Retrospective Epidemiological Study on Goat Disease in Debre Birhan Agricultural Research Center Ataye Boer Breeding, Evaluation and Distribution Site, North Shoa, Ethiopia

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Abstract: The information of diseases prevalence give useful information on disease pattern and thus can be used in preventing diseases as well as formulating policies for future management to prevent diseases. A retrospective epidemiological study of goats diseases were undertaken at Debre Birhan Agricultural Research Center, Ataye Boer Breeding, Evaluation and Distribution Site, from September 2015 to August 2019 to determine the pattern, temporal distribution and associated risk factor of clinical cases. The data's were collected from registered case record book. A total of 2025 cases were documented during the time period, which were analyzed to assess the importance of existing diseases. The data were analyzed by SPSS version 20 and Chi-square test for significance test. Goats were significantly suffering from various diseases and disorders. The maximum 509 (25.1%) was affected by integumentary disease and lowest 3 (0.1%) was affected with urolthiasis. The others diseases highest to lowest rate were 429 (21.2%), 333(16.4%), 311 (15.4%), 192 (9.5%), 98 (4.8%),61 (3.0%), 57(2.8%), 28 (1.4%), and 4 (0.2) affected with respiratory disease, gastrointestinal disease, infectious disease, reproductive disease, deficiency and metabolic disease, musculoskeletal disease, nerve disease, cold stress, and congenital defect respectively. There was statistically highly significant relation between diseases and sex of goats. The highest disease prevalence 1327 (65.5%) was observed in female than male 698(34.5%). Breeds had significant effect, the highest disease prevalence 1238 (61.1%) was observed in cross goat than pure boer 429(21.2%) and local goat 358 (17.6%). Similarly, the age had significant effect and highest value were 1010 (49.9%), 390 (19.3%), 383 (18.9), and 242 (12.0%) observed in >730 days, 0-180days, 181-365days, and 366-330days ages of goats respectively. Also, the season had significant effect and the overall disease prevalence were highest in winter 731 (356.5%), spring 451 (22.3%), autumn 446 (22), and summer 389 (19.2). Based on the results of this retrospective epidemiologic study of goat diseases; respiratory distress 338, enteritis 289, local abscess 279, or 183 and cawdrosis 160 were the most clinical cases and health problems in the study site.

Introduction

The goat population of Ethiopia was estimated to be 21,884,222 (CSA, 2009). The country holds 13.5% of the African goats' population (FAO, 1991). Small ruminants are wide spread in the tropics and are important to subsistence, economic and social livelihoods of a large human population in these areas. Small ruminant are especially important to women, children, and aged individuals, who are the most vulnerable member of the society in terms of under-nutrition and poverty. The great Indian leader and freedom fighter M. K. Gandhi "father of the nation" designated goats as "poor man's cow," emphasizing the importance of small ruminants in poor countries (Lacasta *et al.*, 2008). The agricultural potential in tropics, particularly in Ethiopia varies, and consequently, wide array of small ruminant production systems with different production goals and priorities, management strategies and practice are found (Ramay, 1999).

In Ethiopia, spread of disease is a major constraint for livestock production. The annual total economic losses due to diseases, mortality and reduced productive and reproductive performance were estimated to 150 million USD (Berhanu, 2002). Currently, restricted attention is given to flock health and comprehensive preventive medicine which give proper consideration to both infectious and non-infectious diseases and designed to increase production by preventing disease, rather than just dispensing traditional treatment to clinically sick animals (Sefinew, 2008).

Even though there have been notable successes in the control of livestock diseases, some still pose problems both in developed and developing countries. In Ethiopia, timely recognition of the diseases followed by acquisition of the pharmaceuticals are lacking due to shortage of infrastructure facilities to support health services delivery. Consequently, in the country majority of disease intervention consists of mass inoculations following outbreaks (Radostits, 2007).

Screening disease occurrence on a study area is the accumulation of valuable information and allowing animal attendants and veterinarians to confidently determine priorities to design preventive measures which consequently leads the prevention of economic losses associated with diseases (Zegye *et al.,* 2013). Diagnosing a disease and provision of treatment and control measures for disease management involves physical examination and generation of a list of differential diagnoses; the critical part of which is clinical examination of individual animal or group of animals (Faccini, 2008).

