Global Veterinaria 18 (3): 168-177, 2017
ISSN 1992-6197

DOI: 10.5829/idosi.gv.2017.168.177

Analysis of Morbidity and Mortality of Sheep and Goat in Wolaita Soddo Zuria District, Southern Ethiopia

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Abstract: A cross-sectional study was employed from November 2015 to April 2016 with the objects to analysis morbidity and mortality rates in sheep and goat and also to examine the effects of age, sex, season, management practices and other associated risk factors for morbidity and mortality of small ruminants in wolaita soddo zuria districts. A total of 520 traditionally managed small ruminants owned by 149 respondents, of which 151 goats and 369 sheep data were purposely collected from five selected peasant association and for the study. Overall morbidity rates of sheep and goat were 22.27% and 13.2% respectively. The mortality rate of sheep and goat were 7.04% and 10.4% respectively. In sheep, the morbidity rate was high for respiratory diseases 10.84% followed by paralysis 3.8%, gastro-intestinal tract (GIT) diseases 3.3%, reproductive disease 2.71% and eye disease 1.62% but in goats, the morbidity rate was 6.6% for GIT disease followed 2.6% caused by paralysis and 2% caused by reproductive disease in goat. The mortality rate was high for GIT disease, starvation and paralysis 1.4% followed by unknown reason 1.08 % in sheep and accident and starvation 3.31%, GIT problem 2% and paralysis 1.32% in goat. The above diseases can be minimized by adopting necessary action regarding deworming, vaccination, proper ventilation, balanced ration and good management practices.

Key words: Goat · Morbidity · Mortality · Sheep · Wolaita Soddo

INTRODUCTION

Small ruminants are widely reared in a crop-livestock farming systems and are distributed across different agro-ecological zones of Ethiopia. Sheep and Goat production is an important activity for smallholders, particularly for resource poor farmers in many parts of the country. They provide their owners with a vast range of products and services such as immediate cash income, meat, milk, skin, manure, risk spreading/ management and social functions. They are also exported and become a source of foreign currency [1, 2].

Sheep and goats, with their higher reproductive capacity and growth rates, are ideally suited to production by resource-poor smallholders [3, 4]. Indigenous sheep and goats are resistant to diseases and parasites, good flocking instinct, ability to walk long distances in search of feed, high tolerance to adverse climatic conditions, endurance to droughts and to low and fluctuating nutrient availability [5]. They require smaller investments, have shorter production cycles and greater environmental adaptability and hence have a unique niche in smallholder agriculture.

Ethiopia has the largest livestock inventories in Africa, including about 53.99 million cattle, 25.5 million sheep, 24.06 million goats, 1.91 million horses, 6.75 million donkeys, 0.35 million mules, 0.92 million camels and about 50.38 million poultry are estimated to find in the country [6]. The relative importance of these resources and their products varies from region to region and are largely determined by ecological and economic factors. Traditionally keeping large number of small ruminants was considered as an expression of status in the rural community. However, with ever-increasing human population and drastically shrinking farmlands, sheep and goat production has become a mean of survival particularly for the landless youth and female headed households in the rural areas. As a result, the contribution of small ruminants is increasing whereas sustaining large ruminants is facing difficulty during season of critical feed shortage [7, 8]. Furthermore, roles and functions of the animals undergo changes as the systems face continuous changes in resource availability.

Despite the large livestock population of Ethiopia, the economic benefits remain marginal due to prevailing diseases, poor nutrition, poor animal production systems,

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reproductive inefficiency, management constraints and general inadequate veterinary care. These factor have a major impact on morbidity and mortality rates, with annual losses as high as 30–50% of the total value of livestock products of Ethiopia [9].

The effect of diseases, poor nutrition, poor animal production systems, reproductive inefficiency, management constraints and general inadequate veterinary care on livestock productivity include; reduced feed intake, change in digestion and metabolism, decreased rates of reproduction, weight gain, milk production and mortality. Morbidity and mortality greatly affect the economic returns from sheep and goat husbandry. Knowledge of these factor patterns in different age groups, sex and seasons will be of immense help in health management to reduce morbidity and mortality. Keeping these aspects in view, the present study aimed to ascertain factors affecting morbidity and mortality pattern of sheep and goats in Wolaita zone Southern Ethiopia. Therefore; the present research has been undertaken to analyze morbidity and mortality rates of sheep and goat; and also to ascertain associated risk factors that cause morbidity and mortality in sheep and goat in study area.

