

STUDY ON THE PREVALENCE OF IXODID TICK INFESTATION AND ITS ASSOCIATED RISK FACTORS IN CATTLE IN AND AROUND LAY ARMACHIHO DISTRICTS OF AMHARA REGION, NORTH WEST ETHIOPIA.

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ABSTRACT: Background: *Ticks* are harmful blood sucking external parasites and cause economic loss towards livestock production and have a negative impact on food security, animal product and by products. Objectives: To estimate the prevalence of Ixodid Tick and its Associated Risk Factors in cattle in Lay Armachiho District, Amhara region, Northwest Ethiopia. **Methods:** Simple random sampling procedure was used for selecting study animals. Descriptive statistics and mixed effect logistic regression was used to assess the associations between ticks and its potential risk factors. Results: The overall prevalence of tick-borne hemoparasite was 37.76% (95% CI: 0.33-0.43) in the study area. From identified ticks, the genus level prevalence was 14.32%, 11.98%, 7.55% and 3.91% for *Amblyomma*, *Boophilus*, *Rhipicephalus* and *Hyalomma*, respectively. Groin and scrotum/udder is the most favorable tick attachment sites followed by dewlap, belly, neck, under tail and legs/hooft. Based on mixed effect logistic regression analysis, communal grazing land, agroecology, study kebeles, body condition score, season and communal watering point were identified as potential risk factors. **Conclusions:** Tick infestation plays an important role for the reduction of production and productivity in livestock industries. Therefore, strategic tick control measures should be carried out in order to minimize losses attributed to ticks in Ethiopia. *Researcher* 2024;16(10):35-45. ISSN 1553-9865 (print); ISSN 2163-8950 (online). <http://www.sciencepub.net/researcher>. 03. doi:[10.7537/marsrj161024.03](https://doi.org/10.7537/marsrj161024.03)

Key words: Cattle, Lay Armachiho, Prevalence, Tick, Risk factors

INTRODUCTION

1.1. Background

Ethiopia has an extremely diverse topography, a variety climatic features and agro ecological zones that are expedient to host a very large animal population [1]. It has the largest livestock population in Africa with an estimate of 78 million cattle, 42.9 million sheep, 52.5 million goats, 2.11 million horses, 0.38 million mules, 8.98 million donkeys, 8.1 million camels and 57 million of poultry [2].

Livestock sub sector plays vital roles in national economy like in generating income to farmers, creating job opportunities, ensuring food security, providing services, contributing to asset, social, cultural and environmental values, and sustain livelihoods but its development is hampered by different constraints [3]. The most important constraints to cattle productions are widespread endemic diseases including parasitic infestation, poor veterinary service and lack of attention from government [1].

Ectoparasite is widespread and the most important prevalent constraints to the livestock sector that affect the production and productivity of cattle [5, 6]. Ticks are very significant and harmful blood sucking

external parasites of mammals, birds and reptiles throughout the world [6]. It has a considerable impact on animals either by inflicting direct damage or by transmission of tick-borne pathogens [7]. Tick and tick born disease affect 90% of the world's cattle population and are widely distributed throughout the world [8]. The country's environmental condition and vegetation are highly conducive for ticks and tick-borne disease perpetuation [9]. Ticks are more prevalent in the warmer climates, especially in tropical and sub-tropical areas [10].

Tick distribution and their population in the country vary according to their adaptability to ecology, eco-climate, microhabitats, ambient temperature, rainfall and relative humidity which is critical factors affecting life cycle of ticks [7]. Ticks comprise various types of genera, including *Amblyomma*, *Rhipicephalus*, *Haemaphysalis*, *Hyalomma* and *Rhipicephalus* (*Boophilus*). The genus *Amblyomma* and *Rhipicephalus* (*Boophilus*) are predominating in many parts of country [11]. The life of ticks depends on the host animal which results in retardation to animal growth, loss of milk and meat production.

Generally ticks could be affecting the market price and decreasing the annual income of humans [12]. In Ethiopia, ticks in cattle population cause serious

economic loss to smallholder farmers, the tanning industry and the country as a whole through the mortality of infected animals, decreased production, down grading and rejection of hide [13]. The effects of ticks estimated annual loss of US\$ 500,000 from hide and skin downgrading and approximately 65.5% of major defects of hides in Eastern Ethiopia [14].