Prevalence and intensity of pathogenic infections are often seasonal and occur in many species and may be linked to changes in the host or to seasonal changes in the prevalence of the pathogen or vector (Zegye *et al.,* 2013). In this regard, knowledge of temporal pattern of distribution of a disease in a population is important in suggesting the type of disease that is occurring and its possible causes (Radostits, 2007). Understanding on the incidence, prevalence, distribution and determinants or risk factors of diseases in an area is necessary for undertaking efficient control program. The objectives of this study were:

➢ To observe the occurrence and associated risk factors of clinical diseases of goats and to point out the epidemiology of diseases in breeding, evaluation and distribution site.

➢ To give useful information on disease pattern and thus can be used in preventing diseases as well as formulating policies for future management to prevent diseases.

Materials And Methods
Description of Study Area
Debre birhan agricultural research center, Ataye boer breeding, evaluation and distribution site is found 5km far from Ataye town, Eastern Amhara Regional state of Ethiopia. The site located 250 km from Addis Ababa. At'aye (Āt'aye) is a populated place (class P - Populated Place) in Amhara Regional State ((ET10)), Ethiopia (Africa) with the region font code of Africa/Middle East. It is located at an elevation of 1,468 meters above sea level. Its coordinates are 10°21'0" N and 39°55'60" E in DMS (Degrees Minutes Seconds) or 10.35 and 39.9333 (in decimal degrees). Its UTM position is FM04 and its Joint Operation Graphics reference is NC37-07. Ataye's climate is classified as tropical. In winter, there is much less rainfall in Ataye than in summer. At an average temperature of 25.4 °C, June is the hottest month of the year. December has the lowest average temperature of the year. It is 18.7 °C. In a year, the average rainfall is 1085 mm.

Study Animals and Their Management:
Clinically sick, goats were the study subjects in Debre birhan agricultural research center, Ataye boer breeding, evaluation and distribution site. Goats were kept in intensive and semi-intensive management system. Kids weaned at 3 months of age. Goats were reared with two categories of feeding management i.e. concentrate plus green grass /napier/ to pure boer and cross goats, and concentrate only to local goats though out the years. Local and cross goats were allowed to graze from 8:30 am to 11:30 am and from 1:30pm to 5:00pm with 2 h rest (11:30 am to 7:30 pm) when fresh river water and concentrate were supplied. A concentrate was provided twice daily in the morning and evening at the rate of 200g/h/d for pure boer goat with overnight access of hay and once 300g/h/d and 200 g/h/d for cross and local goat respectively at the rest time and also, accessed hay at the rest and night time. Napier grass were allowed for pure and cross goat from 11:30am to 1:30 pm. Kids had access to napier and concentrate feed in addition to their dam's milk before weaning with 100g/h/d to 200g/h/d.

Goats were vaccinated against goat *pox, contagious caprine pleuro pneumonia/CCPP/, pestides petites ruminitis* and *ovine pasterollosis* diseases. They were treated regularly for internal and external parasites. All animals were dipped and sprayed for *ticks, mites* and *other ectoparasites* with Diazinon 60% and Amitrazine (12.5%) and regularly drenched for internal parasites with Albendazole, Tribex, levanide, oxyclozanide, redaflucks and ivermectine for treatment and for prophylaxis measure. Generally, there were a regular follow up of sick animals and the causes of illness and type of disease were registered in case recording book. Morbidity was recorded daily on the basis of observed clinical signs and some by laboratory examinations. Suspected causes of mortality were clarified by taking history, clinical signs before death where showed, postmortem examination and in some cases by laboratory tests.

Study Design
Retrospective epidemiologic study of diseases was done using of five years recorded data (September, 2015 to Augest, 2019) in Debre Birhan Agricultural Research Center, Ataye Goat Breeding, Evaluation and Distribution Site. Diagnosis was based

on fecal, postmortem and clinical examination. Accordingly management system, weaning time and chance of exposure to infectious agent, diseased animals were grouped based on age (as <90 days, 90 - 365 days, 365-730 days, >730days), breed (as pure boer, cross goat (pure boer X local goat, cross boer (f1) X cross boer (f1)), and local goat), sex (female and male), and body condition score (good, medium, and poor). Also the time of exposure were grouped into season (summer from June to august, autumn from September to November, winter from December to February, and spring from march to May)

The data were analyzed retrospectively and interpreted to determine the prevalence of diseases; seasonal pattern and distribution of diseases. The age, breed, sex, and body condition of the animals were collected from the data recording book. There were 2025 clinical cases, which has been registered in case recording book. The encountered cases were grouped into the following **eleven major** categories viz. gastrointestinal disease, respiratory disease, reproductive disease, musculoskeletal disease, integumentary disease, nerve disease, infectious disease, cold stress, congenital defect, urolithiasis and deficiency and metabolic disorders.

