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Assessment on the indigenous knowledge of pastoral community on contagious caprine pleuropneumonia in Borana and Guji lowlands, Southern Ethiopia

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Assessment on the indigenous knowledge of pastoral communities in Borana and Guji lowlands on contagious caprine pleuropneumonia was done in 2008 using participatory appraisal techniques and conventional disease investigation methods. The participatory appraisal techniques employed were matrix scoring and seasonal calendar. To triangulate the findings during the participatory appraisal, clinical and laboratory examinations were also employed. The matrix scoring and seasonal calendars were standardized and repeated with 20 informant groups. After clinical examinations, serum samples were collected from 9 goats which were infected with contagious caprine pleuropneumonia as per the perception of the informant groups. Disease matrix scoring depicted a good to perfect agreement among the informant groups (W=0.546 to 1.00, p<0.001), indicating that contagious caprine pleuropneumonia affects only goats and possesses high morbidity, coughing and high mortality. Moreover, it showed that there was a good to perfect agreement among the informant groups (W=0.880 to 1.00, p<0.001) depicting no circular movement, diarrhea, and skin damage. Similarly, it was indicated that there was a good agreement among the informant groups (W=0.910, p<0.001) that the occurrence of contagious caprine pleuropneumonia was high during cool dry season locally known as "Adoolessaa" and long dry season locally known as "Bona". Out of the 9 serum samples of goats, 6 (66.6%) samples showed sero-positivity. Most of the serologically positive goats showed symptoms of nasal discharge, coughing, diarrhea and dyspnea during clinical examination. During the matrix scoring, very few informants identified diarrhea as an indicator. All the informant groups identified nasal discharge and coughing as an indicator for contagious caprine pleuropneumonia. This study indicated that pastoral communities living in Borana and Guji lowlands have detailed indigenous knowledge about contagious caprine pleuropneumonia. Therefore, the combined use of participatory appraisal and conventional methods is very useful for the diagnosis and surveillance of the disease.

Key words: Assessment, Borana, Guji, contagious caprine pleuropneumonia, Ethiopia, participatory approaches.

INTRODUCTION

In Ethiopia, the presence of contagious caprine pleurapneumonia has been suspected for long period, especially in areas at the immediate vicinity of endemic regions of Kenya and Sudan. As indicated by Thiaucourt

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et al. (1992),contagious caprine pleuropneumonia has been confirmed to be present in Ethiopia since 1980s. Since its confirmation, most of the reports of the disease were from Oromia and Southern Nation, Nationalities and Peoples Regional States indicating the widespread nature of the disease in these two regions (MoARD, 2007). Moreover, different workers have also indicated the importance and widespread nature of the disease in different parts of the country (Gelagay et al., 2007).

Contagious caprine pleuropneumonia is becoming one of the major killer diseases of goats in Borana and Guji lowlands. The area is characterized by poor animal health service as control measures for various livestock disease in general and contagious caprine pleurapneumonia in particular is ineffective and inefficient. To suffice the purpose, the pastoralists living in the area have been using their indigenous knowledge.

Pastoralists have a rich indigenous knowledge about animal health problems affecting their herds (Catley et al., 2002). This rich indigenous veterinary knowledge is based on oral tradition, shared information and the lifelong experience of the individuals. The core of this knowledge is clinical, pathological and epidemiological observations that serve to organize disease information into recognizable entities.

Like other pastoralists, pastoral communities living in Borana and Guji lowlands have a good indigenous knowledge on livestock disease identification and management (Genene, 2005) which could be a good platform to design appropriate livestock disease control and prevention program. Similar reports were made by Shiferaw et al. (2009) indicating that Afar pastoralists have detailed knowledge about their livestock health. However, the indigenous knowledge of the pastoral community in Borana and Guji zone on contagious caprine pleuorpneumonia is not recorded. Therefore, this study was performed with the objectives of assessing the perceptions and indigenous knowledge of pastoral community about contagious caprine pleuropneumonia, so that the areas of complementarities between local indigenous knowledge and conventional animal health service approaches to control the disease can be identified.

