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Epidemiological Study of Small Ruminant Diseases in Selected Districts of Kaffa and Bench- Maji Zone, Southern Nations Nationalities and Peoples Regional State (SNNPRs), Ethiopia

Fisseha Mengstie ^α & Amenay Assefa ^σ

Abstract- An epidemiological survey of small ruminant disease was conducted in Boka-Shuta, Konda-Zuriya and Debre-Work kebelles of Kaffa and Bench-Maji zone, Southern Nations, Nationalities and people's regional state (SNNPRs), Ethiopia from July 2012 to June 2013. The objective of the study was to assess diseases of small ruminants affecting production and productivity; their occurrence and distribution; and associated risk factors. For these, Semi structured questioner format was prepared and survey was conducted. The result revealed that, 90.6%, 76.0% and 65.6% of interviewed farmers describe the multi-factorial causes of respiratory diseases; systemic diseases; and Gastro-intestinal parasite respectively were the most prevalent diseases irrespective of agro-ecology difference. The type of disease conditions documented in each agro-ecology had differences. Bloating (accumulation of excess amount of fluid in their abdominal cavity and blood tinged internal organs observed when slaughtered) followed by head circling in Boka-Shuta (highland); gastro intestinal parasite and head circling in Debre-Work (midland); and bottle jaw and orf in Konda-Zuriya (lowland) were the most prevalent and had serious problems in small ruminant production and productivity. Regarding the diseases occurrence and distribution, the highest cases were recorded in summer followed by autumn. Ewes/doe and lambs/kids were the most susceptible age group. Each specific disease conditions occurrence and distribution in this study had its own specific risk factor. In general, however, disease management methods and practices by the farmers, susceptible age groups and seasons of occurrence were important risk factors playing an important role. Thus, the production and productivity of small ruminant was highly determined by diseases conditions. The result presented here suggests that, ewes/doe and lambs/kids need special attention to prevent them from diseases to improve production and productivity. And also, the small ruminant flock should get appropriate vaccination prior to the disease occurrence. Thus, the farmers' disease management and practices method need to be improved through training on small ruminant disease and their management. In addition, further studies should be conducted to identify the specific diseases types and their associated risk factors.

Keywords: agro-ecology, diseases, epidemiology, production, small ruminant, susceptible.

I. INTRODUCTION

Indigenous small ruminants constitute greater percentage of ruminant population in Africa (Lebbie *et al.*, 1994). These flocks of animals are commonly found in the rural areas where they are owned and managed under extensive system (Otchere, 1986). Small ruminants play an important role in the lives of most people especially rural farmers who livelihood entirely depend on them. They provide source of animal protein through their meat and milk (Fajemisin, 1991). Not with standing, they fetch a source of income when sold to meet some other family needs as well as play a vital social roles during ceremonies and festivals.

The importance of small ruminants (ie sheep and goats) to the socio-economic well being of people in developing countries in the tropics in terms of nutrition, income and intangible benefits (eg savings, insurance against emergencies, cultural and ceremonial purposes) cannot be overemphasized (Kosgey, 2004). Sheep and goats are important livestock species in developing countries because of their ability to convert forages, and crop and household residues into meat, fibre, skin and milk.

For an improved animal protein intake, there is need for improvement in the production of meat and other protein sources from the livestock industry. Sheep and goats offer a great potential in this respect due to their relative ease of breeding, management, ability to subsist on forages, hardiness, adaptation to a wide range of ecological zones and distribution among others. In recent times, sheep and goats production is becoming popular even among urban dwellers as result of the aforementioned merits (Umunna *et al.*, 2014).

Small ruminant management is seriously hindered by diseases in the tropics. Diseases are very important to farmers and affect the production of small ruminants in several ways. It increases cost of

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production, lowers production level, reduces the quality and quantity of animal products and generally causes great loss to the farmer (Abdullahi *et al.*, 2013).

In Ethiopia, There are more than 38 millions of cattle and 30 million small ruminants (CSA, 2007). However, the country is not making use of this huge potential attributed to different constraints among which disease stands in the front line (Samson and Frehwot, 2010; Firew, 1999). Diseases of various origins (bacterial, viral, parasitic, etc.) directly or indirectly are among the numerous factors responsible for poor production and productivity (Firew, 1999; Feyesa *et al.*, 2010) which results the major barriers for the improvement of livestock production, reproduction and marketing. The annual total economic losses due to diseases, mortality and reduced productive and reproductive performance were estimated by 150 million USD (Berhanu, 2002).