Various Tick prevalence studies have been conducted in different localities of Ethiopia. The prevalence of ticks in different studies has shown a range of 23-85%. In the study area, information is scarce as there have not been any epidemiological studies conducted on ticks in cattle. Therefore, this study was initiated to generate baseline information on the epidemiology of tick in cattle for developing disease control and prevention programs. It also expected to guide community-based awareness programs about ticks in the study area to improve effective tick prevention and control measures in cattle.

1.2. Statement of the Problem

Tick infestations in cattle are economically important ectoparasite and cause a major impediment to the health and productive performance of cattle in tropical and subtropical area [15]. This disease causes economic loss towards livestock production and has a negative impact on food security, animal product and by products [16]. In Ethiopia, ticks and tick-borne diseases in cattle population cause serious economic loss to smallholder farmers, the tanning industry and the country as a whole through the mortality of infected animals, decreased production, down grading and rejection of hide [13]. In addition the influence of livestock farming practices on the spread and maintenance of ticks in cattle is poorly understood [17].

Despite the widespread distribution of various tick species across the study area little is known about the spread of harmful hemoparasite carried by ticks. Thus, there is paucity of information on tick in Lay Armachiho. In order to address the above problems, a study is required to fill the gaps in knowledge about the disease and its vectors in order to create baseline information that can be used to develop efficient disease control and prevention program. So, because of these problems the following research questions are formulated.

1.2. Research Questions

This research work was attempted to answer the following research questions.

- ✓ What are the prevalence Ixodid ticks in cattle in the study district?
- ✓ What are the associated risk factors of Ixodid tick species in cattle in the study district?

1.4. Objectives

1.4.1. General objective

- The aim of this study was to quantify the epidemiology of Ixodid tick infestation in cattle in Lay Armachiho districts of Amhara region, Northwest Ethiopia.

1.4.2. Specific objectives

The specific objectives of this study are:

- To determine the prevalence Ixodid ticks infestation in cattle in the study district.
- To identify the associated risk factors of Ixodid tick species in cattle in the study district.

1.5. Significance of the Study

This study would be used to quantify the epidemiology of Ixodid tick infestation in cattle in the study area. To update the required bodies about the important risk factors responsible for the occurrence of ticks in cattle. The study would be promoted to future researchers to use the gap for further investigating the occurrence of this ectoparasite in cattle. It also investigating the occurrence of tick borne diseases in cattle in the study area and bordering districts. Therefore, this study would facilitate zonal and regional animal health sectors used to designing and implementing effective control and prevention strategies of Ixodid ticks in cattle.

