



Contagious Bovine Pleuropneumonia: Farmers Knowledge, Attitude and Practice towards The Disease in Selected Districts of Western Ethiopia

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Abstract

Contagious Bovine Pleuropneumonia (CBPP) is a highly contagious disease of cattle caused by *Mycoplasma mycoides* subsp. *mycoides* small colony (*Mmm* SC). A cross-sectional study design was conducted in selected district of East Wollega and West Showa zones of western Ethiopia to assess the Knowledge, Attitude and Practice (KAP) of farmers towards CBPP disease. Therefore, a total of 113 households were purposively selected and interviewed with structured questionnaire. Thus, the summary of KAP questionnaire result indicated there was knowledge and attitude gap among the study farmers related to CBPP disease occurrence in general. Besides, majority of farmers were practicing poor animal husbandry that created favorable conditions for the distribution of the disease in the community. Therefore, cattle herders should be made aware of about the general characteristics of disease and its controlling option through veterinary extension and farmers training. Additionally, to deal with CBPP disease further an assessment with large coverage and as a country designing and applying of controlling options is an essential.

Received: May 22, 2022

Accepted: Jan 16, 2023

Published Online: Jan 19, 2023

Journal: Journal of Veterinary Medicine and Animal Sciences

Publisher: MedDocs Publishers LLC

Online edition: <http://meddocsonline.org/>

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Keywords: CBPP; KAP; Farmers; Veterinary extension; Western Ethiopia.

Introduction

Regardless of the large number of cattle we have and very important source of economy in the country, the sector is characterized by low productivity. Income derived from this sector couldn't bear significant role in the development of the country's economy due to many constraints mostly diseases. Cattle disease problems were extremely exacerbated by drought, concentration of livestock at watering points and dry grazing grounds combined with reduced resistance, intensifies the spread of contagious and parasitic diseases which often cause higher losses than the forage or water shortages [1]. Ethiopia was ranked highest among Sub-Saharan countries in livestock

disease burden [2], such as in 2014/2015 fiscal year deaths estimated for Ethiopia due to various diseases were 3.23 million cattle, 4.37 million sheep and 4.90 million goats [3]. There are numerous diseases of cattle that affect productivity and fertility of the sector in the country, however, in this study only put emphasis on Contagious Bovine Pleuropneumonia (CBPP).

Contagious Bovine Pleuropneumonia (CBPP) is an acute, sub-acute or chronic disease of cattle characterized by anorexia, fever and respiratory signs such as dyspnoea, polypnoea, cough, nasal discharges, fibrinous pneumonia, serofibrinous pleuritis, and oedema of the interlobular septa of the lungs [4]. It is one of the great plagues that continue to devastate the cattle herds



Cite this article: Cherinnat TM, Dibaba MD. Contagious Bovine Pleuropneumonia: Farmers Knowledge, Attitude and Practice towards the Disease in Selected Districts of Western Ethiopia. *Vet Med Animal Sci.* 2022; 6(1): 1122.

on which so many people are dependent and considered as the most serious infectious animal disease affecting African cattle [5,6]. Although the disease has great potential for rapid spread and causes major impact on cattle production, still nationwide epidemiological surveillance and control activities are often inadequate or unavailable in most African countries including Ethiopia [7].

Knowing the extent of diseases distribution like CBPP is valuable since used as an input for development of optimum prevention and controlling strategies and that will ultimately assist in poverty alleviation by improving the productivity of the sector. Therefore, to carry out an effective control of the disease, prerequisites such as understanding of the epidemiological scenario of the disease and farmer's knowledge, attitude and practices towards the disease should be well-known. However, the previous studies were stressed mainly only on seroprevalence and causative agent identification, where as there is no reported document on farmers' knowledge, attitude and practices towards the disease to date in the country in general and Western Oromia in particular. Hence, identifying the awareness of the society towards the disease is vital. Therefore, based on these key statements, the study was conducted with the objective of assessing the knowledge, attitude and practice of farmers towards CBPP disease.

Materials and methods

Description of the study area

The study was carried out in selected districts, Sibu-Sire and Ilu-Galan which were selected from two zones, East Wollega and West Showa zone, respectively, of Oromia regional state, Western Ethiopia.