MATERIALS AND METHODS

Study Area: The study was conducted in Wolaita Soddo Zuria district. This district is one of the 13 districts of Wolaita zone in Southern Nations, Nationalities and People Regional State (SNNPRS), Ethiopia, which is located 390 km away from Addis Ababa, in Southern direction. The district consists of 23 peasant associations (PA's), which are the smallest administrative units in Ethiopia. The area is located at latitude of 8°50'N and longitude of 37°45'E. The altitude varies from 1100-2950 meter above the sea level (masl). The highest mountain is Damota 2500 masl, which is located near Soddo town [10]. The area experiences mean annual temperature of about 20°C. The area is characterized by bimodal rainfall pattern with the high rainy season extending from June to September and a small rainy season occurring from February to April. The mean annual rain falls of the area ranges from 450-1446 mm with the lowest being in low land and highest in high land. Topographically, the area is marked by hilly, flat, steep slopes and a number of streams and mountains. Wolaita zone shares boundaries with four other zones of the SNNPRS. These include from north with Kembata and Tambaro zone; from south with Gamo and Gofa zones; from east with Sidama zone; and from west with Dawro zone. Mixed crop-livestock production is the predominant farming system in the area. The livestock resource of the area comprises 923, 633 cattle (Local and improved), 231, 115 sheep, 118, 178 goats, 4, 212 horses, 38, 238 donkeys, 3, 031 mules, 550, 489 poultry and 53, 781 bee colonies [11].

Study Population and Sampling Procedure: A cross-sectional study was done from November 2015 to April 2016 in Wolaita Soddo Zuria district. Five peasant association, one from Urban (Fana) and four from rural area (Humbo Larena, Gututo Larena, Marachare and Dalbao Wogane) were purposively selected based on their accessibility, easy of logistic and number of Sheep and Goat populations in the area. A total of 520 traditionally managed small ruminants, of which 151 goats and 369 sheep were selected for this study. From each peasant association 104 small ruminants were proportionally taken. For this survey purposes Humbo Larena (40), Gututo Larena (34), Fana (24), Marachare (21), Dalbo Wogane (30) sheep and goat owner from five peasant association a total of 149 respondents selected purposely in order to assess mortality and morbidity patterns and associated risk factors of sheep and goat in the area.

Data Collection: A single-visit multiple subject formal survey technique [12] was used for data collection using a semi-structured questionnaire. The questioner was translated into local language in order to make the farmers understood the question and respond and give us clear and relevant information. Major factor causes of morbidity and mortality in sheep and goat were some of the data collected.

Data Management and Analysis: All data collected during the study period were entered into Microsoft excel spread and analyzed using SPSS version 11.5 statistical software. The prevalence of mortality rate was calculated as the number of animals died by different causes divided by the total number of animals born during that specific period. Data pertaining to morbidity and mortality rate were analysed by descriptive statistic. Least squares analyses were used for the traits applying the general linear model procedures of the Statistical Analysis System (SAS) software packages to determine the effect of different factors on sheep and goat mortality and morbidity rate.

RESULT

Household Characteristic: In the study area, the general characteristics of the respondents are presented in Table 1. The study indicates that, the majority (47.7%) of the respondents were old (>45 years), 57% of interviewed respondents were females and 26.8%, 22.8%, 16.8%, 14.1% and 20.1% from Humbo Larena, Gututo Larena, Fana, Marachare and Dalbo Wogane respectively.

Possession of Small Ruminants: The entire interviewed household in the study areas owned either sheep or goat but not raising both of them. In both cases, only local breeds of sheep (70.96%) and goat (29.04%) were reared. In addition to sheep and goats, the respondents kept also cattle and donkey.

Housing: About 100% of respondents accommodate their flocks in the main houses together with the family members. Key informant farmers during group discussion indicated that the local tradition is that 'sheep, goats and honey bees survive less in the absence of smoke from the house fire.' Flocks are kept in house at night and during the day when the heat intensity is high during hot season.