3. MATERIALS AND METHODS

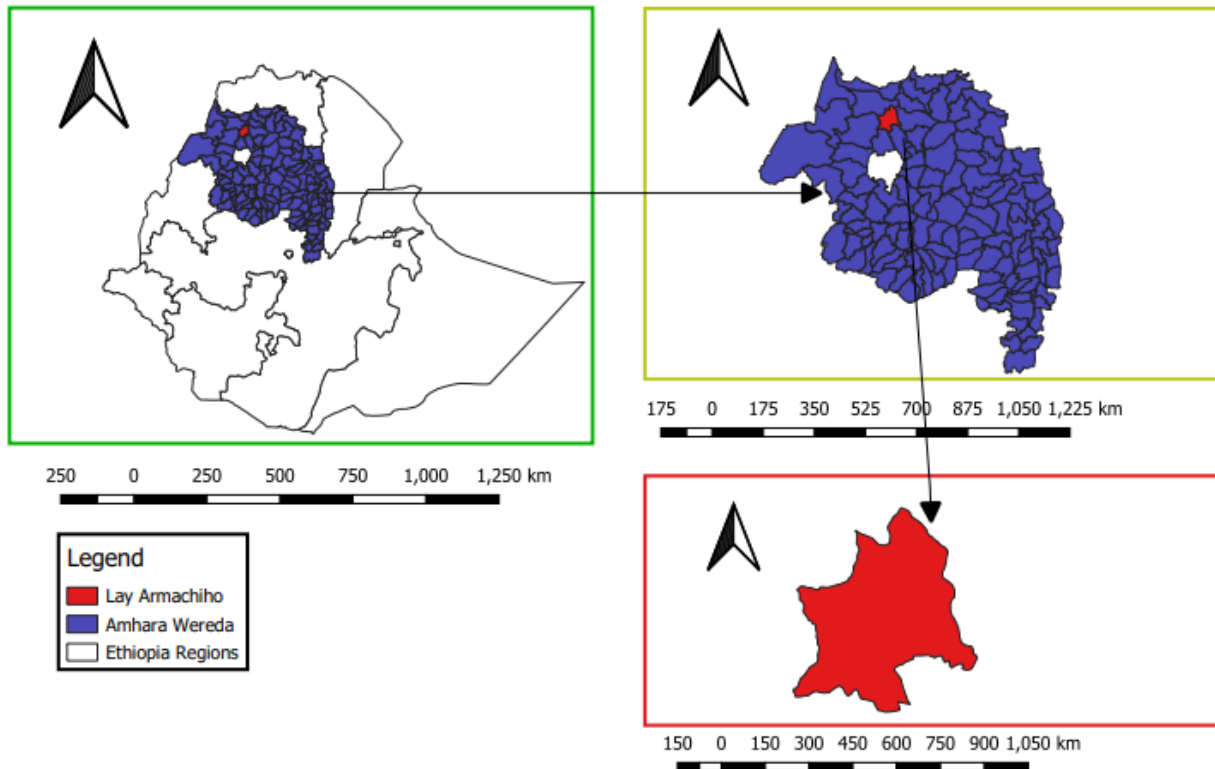
3.1. Study Area

The study was conducted in Lay Armachiho district in Amhara region, Northwest Ethiopia from February 2023 to April 2024. The administrative zone was selected purposively based on their livestock population agro ecology representation and accessibility.

Lay Armachiho district is found in Central Gondar zone with an area of 1,059.33 square kilometers. It is located in Central Gondar zone, Amhara regional state, Northwest Ethiopia, located at latitude of 13°

north and longitude of 37.2° east at an altitude ranges from 1,500-2,700 meters above sea level. The administrative center of the district is Tikel Dingay, with 29 rural and two town administrative units/kebeles. The agro climatic zone of the area is characterized as highland (7%), midland, (61%) and lowland (32%) with the temperature and rainfall ranges between 18-30°C and 800-1,500 mm, respectively.

It is located 749 kilo-meters away from Addis Ababa, the capital city of the country, and 207 kilo-meters away from Bahir Dar, the capital city of the region (Demeke *et al.*, 2020). The livestock populations of the district were 456,522 (cattle 145,733, sheep 40,917, goats 72,247, horses 330, mules 295, donkeys 20,219 and poultry 197,000) [18]. A total human population of a district estimated to be 157,836, of whom 79,538 were males and 78,298 females.



Sources: QGIS software version 3.22 Figure 1: Maps of the study area

3.2. Study Population

The study was conducted on local and cross breed of cattle with different age, sex and body condition scores (BCS). Cattle are kept under extensive and semi-intensive management system in which it depends on grazing for their feed sources.

3.3. Study Design

A cross-sectional study was conducted from February 2023 to April 2024. to estimate the prevalence of ixodid ticks and identify its associated risk factors in cattle in Lay Armachiho district. Body condition scores of each cattle was evaluated during sample collection and the cattle was classified as

emaciated (poor), moderate (medium) and good based on anatomical parts and the flesh and fat cover at different body parts [19]. Animals were conveniently classified as young (<3 years) and Adult (>3 years) age categories as described by [19].

3.4. Sampling Method and Sample Size Determination

The study districts were selected purposively based on their livestock population, agro ecology representation and accessibility. Simple random sampling techniques were used to select study kebeles, villages and animals.

Sample size was calculated according to the formula given by [20] with 95% confidence level and 5% absolute precision.

$$n = \frac{1.96^2 (P_{exp} (1 - P_{exp}))}{d^2} = \frac{1.96^2 (0.5 (1 - 0.5))}{0.05^2} = 384$$

Where, n = required sample size

P_{exp} = expected prevalence

d = desired absolute precision

Thus, a total of 384 both local and cross breed cattle were used for this study.

Table 1: Proportional sampling allocations from the selected kebeles in the study district

Districts	Kebeles (Villages)	Cattle population (S)	Sample size (n)
Lay Armachiho	Atsemider	6930	76
	Janikaw	6774	74
	Jiha	6150	68
	Shumara	5705	63
	Kerker balegezihaber	5032	56
	Chira	4235	47
Total		34,826	384

Sources: (Lay Armachiho district livestock resources and development office, 2024); S = Cattle population, n = sample size.

