

## **Prevalence of Lameness and Associated Risk Factors in Ruminants in Jimma Zone of Oromia Region, South-western Ethiopia**

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**Abstract:** A cross sectional study was carried out between November, 2016 and March, 2017 with the objectives of surveying the prevalence of lameness and its causes in ruminants at Dedo and Serbo districts markets, Jimma zone, South western Ethiopia. Animals were examined visually and physically by palpating for the presence of lameness. Out of a total of 933 ruminants inspected 51 (5.5%) were found affected by lameness in Dedo (524) and in Serbo districts (409). The prevalence of lameness was 33 (3.5%) and 18 (1.9%) in Dedo and Serbo markets, respectively. Species was observed to significantly influence the prevalence of lameness ( $P < 0.05$ ) in both markets, higher prevalence was observed in sheep 17(3.2%) in Dedo and 10 (2.4%) in Serbo market. There was no statistical significant variation ( $P > 0.05$ ) in the occurrence of lameness between sex groups in both markets. There was no statistical significant variation ( $P > 0.05$ ) in the occurrence of lameness between age groups in Dedo district markets. But it has statistical significant variation ( $P < 0.05$ ) in Serbo district markets. But the rate is higher in young's in both markets, 19(3.6%) and 12 (2.9%) in Dedo and Serbo, respectively. Major lesion rendering lameness was attributed to trauma 21 (42%) and 9 (18%) in Dedo and Serbo markets, respectively. Joint problem was found to be the least observed in both markets with 1 (2%) and 2 (4%), respectively. There was no statistical significant variation ( $P > 0.05$ ) in the type of lesion between species, sex and age groups in Dedo and Serbo markets. In all markets and in all species of ruminants the major cause of lameness was trauma, with 25% in cattle, 31.2% in sheep and 9.4% in goat in Dedo district markets and 11.1% in cattle, 33.3% in sheep and 1% in goat in Serbo district market. In Dedo district markets, adults (34.4%) were more frequently affected by trauma than young's (31.2%) but in Serbo district markets the rate of trauma is higher in young' (38.9%) than adult (11.1%). In Dedo district market, both males and females were frequently affected by trauma with 50% and 15.6%, respectively but in Serbo district males frequently affected by fracture and trauma with 22.2% each and females by trauma (27.8%).

**Key words:** Cross Sectional • Dedo • Fracture • Serbo • Trauma

### **INTRODUCTION**

In Ethiopia, agriculture contributes about 50% to the overall gross domestic product (GDP), generates 90% of export earnings and provides employment for 80% of the population [1]. Livestock is an integral part of the agriculture and the contribution of live animals and their products to the agricultural economy accounts for 47% [2]. The recent livestock population census shows that Ethiopia has about 53,990,061 cattle, 25,489,204 sheep and 24,060,792 goats [3].

Animal handling is an important subject since it affects not only animals' emotional and welfare states but also the economics and the value of the animals. Due to the fact that abusive handling can, or most likely will, result in lowered production [4]. In Ethiopia, handling of animals is usually aversive [5].

Lameness can be described as a condition where the affected animal reduces weight bearing on one or more limbs [6] and it is generally characterized by an inability to maintain a normal gait pattern manifested by asymmetry in movement, apparent in coordination, or weakness and inefficient or ineffective locomotion. Lameness can be

assessed when the animal is moving on its own although severe lameness can cause reluctance or inability to move [7].

Although various researches have been carried out to evaluate the prevalence of parasitic and infectious diseases in ruminants, little or no study was conducted on prevalence of lameness in ruminants at market levels. Most of studies were only able to evaluate lameness in dairy cattle and equines and little is studied at market levels. Reports related to the prevalence of lameness in small ruminants are scarce. With this as a background, the main objective of this study was to evaluate the prevalence of lameness and its causes in ruminants in Dedo and Serbo districts markets of Jimma zone.

## **MATERIALS AND METHODS**

**Study Area Description:** The study was conducted from November 2016 to March 2017 in Dedo and Serbo districts livestock markets in Jimma zone, Oromia regional state, south western Ethiopia. The annual average rainfall and temperature lies between 1200 to 2000 mm and 7°C to 30°C, respectively. According to the statistical data obtained [1], Jimma zone has a livestock population of 2,016,823 cattle, 288,411 goats, 942,908 sheep and 74,574 horses, 49,489 donkey, 28,371 mules and 1,139,735 poultry.