Major Feed Resources and Supplementary Feed: Availability of different feed sources vary depending on the area where the households were located in references to market, Cafeterias and grazing land which is either private or open area and type of crop cultivated. Major feed resources were grazing (100%), which includes road and fence side grazing, private or government land area grazing, free roaming on waste disposal and purchase grass from different sources is common. In addition to this there is also Enset and banana leaves, grinding by product, fruit peels, collected from the cafeteria and in the market. Grain and legume (e.g. Bean, pea, maize) feeding is more common in Fana of urban sites. This is usually common in the household who live near market area and trade grain/legume. The non-conventional feeds used by smallholder include the traditional *Arake* and *Tella* residue (*Atella*) chat, vegetables and fruit wastes and leftover foods.

Watering: This study indicated that the distance from residential areas to watering points, season of year and availability of water in the area have significant influences on the frequency of watering. Tape water (77.2%) was reported to be a major water resource for sheep and goat in study area as represented in table below.

Treatment and Vaccination of Animal: Treatment and vaccination measures of sheep and goat disease are presented in Table 3. The majority of the respondents (50.3%) used veterinarian prescribed modern medicines, (34.9%) both veterinarians prescribed modern medicines and ethno-veterinary traditional medicines to treat sick animals. About 73.2% of the respondents vaccinated their sheep and goats free of charge. The respondent reported that Veterinary clinic service was frequently accessible in the study area.

Morbidity Pattern in Sheep: The overall morbidity rate was 22.27%. However, the overall morbidity was higher due to respiratory disease (10.84%) (Table 4). the morbidity pattern between lamb and adult due to different disease were 16% and 26% respectively.

Morbidity pattern between male and female animals had shown in (Table 5). Morbidity pattern between male and female was 18.7% and 23.7% respectively.

The morbidity pattern in different season shown in the Table 6. These indicated morbidity of sheep was high (52.3%) during winter followed by spring (22.1%), summer (14%) and low (11.6%) during autumn season. Within all year seasons, the high morbidity referred to respiratory disease.

Morbidity Pattern in Goat: The overall morbidity rate was 13.2%, the overall incidence of GIT problem was 6.6% followed by paralysis 2.6% (Table 7). Kid show less morbidity than adult that were 10% and 13.5% respectively.

The morbidity due to GIT disease was higher in both sexes of which male (8%) and female (10%). The morbidity in female (15%) higher than male (5%; Table 8).

The morbidity of goats was 36%, 31.8%, 27.3%, 4.5% during autumn; spring, winter and summer respectively (Table 9).

Mortality Pattern in Sheep: Table (10) summarizes major causes of sheep mortality pattern in different age groups identified during the study and their contribution to the total number of death. The overall mortality rate in sheep was (7.04%). Highest mortality due to GIT disease and starvation (1.4%) followed by unknown reason (1.08%). Lamb (9.6%) shows highest mortality than young (6%) and adults (4.5%).

Present study indicated the highest mortality in male (8.9 %) than female (6.1%) due to different disease (Table 11).

Table 1: Description of household characteristics

Respondents	Number of respondents	Percentage of respondents
Age		
Young(<18 year)	10	6.7
Adult (18-45 year)	68	45.6
Old(>45 year)	71	47.7
Sex		
Male	64	43
Female	85	57
Kebele		
Humbo Larena	40	26.8
Gututo larena	34	22.8
Fana	24	16.8
Marachare	21	14.1
Dalbo wogane	30	20.1

Table 2: Distribution of households according type and frequency of water provision

Type of watering	Percentage of household	Frequency of watering per day	Percentage of household
River water	22.8	Once	48.3
Tap water	77.2	More than once	51.7

Table 3: Description of treatment and vaccination of animal.

Type of treatment and vaccination	Number of respondent	Percent of respondent
Traditional	13	8.7
Clinical	75	50.3
Both	52	34.9
No treatment	9	6
Vaccinated	109	73.2
Not vaccinated	40	26.8
Reason for no vaccination		
No vaccination program information	35	23.5
Not know importance of vaccine	3	2
Luck of time	2	1.3

Table 4: Age wise of morbidity pattern in sheep

		Lamb (n=125)		Young (n=51)		Adult (n=193)		Total n=369	
No	Disease	No	%	No	%	No	%	No	%
1	Eye disease	2	1.6	1	0.9	3	1.6	6	1.62
2	Respiratory disease	12	9.6	7	6.4	21	11	40	10.84
3	Reproductive disease	_	_	_	_	10	5.2	10	2.71
4	GIT disease	2	1.6	2	1.8	8	4.12	12	3.3
5	Paralysis	4	3.2	2	1.8	8	4.12	14	3.8
	Total	20	16	12	23	50	26	82	22.27

Table 5: Sex wise of morbidity pattern in sheep.