3.5. Data collection

3.5.1 Tick sample collection and preservation

The entire body surface of the animal was examined thoroughly for the presence or absence of ticks from each body part of animals. Ticks were collected after cattle restrained properly. Then, ticks were collected carefully and gently in a horizontal pull to the body surface of cattle by using forceps and care was taken to avoid decapitulation [21]. The collected ticks were preserved in clean universal bottle containing 70% ethyl alcohol and labeled it. During examination the selected animal's age, sex, breed, body condition score, tick infestation, date of collection, kebeles and its tick predication sites were recorded on a data recording format designed for this purpose.

3.5.2. Tick identifications

Ticks were identified to the genus and species level according to their morphological key structures such

as shape of scutum, leg colour, scutum ornamentation, body grooves, punctuations, basis capitulum, coaxes and ventral plates. During tick identification in the laboratory, the sample was put on Petri dish and adult ticks were identified under a stereomicroscope using the standard identification keys [22, 21].

3.6. Data Analysis

The collected data was entered into Microsoft Excel, coded and summarized using descriptive statistics. The prevalence was calculated for all data by dividing positive samples over the total number of examined samples and multiplying by hundred. All statistical analyses were done using Stata 17 statistical software. A mixed effect logistic regression model (household was taken as random effect) was used to assess the association of risk factors with the occurrence of hemoparasite infections in cattle. Districts, breed, sex, age category, health status, season, body condition score, tick infestation, communal grazing land and watering points were the predictor variables in which associations examined. Factors with p-value less than 0.25 in the univariable analysis were incorporated into the multivariable mixed effect logistic regression model. In the multivariable mixed effect logistic regression, P-value < 0.05 was considered as statistically significant and odds ratio (OR) and 95% CI were also calculated. Correlation, confounding and interaction tests were checked.

4. RESULTS

4.1. Prevalence of Bovine Ixodid tick infestation at Kebele Level

A total of 384 cattle were examined for tick infestation. Of which, 145 cattle were found positive for tick infestation with overall prevalence of 37.76 % was recorded at 95% confidence interval in the study areas. Examined animals were considered to be positive for a given tick infestation when at least one tick was collected from them. Out of the total animals exposed to Ixodid tick infestation 32 (4 2.1%), 30 (40.5%), 27 (39.7%), 23 (36.5%), 18 (32.1 4%) and 15 (31.91%) were from Atsemider, Janikaw, Jiha, Shumara lomeye, Kerker and Chira kebeles respectively (Figure 1).

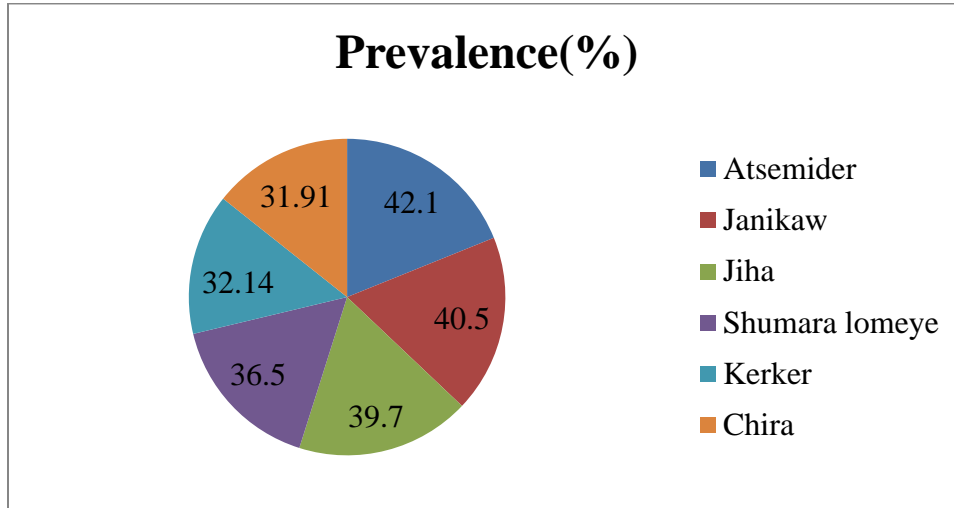


Figure 2: Prevalence of Ixodid tick infestation in cattle at kebele level.

4.2. Prevalence of Bovine Ixodid tick infestation at Genus Level

Out of 384 cattle examined, 37.6% were found to be infested with four different genera of ticks. Amblyomma (14.32%) takes the largest infesting

ticks in cattle in the study area followed by Boophilus (11.98%), Rhipicephalus (7.55%) and Hyalomma (3.91%) (Table1).