**Study Animals and Design:** Cross sectional study was conducted on 933 randomly selected ruminants (546 cattle, 235 sheep and 152 goats) found in Dedo and Serbo districts markets of Jimma zone.

**Sample Size Determination:** To determine the sample size, the expected prevalence in the study area was assumed to be 50% at 95% confidence interval because of absence of previous study. Therefore, the sample size was calculated based on the formula given by Thrusfield [8], which will be 384 but to increase precision 933 ruminants were sampled.

**Study Methodology:** Animals were examined visually and physically by palpating for the presence of lameness; the results were recorded according to the place of market, the type of wound, species, sex and age of the animal.

**Data Analysis:** Data obtained from the study was analyzed using SPSS version 20.0. Prevalence of lameness was determined as the proportion of lamed animals out of

the total examined. Association and risk of factors relating to occurrence of lameness was investigated using chi-square test ( $X^2$ ).

## **RESULTS**

During the present study, the prevalence and major causes of lameness in ruminants at Dedo and Serbo district markets of Jimma zone, south western Ethiopia were surveyed. Out of a total of 933 ruminants (524 in Dedo and 409 in Serbo) were inspected 51 (5.5%) were found affected by lameness in all markets. The prevalence of lameness was 33 (3.5%) and 18 (1.9%) in Dedo and Serbo districts markets, respectively.

Species was observed to significantly influence the prevalence of lameness ( $P < 0.05$ ) in all markets, higher prevalence was observed in sheep 17 (3.2%) in Dedo district and 10 (2.4%) in Serbo district markets (Table 1). There was no statistical significant variation ( $P > 0.05$ ) in the occurrence of lameness between sex groups in all markets (Table 2). Both male and female has equal probability of be lamed but the rate is higher in male 25 (4.8%) and 12 (2.9%) in Dedo and Serbo districts markets, respectively (Table 2). There was no statistical significant variation ( $P > 0.05$ ) in the occurrence of lameness between age groups in Dedo district markets. But it has statistical significant variation ( $P < 0.05$ ) in Serbo district markets. But the rate is higher in young's in all markets, 19 (3.6%) and 12 (2.9%) in Dedo and Serbo districts markets, respectively (Table 3).

Major lesion rendering lameness was attributed to trauma 21 (42%) and 9 (18%) in Dedo and Serbo districts markets, respectively (Figure 1). Joint problem was found to be the least observed in Dedo and Serbo districts markets, with 1 (2%) and 2 (4%), respectively.

There was no statistical significant variation ( $P > 0.05$ ) in the type of lesion between species, sex and age groups in all markets. In all markets, in all species the major cause of lameness was trauma, with 25% in cattle, 31.2% in sheep and 9.4% in goat in Dedo district markets and 11.1% in cattle, 33.3% in sheep and 1% in goat in Serbo district markets (Table 4). In Dedo district markets, adults were more frequently affected by trauma with 34.4% than young's (31.2%) but in Serbo district markets the rate of trauma is higher in young's with 38.9% than adults (11.1%) (Table 5). In Dedo district markets both male and females frequently affected by trauma with 50% and 15.6%, respectively but in Serbo district markets males frequently affected by fracture and trauma with 22.2% each and females by trauma (27.8%; Table 6).

Table 1: Prevalence of lameness among species in both markets

Market	Species	Total examined	Positive	$\chi^2$ value	P-value
Dedo district	Cattle	311 (59.4%)	12 (2.3%)	13.567	0.001
	Sheep	130 (24.8%)	17 (3.2%)		
	Goat	83 (15.8%)	4 (0.8%)		
	Total	524 (100%)	33 (6.3%)		
Serbo district	Cattle	235 (57.5%)	6 (1.5%)	8.827	0.012
	Sheep	105 (25.7%)	10 (2.4%)		
	Goat	69 (16.9%)	2 (0.5%)		
	Total	409 (100%)	18 (4.4%)		