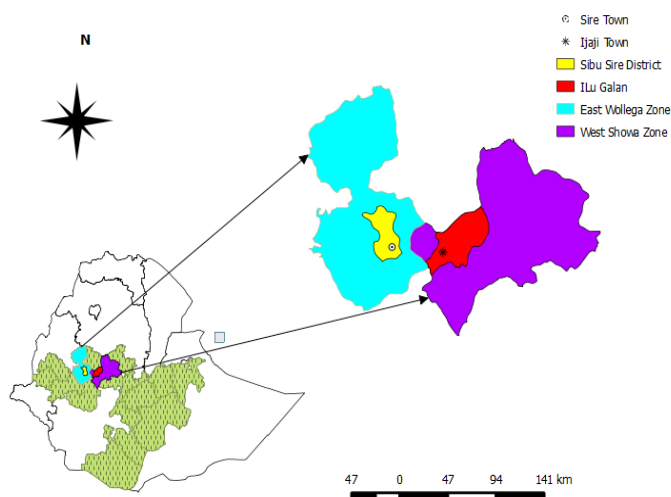


Figure 1: Map of the Study Area.

Study design and methods

The purpose of the study was fully explained to the selected cattle owners before conducting the survey to have owners' agreement and questionnaire interviews were conducted during a face-to-face interview with the study participants. On each study household, questionnaire interviews of cattle owners (households) have been conducted and the knowledge, attitude and practice (KAP) of cattle owners had towards respiratory disease in general and CBPP disease in particular was assessed and 113 sample sizes of respondents were involved in the questionnaire. The cross-sectional study design was conducted in two districts and equal sample size was considered

for both districts. To select the study districts non-probability sampling (purposive sampling) technique was used. In the first stage the two districts Sibu Sire from East Wollega zone and Ilu Galan from West Showa zone were selected purposively based on nearby to Bako Agricultural Research Center, easily accessible and densely populated area of cattle. In the second stage, after made of a brief discussion with the selected districts' of livestock and fishery resource development office and health agencies, Kebele which mean the smallest administrative unit of the districts were randomly selected from the two districts. So that Sibu Sire district has 22 kebeles whereas Ilu Galan has 17 kebeles, and from each district two kebeles were randomly selected. Thus, from Sibu Sire (Lalisa and Cheri Jarso) and from Ilu Galan (Ale Wara Ilu and Wadeyi Granche) were sampled, accordingly. To select households, since the total numbers of households that having cattle mean sampling frame in each kebele were not well known, therefore, purposive sampling technique was used.

Data collection

A questionnaire survey was made to evaluate farmers' knowledge, attitude and practice (KAP) towards overview of cattle respiratory health problems of cattle in general and with particular emphasize to CBPP disease. Therefore, a detailed structured questionnaire was prepared in English before being reverse translated in to Afaan Oromo, piloted and pre-tested. Information that contained in the body of developed questionnaire were: general household characteristics (gender, age, educational background, marital status, and house hold family size); cattle herd size and structure (herd size, sex, and age); to ascertain farmers knowledge, attitude and practices general overview of cattle's respiratory disorders such as presence or absence of respiratory disorders within the herds, farmers assumption related to the factors that causes the disorders, any infectious diseases known by farmers, major signs of CBPP disease that recognized by farmers (chest pain, standing with elbow abducted, standing with back arched, head extended coughing, labored and painful breathing, frothy saliva at mouth, dilation of nostril and mucoid discharge, swelled throat and dewlap and polyarthritis particularly on young), any respiratory infectious diseases that are known by farmers, possible transmissions methods of CBPP or any contagious diseases, economic importance and farmers' routine cattle management practices that are associated with prevention and controlling methods of contagious infectious diseases like CBPP were the major issues that included in the questionnaire.

Data management and analysis

The questionnaire was entered into SPSS ver. 26 statistical software and finally analyzed using descriptive statistical tests (frequencies, proportions, means and ranges).

Results

Knowledge Attitude and Practice (KAP) Questionnaire Result

Demographic characteristics, Herd size and structure of the respondents

A total of 113 households that had at least one cattle were involved in this study. The majority of the respondents were male (87.6%) and the rest female (12.4%). Similarly, the majority of respondents (86.7%) were married. The ages of respondents were ranges 15 to 80 with mean of 39.37 ± 13 years old. Regard-

ing education status of the participants (35.4%) of them had no formal education while (6.2%) of them college (university) level educated and the mean of household size of participants was 5.4±2.34. Total number of cattle per household was ranging from 2-25 with mean of 8.13±4.47. Out of a total 919 animals that 113 households had more than half of them were female cattle (53.2%) with mean of 4.3±2.51 per respondents and (46.79%) were male with mean of 3.8±2.47. Similarly, (26.66%) cattle population were young (1-3 years), (58.68%) adults (>3 years), and (14.04%) calves (less than one year) (Table 1).