Table 2: Prevalence of Bovine Ixodid tick infestation at Genus Level

Tick Genera	Tick counts	Proportion (%)
Amblyomma	55	14.32
Boophilus	46	11.98
Rhipicephalus	29	7.55
Hyalomma	15	3.91
Total	145	37.6

4.3. Prevalence of Bovine Ixodid tick infestation at Species Level

Out of 145 infested cattle, 1470 tick species were observed during the study period. Amblyomma

variegatum and Boophilus decoloratus were the most abundant tick species with a prevalence of 39.18% and 23.95% in the study area respectively (Table 2).

Table 3: Prevalence of Bovine Ixodid tick infestation at species Level

Tick Species	Tick counts	Proportion (%)
Amblyomma variegatum	576	39.18
Amblyomma cohenense	201	13.67
Amblyomma lepidum	56	3.81
Boophilus decoratus	352	23.95
Boophilus evertsi evertsi	251	17.07
Hyalomma marginatum	34	2.31
Total	1470	100

4.4. Distribution of Tick Species at Predilection Sites

The distribution of ticks species were widely distributed in different parts of cattle bodies such as scrotum/udder, groin, dewlap, under-tail, belly, legs/h hoof and neck. Groin and scrotum/udder is the most favorable tick attachment sites followed by

dewlap, belly, neck, under tail and legs/h hoof. The most favorable predilection sites for Amblyomma species were the udder/scrotum and groin. Moreover, Boophilus decoloratus was preferred groin, dewlap, a nd neck. Rhipicephalus evertsi was preferred groin and belly. Other tick species attached other body parts of cattle like under tail and legs/h hoofs.

Table 4: Distribution of tick species at their predilection sites

Tick Species	Tick predilection sites							
	S/U	Groin	Dewlap	Belly	Neck	Under tail	Legs/h hoof	Over all
Amblyomma variegatum	270	164	60	82	-	-	-	576
Amblyomma cohenense	90	65	-	-	-	30	16	201
Amblyomma lepidum	21	16	12	-	-	7	-	56
Boophilus decoratus	42	145	130	-	35	-	-	352
Boophilus evertsi evertsi	27	101	75	48	-	-	-	251
Hyalomma marginatum	8	15	11	-	-	-	-	34
Total	458	506	288	130	35	37	16	1470

S/U =Scrotum or Udder

4.5. Risk Factors for Ixodid Tick Infestation in cattle

In univariable logistic regression, the risk factors such as study kebeles, breed, sex, age, body condition score; season, agro ecology, communal grazing land and communal watering points were analyzed. Among these factors study kebele, age, body condition score, season, agro ecology, communal

grazing land and communal watering points were found to be statistically significant association with Ixodid tick infestation (P<0.25) effects on the occurrence of these infections in cattle. However, the factors considered in the initial univariable logistic regression analysis only breed and sex were removed for multivariable logistic analysis in which p-value greater than 0.25.

Table 5: Univariable logistic regression analysis of risk factors associated with Ixodid tick infestation in cattle.

Variables	Categories	Number examined	Number positive (%)	OR (95% CI)	P-value
Kebeles	Chira	47	15 (31.91)	Ref.	-
	Kerker	56	18 (32.14)	1.09 (0.37 - 3.20)	0.868
	Shumara lomeye	63	23 (36.5)	3.29 (1.27 - 8.52)	0.014
	Jiha	68	27 (39.7)	3.12 (1.12 - 8.02)	0.018
	Janikaw	74	30 (40.5)	9.06 (3.58 - 22.92)	0.001
	Atsemider	76	32 (42.1)	5.87 (2.33 - 14.75)	0.001
Breed	Cross	109	34 (31.2)	Ref.	-
	Local	275	111 (40.36)	1.26 (0.57 - 2.78)	0.562
Sex	Male	174	55 (31.61)	Ref.	-
	Female	210	90 (42.9)	0.86 (0.57 - 1.30)	0.475
Age	Young	82	24 (29.3)	Ref.	-
	Adult	302	121 (40.07)	0.61 (0.38 - 0.99)	0.045
Season	Dry	192	35 (18.2)	Ref.	-
	Wet	192	110 (57.3)	1.68 (1.11-2.54)	0.015
BCS	Good	70	20 (28.6)	Ref.	-
	Medium	215	73 (33.95)	1.92 (1.18 - 3.10)	0.008
	Poor	99	42 (42.4)	1.19 (0.65 - 2.17)	0.573
Agro ecology	High land	128	18 (14.06)	Ref.	-
	Mid land	128	57 (44.53)	2.26 (1.28 - 3.99)	0.005
	Low land	128	70 (54.7)	6.10 (3.48 - 10.70)	0.001
Communal grazing land	Absent	133	42 (31.6)	Ref.	-
	Present	251	103 (41.04)	2.52 (1.58 - 4.02)	0.001
Communal watering points	Absent	150	50 (33.3)	Ref.	-
	Present	234	95 (40.6)	1.61 (1.04 – 2.51)	0.034