In Ethiopia, Sheep and goats contribute 25% of the meat domestically consumed with a production surplus mainly being exported as live animals (Alemayehu and Fletcher, 1991; Tibbo, 2006). Both species also contribute 50% of the domestic needs in wool, about 40% of skins and 92% of the value of hides and skin exported (ILCA, 1993). The total income share of small ruminants tends to be inversely related to size of land-holding, suggesting that small ruminants are of particular importance for landless people. In some settings where, agriculture (crop production) provides only seasonal employment, rearing small ruminants would provide employment and income as a subsidiary occupation (Coppock *et al.*, 2006).

However in Ethiopia, Small ruminant contribution to food consumption, rural income and export economy is below the expected potential, because of their husbandry is constrained by compound effect of disease, poor feeding, and poor management (Chalachew, 2001). Among many factors which limit the economic return from small ruminant production diseases stands in the front line (Firew, 1999). As a result of small ruminant diseases, 5-7 million sheep and goats die each year (Sileshi and Lidetu, 2007) and 35% of sheep and 56% of goat skins rejected due to skin parasites (Bayou, 1998) which leads serious economic loss to small holder farmers, the tanning industry, and the country as whole (ESGPIP, 2009) in which Many of the diseases in Ethiopia are still uncontrolled and are causing devastating effects both to the producers and to the national economy (EARO, 1996).

Even if small ruminants play a very important socio-economic role, little is known about health problems of these animals in the study area. In order to design relevant disease control strategies, assessment of the existing small ruminant diseases in the area is vital to devise appropriate technological interventions as well as for further study. Therefore, the aim of this study

was, to assess diseases of small ruminant affecting production and productivity; their occurrence and distribution; and associated risk factors in selected districts of Kaffa and Bench Maji zone.

II. MATERIALS AND METHODS

a) Study Area and Study Design

A cross-sectional study to assess diseases of small ruminant affecting production and productivity; their occurrence and distribution; and associated risk factors was conducted from July 2012 to June 2013 in Boka-Shuta and Konda-Zuriya of Kaffa zone; and Debre-work of Bench-maji zone. The study areas were selected purposively based on altitude variations, accessibility and availability of small ruminant. Thus, Boka-Shuta (highland), Konda-Zuriya (lowland) and Debre-work (Midland). The interviewed households with in each study areas were selected using systematical random sampling technique.

b) Sample Size Determination and Data Collection

Before conducting the formal survey, group discussion was made with experts of each respective zonal and district agriculture and rural development office on small ruminant production problems and diseases in particular. Semi structured questioner format was prepared. Then, it was pre-tested and modified as necessary and finally the formal survey was conducted and data was collected using single-visit-multiple-subject formal survey technique (ILCA, 1990). Accordingly, a total of 96 households were interviewed and data's were collected on major small ruminant disease and health problems; their occurrence and distribution; and associated risk factors.

c) Data Management and Analysis

The data was analyzed using STATA version 11. Descriptive statistics was employed to determine the prevalence and Chi-square (X^2) test was used to measure the effect of predisposing factors on the distribution of different diseases. A significance level ($p < 0.05$) and confidence level (95%) was set to determine the presence or absence of statistically significant difference between the given parameters. And also, multivariate logistic regression was tested to confirm the stated factors.

III. RESULTS AND DISCUSSIONS

a) Importance of Livestock Species

The overall importance of livestock species irrespective of agro-ecology difference indicated that, cattle had the highest proportion (90.6%) followed by poultry (68.8%) (Figure 1). The different animal species are distributed throughout the three agro-ecologies of the study areas; and these could suggest that, the areas have a potential to favorably support live stock

production and productivity. However, the proportion of livestock species had differences amongst the different agro-ecologies. Thus, small ruminants had the highest level of proportion than other livestock species; goat (54.5%) in Konda-Zuriya (lowland) followed by sheep (49.2%) in Boka-Shuta (highland). These could indicate that, the production potential for selected species of

animals in different agro-ecologies (figure 2). The present finding was supported by Enwelu et al (2015) from Nigeria; the farmer's preferred goat than sheep due to a number of reasons. These were; prolificacy (54.2%); profitability (36.1%); longevity (long life span) (5.6%); and type of meat/animal dung (2.8%).