MATERIALS AND METHODS

Description of the study area

The study area comprised of Borana and Guji lowland of Southern Ethiopia, covering an area of 95000 km^2. The Borana plateau gently slopes from the high mountain massif in the North 1650 m above sea level to the South bordering Kenya at 1000 m above sea level with slight variation due to central mountain ranges and scattered volcanic cones and craters (Coppock, 1994). The area borders Kenya to the South, Somali region to the East, the highland parts of Borana and Guji to the North, and Southern Nations and Nationalities People's Regional State to the West. This study was conducted in three selected districts, namely Teltale, Moyale and Liban.

Assessment of goat diseases

Two participatory approach techniques, matrix scoring and seasonal calendars were employed to assess and generate data on the indigenous knowledge of the local pastoral community on goat diseases in general and contagious caprine pleuropneumonia in particular. The guideline descriptions for the two techniques were given Catley et al. (2002, 2005). The assessment was conducted with 20 informant groups (7 groups from Teltale district, 6 groups from Moyale district, and 7 groups from Liban district). The group size varied from 20 to 30 people. Overall 400 to 600 pastoralists were contacted during the assessment. The level of agreement among the informant groups was determined by methods of Siegel and Castellan (1994).

The informant groups identified major goat diseases in their areas, out of which, the first five were selected for matrix scoring. Pair wise comparisons of the five goat diseases were conducted. During the pair wise comparison, list of reasons known as "indicators" in participatory methods were established. The identified indicators locally perceived clinical signs of the diseases. The five diseases placed along the x-axis in the matrix were scored against the list of clinical signs of the disease which were placed along the y-axis of the matrix. The diseases and clinical signs were represented by locally known objects so that the informants could easily identify them during scoring. For each clinical signs, informants were asked to score each disease by dividing piles of 25 stones (five for each disease). The informants were given the chance to change the score if they wished. The final score was recorded.

In the seasonal calendar, the local names of seasons in Borana and Guji lowlands were identified as long rainy ("Ganna"), short rainy ("Hagayya"), cold dry ("Adoolessa") and long dry ("Bonaa"). The seasons were represented by local materials on the top x-axis and the indicators to be scored against the season were placed along the y-axis. The diseases, rainfall and seasons were represented using locally known objects. Rainfall was chosen as the first event to be scored during the seasonal calendar scoring. The annual objective rainfall data of the study area during the past one year were collected from the local station. The informant groups were given a pile of 30 stones and were asked to divide the stones against the seasons to show the patterns of the indicators. The informants were given the chance to change the score if they wished. The final score was recorded.

Clinical and laboratory examination

Serum samples were collected from 9 goats which were infected with contagious caprine pleuropneumonia as per the perception of the community. Serological investigation was done using complement fixation test (CFT) according to Office International des Epizooties (OIE, 2000) standard test procedure using *Mycoplasma capricolum capripneumonia* antigen. The test was done at National Veterinary Institute (Debre Zeit, Ethiopia). Moreover, the sampled goats were clinically examined focusing on body temperature, respiration rate, presence of nasal discharge, presence of coughing, body condition and presence of diarrhea.

Data management and analysis

The data were stored in MS-Excel 2003 spread sheet and were analyzed by computing descriptive statistics. The level of agreement among the groups was assessed using Kendall's coefficient of concordance (W) using SPSS (2006) version 15.0. W values less than or equal to 0.26 at $p>0.05$ show weak agreement, W values greater than 0.26 and less than or equal to 0.38 show

Table 1. Summarized matrix scoring of major goat disease signs (n=20).

