	0.4	0
	Education	28	0
Attitude score	Sex	0.3	0.003
	Age	16	0.001
	Education	-	0
	Farm size	-	0.005
Practice score	Age	0.4	0
	Education	12	0.012
	Respondent role	-	0.001
	Resident	-	0
	Farm type	-	0
	Farm size	-	0.002

providing employment to rural and peri-urban community. In this study, the first attempt in sodo was assessing the knowledge, attitude, and practices of dairy farm practitioners towards zoonotic diseases. More than half of the participants have sufficient knowledge (65.34%), positive attitude (73.90%) and positive practice (59.36%) towards the transmission, control and prevention of zoonotic diseases. This result indicates that, despite of an overall good knowledge, attitude and practice score about zoonotic diseases, there are some serious knowledge and awareness shortcomings.

Almost all (92.68%) of the respondents knew about zoonotic disease so they can be considered as highly knowledgeable about zoonosis. Majority of the respondents know the transmission of disease from animals to humans by drinking raw milk, eating uncooked meat, assisting animals during parturition and collecting aborted fetuses or placenta with bare hand. The percentage of participants who knew drinking of raw milk is a source of infection was 85.37%. This figure is higher than 41.5% and lower than 99.6% but it is comparable 87.5% [5-7]. In the present study, 90.24% of them knew that eating uncooked meat is source of infection. In this regard, respondents seem to have a good deal of knowledge concerning the source of disease when eating raw meat. Raw meat consumption has been applied for generations in many social groups located in Russia, Cuba and Africa.

Participants who knew that assisting animals during parturition and collecting aborted fetuses or placenta with bare hand as source of infection were 82.93% and 80.49%, respectively. It is much higher than that of Seyoum, where 15.6% mentioned assisting with cow birth could be source of infection. Majority of participants believed that zoonotic diseases can be controlled (80.49%) and prevented (81.30%) and treated (78.05%) which is much higher than that of Khadayata and Aggarwal, where 33% had knowledge where zoonotic disease can be prevented by maintaining proper hygiene. The indicated prevention methods are using cooked meat, boiling milk, vaccination, separating animals' house. The participants that agree risk of acquiring disease through consumption of raw meat and milk were 73.98%.

This result is much higher than that of Seoum, where 21.3% of respondents said raw milk is not more healthy and nutritious than pasteurized or boiled. Acceptable level of attitude was obtained regarding the possibility of contracting zoonotic diseases from only sick animals (56.90%). That means 42.10% believed that disease can be acquired from apparently healthy animals much higher than that of Seyoum, who reported 18.7%. Consumption of meat (90.24%) is the prime way for zoonosis and milk (85.37%). Babu has been reported that 22.46% and 14.10% respondents were conscious on consumption of meat and milk, respectively causes zoonotic infection. Whereas most livestock keepers are aware of the risk involved through the consumption of animal products, such as milk and meat, as well as direct transmission, for example by aerosols or direct contact. This good level of awareness is help them likely to prevent them from an increased risk of contracting zoonoses, as they are likely to take proper precautions or use protective clothing when dealing with abortions or calves with diarrhea and during on-farm activities like milking, cleaning the cowshed or slaughtering cattle. Although livestock keepers might be aware of the risk of consuming raw milk or meat the habit of consuming raw milk, raw blood or raw or undercooked meat is, however, still common practice, especially among rural communities [8].

Despite majority of the participants have sufficient knowledge (65.34%) and positive attitude (73.90%) and positive practice (59.34%) in relation to transmission, control and prevention of zoonotic diseases. However, 41.64% of them could not reflect their knowledge attitude towards real practices. The current study is higher than 32% positive practice done by Cakmur. The most important findings are identification of several high-risk practices absence of protective equipment while assisting an animal's parturition and handling birth, eating raw meat, drinking raw milk and leaving in common with animals material, being universal among the participants. Respondents were highly knowledgeable and approach concerning the potential health risk of animal zoonosis. Unfortunately such level of knowledge attitude was not reflected in the real practice where 41.36% do negative practice such drinking raw milk, eating raw meat, assisting animal parturition and collecting aborted materials with bare hand. In this study, nearly 61% of dairy farmers mentioned that they consumed milk after boiling; however, 39% of them drink raw milk which is consistent Seyoum, who reported 47% practice drinking of raw milk. Similarly 39% of the respondents have the habit of eating raw meat which is much higher than 12% of cattle farmers consume raw meat.

Production of animal products, contamination during this production, wrong feeding habits and lack of knowledge can be effective in the transmission of zoonotic diseases [9]. Raw meat consumption creates dangerous situations in terms of public health due to parasite diseases originated from food as well as bacterial diseases.

One of the most important findings is the identification of several high-risk practices, with negligence of protective equipment while assisting an animal's parturition and handling aborted material, being universal among the participants. Only 17% all of the participants use protected glove while assisting cow birth. Similar to this study, worker in Jordan also reported that only 6% of cattle owners wear protective cloths and gloves while dealing with cow birth. This low level of awareness may lead to risk-practice which most likely exposes them to an increased risk of contracting zoonotic disease such as brucellosis, as they are unlikely to take proper precautions or use protective clothing when dealing with animal birth and abortions. There were differences between the positive knowledge level, attitude and practices of cattle farmers regarding zoonotic diseases and their sex, age, educational level, respondent's role, resident farm type and farm size. Similar reports were done by different researchers across the world. The age and education level has been associated with better zoonotic disease knowledge and practices.

There was a significant difference between and education levels towards and knowledge, attitude, and practices of zoonotic diseases ($P<0.05$). It was confirmed that especially the ones who had high school and college education had a knowledge level distinctly higher and their attitude and practices, except for those who were not illiterate, were closely related to each other. In the same manner, studies conducted in Tajikistan, Senegal, Nepal, and India reported that livestock farmers with low education level had a low level of knowledge, attitude, and practices toward protection from zoonotic diseases [10-12]. In addition to this, the increase in age correlates with good knowledge about zoonosis. These findings can be attributed to the improvement of education system across the years, the acquaintance of the new generation with technological developments and the introduction of training courses for the education of new farmers in this field.

Conclusion and Recommendations

This study gives an understanding on the variability of knowledge, attitudes, and practices related to zoonotic disease risk among dairy farm communities in Sodo. Generally, an overall good score were observed in knowledge, attitude and practice sub scores. However, the observed low level of attitude obtained regarding the possibility of contracting zoonotic diseases from apparently healthy animals; low level of practices in drinking boiled milk and eating cocked meat need urgent intervention. The finding of this study suggested that establishing a desired attitude on impact of those diseases on public health and their mitigation strategies among the community is vital to reduce the transmission of zoonotic agents from animals to humans. Therefore awareness should be created about the importance of zoonosis with respect to KAP among livestock keepers by Information Education Communication, Community awareness should be included to educate how harmful consumption of raw or unpasteurized milk and uncooked meat and bare hand assistance during parturition and handling of aborted materials, Age and education of the farmer must be in the core of any program oriented towards the improvement of the zoonotic disease KAPs, Role of the farmer and location of the farm determine awareness, disease identification skills, and preventive behavioural practices, thus it need attention during community health education program development and Awareness should be done to address the above practice gaps to reduce the risk of zoonotic infection to livestock producers and livestock products consumer.

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Conflict of Interest

None.

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