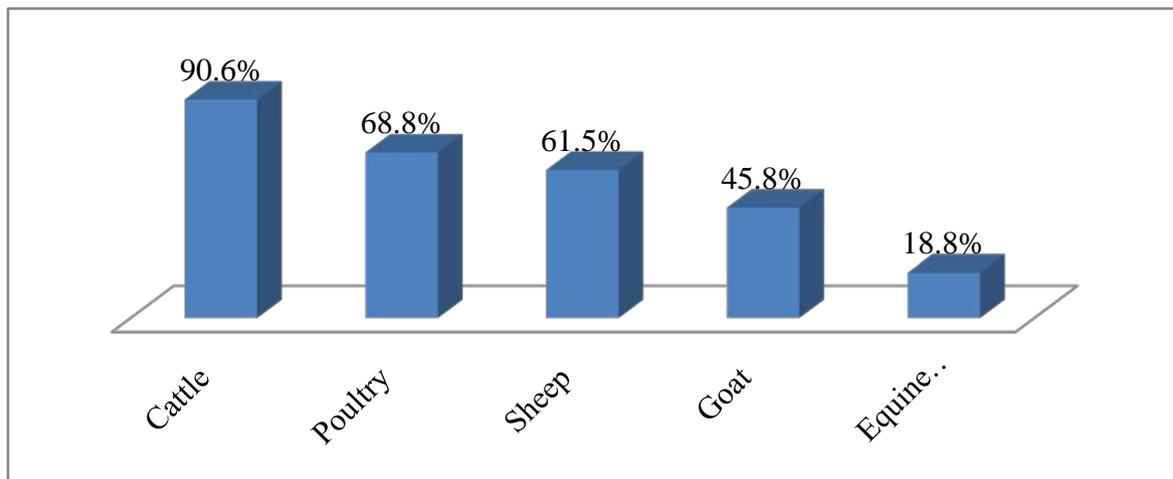


Figure 1: Overall proportion of livestock species importance in Boka-Shuta, Debre-Work and Konda-Zuriya of southern Ethiopia

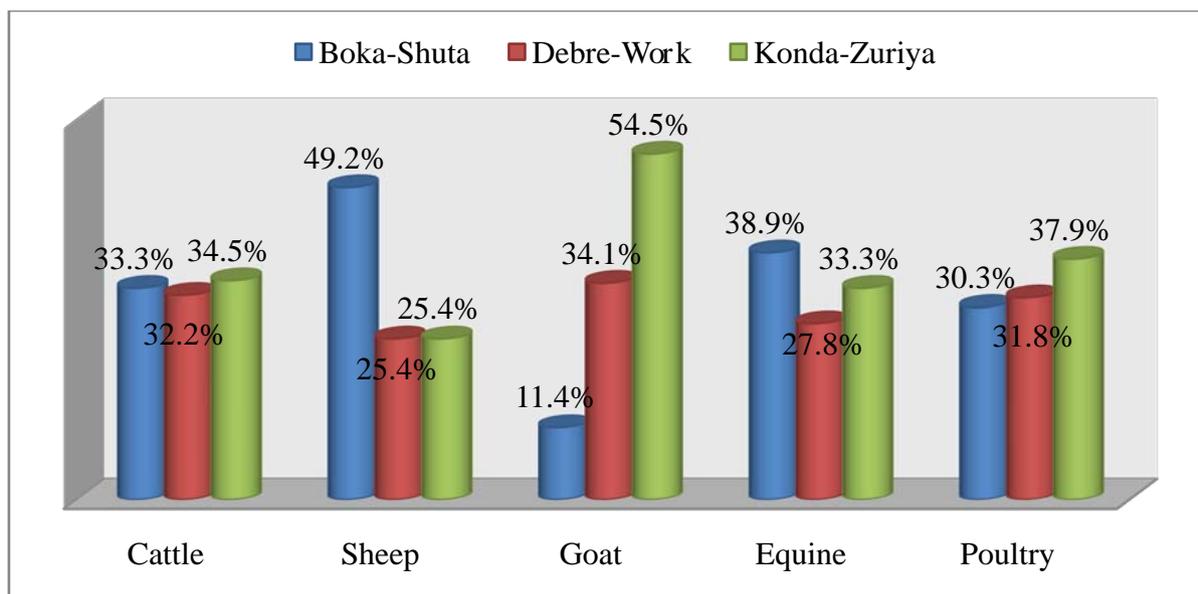


Figure 2: Proportion of livestock species importance in Boka-Shuta, Debre-Work and Konda-Zuriya of southern Ethiopia

b) *Small Ruminant Diseases and Their Prevalence*

Farmers listed different types of small ruminant diseases conditions that could cause mortality and morbidity in the study areas during the questioner survey. Among these, respiratory disease, systemic diseases, diarrhea, swollen head, Gastro-intestinal parasite and head circling had most frequently recorded. 90.6% of the respondents mentioned, diseases of the respiratory system (with signs of

coughing and nasal discharge) which could be multifactorial caused followed by 76.0% for systemic diseases (with signs of erected hair, depression and inappetent) were the most common. The multi symptomatic gastro-intestinal parasitism (in the present case could be manifested in diarrhea, emaciation or bloating) had significant occurrence (Figure 3).