Table 1: Socio-demographic characteristics, Herd size and structure of the respondents.

Parameters	Mean±SD (Range)	Frequency	Proportion (%)
Gender of respondents			
Male	-	99	87.6
Female	-	14	12.4
Marital status			
Single	-	11	9.7
Married	-	98	86.7
Divorced	-	4	3.6
Educational Background			
Primary	-	5	45.1
Secondary	-	15	13.3
College or university	-	7	6.2
No formal education	-	40	35.4
Age of respondents	39.37±13.8 (15-80)	-	-
Household family size	5.38±2.34 (2-10)	-	-
Herd structure per household			
Sex			
Male	0-14	3.8±2.47	430 (46.79)
Female	0-13	4.3±2.51	489 (53.2)
Age			
Young (1-3 years)	0-11	2.2±1.93	245 (26.66)
Adults (>3 years)	1-13	4.8±2.65	539 (58.68)
Calves (< 1 year)	0-4	1.14±1.13	129 (14.04)
Over all	2-25	8.13±4.47	919

Farmers’ knowledge and attitude related to CBPP disease in general

Of the total, (31.9%) of the respondents were knowledgeable with the cause of disorder while the majority of respondents had no any knowledge regarding to the factors that causes of respiratory disorders. (77.9%) of respondents were encountered respiratory problems of cattle, but (26.5%) of them recognized that the causes was due to infectious diseases while the majority of them had no reasons about the source of the problems and only (7%) of respondents had heard or knew CBPP and (93%) of the respondent hadn’t (Table 2).

In this study the infectious diseases in general as well as respiratory diseases of cattle that known locally by farmers were assessed and the local names of the diseases were translated in to scientific or English name with the help of the nearby animal health worker of that area, accordingly. As the result showed the predominant cattle diseases known by the respondents were trypanosomiasis (79.6%), blackleg (43.4%), pasteurellosis (36.3%), anthrax (33.6%) and LSD (24.8%) whereas samba-beshita/dangila/ somba (25.7%) was the most known endemic respiratory disease of the area, however its scientific name couldn’t identified yet (Table 3).

Table 2: Overview of farmer’s knowledge related to respiratory disorder of cattle and CBPP.

Issue raised related to general overview of the respiratory disorder (RD) of cattle	Response category (N=113)		
	Yes (%)	No (%)	Don’t know (%)
Have you encountered respiratory problems of cattle?	88 (77.9)	25 (22.1)	0
Has your neighbor had any problems with cattle RD?	73 (64.6)	18(15.9)	22 (19.5)
Do you know factor that cause respiratory disorder?	30 (26.5)	24 (21.2)	59 (52.2)
Do you think infectious disease can cause the RD?	36 (31.9)	10 (8.8)	67 (59.3)
Have your several animal experienced respiratory problems simultaneously?	44 (38.9)	69 (61.1)	0
Have you heard about CBPP disease?	8 (7.1)	103 (91.2)	2 (1.8)

Table 3: Name of cattle diseases that commonly known by respondents in the study area.

Issue raised to the respondent	Local name of disease that known by farmer	Scientific Name of the disease	Freq. (%)
Can you name any infectious diseases that found in your area or farm?	Hudha/Gororsisa	Pasturellosis	41 (36.3)
	Bishoftu/Cacabsa/Aba-gurba	Blackleg	49 (43.4)
	Desta	Rinderpest	6 (5.3)
	Labobesa/Dukuba Alati	Milk fever	7 (6.2)
	Aba-sanga/cita/Dingetegna	Anthrax	38 (33.6)
	Gandi/Koksa	Trypanosomiasis	90 (79.6)
	Masa(Maasaa)	FMD	11 (9.7)
	Gara bokoksa	Bloat	17 (15)
	Goga lukisa/Citesa	LSD	28 (24.8)
	Samba beshita/Dangila/ somba	Could be CBPP or TB	29 (25.7)
Sombaa/Danglaa/samba beshita	Could be CBPP or TB	13 (11.5)	

Can you name any respiratory infectious disease you know?	koksa/Gandii	Trypanomosis	25 (22.2)
	Don't know	Don't know	75 (66.4)

Table 4: Farmers knowledge assessment related to major symptoms of CBPP disease.