BCS= body condition score, OR= odd ratio, CI= confidence interval, Ref. = Reference

For final mixed effect logistic regression model, factors with p-value <0.05 in the multivariable logistic regression analysis were included to fit the model. In the final multivariable logistic regression analysis; communal grazing land, study kebele, agro

ecology, body condition score, season and communal watering points were found to be the potential risk factors for the occurrence of Ixodid tick infestation in the study area.

Table 6: Final multivariable logistic regression model of factors associated with Ixodid tick infestation in cattle.

Variables	Categories	Number examined	Number positive (%)	OR (95% CI)	P-value
Communal grazing land	Absent	133	42 (31.6)	Ref.	-
	Present	251	103 (41.04)	3.26 (1.91 - 5.58)	0.001
Agro ecology	High land	128	18 (14.06)	Ref.	-
	Mid land	128	57 (44.53)	1.05 (0.09 - 11.90)	0.968
	Low land	128	70 (54.7)	2.95 (1.10 - 7.90)	0.031
Kebeles	Chira	47	15 (31.91)	Ref.	-
	Kerker	56	18 (32.14)	1.22 (0.40 - 3.73)	0.730
	Shumara lomeye	63	23 (36.5)	3.00 (0.21 - 41.71)	0.414
	Jiha	68	27 (39.7)	3.78 (0.31 - 46.75)	0.299
	Janikaw	74	30 (40.5)	4.34 (1.21 - 15.60)	0.024
	Atsemider	76	32 (42.1)	3.61 (0.96 - 13.55)	0.05
BCS	Good	70	20 (28.6)	Ref.	-
	Medium	215	73 (33.95)	1.83 (1.06 - 3.16)	0.030
	Poor	99	42 (42.4)	1.16 (0.59 - 2.28)	0.672
Season	Dry	192	35 (18.2)	Ref.	-
	Wet	192	110 (57.3)	2.23 (1.36-3.65)	0.001
Communal watering points	Absent	150	50 (33.3)	Ref.	-
	Present	234	95 (40.6)	1.74 (1.04 - 2.90)	0.034

BCS= body condition score, OR= odd ratio, CI= confidence interval, Ref. = Reference

Animals having communal grazing land access had higher prevalence of Ixodid tick infestation (41.04%) compared to absence of communal grazing land access (31.6%). The odds of animals having access of grazing on communal land for the occurrence of tick were 3.26 times more likely of infestation higher than in absence of grazing communal land access (Table 6).

The prevalence of tick infestation was significant (P=0.031) based on the agro ecology of the study animals. The highest prevalence was recorded in animals with a low land agro ecology (54.7%) followed by mid land agro ecology were (44.53%) and the lowest in animals with high land agro ecology were (14.06%) (Table 6).

As indicated in table 5, the prevalence of Ixodid tick infestation in Atsemider, Janikaw and Jiha kebele have nearly similar prevalence such as 42.5%, 40.5% and 39.5% as compared to other study kebeles with statistically significantly (OR= 3.61; 95% CI=0.96-13.55; p=0.05) (Table 6).

The prevalence of Ixodid tick infestation was significant (P=0.012) based on the body condition

score of the study animals. The highest prevalence was recorded in animals with a poor body condition (42.4%) followed by medium body condition animals were (33.95%) and the lowest in animals with good body condition scores were (28.6%). According to multivariable logistic regression analysis, the odd of Ixodid tick occurrence in poor and medium body condition score of animals were 1.16 and 1.83 times more likely than good body condition score of animals positive for tick infestation respectively (Table 6).

The season of study animals, the prevalence of Ixodid ticks in cattle was estimated to be higher in wet season (57.3%) compared to dry season (18.2%). The odd of occurrence of tick infestation in wet season were 2.23 times more likely than in dry season and there was statistically significant difference between the two groups wet and dry season (OR=2.23; CI=1.36 – 3.65; P =0.001) (Table 6).