Different research reports in Ethiopia indicated that, diseases are the main constraints limiting small

ruminant production. Among these, internal parasitic infestation followed by occurrence of persistent nasal discharge and coughing had the highest incidence limiting small ruminant production and could cause serious problems in kids and lambs (Urgessa *et al.*, 2012; Solomon *et al.*, 1995; Yohannes *et al.*, 1995; Solomon and Gemed, 2000; Markos, 2006).

The study report by Abebe *et al.* (2013) in north western Ethiopia confirmed that, Sheep diseases were one of the main constraints for sheep production and Foot rot, skin disease, pasteurellosis, orf and internal parasites were the main. The authors extended their findings and; sheep diseases were the major constraints (ranked first) amongst several constraints limiting small ruminant production. Other authors from South Sudan revealed that; internal parasite followed by pneumonia and external parasite were the most prevalent small ruminant diseases (Lado *et al.*, 2015).

The occurrence of small ruminant diseases conditions with respect to agro-ecologies indicated that; bloating (accumulation of excess amount of fluid in their abdominal cavity and blood tinged internal organs

observed when slaughtered) followed by head circling were the most prevalent in Boka-Shuta. Whereas, gastro intestinal parasite and head circling in Debre-Work; and bottle jaw and orf in Konda-Zuriya were the most prevalent and had serious problems in the small ruminant production and productivity (Figure 4).

And also, statistical significant differences of diseases occurrence among the study areas were observed. Thus, systemic diseases followed by gastro-intestinal parasite and head circling had highest in Midland; whereas, Orf followed by tick infestation in Lowland. Lowest proportion of diseases occurrence was observed in Highland (Boka-Shuta) and these could be due to several intervention activities in the area by Bonga Agricultural research center for controlling and preventing diseases occurrence in small ruminant (like regular vaccination against ovine pasteurellosis disease, anthrax, PPR, sheep and goat pox disease; routine treatment of cases; and regular deworming with broad spectrum antihelmentics), since it was one of Bonga sheep breed improvement community/cooperative (Table 1).

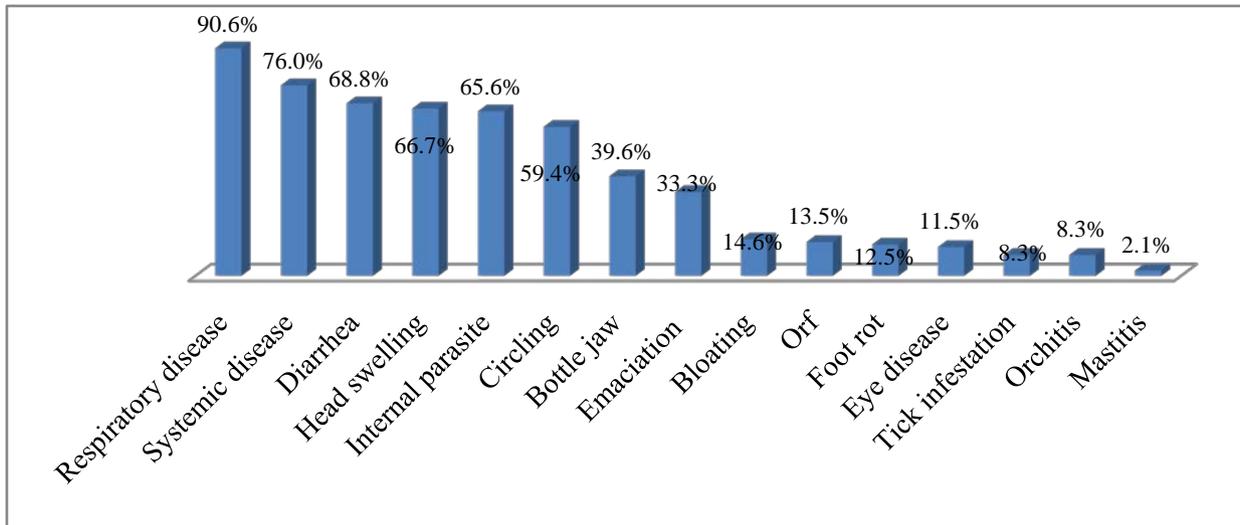


Figure 3: Overall Prevalence of small ruminant disease conditions of Boka-Shuta, Debre-Work and Konda-Zuriya, southern Ethiopia