Disease sign, W and p-value	Diseases with their scientific and local names				
	Mange mite (Locally known as Cittoo)	Coenurosis (Locally known as Sirgo)	Contagious caprine pleuropneumoniaa (Locally known as Sombeessa)	Ticks (Locally known as Silmii)	GI parasites (Albaatii)
High morbidity, W=0.786*	5.5 (4-7)	3 (2-4)	9 (7-12)	3 (2-5)	5 (2-7)
Circular movement, W=1.00*	0 (0-0)	25 (25-25)	0 (0-0)	0 (0-0)	0 (0-0)
Coughing and nasal discharge, W=1.00*	0 (0-0)	0 (0-0)	25 (25-25)	0 (0-0)	0 (0-0)
High mortality, W=0.773*	3.5 (2-6)	5 (3-6)	11 (10-15)	2 (1-4)	3 (2-6)
Has drugs, W=0.846*	6 (4-7)	0 (0-0)	3 (2-5)	8.5 (4-12)	7 (5-15)
Loss of weight, W=0.898*	8.7 (7-11)	2 (0-5)	3 (0-4)	5 (4-7)	6 (5-9)
Diarrhea, W=0.880*	0 (0-2)	0 (0-0)	0 (0-1)	0 (0-7)	25 (22-25)
Skin damage, W=0.960*	15 (12-19)	0 (0-0)	0 (0-0)	8.5 (6-10)	0 (0-4)
Loss of milk yield, W=0.824*	11.5 (10-14)	1.5 (0-4)	2.5 (1-4)	4.5 (3-6)	4.5 (3-6)
Chronic disease, W=0.922*	8.5 (8-10)	3 (1-5)	0 (0-1)	8 (5-8)	6 (2-7)
Seasonal disease, W=0.918*	3.5 (3-5)	0.5 (0-2)	9 (8-10)	5 (4-6)	7 (4-9)
Has vaccine, W=1.00*	0 (0-0)	0 (0-0)	25 (25-25)	0 (0-0)	0 (0-0)
Affects both goat and sheep, W=0.546*	5 (2-8)	6 (3-11)	0 (0-0)	6 (4-9)	5.5 (2-8)

W=Kendall's coefficient of concordance. *Shows good agreement among the informant groups at p<0.001. The median score is outside the parentheses. The minimum and maximum scores are shown in the parentheses.

moderate agreement and W values greater than 0.38 at p<0.01 to p<0.001 show good agreement between the informant groups.

RESULTS

Matrix scoring

Matrix scoring done with the 20 informant groups showed that there was a good agreement among the informants (W=0.546 to 1.00). The agreement was significant (p<0.001). The matrix scoring findings were analyzed, summarized and presented pictorially (Table 1).

Seasonal calendars

Seasonal calendar with the informant groups showed that there was good agreement among the informant groups (W=0.912 to 0.981). The agreement among the informant groups was significant (p<0.001). However, in case of coenurosis, the agreement was weak (W<0.26) and statistically not significant (p>0.05). The matrix scoring findings were analyzed, summarized and presented pictorially (Table 2).

Clinical and serological examination

About 66.7% (6 out of 9) of the goats identified by the community as clinical cases of the disease were positive serologically. Of the serologically positive cases, 66.7% (4 out of 6) had history of coughing, 83.3% (5 out of 6) had nasal discharge and all the positive cases had respiration rate greater than or equal to 45 breaths/min. The summary of the clinical and serological finding was presented (Table 3).

DISCUSSION

Participatory appraisal methods have been used by veterinarians in Africa since late 1980s and examples of field research includes the use of matrix scoring to characterize cattle diseases in Southern Sudan and seasonal calendars to depict seasonal variations in disease incidence and vector population (Catley et al., 2004).

The participatory matrix scoring method has shown that there are many diseases affecting goat population in Borana and Guji lowlands and the pastoralists were able to describe, identify and prioritize these diseases. Accordingly, the major goat diseases identified during the scoring are contagious caprine pleuropneumonia, coenurosis, gastro-intestinal tract (GIT) parasites, mangemite and tick infestations. Observations during the matrix score showed that most cases of GIT parasite infections are manifested through the presence of diarrhea which could be an indicator for the presence of Peste des Petitis Ruminants. However, no attempts were made to further explore this observation. The clinical signs of contagious caprine pleuropneumonia such as high morbidity, high mortality, coughing and nasal discharge, abortion, availability of vaccine for the disease and others

Table 2. Summarized seasonal calendar of major goat diseases (n=20).