Cases of *local abscess, orf, myasis, mengimitis, and contact dermatitis* were grouped as **integumentary disease**. Cases of *Pneumonia/ aspiration pneumonia, and chronic pneumonia/, and Respiratory distress / contagious caprine pleura pneumonia, verminious pneumonia, and pasteurollosis/* were grouped as **respiratory disease**. Cases of *enteritis, gingivitis, internal parasitism /fasciola, pharamphistomum, heamonchus, strongyles, tricuris,* and *monozia/,* and *simple indigestion* were grouped as **gastrointestinal diseases**. Cases of *actinomycosis, cawdrosis, keratoconjectivitis, pesti des petits ruminants' /PPR/,* and *septicaemia* were grouped as cases of **infectious diseases**. Cases such as *abortion, dystocia, mastitis, metritis, orchatis,* and *retained placenta* were all categorized as **reproductive diseases**. Cases of *agalactia, milk fever, and mineral deficiency* were grouped as deficiency and **metabolic disease.** Cases of aging, *arthritis,* mechanical damaged /hernia, bone breakage, and horn breakage/ were grouped as **musculoskeletal disease.** Cases of *coenurosis, enzoticatactia & swayback,* and *parasis* were grouped as **nervous disease.** Also, *schistosomus reflaxisus* and malformed mandible were included in congenital defect.

Data Management and Statistical Analysis:
The data generated were entered and managed in MS excel work sheet. The data were checked manually for obvious inconsistencies, recording errors or missing data. Data were statistically analyzed by Statistical Package for Social Science (SPSS) software 16.0 version. Descriptive statistics was used to determine the prevalence of diseases, seasonal pattern and distribution of diseases. Proportion of different animal's health problems was expressed as percentage by dividing total number of animals positive to a specific health problem to the total number of animals which showed clinical disease. Chi-square (X^2) test with P-value was applied to test the existence of association and to see level of significance between observed health problems and associated risk factors, respectively.

Result And Discussion
Prevalence of Different Clinical Cases and Their Distribution in Sex: In this study a total of 2025 cases were recorded of this respiratory distress, enteritis, local abscess, orf and cawdrosis were the highest case occurred in both sex with an overall occurrences of 338, 289, 279, 183, and 160 cases respectively. Besides of this, Respiratory distress and urolithiasis were the highest and the lowest diseases occurrences in both sexes with overall occurrences of 338 and 3 cases respectively (table 1).

Table 1: Distribution of diseases and disorders in goat observed in age and sex wise

Types of disease	sex		age				total
	female	male	0-180days	180-365day	365-730day	>730day	
Integumentary disease							
Local abscess	203	76	8	21	55	195	279
Orf	120	63	29	24	24	106	183
Myasis	2	4	0	0	0	6	6
Mengimitis	16	17	3	1	5	24	33
Contact dermatitis	-	8	0	0	0	8	8
total	**341**	**168**	**40**	**46**	**84**	**339**	**509**
Respiratory disease							
Pneumonia	62	29	2	23	13	53	91
Respiratory distress	207	131	32	97	66	143	338
Total	**269**	**160**	**34**	**120**	**79**	**196**	**429**
Gastrointestinal disease							