		Male (n=123)		Female (n=246)		Total (n=369)	
No	Disease	No	%	No	%	No	%
1	Eye disease	2	1.63	4	1.63	6	1.62
2	Respiratory disease	11	8.94	29	11.8	40	10.84
3	Reproductive disease	_	_	10	4.1	10	2.7
4	GIT disease	4	3.3	8	3.3	12	3.3
5	Paralysis	5	4.1	9	3.7	14	3.8
	Total	22	17.9	60	24.4	82	22.27

Table 6: Seasonal wise of morbidity pattern in sheep

		Winter		Spring		Summer		Autumn		Total	
No	Disease	No	%	No	%	No	%	No	%	No	%
1	Eye disease	3	6.7	5	26.3	1	8.3	_	_	9	10.5
2	Respiratory disease	25	55.6	9	47.4	_	_	5	50	39	45.4
3	Reproductive disease	6	13.3	2	10.5	_	_	2	20	10	11.6
4	GIT disease	4	9	2	10.5	7	58.3	1	10	14	16.3
5	Paralysis	7	15.6	1	5.3	4	33.3	2	20	14	16.3
	Total	41		19		12		10		82	

Table 7: Age wise of morbidity pattern in goat

		Kid (n=57)		Young (n=14)		Adult (n=80)		Total (n=151)	
No	Disease	No	%	No	%	No	%	No	%
1	Skin disease	_	_	1	7.12	_	_	1	0.7
2	Eye disease	_	_	_	_	1	1.25	1	0.7
3	Reproductive disease	_	_	_	_	3	3.75	3	2
4	GIT disease	5	8.8	1	7.12	4	5	10	6.6
5	Paralysis	_	_	1	7.12	3	3.75	4	2.6
6	Unknown reason	1	1.8	_	_	_	_	1	0.7
	Total	6	10.5	3	21.4	11	13.75	20	13.2

Table 8: Sex wise of morbidity pattern in goat

		Male (n=50)		Female (n=101)		Total (n=151)	
No	Disease	No	%	No	%	No	%
1	Skin disease	_	_	1	1	1	0.7
2	Eye disease	_	_	1	1	1	0.7
3	Reproductive disease	_	_	3	3	3	2
4	GIT disease	4	8	6	6	10	6.6
5	Paralysis	1	2	3	3	4	2.6
6	Unknown disease	_	_	1	1	1	0.7
	Total	5	8.7	15	26.3	20	13.2

Table 9: Season wise of morbidity pattern in goat

		Winter		Spring		Summer		Autumn		Total	
No	Disease	No	%	No	%	No	%	No	%	No	%
1	Eye disease	_	_	_	_	_	_	1	12.5	1	0.7
2	Skin disease	1	16.7	_	_	_	_	_	_	1	0.7
3	Reproductive disease	_	_	2	28.5	_	_	1	12.5	3	2
4	GIT disease	3	33.3	2	28.5	1		4	50	10	6
5	Paralysis	2	33.3	2	28.5	_	_	_	_	4	3.3
6	Unknown disease	1	16.7	_	_	_	_	_	_	1	2
	Total	6		7		1		8		22	14.6

Table 10: Age wise of mortality pattern in sheep

		Lamb (n=125)		Young (n=51)	Adult (n=193)		Total (n=369)		
No	Disease	No	%	No	%	No	%	No	%
1	GIT disease	2	1.6	2	4	1	0.5	5	1.4
2	Reproductive disease	_	_	_	_	3	1.6	3	0.8
3	Respiratory disease	2	1.6	_	_	_	_	2	0.5
4	Paralysis	2	1.6	_	_	3	1.6	5	1.4
5	unknown disease	1	0.8	1	2	2	1.04	4	1.08
6	Predator	2	1.6	_	_	_	_	2	0.5
7	Starvation	5	4	_	_	_	_	5	1.4
	Total	12	9.6	3	6	9	4.7	26	7.04