Indicator, W and p-value	Scientific and local Borana and Guji seasons			
	Long rainy season	Cool dry season	Short rainy season	Long dry season
	March–May (Locally known as Ganna)	June-August (Locally known as Adoolessa)	September-November (Locally known as Hagayya)	December-February (Locally known as Bona)
Mean seasonal rain fall (mm)	175.5 mm	21.4 mm	82.7 mm	11.6 mm
Rain fall, W=0.946*	17 (15-19)	2 (0-3)	10 (8-13)	1 (0-3)
Mange mite infestation, W=0.964*	1(0-4)	14.5 (9-20)	4.5 (3-7)	10 (6-13)
Coenurosis, W=0.013**	8 (5-9)	8 (7-12)	8 (5-8)	7 (5-10)
Contagious caprine pleuropneumonia, W=0.910*	3 (0-6)	9 (6-12)	4 (2-7)	12 (10-17)
Tick infestation, W=0.981*	16.5 (10-20)	8 (0-4)	3.5 (2-8)	2 (0-5)
Internal parasite, W=0.912*	14.5 (10-20)	4.5 (1-6)	8 (6-10)	3 (0-7)
Livestock movement, W=0.968*	1 (0-4)	8 (5-12)	6 (2-8)	14 (10-23)
Fly infestation, W=0.912*	13 (10-18)	6.5 (4-9)	8 (5-9)	2.5 (0-6)

W=Kendall's coefficient of concordance. *Shows good agreement among the informant groups at p<0.001, **Shows weak agreement among the informant groups at p>0.05. The median scores written outside of the parentheses. The minimum and maximum scores are shown in the parentheses.

Table 1. Summary of clinical and serological findings in participatory appraisal (n=9).

Variable	Case number								
	1	2	3	4	5	6	7	8	9
Clinical examination									
Coughing	+	-	-	+	+	+	+	-	+
Nasal discharge	+	+	+	-	-	+	+	+	-
Poor body condition	+	+	+	-	+	+	+	+	-
Diarrhea	-	+	+	+	-	+	+	+	+
Age in years	1	2	2	4	5	6	6	7	3
Sex	M	M	F	M	F	M	M	F	F
Rectal temperature in 0_C	39.5	39	40	39.5	41	39.5	40	40.5	41
Respiration (breaths/min)	45	38	50	40	52	54	42	50	51
Laboratory examination									
CFT result	+	-	+	-	+	+	-	+	+

+= Positive, - =Negative.

described by the informant groups were almost similar to the text book descriptions of the disease. This is in agreement with the results obtained previously (Mekuria and Asmare, 2009).

The seasonal calendar has identified the season of the year when the incidence of caprine pleuropneumonia is high. It is shown that the disease can occur at any season of the year; however, the incidence of the disease were found to be high during the cool dry season locally known as "Adoolessaa" and during long dry season locally known as "Bona". It was explained that the cold climate during the cool dry season and the frequent meeting at watering point and shortage of feed during the long dry season, were the major contributing factors for the high incidence of the disease during these seasons.

In both matrix scoring and seasonal calendar methods, it was observed that the scoring has achieved high level of agreement among the informant groups. During the scoring, the informants were seen to carefully count the stones allocated to each indicator. The scoring has showed that the community can prioritize goat diseases and score factors which they consider to be of relevance while distinguishing these diseases. Similar observations were reported previously (Gezahegn, 2006).

Although, matrix scoring was considered to be a useful method and hence its use should be combined and triangulated with other methods. Basic veterinary investigation methods such as clinical and post mortem examinations can be used to validate local diagnosis for some diseases (Catley et al., 2002). It has been observed that the cases identified by the communities as of caprine pleuropneumonia, 66.6% were found to be serologically positive. Majority of the serologically positive goats had nasal discharge, coughing, diarrhea and rapid breathing. These indicators have also been identified by the informant groups during the matrix scoring. But few informants identified diarrhea and rapid breathing as indicators for caprine pleuropneumonia even though they subsequently seemed to be associated with goats that were seropositive for caprine pleuropneumonia. However, the research methods did not show any clear indication about what proportion of goats seropositive for caprine pleuropneumonia could be recognized by local diagnosis. An answer to this question has implication for the use of local diagnosis in disease surveillance, and should therefore be the subject of further research.

In conclusion, the participatory appraisal has indicated that pastoral communities living in Borana and Guji lowlands have detailed indigenous knowledge about caprine pleuropneumonia. Therefore, the combined use of participatory appraisal and conventional methods is very useful for the diagnosis and surveillance of the disease.

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