Types of disease	sex		age				total
	female	male	0-180days	180-365day	365-730day	>730day	
Enteritis	145	144	160	95	8	26	289
Gingivitis	1	0	0	0	0	1	1
Internal parasitism	28	12	0	4	8	28	40
Simple indigestion	3	0	0	0	0	3	3
total	**177**	**156**	**160**	**99**	**16**	**58**	**333**
Infectious disease							
Actinomycosis	13	4	0	2	0	15	17
Cawdrosis	86	74	22	36	36	66	160
Keratoconjectivitis	40	28	32	23	0	13	68
PPR	27	0	0	15	11	1	27
Septicaemia	27	12	1	9	2	27	39
Total	**193**	**118**	**55**	**85**	**49**	**122**	**311**
Reproductive disease							
Abortion	54	-	-	-	0	54	54
Dystocia	22	-	-	-	0	22	22
Mastitis	27	-	-	-	0	27	27
Metritis	19	-	-	-	0	19	19
Orchatis	-	5	0	0	1	4	5
Retained placenta	65	-	-	-	0	65	65
total	**187**	**5**	**0**	**0**	**1**	**191**	**192**
Metabolic disease							
Agalactia	36	27	63	-	-	-	63
Milk fever	14	-	-	-	0	14	14
Mineral defficiency	18	3	0	10	10	1	21
Total	**68**	**30**	**63**	**10**	**10**	**15**	**98**
Musculoskeletal disease							
Aging	6	3	-	-	-	9	9
Arthritis	0	7	0	5	0	2	7
Mechanical damaged	41	4	2	2	0	41	45
Total	**47**	**14**	**2**	**7**	**0**	**52**	**61**
Nervous disease							
Coenurosis	0	1	0	0	0	1	1
Enzotic atactia & swayback	2	12	8	3	1	2	14
Parasis	25	17	0	13	2	27	42
Total	**27**	**30**	**8**	**16**	**3**	**30**	**57**
Cold stress	14	14	28	-	-	-	28
Congenital defect	1	3	4	-	-	-	4
Urolithiasis	3	0	0	0	0	3	3
Grand total	**1327**	**698**	**1010**	**390**	**383**	**242**	**2025**

In this stud there was statistically highly significant relation between diseases and sex of goats. Based on the study higher clinical cases were registered in female goat with prevalence of 65.5%. The present finding was in agreement with the report of Ali *et al* (2011) and Asres *et al.,* (2014), they report female goats were more prone to disease than male goats. Integumentary disease and urolithiasis case were the highest and lowest in both sexes as compared to other diseases (Table 2). The occurrence of diseases was found to be more in females than males. It could associate with higher number of female animals as compared to male in the study site. In addition, it might also partly associate with the low level of immunity of female animals. Susceptibility to infection in female animals is maximized during time of per parturient and parturition where relaxation of resistance and suppression of immunity happens (Sefinew and Bider, 2011).

Table 2: Cross tabulation of diseases and different sex of goats

Types of disease	sex		Total chi square value (%)
	Female (%)	Male (%)	
Integumentary disease	341 (16.8)	168 (8.3)	509 (25.1)
Respiratory disease	269 (13.3)	160 (7.9)	429 (21.2)
Gastrointestinal disease	177 (8.7)	156 (7.7)	333 (16.4)
Infectious disease	193 (9.5)	118 (5.8)	311 (15.4)
Reproductive disease	187 (9.2)	5 (0.2)	192 (9.5)
Metabolic disease	68 (3.4)	30 (1.5)	98 (4.8) 135.520***
Musculoskeletal disease	47 (2.3)	14 (0.7)	61 (3.0)
Nervous disease	27 (1.3)	30 (1.5)	57 (2.8)
Cold stress	14 (0.7)	14 (0.7)	28 (1.4)
Congenital defect	1 (0.0)	3 (0.1)	4 (0.2)
Urolithiasis	3 (0.1)	0 (0.0)	3 (0.1)
Grand total	1327 (65.5)	698 (34.5)	2025 (100.0)

*** There is statistically highly significant relation between diseases and sex of goats.

Prevalence of Clinical Cases in breed:
In the present study respiratory distress, enteritis, local abscess, orf and cawdrosis were the highest case occurred in all breeds with an overall occurrences of 338, 289, 279, 183, and 160 cases respectively. It was also observed that arthritis and urolithiasis were not recorded in pure boer and local goats (table 3). From total observed disease conditions, higher clinical cases were registered in cross goat as compared to pure boer and local goat (table 3). The difference in the number of clinical cases between breed might be associated with the number of population of animals in the study area, management difference, or difference in natural immunity.

Table 3: Distribution of diseases and disorders in goat observed in breed and body condition score wise