Table 11: Sex wise of mortality pattern in sheep

		Male (n=123)		Female (n=246)		Total (n=369)	
No	Disease	No	%	No	%	No	%
1	GIT disease	1	0.8	4	1.63	5	1.4
2	Reproductive disease	_	_	3	1.2	3	0.8
3	Respiratory disease	_	_	2	0.8	2	0.5
4	Paralysis	2	1.63	3	1.2	5	1.4
5	unknown disease	2	1.63	2	0.8	4	1.08
6	Predators'	2	1.63	_	_	2	0.8
7	Starvation	4	3.3	1	0.4	5	1.4
	Total	11	8.9	15	6.1	26	7.04

Table 12: Seasonal wise in mortality pattern in sheep

		Winter		Spring		Summer		Autumn		Total	
No	Disease	No	%	No	%	No	%	No	%	No	%
1	GIT problem	1	10	3	75	_	_	1	11.1	5	20.8
2	Reproductive disease	2	20	1	25	_	_	_	_	3	12.5
3	Respiratory disease	2	20	_	_	_	_	_	_	2	8.3
4	Paralysis	3	30	_	_	_	_	_	_	5	12.5
5	unknown disease	1	10	_	_	_	_	3	33.3	4	16.7
6	Predators	_	_	_	_	_	_	2	22.2	2	8.3
7	Starvation	1	10	_	_	1	_	3	33.3	5	20.8
	Total	10		4		1		9		26	

Table 13: Age wise mortality pattern in goat

		Kid (n=57)		Young (n=14)		Adult (n=80)		Total (n=151)	
No	Disease	No	%	No	%	No	%	No	%
1	GIT disease	_	_	_	_	3	3.75	3	2
2	Mammary disease	_	_	_	_	1	1.25	1	0.7
3	Paralysis	_	_	_	_	2	2.5	2	1.32
4	Accident	2	0.35	2	14.8	1	1.25	5	3.31
5	Starvation	5	8.8	_	_	_	_	5	3.31
	Total	7	12.3	2	14.3	7	8.75	16	10.4

Table 14: Sex wise mortality pattern in goat

		Male (n=50)		Female (n=101)	Total (n=151)		
No	Disease	No	%	No	%	No	%
1	GIT disease	1	2	2	2	3	2
2	Mammary disease	_	_	1	1	1	0.7
3	Paralysis	_	_	2	2	2	1.33
4	Accident	1	2	4	4	5	3.31
5	Starvation	2	4	3	3	5	3.31
	Total	4	8	12	12	16	10.4

Table 15: Seasonal wise mortality pattern in goat

		Winter		Spring		Summer		Autumn		Total	
No	Disease	No	%	No	%	No	%	No	%	No	%
1	GIT disease	_	_	_	_	1	_	2	28.5	3	20
2	Mammary disease	_	_	_	_	_	_	1	14.3	1	6.7
3	Paralysis	1	33.3	1	25	_	_	_	_	2	13.3
4	Accident	1	33.3	2	50	_	_	1	14.3	5	33.3
5	Starvation	1	33.3	1	25	_	_	3	43	5	33.3
	Total	3		4		1		7		16	

The mortality of sheep was high during winter (41.7%) followed by autumn (37.5%), spring (16.7%) and low during summer (4.17%; Table 12).

Mortality Pattern in Goat: The overall mortality rate in goat was 10.4% (Table13). Mortality was high in kid (12.3%), compared to adult (8.75%).

Mortality due to starvation and accident (3.31%) was more prominent followed by GIT disease (2%), paralysis (1.32), mammary disease (0.7%) in the different sex group (Table 14). Females (12%) shows high mortality than males (8%).

The death of goats was high (46.7%) during autumn followed by spring (26.7%), winter (20%) and low (6.7%) during summer season (Table 15).