Regarding the prevalence of tick infestation in animals having access of communal water and non access of communal water in cattle, the higher prevalence was found in sharing access of communal

water (40.6%) cattle than non-sharing communal water access (33.3%) cattle. This difference was statistically significant (OR=1.74; 95% CI=1.04- 2.90; P=0.034) (Table 6).

In the present study, the most favorable predilection site for tick species were Groin, scrotum or udder and Dewlap with a proportion of 34.42%, 31.16% and 19.6% respectively as compared to other tick attachment sites. This is due to ticks need smooth body parts and short hairs to attach the host body (Table 4).

5. DISCUSSION

In the present study, a total of 1470 ticks were collected from 145 cattle with the overall prevalence of Ixodid tick infestation was found to be 37.76% in cattle in the study districts. The present result coincides with the previous studies reported by [23, 24, and 25] in Hadiya zone, Kombolcha and Haramaya town respectively. However, the present finding disagrees with the studies made in Ethiopia by [26, 7, and 27] with a prevalence of 25.64%, 56%, 91.5% and 91.7%, respectively. The variation in the prevalence of ticks could be due to the climatic factors which directly influence the vector distribution, agroecology, study design, animal husbandry practices and time of study.

The hard tick prevalence distribution in the present study was varied among genus and species of the hemoparasites. In the current study, *Amblyomma*, *Rhipicephalus*, Subgenus *Rhipicephalus* (*Boophilus*) and *Hyalomma* were the four tick genera identified. *Amblyomma* (14.32%) was the most abundant hard tick genus whereas *Hyalomma* (3.91%) was the least abundant genus among the identified genera in the study areas. This finding is in agreement with the report of the study done by [28] in Diga, Western Ethiopia. *Hyalomma* was the least abundant tick species in the study areas with over all prevalence of 4.1%. This report coincides with the previous study with 3% prevalence by [29] in and around Bishoftu town, Oromia, Ethiopia. However, the current study is disagree with the study done by [23] in Hosanna district, Hadiya zone, Ethiopia stated that *Hyalomma* was the most abundant tick genus with the prevalence of 11.9%. This variation could be due to the difference of the season of tick collection and agro ecological systems in study areas.

The finding of the present study indicated that *Amblyomma variegatum*, *Amblyomma coherence*, *Amblyomma lepidum* *Boophilus decoloratus*, *Rhipicephalus evertsi evertsi* and *Hyalomma*

marginatum are the most abundant tick species in the study districts. On the other hand, *Amblyomma lepidum* and *Hyalomma marginatum* were collected in a small occurrence the study area. In this study, *Amblyomma variegatum* (39.18%) was the most prevalent tick species. This report coincides with a study reported by [30, 31 and 32], who reported a prevalence of 37.5% in Dangila District, 43.6% in and around Assosa and 51% in Jabitehnan district Northwest Ethiopia. Similarly, the finding of the present study disagrees with the finding reported by [33, 34 and 35], who reported 18.1%, 54.9% and 61.8% prevalence in Southern Ethiopia and Awi zone Northwest Ethiopia respectively.

Boophilus decoloratus was the second most observable tick species in the study areas with the prevalence of 23.95%. This finding was in line with the previous study reported by [7, 35 and 36], with the prevalence of 18%, 26.3% and 34.6% in North Gondar zone, Haramaya town and Mesela District, respectively. This finding is inconsistent with the previous studies reported by [37, 38 and 39] with a prevalence of 10.7%, 15.5% and 15.7% in and around Sebeta Town, in and around Haramaya town and Awi zone, respectively. *Rhipicephalus evertsi evertsi* was the third most abundant tick species in the study areas with a prevalence of 17.07%. This is in accordance with the previous studies who reported by [31 and 35] with a prevalence ranges from 15-16%. However, our report is inconsistent with the studies reported by [1, 7, 40 and 37], with a prevalence of 7.4%, 11%, 28.6% and 53.4% in Awi zone, North Gondar zone, Sude district and in and around Sebeta town respectively.

Amblyomma cohereense was the fourth most abundant tick species in the study areas with a prevalence of 13.7%. This finding is consistent with the previous study conducted by [1, 7 and 28] in Awi zone, Diga and North Gondar zone, North West Ethiopia, respectively. The finding of the present study was in strongly disagrees with the previous studies reported by [13, 37 and 41] with the prevalence of 1.95%, 2.4% and 5.21% Dembia, Chilga district and in and around Sebeta Town, Ethiopia, respectively.