Types Of Disease	Breed			Body Condition Score			Total
	Pure Boer	Cross goats	Local goat	Good	Medium	Poor	
Integumentary disease							
Local abscess	67	165	47	63	158	58	279
Orf	64	85	34	16	99	68	183
Myasis	2	2	2	0	4	2	6
Mengimitis	14	17	2	2	19	12	33
Contact dermatitis	2	6	0	0	7	1	8
total	**149**	**275**	**85**	**81**	**287**	**141**	**509**
Respiratory disease							
Pneumonia	36	48	7	9	36	46	91
Respiratory distress	36	263	39	37	227	74	338
Total	**72**	**311**	**46**	**46**	**263**	**120**	**429**
Gastrointestinal disease							
Enteritis	61	224	4	47	139	103	289
Gingivitis	1	0	0	0	1	0	1
Internal parasitism	6	21	13	2	8	30	40
Simple indigestion	2	1	0	0	1	2	3
total	**70**	**246**	**17**	**49**	**149**	**135**	**333**
Infectious disease							
Actinomycosis	3	9	5	2	6	9	17
Cawdrosis	27	121	12	27	95	38	160
Keratoconjectivitis	12	51	5	13	29	26	68
PPR	0	0	27	3	15	9	27
Septicaemia	23	10	6	7	23	9	39
Total	**65**	**191**	**55**	**52**	**168**	**91**	**311**
Reproductive disease							
Abortion	8	28	18	15	25	14	54
Dystocia	5	6	11	3	12	7	22
Mastitis	6	10	11	6	13	8	27

Types Of Disease	Breed			Body Condition Score			Total
	Pure Boer	Cross goats	Local goat	Good	Medium	Poor	
Metritis	3	6	10	3	10	6	19
Orchatis	2	3	-	0	4	1	5
Retained placenta	12	29	24	15	28	22	65
total	36	82	74	42	92	58	192
Metabolic disease							
Agalactia	11	52	-	1	2	60	63
Milk fever	2	1	11	0	0	14	14
Mineral deficiency	0	4	17	1	5	15	21
Total	**13**	**57**	**28**	**2**	**7**	**89**	**98**
Musculoskeletal disease							
Aging	2	2	5	2	1	6	9
Arthritis	0	7	0	1	3	3	7
Mechanical damaged	6	7	32	5	22	18	45
Total	**8**	**16**	**37**	**8**	**26**	**27**	**61**
Nervous disease							
Coenurosis	1	0	0	0	0	1	1
Enzoticatactia & swayback	7	7	0	2	4	8	14
Parasis	6	20	16	1	20	21	42
Total	**14**	**27**	**16**	**3**	**24**	**30**	**57**
Cold stress	1	27	-	0	6	22	28
Congenital defect	1	3	-	0	2	2	4
Urolithiasis	0	3	0	0	2	1	3
Grand total	**429**	**1238**	**358**	**283**	**1026**	**716**	**2025**

In this stud there was statistically highly significant relation between diseases and breeds of goats. The results obtained from the study showed that clinical cases were more prominent in cross goats (61.1%) than that of pure boer (21.1), and local goat (17.6%). The present finding was in agreement with the report of Asres *et al.,* (2014); they report cross goats were more prone to disease than local goats. This might associated with the presence of higher number of cross breed animals in the study area.

Integumentary disease and respiratory disease were the highest case occurrences in all breed with prevalence rate of 25.1% and 21.2 respectively. Besides this, clinical cases of urolithiasis were not observed in pure boer and local goat (Table 4). Internal parasitism was less observed than other breeds. This might be pure boer were indoor but other breeds were allowed to graze as a result they easily access the parasite.

Table 4: Cross tabulation of diseases and different breeds of goats

Types Of Disease	Breed			Total (%) chi square value
	Pure Boer (%)	Cross goats (%)	Local goat (%)	
Integumentary disease	149 (7.4)	275 (13.6)	85 (4.2)	509 (25.1)
Respiratory disease	72 (3.6)	311(15.4)	46 (2.3)	429 (21.2)
Gastrointestinal disease	70 (3.5)	246 (12.1)	17 (0.8)	333 (16.4)
Infectious disease	65 (3.3)	191 (9.4)	55 (2.7)	311 (15.4)
Reproductive disease	36 (1.8)	82 (4.0)	74 (3.7)	192 (9.5) 252.894***
Metabolic disease	13 (0.6)	57 (2.8)	28 (1.4)	98 (4.8)
Musculoskeletal disease	8 (0.4)	16 (0.8)	37 (1.8)	61 (3.0)
Nervous disease	14 (0.7)	27 (1.3)	16 (0.8)	57 (2.8)
Cold stress	1 (0.0)	27 (1.3)	-	28 (1.4)
Congenital defect	1(0.0)	3 (0.1)	-	4 (0.2)
Urolithiasis	0 (0.0)	3 (0.1)	0 (0.0)	3 (0.1)
Grand total	429 (21.2)	1238 (61.1)	358(17.6)	2025 (100.0)