Table 2: Prevalence of lameness among sex groups in both markets

Market	Sex	Total examined	Positive	$\chi^2$	OR (95% CI)	P-value
Dedo	Male	398 (76.0%)	25 (4.8%)	0.001	1 (0.434-2.251)	0.978
	Female	126 (24.0%)	8 (1.5%)			
	Total	524 (100)	33 (6.3%)			
Serbo	Male	328 (80.2%)	12 (2.9%)	2.170	0.475 (0.173-1.306)	0.141
	Female	81 (19.8%)	6 (1.5%)			
	Total	409 (100%)	18 (4.4%)			

Table 3: Prevalence of lameness among age groups in Dedo and Serbo districts markets

Market	Age	Total examined	Positive	$\chi^2$ -	OR (95% CI)	P- value
Dedo	Young	235 (44.8%)	19 (3.6%)	2.307	1.728 (0.847-3.525)	0.129
	Adult	289 (55.2%)	14 (2.7%)			
	Total	524 (100%)	33 (6.3%)			
Serbo	Young	172 (42.1%)	12 (2.9%)	4.681	2.888 (1.062-7.853)	0.031
	Adult	237 (57.9%)	6 (1.5%)			
	Total	409 (100%)	18 (4.4%)			

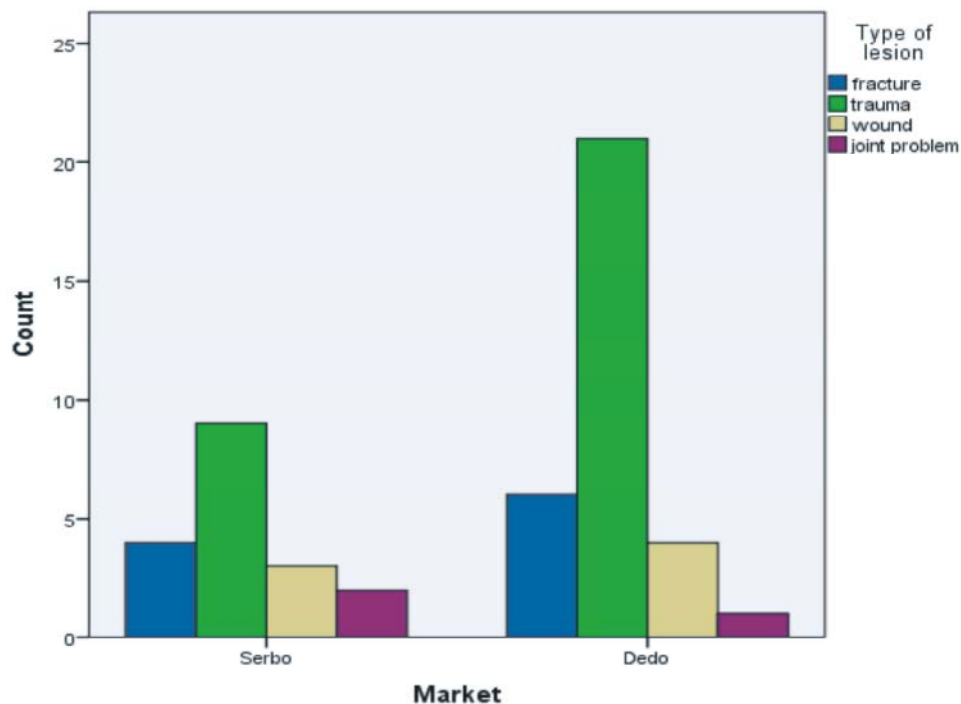


Fig. 1: Type of lesion observed in Dedo and Serbo districts markets

Table 4: Type of lesion among species groups

Market	Species	Type of lesion				Total	X <sup>2</sup>	P-value
		Fracture	Trauma	Wound	Joint Problem			
Dedo	Cattle	2(6.2%)	8(25%)	2(6.2%)	-	12 (37.5%)	1.857	0.932
	Sheep	3(9.4%)	10 (31.2%)	2(6.2%)	1(3.1%)	16(50%)		
	Goat	1(3.1%)	3(9.4%)	-	-	4 (12.5%)		
	Total	6 (18.8%)	21 (65.6%)	4 (12.5%)	1 (3.1%)	32 (100%)		
Serbo	Cattle	1(5.6%)	2(11.1%)	2 (11.1%)	1(5.6%)	6 (33.3%)	3.333	0.766
	Sheep	2 (11.1%)	6(33.3%)	1(5.6%)	1(5.6%)	10 (55.6%)		
	Goat	1(5.6%)	1(5.6%)	-	-	2 (11.1%)		
	Total	4 (22.2%)	9(50%)	3 (16.7%)	2 (11.1%)	18 (100%)		

Table 5: Type of lesion among age groups

Market	Age	Type of lesion				Total	X <sup>2</sup>	P-value
		Fracture	Trauma	Wound	Joint Problem			
Dedo	Young	5 (15.6%)	10 (31.2%)	2(6.2%)	1(3.1%)	18 (56.2%)	3.265	0.353
	Adult	1(3.1%)	11 (34.4%)	2(6.2%)	-	14 (43.8%)		
	Total	6 (18.8%)	21 (65.6%)	4 (12.5%)	1(3.1%)	32 (100%)		
Serbo	Young	2 (11.1%)	7(38.9%)	1(5.6%)	2(11.1%)	12 (66.7%)	3.500	0.321
	Adult	2 (11.1%)	2(11.1%)	2 (11.1%)	-	6 (33.3%)		
	Total	4 (22.2%)	9(50%)	3 (16.7%)	2(11.1%)	18 (100%)		

Table 6: Type of lesions among sex groups

Market	Sex	Type of lesion				Total	X <sup>2</sup>	P-value
		Fracture	Trauma	Wound	Joint Problem			
Dedo	Male	4(12.5%)	16(50%)	4(12.5%)	-	24 (75%)	4.571	0.206
	Female	2(6.2%)	5 (15.6%)	-	1(3.1%)	8(25%)		
	Total	6 (18.8%)	21 (65.6%)	4 (12.5%)	1(3.1%)	32 (100%)		