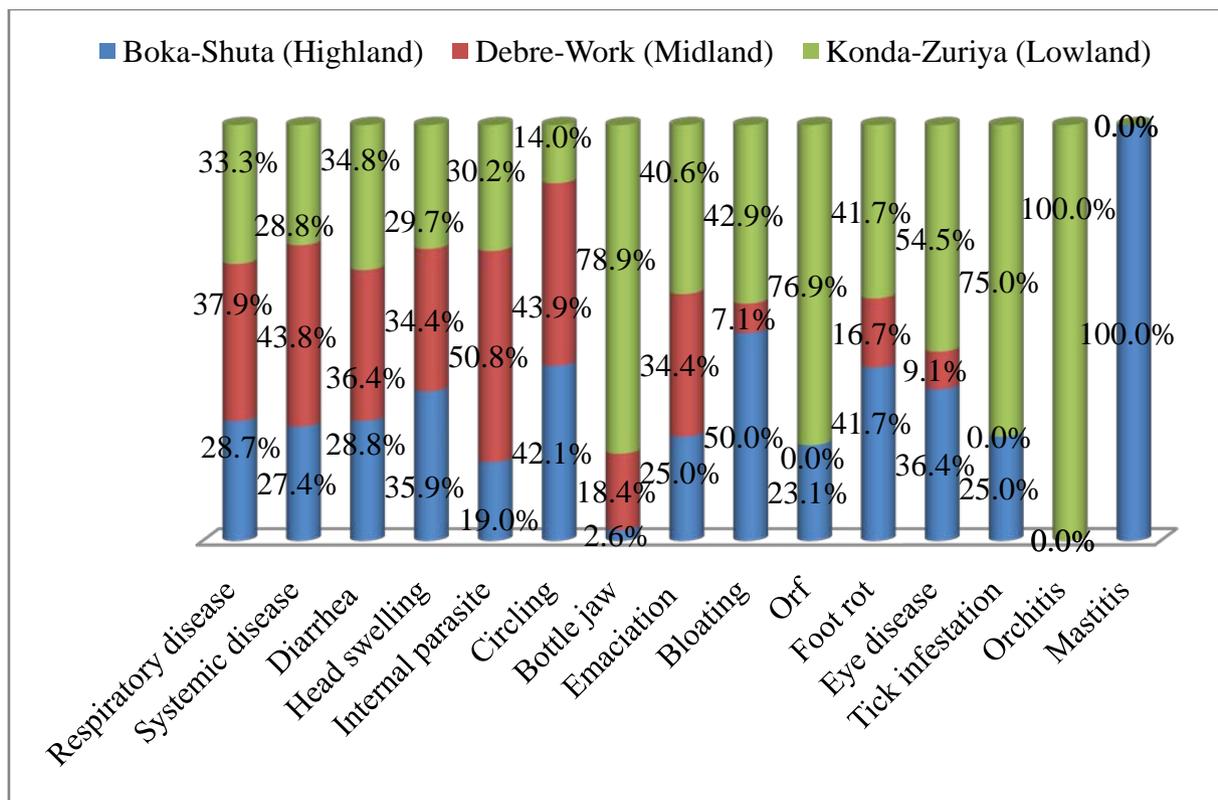


Figure 4: Prevalence of small ruminant disease conditions with respect to agro-ecologies, southern Ethiopia

Table 1: Prevalence of small ruminant disease conditions having statistical significant difference with respect to agro-ecologies, southern Ethiopia

Health related problems	N	Study areas			Percentage (%)	Sig.
		Boka-shuta (Highland)	Debre-Work (Midland)	Konda-Zuriya (Lowland)		
Respiratory disease	87	25(28.7)	33(37.9)	29(33.3)	90.6	0.074
Systemic disease	73	20(27.4)	32(43.8)	21(28.8)	76.0	0.002
Diarrhea	66	19(28.8)	24(36.4)	23(34.8)	68.8	0.817
Head swelling	64	23(35.9)	22(34.4)	19(29.7)	66.7	0.145
Internal parasite	63	12(19.0)	32(50.8)	19(30.2)	65.6	0.000
Head circling	57	24(42.1)	25(43.9)	8(14.0)	59.4	0.000
Bottle jaw	38	1(2.6)	7(18.4)	30(78.9)	39.6	0.000
Emaciation	32	8(25.0)	11(34.4)	13(40.6)	33.3	0.671
Bloating	14	7(50.0)	1(7.1)	6(42.9)	14.6	0.052
Orf	13	3(23.1)	0(0.0)	10(76.9)	13.5	0.002
Foot rot	12	5(41.7)	2(16.7)	5(41.7)	12.5	0.368