*** There is statistically highly significant relation between diseases and different breeds of goats.

Disease Distribution in Age: In this stud there was statistically highly significant relation between diseases and ages of goats. Of the total 2025 clinical cases, 19.9%, 18.9%, 12.0% and 49.9%, were observed in the age group of 0- 180 days, 181-365 days, 366-730 day and >730 day respectively (Table 5). Animals with age group of >730days old were most significantly susceptible to diseases. This might associate with chance of exposure to infectious agents increase as their life period of goat increase. In this study the rate of infection to internal parasitism, local abscess and cawdrosis increase but keratoconjectivitis and enteritis decrease as the ages of goats increases (Table 1).

Table 5: Cross tabulation of diseases and different age of goats

Types of disease	age				Total chi square value (%)
	0-180days (%)	181-365day (%)	366-730day (%)	>730day (%)	
Integumentary disease	40 (2.0)	46 (2.3)	84 (4.1)	339 (16.7)	509 (25.1)
Respiratory disease	34 (1.7)	120 (5.9)	79 (3.9)	196 (9.7)	429 (21.2)
Gastrointestinal disease	160 (7.9)	99 (4.9)	16 (0.81)	58 (2.9)	333 (16.4)
Infectious disease	55 (2.7)	85 (4.2)	49 (2.4)	122 (6.0)	311 (15.4)
Reproductive disease	0 (0.0)	0 (0.0)	1 (0.0)	191 (9.4)	192 (9.5)
Metabolic disease	63 (3.1)	10 (0.5)	10 (0.5)	15 (0.7)	98 (4.8) 911.729***
Musculoskeletal disease	2 (0.1)	7 (0.3)	0 (0.0)	52 (2.6)	61 (3.0)
Nervous disease	8 (0.4)	16 (0.8)	3 (0.1)	30 (1.5)	57 (2.8)
Cold stress	28 (1.4)	-	-	-	28 (1.4)
Congenital defect	4 (0.2)	-	-	-	4 (0.2)
Urolithiasis	0 (0.0)	0 (0.0)	0 (0.0)	3 (0.1)	3 (0.1)
Grand total	390 (19.3)	383 (18.9)	242 (12.0)	1010 (49.9)	2025 (100.0)

*** There is statistically highly significant relation between diseases and different ages of goats.

Pattern of Diseases Season: In this study, there was statistically highly significant relation between diseases and different seasons for goats, which was in agreement with the report of Ali *et al.,* (2011) and Asres *et al.,* (2014). Peak cases were observed during the season of winter with a rate of 36.5% (table 6). As a result of scarce grazing, animals graze close to the ground and have higher chance to acquire infectious agents. Those animals which are under fed and debilitated had low resistance to infection. Integumentary diseases were highest in winter season as compared to other seasons (table 6). This condition might be associated with the shortage of feed, animals graze close to the ground and dust might favour transmission of infectious agents and other environmental stress factors. Peak parasitic cases were observed during the winter season while the lowest number of cases of parasite was observed in summer season, with which agrees with works of Alemu *et al*., (2009) who reported highest prevalence of small ruminant lungworms was in November and February, bit disagrees with the finding of Asres *et al.,* (2014), they reported peak parasitic cases were observed during the months of September and August while the lowest number of cases of parasite was observed in December, November and February. The difference might be associated with variation in seasonal factors as the epidemiology of gastrointestinal parasitic infections is influenced by climatic factors (particularly rainfall and temperature), management systems used for the animals and parasite factors including intermediate hosts all determine the epidemiology of the parasite as well (Kusiluka and Kambarage, 2006).

In this findings, highest cases of respiratory disease were recorded in main rain season (summer) (table 7), which was in agreement with Asres *et al.,* (2014), they report pneumonia was peaked at months of July. Marked changes in weather and other factors that impair innate or adaptive resistance increase susceptibility to pneumonia (Radostits, 2007). In such cases, most of the bacteria which are normally resident in the upper respiratory tract have the ability to establish themselves in the lower respiratory tract (lung) and cause disease when the defence mechanism of the host is affected (Lopez, 1995). Therefore, the highest number of respiratory disease is associated with change in the factors that determine animals 'resistance to infection or due to lack of an effective vaccine against pasteurellosis.