Issue raised related to the major CBPP symptoms	Response category (N=113)		
	Yes (%)	No (%)	Don't know (%)
Have you know or encountered any of the following the major signs of CBPP disease?			
Chest pain	22 (19.5)	56 (49.6)	35 (31)
Stand with the elbows abducted	44 (38.9)	44 (38.9)	25 (22.1)
Standing with back arched	50 (44.2)	37 (32.7)	26 (23.1)
Head extended coughing	85 (75.2)	21 (18.6)	7 (6.2)
Laboured & painful breathing	62 (54.9)	30 (26.5)	21 (18.6)
Grunting when exhaling (coughing)	90 (79.6)	22 (19.5)	1 (0.9)
Frothy saliva at the mouth	64 (56.6)	41 (36.3)	8 (7.1)
Dilation of nostril & mucoid discharge	81 (71.7)	20 (17.7)	12 (10.6)
Swelled throat and dewlap	68 (60.2)	35 (31)	10 (8.8)
Polyarthritis particularly on young	26 (23)	55 (48.7)	32 (28.3)

The proportion of each major signs of CBPP disease that known by respondents were: grunting during coughing or exhaling (79.6%), head extended coughing (75.2%), dilation of nostril and mucoid discharge (71.7%), swelled throat and dewlap (60.2%), standing with back arched (44.2%), laboured & painful breathing (54.9%), standing with the elbows abducted (38.9%), chest pain (19.5%), frothy saliva at the mouth (56.6%), and polyarthritis on young (23%). Generally in this study majority of the respondents were encountered or familiar with signs of CBPP disease (**Table 4**).

Regarding knowledge of disease transmission, majority of the respondents hadn't aware of the possible transmission methods of contagious diseases like CBPP. However, 77% and 67.3% of the respondents recognized as diseases transmitted through close contact with diseased animals and through coughing of infected animals, respectively. Regarding to the contaminated diseased cattle fetal membrane and uterine discharge, only (8.8%) of the participants knowledgeable as it was associated with disease transmissions method. The table below is clearly summarized the knowledge of respondents had regarding the possible transmission methods of contagious diseases like CBPP (**Table 5**).

In the current study, majority of the respondents aware of the economic importance disease like CBPP for example (85.8%), (78.8%), (74.3%), and (57.5%), (61%) of respondents aware of as disease able to cause loss of body weight, loss of production, reduce working ability of cattle, mortality of cattle, and reduced growth rate, respectively. Regarding CBPP prevention and controlling methods, majority of the participants had basic knowledge on treatment of symptomized or diseased animal (93.8%) and vaccination (78.8%). Moreover, (32%) of the participants are aware of good management like decontamination of infected premises is used for disease prevention and controlling techniques. However, very few of participants were recognized test and slaughter/stamping out policy (16.8%) and isolation of new purchased animal from herd (19.5%) are used

as disease prevention and controlling methods (**Table 6**).

Cost of treatment of diseased animal (34.5%), death of animal due to the disease (29.2%), and loss of production (25.7%) are the foremost worries that respondents had felt related to respiratory disease of CBPP. Farmers preference ways of receiving knowledge related to animal diseases, the majority of the respondents (65.5%) preferred to receive knowledge through veterinarian/animal health workers followed by agricultural developmental agent (DA) (22.1%) whereas very few of respondents preferred to get through local cultural healers (2.7%). (60.2%) of the respondents preferred to know prevention and controlling methods followed by (22.1%) transmission methods while few farmers (4.4%) chosen diagnostic techniques (**Table 7**).

Farmers' practices towards disease prevention and controlling techniques

In the present study result, there were very few farmers practiced good animal husbandry such as (3.5%) of respondents were practicing of communal grazing/watering, (15%) of respondents hadn't used common breeding bulls with the surrounding communities, (30.1%) of respondents hadn't purchased cattle from disease infected origin or outbreak area, (18.6%) performing isolation of new purchased animal from the herd and (8%) respondents were carry out restriction of freely cattle movement across the surrounding communities. Similarly, only 69% of the respondents were following up vaccination of cattle. Moreover, of the total respondents (45%) were familiar to selling of diseased animal to neighbors or local market/butchers, (52%) practicing treating of diseased animal with cultural medications and only (36.3%) of the farmers experienced separating or isolation of diseased animal from healthy herds whereas none of the respondent exercising stamping out policy of severely diseased animals. However, (99%) of respondents were carry out treating of diseased animals in nearby of veterinary clinics. Generally majority of the respondents were following up poor animal husbandry practices (**Table 8**).