Eye disease	11	4(36.4)	1(9.1)	6(54.5)	11.5	0.153
Tick infestation	8	2(25.0)	0(0.0)	6(75.0)	8.3	0.031
Orchitis	8	0(0.0)	0(0.0)	8(100)	8.3	0.000
Mastitis	2	2(100)	0(0.0)	0(0.0)	2.1	0.094
Total	96	29(30.2)	33(34.4)	34(35.4)	100.0	

c) *Small Ruminant Diseases Management and Practices by the Farmers*

In general, small ruminant disease management by modern treatment in veterinary clinics was significantly different among the study areas. For example, 77.1% the interviewed household in Konda-Zuriya had better trend and awareness for treating their sick animals in veterinary clinics (Table 2). But, in areas where veterinary clinics are remote from farmers' residences (like in case of Boka-Shuta out of the reach

of intervention areas by the research center); the farmers manage their sick animals either by treating with home remedy and herbs or slaughtered for skin. Few households were also mentioned that, they used drugs by buying from the market and shop to treat their animals by themselves. The present finding was strongly supported by the study from South Sudan that; inadequate knowledge of small ruminant management was the most common challenge facing small ruminant production (Lado *et al.*, 2015).

Table 2: Small ruminant diseases management and practices by the farmers

Variables		Study areas			Total (%)	Sig.
		Boka-shuta	Debre Work	Konda-Zuriya		
Small ruminant disease management (controlling and prevention)	Self treatment using home remedy and herbs	14(28.6)	17(34.7)	18(36.7)	49(51.0)	0.932
	Modern treatment in veterinary clinics	17(23.0)	24(32.4)	33(44.6)	74(77.1)	0.001
	Slaughtering diseased sheep for skin	8(61.5)	2(15.4)	3(23.1)	13(13.3)	0.029
	Selling to market	11(26.2)	21(50.0)	10(23.8)	42(43.8)	0.148
	Vaccination against small ruminant diseases	14(40.0)	19(54.3)	2(5.7)	35(36.5)	0.000
Pasture management for disease transmission	Separate grazing/browsing house hold herd and flock from the community	14(23.3)	19(31.7)	27(45.0)	60(62.5)	0.030
	Communal grazing/browsing house hold herd and flock from the community	17(34.7)	17(34.7)	15(30.6)	49(51.0)	0.516
Quarantine system	Free movement of animal within and across the areas	27(40.3)	24(35.8)	16(23.9)	67(69.8)	0.000
	Restricted movement of animal within and across the areas	2(6.9)	9(31.0)	18(62.1)	29(30.2)	0.000
Total		29(30.2)	33(34.4)	34(35.4)	96(100)	

d) *Temporal Distribution of Small Ruminant diseases*

The occurrence of small ruminant diseases conditions in different seasons of the year had significantly varied. Thus, the highest occurrence was documented in summer (50.0%) followed by autumn (21.9%). On the other hand, seasons with high risk of disease occurrence were identified; and thus, autumn and summer with 32.3%. For these, different factors were identified. Grazing on immature fresh grass

(22.9%) was the main predisposing factor followed by unknown reason (20.8%) (Table 3). The present finding was justified by Abebe et al (2013); Sheep death occurs mainly at the end of the rainy season. This may be due to feed shortage and the suitability of the environment for the disease causing organisms. These also further aggravated by the introduction of animals into the area from different places and markets which might introduce different diseases.