DISCUSSION

A total of 520 sheep and goat of different age and sex were maintained by 149 livestock owners selected for the study during the study period. 369 sheep and 151 goats were identified affected due to various disorders, such as respiratory disease, paralysis, GIT disease, reproductive diseases, eye disease, mammary disease; starvation and accident were prevalent in the study area. These diseases were classified into various categories of which respiratory diseases were more prominent in incidence having highest morbidity rate 10% followed by paralysis (3.8%), GIT disease (3.3%), reproductive disease (2.71%) and eye problem (1.62%).

The overall morbidity rate of sheep was 22.27%. This finding was in agreement with the finding of Dohare *et al*. [13] in India (20.58%). The morbidity caused by respiratory disease (10.84%) was more prominent in study area. As compared to previous research done in India and it agreed with that of Sharma and Verma [14]. They reported that as respiratory infections represented 8% of causes for morbidity in sheep. This result is in comparable with the findings of Mugerw *et al.* [15] who reported that respiratory infections represented 14% of causes for neonatal lamb morbidity and mortality.

In this study morbidity caused by GIT diseases were (3.3%), which close to the findings of Chaudhary and Sing [16] in India (1.56%). This morbidity may be due to various infectious diseases were found to be digestive system that was refer to inadequate knowledge about deworming, vaccination and improper ventilation. The parasitic diseases were among the one of the important cause for GIT problem because of lack of awareness of farmers under village conditions to do regular deworming of livestock and unhygienic condition of anima under rural condition.

Lambs highly affected by respiratory disease (9.6%) followed by paralysis (3.2%), eye disease and GIT disease (1.6%). This study demonstrated that respiratory disease is the most common cause of lamb morbidity. This result is in close to the findings of Sharif *et al.* [17] in Jordan (13.3%).

The morbidity data was categorized according to age as, lamb, young stocks and adults. Amongst the age groups, adult stocks showed highest morbidity rate 26% followed by young (23%) and lamb 16%. This result varied from finding of Chaudhary and Singh [16] reported that amongst the age groups, young stocks showed highest morbidity rate 67.63% followed by kids 12.70% and adults 7.47%. This difference can be explained by ago-ecological, management and other veterinarian care; and also the major causes of morbidity in neonates mainly due to birth injury, starvation and hypothermia.

Female showed more morbidity due to diseases than male, which was 23.2% and 16% respectively. Similar findings were observed by Solomon *et al*. [18] in North-western Amhara, they reported that as this may be due to the husbandry practices of the area where female lambs are kept longer time than males in a flock for the purpose of breeding. Since females are kept for a longer period of time they may have more chance to be exposed to risks that may render them susceptible to diseases. Furthermore, withdrawals of young male lamb for marketing was practiced at early stage making follow up of death recording especially with disease conditions, was difficult. Male had better rate of survival than females.

The morbidity and mortality of sheep and goat was high during winter followed by spring, autumn and summer season. There is high morbidity during the dry season of the years as compare to others seasons. This result is in agreement with the findings of Hailu *et al.* [19] who reported that as lower survival rate for Borana and Arsi-Bale lamb and kids, which is born in the dry season than those born in the wet season. El-Abid and Nikhaila [20] also observed similar effect of season on lamb and kid morbidity and mortality rate. The result of the current study varied from finding of Awemu *et al.* [21] who reported high rate of kids' mortality in the wet season. The cause of death in sheep and goat during these seasons is probable due to variation of incidence of

diseases and feed availability between seasons. After the end of the short rainy season, some infectious disease might be aggravating the morbidity and mortality of growing lamb, kid, doe and ewe due to the season is very conducive for multiplication of some bacteria and viruses.

The current study presented an overall morbidity rate of goat of 13.2%. Which varied from Chaudhary and Singh [16] who reported that overall high morbidity rate of goat of 25.72%. The lower morbidity rate in the particular years might be due to small number of kids born in that particular year, more kid born in favourable kidding season and better management conditions in comparison with the years having higher mortality.

The overall incidence of GIT disease in goat was 6.6%. Which is lower than the finding of Sharma and Varma [14] in Indian (18%). These lowest Occurrences of digestive diseases were high in village condition which may relate to the feeding management. Awareness regarding balance feeding among villager, feeding high nutrient diet; avoiding sudden changes in feeding of animals were the factors which decrease the disease occurrence. The incidence of reproductive disease was 2%; this finding similar to finding of Sharma and varma [14] who reported that as occurrence of the reproductive disease in the extent of 2%.