Table 5: Farmers knowledge regarding to the possible transmission methods of disease.

Issue raised regarding to knowledge of disease transmissions methods	Response category (N=113)		
	Yes (%)	No (%)	Don't know (%)
What are the possible transmission methods of CBPP disease or any contagious diseases among cattle of the following?			
Through contaminated feed or water	29 (25.7)	28 (24.8)	56 (49.6)
Transmitted through sexual contact	12 (10.6)	44 (38.9)	57 (50.4)
Close contact with diseased animal	87 (77)	9 (8)	17 (15)
Inhalation of infected droplets	56 (49.6)	18 (15.9)	39 (34.5)
Through contaminated fomites/objects	27 (23.9)	38 (33.6)	48 (42.5)
Can be transmitted through transplacental	30 (26.5)	19 (16.8)	64 (56.6)
Through fetal membrane & uterine discharge	10 (8.8)	30 (26.5)	73 (64.6)
Can be transmitted across long distance in air	19 (16.8)	54 (47.8)	40 (35.4)
Through saliva or urine of diseased animal	31 (27.4)	25 (22.2)	26 (23)
Through coughing of infected animal	76 (67.3)	11 (9.7)	26 (23)

Table 6: Farmers knowledge regarding to the possible transmission methods of disease.

Issue raised related to economic importance and prevention and controlling	Response category (N=113)		
	Yes (%)	No (%)	Don't know (%)
What are the economic importance' of CBPP/any respiratory related diseases in cattle production?			
Can cause mortality of cattle	65 (57.5)	40 (35.4)	8 (7.1)
Can cause loss of body weight	97 (85.8)	9 (8)	7 (6.2)
Reduced working ability of cattle	84 (74.3)	4 (3.5)	25 (22.1)
Reduced fertility of cattle	54 (47.8)	24 (21.2)	35 (31)
Reduced growth rate of cattle	69 (61.1)	11 (9.7)	33 (29.2)
Can cause loss of production	89 (78.8)	10 (8.8)	14 (12.4)
What do you think the effective way of disease prevention & controlling method of the following?			
Vaccination	89 (78.8)	7 (6.2)	17 (15)
Treatment of symptomized animal	106 (93.8)	5 (4.4)	2 (1.8)
Test and slaughter or stamping out policy	19 (16.8)	71 (62.8)	23 (20.4)
Movement control or quarantine	24 (21.2)	57 (50.4)	32 (28.3)
Isolation of new purchased animal from herd	22 (19.5)	78 (69)	13 (11.5)
Decontamination of infected premises	36 (31.9)	44 (38.9)	33 (29.3)

Table 7: Respondents attitudes regarding CBPP disease.

Issue raised related to farmers attitude	Frequency	Percentage (%)
What worries you most felt if your animal diseased with respiratory disease of CBPP?		
Transmission to healthy animal	9	8
Cost of treatment	39	34.5
Death due to disease	33	29.2
Loss of production	29	25.7
No worries	3	2.7
Which ways do you want to receive knowledge about CBPP disease?		
Through district expert	6	5.3
Through PA DA	25	22.1

Veterinarian/animal health workers	74	65.5
Local cultural healers	3	2.7
Media	5	4.4
Which part of CBPP knowledge do you want to know more?		
About the causative agent of the disease	6	5.3
Symptoms of the disease	9	8
Transmission methods of the disease	25	22.1
Diagnostic methods	5	4.4
Prevention and controlling methods	68	60.2

Table 8: Farmers' practices towards animal disease prevention and controlling methods.

Issue raised regarding respondents practices associated with disease prevention and controlling methods	Response category(N=113)	
	Yes (%)	No (%)
What are your practices you are doing during herd management to prevent contagious infectious diseases?		
Avoid using common breeding bulls in the community	17 (15)	96 (85)
Avoiding of communal grazing & watering	4 (3.5)	109 (96.5)
Avoiding of cattle purchase from disease outbreak area	34 (30.1)	79 (69.9)
Routine manure removal or changing of kraal	51 (45.1)	62 (54.9)
Follow up of regular vaccination of herds	78 (69)	35 (31)
Isolating new purchased animal from the herd	21 (18.6)	92 (81.4)
Restriction of freely cattle movement	9 (8)	104 (92)
What are the common practices you exercised when your animal suspected or diseased with respiratory disease?		
Selling to neighbors or local market/butchers	51 (45.1)	61 (54)
Presenting to veterinary clinic of area	112 (99.1)	1 (0.1)
Treating with cultural medications	59 (52.2)	54 (47.8)
Separating/isolation of diseased animal from health	41 (36.3)	72 (63.7)
Slaughtering for self-consumption	16 (14.3)	97 (85.8)
Follow up stamping out policy (culling)	0	113 (100)