Table 3: Temporal distribution of small ruminant disease conditions, southern Ethiopia

Variables		Study Areas			Total (%)	Sig.
		Boka-shuta	Debre-Work	Konda-Zuriya		
		N(%)	N(%)	N(%)		
Occurrence of diseases in different seasons	All season	3(75.0)	0(0.0)	1(25.0)	4(4.2)	0.000
	Autumn	5(23.8)	14(66.7)	2(9.5)	21(21.9)	
	Spring	2(66.7)	0(0.0)	1(33.3)	3(3.1)	
	Summer	5(10.4)	17(35.4)	26(54.2)	48(50.0)	
	Winter	14(70.0)	2(10.0)	4(20.0)	20(20.8)	
Seasons with high risk of disease occurrence	All season	3(75.0)	0(0.0)	1(25.0)	4(4.2)	0.000
	Autumn	6(19.4)	16(51.6)	9(29.0)	31(32.3)	
	Autumn & Summer	1(20.0)	4(80.0)	0(0.0)	5(5.2)	
	Spring	3(75.0)	0(0.0)	1(25.0)	4(4.2)	
	Summer	4(12.9)	7(22.6)	20(64.5)	31(32.3)	
	Winter	12(66.7)	3(16.7)	3(16.7)	18(18.8)	
	Winter & Autumn	0(0.0)	3(100)	0(0.0)	3(3.1)	
Factors for seasons of high risk of disease occurrence	Communal grazing	0(0.0)	1(100)	0(0.0)	1(1.0)	0.000
	Feed shortage	1(14.3)	6(85.7)	0(0.0)	7(7.3)	
	Feed shortage and unfavorable weather	9(52.9)	0(0.0)	8(47.1)	17(17.7)	
	Grazing on meshy areas	0(0.0)	0(0.0)	1(100)	1(1.0)	
	Immature fresh grass	6(27.3)	14(63.6)	2(9.1)	22(22.9)	
	Immature fresh grass and biting flies	0(0.0)	1(11.1)	8(88.9)	9(9.4)	
	Not known	3(15.0)	7(35.0)	10(50.0)	20(20.8)	

	Unfavorable weather & dusts	5(100)	0(0.0)	0(0.0)	5(5.2)	
	Unfavorable weather	5(35.7)	4(28.6)	5(35.7)	14(14.6)	
	Total	29(30.2)	33(34.4)	34(35.4)	96(100)	

e) Occurrence of Disease Outbreak in Small Ruminant flock

Significant variations for the occurrence of small ruminant disease outbreak in different seasons were recorded. Thus, 33.3% were during winter followed by

25% in autumn. Diseases manifesting respiratory signs had 50% of probability for causing outbreak (Table 4). The present finding was justified by Abebe et al (2013) report; disease mainly occurs during feed shortage periods (dry periods).

Table 4: Occurrence of small ruminant diseases outbreak, southern Ethiopia

Occurrence of small ruminant disease outbreak		Study Areas			Total	Sig,
		Boka-shuta	Debre-Work	Konda-Zuriya		
		N(%)	N(%)	N(%)		
Occurrence of disease outbreak in small ruminant		14(38.9)	4(11.1)	18(50.0)	36(37.5)	
Seasonal distribution	Autumn	3(33.3)	3(33.3)	3(33.3)	9(25.0)	0.035
	In any of the seasons	0(0.0)	0(0.0)	8(100)	8(22.2)	
	Spring	3(75.0)	0(0.0)	1(25.0)	4(11.1)	
	Summer	2(66.7)	0(0.0)	1(33.3)	3(8.3)	
	Winter	6(50.0)	1(8.3)	5(41.7)	12(33.3)	
Factors for diseases outbreak	Anthrax	1(50.0)	1(50.0)	0(0.0)	2(5.6)	0.027
	Bloating	2(100)	0(0.0)	0(0.0)	2(5.6)	
	Head circling	2(100)	0(0.0)	0(0.0)	2(5.6)	
	Diarrhea	0(0.0)	1(50.0)	1(50.0)	2(5.6)	
	Respiratory disease	2(11.1)	2(11.1)	14(77.8)	18(50.0)	
	Respiratory disease with diarrhea	1(100)	0(0.0)	0(0.0)	1(2.8)	
	Swollen head	2(100)	0(0.0)	0(0.0)	2(5.6)	
	Swollen head with coughing	0(0.0)	0(0.0)	2(100)	2(5.6)	
	Swollen head with coughing and diarrhea	0(0.0)	0(0.0)	1(100)	1(2.8)	
	Swollen head with diarrhea	1(100)	0(0.0)	0(0.0)	1(2.8)	
	Unknown disease	3(100)	0(0.0)	0(0.0)	3(8.3)	



f) *Distribution of Small Ruminant Diseases Conditions in Different Age Groups*

The occurrence and distribution of small ruminant diseases conditions in different age groups

were significantly vary even if, 22.9% were documented in all age groups. Thus, the highest was in ewes/doe and lambs/kids (26%) as compared to other age groups (Table 5).