Table 6: Cross tabulation of diseases and different seasons

Types Of Disease	Season				Total (%) chi square value
	Autumn (%)	Winter (%)	Spring (%)	Summer (%)	
Integumentary disease	90 (4.4)	222 (11.0)	140 (6.9)	57 (2.8)	509 (25.1)
Respiratory disease	94 (4.6)	80 (4.0)	92 (4.5)	163 (8.0)	429 (21.2)
Gastrointestinal disease	77 (3.8)	169 (8.3)	62 (3.1)	25 (1.2)	333 (16.4)
Infectious disease	44 (2.2)	130 (6.4)	71 (3.5)	66 (3.3)	311 (15.4)
Reproductive disease	63 (3.1)	62 (3.1)	32 (1.6)	35 (1.7)	192(9.5) 311.537***
Metabolic disease	34 (1.7)	33 (1.6)	29 (1.4)	2 (0.1)	98 (4.8)
Musculoskeletal disease	14 (0.7)	18 (0.9)	17 (0.8)	12 (0.6)	61 (3.0)
Nervous disease	20 (1.0)	5 (0.2)	7 (0.3)	25 (1.2)	57 (2.8)
Cold stress	8 (0.4)	18 (0.9)	1 (0.0)	1 (0.0)	28 (1.4)
Congenital defect	0 (0.0)	1 (0.0)	0 (0.0)	3 (0.1)	4 (0.2)
Urolithiasis	2 (0.1)	1 (0.0)	0 (0.0)	0 (0.0)	3 (0.1)
Grand total	446 (22.0)	739 (36.5)	451 (22.3)	389 (19.2)	2025 (100.0)

*** There is statistically highly significant relation between diseases and different seasons for goats.

Table 7: Distribution of diseases and disorders in goat observed from September 2014 to August 2019 and season wise

Types Of Disease	Season				Year						Total
	Autumn	Winter	Spring	Summer	2014	2015	2016	2017	2018	2019	
Integumentary disease											
Local abscess	50	93	100	36	19	44	64	81	56	15	279
Orf	33	107	29	14	5	38	28	20	92	0	183
Myasis	3	3	0	0	0	0	1	0	4	1	6
Mengimitis	3	15	8	7	0	0	7	9	2	15	33
Contact dermatitis	1	4	3	0	0	0	0	3	4	1	8
total	**90**	**222**	**140**	**57**	**26**	**82**	**100**	**113**	**158**	**32**	**509**
Respiratory disease											
Pneumonia	26	17	33	15	20	10	21	15	17	8	91
Respiratory distress	68	63	59	148	0	0	160	101	27	50	338
Total	**94**	**80**	**92**	**163**	**20**	**10**	**181**	**116**	**44**	**58**	**429**
Gastrointestinal disease											
Enteritis	63	155	52	19	14	86	33	91	56	9	289
Gingivitis	0	0	1	0	0	1	0	0	0	0	1
Internal parasitism	11	14	9	6	0	0	10	20	8	2	40
Simple indigestion	3	0	0	0	3	0	0	0	0	0	3
total	**77**	**169**	**62**	**25**	**17**	**87**	**43**	**111**	**64**	**11**	**333**
Infectious disease											
Actinomycosis	3	5	6	3	2	0	0	4	10	1	17
Cawdrosis	20	52	56	32	2	4	37	38	53	26	160
Keratoconjectivitis	14	42	9	3	1	21	9	21	16	0	68
PPR	0	0	0	27	0	0	0	27	0	0	27
Septicaemia	7	31	0	1	7	6	15	8	3	0	39
Total	**44**	**130**	**71**	**66**	**12**	**31**	**61**	**98**	**82**	**27**	**311**
Reproductive disease											
Abortion	20	14	7	13	0	0	19	19	15	1	54
Dystocia	8	11	2	1	0	4	1	9	8	0	22
Mastitis	5	4	9	9	1	2	1	16	5	2	27
Metritis	6	11	2	0	3	10	2	4	0	0	19
Orchatis	4	1	0	0	0	0	0	1	4	0	5
Retained placenta	20	21	12	12	3	10	23	20	9	0	65
total	**63**	**62**	**32**	**35**	**7**	**26**	**46**	**69**	**41**	**3**	**192**
Metabolic disease											