Serbo	Male	4 (22.2%)	4 (22.2%)	3 (16.7%)	1(5.6%)	12 (66.7%)	5.750	0.124
	Female	-	5 (27.8%)	-	1(5.6%)	6 (33.3%)		
	Total	4 (22.2%)	9(50%)	3 (16.7%)	2(11.1%)	18 (100%)		

## DISCUSSION

The current study was revealed an overall prevalence of lameness in ruminants in Dedo and Serbodistricts markets was 5.5%. The prevalence was higher in Dedo district markets with 3.5% when compared to Serbo district markets (1.9%). This result is in proximate of the result of Haftu *et al.* [9], who reported 3.8% prevalence in Abergelle fattening farm of Alamata, south tigray, Ethiopia, Jerlström [10], who reported 3% at Gudar, Kera and Shola markets in Guder and Addis Ababa markets, Mishamo and Abebe [11] also reported 3.5% prevalence in selected dairy farms of Hawassa town and Hambali *et al.* [12], who reported 4.3% at herd level in Karu Local Government areas of Nasarawa state, Nigeria. But our result is lower than the report of Ali *et al.* [13], who reported 26.8% in cart mules in Bahir Dar town, Ethiopia and Amene *et al.* [14], who reported 40.2% prevalence in cart pulling donkeys in Hawassa city administration, southern Ethiopia.

This could be explained probably attributed to species differences, management differences and different geographical locations.

In our study species was found to be significantly influence on the occurrence of lameness in all study markets, where sheep were frequently affected by lameness compared to cattle and goat, this is may be due to overcrowding during handling. Sex was not found to vary lameness in both markets but the rate is higher in male than female, this finding is in consistence with the result of Hambali *et al.* [12]. There was no statistical significant variation in the occurrence of lameness between age groups in Dedo district markets but it has statistical significant variation in Serbo district markets with higher prevalence in young's in both districts markets (3.6% and 2.9%, respectively). This result is in contrary to Haftu *et al.* [9], who reported adults were frequently affected, this is may be due to difference in method of classification of age and species of animals involved in the study.

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