Table 5: The occurrence and distribution of small ruminant disease conditions in different age groups, southern Ethiopia

Diseases distribution in different small ruminant age group		Study area			Total (%)	Sig.
		Boka-Shuta	Debre-Work	Konda-Zuriya		
		N (%)	N (%)	N (%)		
Age group	Adult	0(0.0)	1(100)	0(0.0)	1(1.0)	0.000
	Adults and lambs/kids	8(66.7)	2(16.7)	2(16.7)	12(12.5)	
	All age	6(27.3)	2(9.1)	14(63.6)	22(22.9)	
	Ewes/doe	7(46.7)	5(33.3)	3(20.3)	15(15.6)	
	Ewes/doe and lambs/kids	7(28.0)	5(20.0)	13(52.0)	25(26.0)	
	Lambs/kids	1(4.8)	18(85.7)	2(9.5)	21(21.9)	
Total		29(30.2)	33(34.4)	34(35.4)	96(100)	

g) *Factors Associated with the Occurrence and Distribution of Small Ruminant Diseases*

Based on multivariate logistic regression analysis, different determinant factors were found significantly associated for the occurrence and distribution of small ruminant disease conditions (Table 6). According to the model, holding the effect of other variables constant, the risk of acquiring infection with disease conditions manifested by swelling of head was 6.9% higher for those not treated in veterinary clinic (didn't get Modern treatment) than treated. The risk of getting head circling was 13.6% higher for Ewes/doe and lambs/kids than Lambs/kids alone; and season of occurrence was 39.6% higher in summer than winter. For GIT parasite infestation, the risk was 0.9% lower in Boka-Shuta than Konda-Zuriya which is justified by the regular deworming intervention by the research center in the study area. Traditional treatment practice by the farmers in the study areas for GIT parasite infestation indicated that, the risk was 21.2% higher for those not treated by herbal remedy than treated. For the occurrence and distribution of disease conditions like emaciations and eye diseases, market was significantly associated as a source of infection where diseased animals could disseminate the disease causing organism to the areas.

Table 6: Multivariate logistic regression analysis result - lists of significant variables after insignificant factors were excluded

Diseases conditions	Variables	Categories	OR	95% CI for OR	P value
Swollen head	Disease management method and practice	Modern treatment (No vs. Yes)	6.882	1.191, 39.8	.031
	Susceptible age	all ages vs. Lambs/kids	21.037	2.088, 211.9	.010
Head Circling	Study area	Konda-Zuriya vs. Boka-Shuta	.001	.000, .033	.000
	Susceptible age	Ewes/doe and lambs/kids vs. Lambs/kids	13.578	.950, 194	.055
	Season of occurrence	Summer vs. Winter	39.632	1.508, 1041.4	.027
GIT parasites	Study area	Boka-Shuta vs. Konda-Zuriya	.009	.000, .604	.028
	Disease management method and practice	Traditional treatment (No vs. Yes)	21.164	1.691, 264.8	.018
	Season of occurrence	summer vs. winter	.010	.000, .407	.015
Emaciation	Disease management method and practice	Selling to market	.129	.022, .763	.024
Bottle jaw	Study area	Boka-Shuta vs. Konda-Zuriya	.001	.000, .062	.001
		Debre-Work vs. Konda-Zuriya	.009	.000, .231	.005
Eye diseases	Disease management method and practice	Selling to market	.002	.000, .635	.035

IV. CONCLUSIONS AND RECOMMENDATIONS

The distribution and production of small ruminant was highly determined by diseases conditions. Of which, multi-factorial cause of respiratory diseases and Gastro-intestinal parasite are most prevalently occurred. The occurrence and distribution of those disease conditions had differences in seasons where the highest was in summer followed by autumn; and ewes/doe and lambs/kids were most frequently affected. Each specific disease conditions occurrence and distribution in this study had its own specific risk factor. In general, however, disease management methods and practices by the farmers, susceptible age groups and seasons of occurrence were important risk factors playing an important role. Thus, the production and productivity of small ruminant was highly determined by

diseases conditions. The result presented here suggests that, ewes/doe and lambs/kids need special attention to prevent them from diseases to improve production and productivity. And also, the small ruminant flock should get appropriate vaccination prior to the disease occurrence. In addition, the farmers' disease management and practices method need to be improved through training to create awareness on small ruminant disease and their management. In addition, further studies should be conducted to identify the specific diseases types and their associated risk factors.

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