Types Of Disease	Season				Year						Total
	Autumn	Winter	Spring	Summer	2014	2015	2016	2017	2018	2019	
Agalactia	15	23	25	0	0	0	37	20	6	0	63
Milk fever	0	10	3	1	0	0	12	2	0	0	14
Mineral deficiency	19	0	1	1	0	0	0	19	0	2	21
Total	**34**	**33**	**29**	**2**	**0**	**0**	**49**	**41**	**6**	**2**	**98**
Musculoskeletal disease											
Aging	1	3	1	4	0	0	0	4	3	2	9
arthritis	3	4	0	0	0	3	0	3	1	0	7
Mechanical damage	10	11	16	8	8	13	9	5	6	4	45
Total	**14**	**18**	**17**	**12**	**8**	**16**	**9**	**12**	**10**	**6**	**61**
Nervous disease											
Coenurosis	0	0	1	0	0	0	0	0	0	1	1
Enzootic atactia & swayback	2	5	6	1	1	2	1	5	3	2	14
Parasis	18	0	0	24	0	0	16	1	12	13	42
Total	**20**	**5**	**7**	**25**	**1**	**2**	**17**	**6**	**15**	**16**	**57**
Cold stress	**8**	**18**	**1**	**1**	**0**	**0**	**1**	**24**	**3**	**0**	**28**
Congenital defect	**0**	**1**	**0**	**3**	**0**	**0**	**0**	**3**	**1**	**0**	**4**
Urolithiasis	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**2**	**0**	**3**
Grand total	**446**	**739**	**451**	**389**	**89**	**254**	**507**	**594**	**426**	**155**	**2025**

Distribution of Clinical Cases in Years: The general frequency of the diseases were randomly distributed throughout the year, but relatively more cases were encountered during 2017 (594 cases) followed by 2016 (507) as stated in Table 7. Occurrence of variable number of cases in the study years might be due to not full period study on the year 2014 and 2019. Also it might be associated with changes in environmental factors like rain fall, temperature and humidity which might affect animal disease occurrence among the study years.

Prevalence of Clinical Cases in body condition score: In this study, there was statistically highly significant relation between diseases and different body condition scores of goats. Of overall, peak cases were observed on medium body conditioned goats with prevalence a rate of 50.7% (Table 8), but *agalactia, milk fever*, and mineral deficiency cases were more observed in poor conditioned goats as compared to medium and good conditioned goats (Table 3). The relative variation in the distribution of the number of clinical cases within body condition score might be associated with the number of population of animals in the study area, management difference, or difference in natural immunity.

Table 8: Cross tabulation of diseases and different body condition score of goats

Types Of Disease	Body Condition Score			Total (%) chi square value
	Good (%)	Medium (%)	Poor (%)	
Integumentary disease	81 (4.0)	287 (14.2)	141 (7.0)	509 (25.1)
Respiratory disease	46 (2.3)	263 (13.0)	120 (5.9)	429 (21.2)
Gastrointestinal disease	49 (2.4)	149 (7.4)	135 (6.7)	333 (16.4)
Infectious disease	52 (2.6)	168 (8.3)	91 (4.5)	311 (15.4)
Reproductive disease	42 (2.1)	92 (4.5)	58 (2.9)	192 (9.5) 221.029***
Metabolic disease	2 (0.1)	7 (0.3)	89 (4.4)	98 (4.8)
Musculoskeletal disease	8 (0.4)	26 (1.3)	27 (1.3)	61 (3.0)
Nervous disease	3 (0.1)	24 (1.2)	30 (1.5)	57 (2.8)
Cold stress	0 (0.0)	6 (0.3)	22 (1.1)	28 (1.4)
Congenital defect	0 (0.0)	2 (0.1)	2 (0.1)	4 (0.2)
Urolithiasis	0 (0.0)	2 (0.10	1 (0.0)	3 (0.1)
Grand total	283 (14.0)	1026 (50.7)	716 (35.4)	2025 (100.0)

*** There is statistically highly significant relation between diseases and different body condition score of goats.

Conclusion

Based on the results of this retrospective epidemiologic study of goat diseases; respiratory distress, enteritis, local abscess, orf and cawdrosis were most clinical cases and health problems in the breeding site. The occurrence of diseases were found to be more in females than male's as well in cross goat than local goat and pure boer. The prevalence of diseases was more >730days age. It also observed that distribution of diseases were affected by temporal factors. Identification of risk factors of diseases will help to initiate efficient control program. Increased production of goat meat and skin are deeply related to management of the goat, identification of risk factors of diseases and disorder. Therefore strategies should be taken to minimize their occurrence.

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