Hyalomma marginatum was the least occurrence of tick species during the study area with 2.31% of prevalence. This finding is agrees with the previous study reported by [7, 31 and 42] in North Gondar zone, Assosa and in and Around Bishoftu Town, Ethiopia respectively. The finding of the present study was strongly disagrees with the previous studies reported by [37, 32 and 27] with a prevalence

of 0.8%, 23.5% and 33.1% in Sebeta and Jabitehnan district, Ethiopia respectively. Generally the difference for the occurrence of tick could be due to the climatic factors which directly influence the vector distribution, agroecology, study design, animal husbandry practices and time of study [43].

Animals having access of grazing on communal land was significantly affected and higher occurrence of tick infestation than animals having no access of grazing on communal and. This could be due to the reason that cattle having access of grazing on communal land have high chance of contact with tick infected animals and tick vectors getting their preferable host to attach the different body parts of animals.

In the present study, the prevalence and abundance of hard tick infestation of cattle was highest in lowland and midland than highland. This finding is coincides with previous results in Ethiopia reported by [44]. It was due to the fact that lowland and midland agro ecological systems with high temperature and humidity are more suitable for tick proliferation and survival as compared to highland area previously reported by [45].

In the present finding, the occurrence of ticks in Atsemider, Janikaw and Jiha kebeles were significantly affected and higher occurrence of tick than other study kebeles. This variation could be due to the difference in cattle management system, burden of tick and agro-climatic condition of the study areas.

In the present study, poor body condition cattle higher number of tick infestation was observed (33.95%), it was agreed with [7 and 40], they reported prevalence of 80.7% and 100% in North Gondar zone and Sude district, Arsi Zone, Ethiopia. Because poor body conditioned animals had reduced resistance to tick infestation and they exposed to tick victors easily during grazing on the field than medium and good body conditioned animals.

Ticks are more prevalent in the warmer climates, especially in tropical and sub-tropical areas [17]. In the present study, the occurrence of tick was higher in wet season than dry season. This report was in consistent with the report of [45] that high humidity and temperature are crucial factors that influence the seasonal variation of ticks. However, this study is in disagreement with the study done by [4] who reported that there was no considerable difference in the prevalence of ticks within the wet and dry season. Additionally, this finding is in agreement with the study done by [44] that ticks were found on cattle throughout the study period, although higher tick

counts were observed during the rainy than dry season. This might be attributed that Dry environmental conditions are a serious danger to ticks, particularly to the questing larvae, which are very susceptible to drying out fatally [1].

In the present study, higher prevalence was recorded in animals having access of communal watering points (40.6%) than animals having no access of communal watering points (33.3%). This variation could be due to the reason that cattle having access of communal watering points having high chance of contact with tick infected animals and tick vectors that transmit from tick infested to tick non-infested animals.

In the present study, Groin, scrotum or udder and Dewlap were the most favorable predilection site for tick species with a proportion of 34.42%, 31.16% and 19.6% respectively as compared to other tick attachment sites. This is due to ticks need smooth body parts and short hairs to attach the host body (Table 4).

6. CONCLUSION AND RECOMMENDATIONS

An overall prevalence of Ixodid tick infestation from the present study was 37.76% and this study revealed that tick infestation (*Amblyomma*, *Boophilus*, *Rhipicephalus* and *Hyalomma*) are important cattle health problems in the study districts. The main risk factors found to be significantly associated with the occurrence of tick infestation were communal grazing land, agroecology, study kebele, body condition season and communal watering points. In this study, a total of four genera and six tick species were identified. Of them *Amblyomma variegatum* and *Boophilus decoloratus* were the predominant species encountered. In agro ecological study, tick infestation is prevalent in the lowland and midland as compared to highland areas. Therefore, in conclusion ticks play a major role in reducing production and productivity and cause health problems of cattle.

Based on the above conclusions the following recommendations are forwarded;

- Strategic tick control measures should be carried out mainly during season of high tick occurrence in order to minimize losses attributed to ticks in the area.
- Awareness creation should be made about cattle owners for harmful effect of ticks through training.
- Tick resistance breed is identified to minimize tick infestation problems in high tick burden area.

- The economic impact and effects of ticks on cattle productivity should be further studied at zonal and regional level.

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