Female showed more morbidity due to diseases than male than male, which is 15% and 5% respectively. Mortality due to reproductive disease was higher in female than male whereas male showed higher mortality due to GIT disease. Similar findings in Arsi- Bale, those as females are more vulnerable to stress due to competition, abortion, dystocia which is sex specific attribute and diseases due to improper management during pregnancy and parturition [22].

The overall mortality rate in the study area was 7.04% in sheep and 10.4% in goat due to various causes. The mortality rate was high due to GIT disease and starvation (1.4%) followed by unknown reason (1.08%). Among the age groups, lamb showed high mortality 9.6% followed by young stocks 6% and adults 4.7%, suggesting that the mortality rate decreases with increase in age. This may due to the reason that kids were having low immunity and proper feeding and management was not provided to them during their early days of life mortality due to starvation. Accident (3.3%) was more prominent in study area. This result is in agreement with the findings of Chaudhary and Singh [16] who reported that as overall mortality rate was found 4.51% and 8.23% in sheep and goat respectively. From the age groups kids showed highest mortality 11.73% followed by young stocks 11.51% and adults 3.37% and injuries and accidents showed that occurrences were 1.53%.

Male sheep showed highest mortality due to diseases than female, which is 8.9% and 6.1% respectively. The result was agreed with the finding of Aganga *et al*. [23] in Botswana and Hailu *et al*. [19] in Borana, who recorded a higher mortality for male kids compared to females. On the other hand, Girma *et al*. [22], reported higher death rates in females than males in Arsi-Bale kids kept in a similar environment. This might due to difference in the study period and sample size of the study.

This study indicated that the most frequent cause of mortality was starvation (8%) and accident (0.35%) in kid. Death due to starvation-miss mothering exposure was reported in lambs and kids in Jordan [17] and in lambs in Ethiopia [15]. In the early age of lamb and kid, pregnant ewe and doe, they kept around the homestead. These may avoid walking long distances in search of feed and water and to minimize exposure to predators. Small ruminants are kept in house during night to protect them from predators, theft and abrupt climatic changes. Housing of flocks in the main house is more common than other reports in the country [24].

There is a variation among farmers in practicing of treating the sick animals. 50.3% of the respondents used veterinarian who prescribed modern medicines, but 34.9% asked both veterinarians prescribed modern medicines and ethno-veterinary traditional medicines to treat sick animals. Few of the respondents (8.7%), reported to have traditional practices (Ethno-veterinary traditional medicines) for treating their sick animals. Similarly, 6% of respondent did not treat sick animal. The respondent reports that veterinary clinic service was frequently accessible in the study area. This result was opposing the finding of Tsegaye *et al*. [25] who reported that as the percent of households that consults veterinarians to treat sick animals was 44.4% and majority of the households (56.6%) indicated that they used traditional medication practices in Hararghe, Eastern Ethiopia. This might due to difference accessibility and establishment animal health infrastructure and practices of animal owners.

CONCLUSION AND RECOMMENDATION

From the study it could be concluded that majority of the sheep and goat morbidity and mortality were during

the dry seasons of the year. This is probably due to disease and feeds shortage in dry season of the year. At the end of the short rainy season, some infectious disease might be aggravating the morbidity and mortality sheep and goat due to the season was very conducive for multiplication of some bacteria and viruses. The major causes of sheep and goat morbidity and mortality on study area was due to various disorders, such as respiratory disease, paralysis, GIT disease, reproductive disease, eye disease, mammary disease, starvation and accident were prevalent in the study area of sheep. In this study, age, sex and season of a year has a significant effect on morbidity and mortality rate of sheep and goat. Based on the above conclusions, the following recommendations are forwarded:

There is a need to training of sheep and goat owners in all aspects of husbandry like feeding, housing, breeding, health management and bio-security.

Due attention should be given for systematic control of infectious disease and periodic vaccination of sheep and goats of the study areas in order to keep the normal health status of sheep and goats.

Further detail investigations of sheep and goat morbidity and mortality with representing different agro-ecological zones.

ACKNOWLEDGMENT

The authors would like to thank all sheep and goat owner on Wolaita soddo zuria districts for their positive response on course of my survey.

Conflict of Interest: The authors declare that there is no conflict of interest.

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