Discussion

Generally, KAP study related to CBPP disease was found to be very important during the study of disease epidemiology. However, the researchers did not come across on KAP study related to CBPP disease except one paper which was reported by [8] on control of contagious bovine pleuropneumonia: knowledge, perceptions and practices in Narok district of Kenya. In our country Ethiopia many of the reported research findings related to CBPP were emphasized only on the seroprevalence of the disease except the report of [9] who had done Participatory Disease Searches (PDS) in order to understand local perceptions of animal health situation in general and CBPP disease in particular, using semi-structured interviews, focus group discussions and visualization methods like mapping. In the present study even though the existence of the disease have been confirmed through the application of both serology and PCR techniques, large number of farmers had no awareness about CBPP disease in general. For instance, of the total participants (77.97%) were came across respiratory problems of cattle, on the other hand very few (7.1%) of the respondents have been heard about CBPP disease. However, among the respondents questioned to name any infectious disease they knew, 25.7% of farmers named samba beshita/dangla/ or somba and for further confirmation, the respondents again, questioned to name any respiratory infectious disease they knew, and 11.5% were re-

sponded sombaa/dangla/samba beshita, however, its scientific or English name couldn't identified yet. As the present study indicated the aforementioned disease name was most probability might be CBPP disease, but, in order to know exact local name of the disease further assessment should be made in future. Even though the name of the disease is not well-known by the communities, majority of respondents were encountered CBPP disease and undoubtedly familiarized with symptoms of CBPP. For example, 79.6%, 75.2% and 71.7% of the respondents' well-informed each symptom like grunting when exhaling (coughing), head extended coughing, and dilation of nostril & mucoid discharge, respectively.

As the result of KAP questionnaire indicated, majority of the participants do not aware of the possible transmission methods of contagious diseases like CBPP among cattle. However, transmission of through close contact with diseased animal (77%), and coughing of infected animal (67.3%) are the most well-known means of disease transmission methods in the area. On the contrary, majority of respondents were aware of the impact of any respiratory diseases including CBPP. Regarding disease prevention and controlling options only vaccination (78.8%) and treatment of diseased animal (93.8%) are the most recognized techniques of disease prevention and controlling option in the community. However, many of the controlling options like test and slaughter or stamping out policy of severely diseased cattle

(16.8%), movement control or quarantine (21.2%), decontamination of infected premises (31.9%), and isolation of new purchased animal from herd (19.5%) were not recognized by farmers of the study area. Majority of farmers would not know what to do or would do nothing in the event of disease occurrence which agreed with the report of [8] in Narok district of Kenya. Therefore, such kind of knowledge gap among the society creates an ideal environment for contagious diseases like CBPP to easily distribute and infect large cattle population of the area.

The result of this study showed regarding to farmers practice, majority of farmers were following up poor herd management practice that create favorable environment for disease multiplication and distribution across the surrounding communities of the area. Despite large number of peoples were following up poor management system of cattle production, many of farmers are voluntary or had positive attitude to apply any kind of prevention and controlling techniques of animal disease if the necessary education is afforded to them from the government. Therefore, the present study result gave hope from farmer's point of view to create applicable disease prevention and controlling techniques through awareness creation in the communities. In a study in the UK with buffalo farmers, the authors reported that a change in practices among the farmers was necessary for the implementation of diseases prevention and controlling programs [10]. Therefore, optimum prevention and controlling of contagious animal diseases like CBPP can be easily achieved, through changing of farmers' poor animal husbandry practices.

Conclusions and Recommendations

Even though the existence of the disease has been confirmed in the previous study, as KAP questionnaire result indicates there was knowledge and attitude gap among the community towards animal diseases in general and CBPP disease in particular. Besides, the majority of farmers were practicing poor animal husbandry that created favorable environment for CBPP disease multiplication and distribution across the surrounding communities. Therefore, based on the above conclusion the following recommendations were forwarded: The farmers should be made aware of about CBPP disease particularly the economic importance, transmissions methods, and controlling techniques of the disease through veterinary extension education and possible means like media and the government has to apply controlling and prevention strategy of this economically devastating disease of cattle.

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