



**PASTORALISTS' KNOWLEDGE ON PREVALENT CATTLE DISEASES AND PARASITES  
MANAGEMENT PRACTICES IN NORTH-EAST, NIGERIA**

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**ABSTRACT**

*In as much as there exist supportive vegetation and good management practices of cattle diseases and parasites, Cattle rearing can be proud not only in North east but throughout Nigeria. The study assessed pastoralists' knowledge on prevalent cattle diseases and parasites management in North East, Nigeria. Specifically, the study identified the prevalent cattle diseases and parasites in the study area, identified pastoralists awareness of cattle diseases and parasites, assessed pastoralists knowledge of cattle diseases and parasites. Multi Stage sampling techniques were used to select four hundred and twenty pastoralists for the study. The pastoralists comprised 126, 105, 84 and 105 from Adamawa, Bauchi, Gombe and Taraba. Descriptive statistics and logit regression were used to analyse the data. Result revealed that contagious bovine Pleuropneumonia (97.8%) and Tsetse flies (99.3%) were the most prevalent cattle diseases and parasites. Contagious bovine Pleuropneumonia and Tape worms ranked 1<sup>st</sup> with a mean score of 2.81 and 2.77 were highly prevalent. Majority (97.8% and 99.0%) of the pastoralists were aware of bovine tuberculosis and Liver flukes. The result also showed that the pastoralists had a high knowledge of Contagious Bovine Pleuropneumonia and Tape worms with a mean score of 1.89 and 1.86. Result of logit regression analysis revealed Blackleg (0.0092), Foot and Mouth Diseases (0.0317), Tick (0.0053), Tsetse flies (0.0002), Tapeworm (0.0655), were found to be positive and statistically significant at 5%. It is therefore recommended that extension services should target more pastoralists so as to aid their knowledge on the modern practices of cattle diseases and parasites management practices.*

**KEYWORDS:** Diseases, Knowledge, Nigeria, North-East, Parasites, Pastoralists, Prevalence,

**INTRODUCTION**

Cattle diseases and parasites play a crucial role in the life of pastoralists because it not only lower the production but also weaken the pastoralist economically (Ashfaq *et al.* 2018). These roles (effects) of diseases and parasites are mainly felt at farm level, while broader economic impacts can occur with epidemic diseases that restrict trade in livestock and livestock products. The occurrence of such diseases and parasites impacts both poor and richer livestock producers by marginalizing them from higher-price livestock markets and restricting their capacity for value-added trade. The direct effects of animal diseases and parasites on livestock productivity include reduced feed intake, changes in digestion and metabolism, increased morbidity and mortality and decreased rates of reproduction, weight gain and milk production. These have aggregate effects that limit economically important herd-management decisions regarding animal selection and optimal longevity.

Pastoralists are found throughout Nigeria and holding more than half of the livestock in the opinion of (Inuwa, 2013). About 13 million households in Nigeria keep farm animals and the sector contributes six to eight percent of the national GDP (FAOSTAT, 2018). According to reports by Federal ministry of Agriculture and Rural Development (FMARD, 2018), Nigeria has a cattle population of 19.5 million herds among the cattle population 1.47 million milking cows, 13.26 million beef cattle and as well 4.77 million for both dairy and beef products (Kubkomawa, 2017).

However, among cattle population 15.3 million breeds are indigenous to Nigeria which includes the White Fulani, Red Bororo, Sokoto Gudali, Adamawa Gudali, Wadara, Azawak, Muturu, Keteku, Ndama and Kuri (Hassan, 2017). Cattle command prominent position in the beef and dairy supply as well as the livestock industry, where beef is estimated to supply about 45 percent of total meat consumed in Nigeria and less than one percent of this population is managed commercially, while about 99% is managed

traditionally, under the traditional system (Lawal, 2017). Most of the cattle in Nigeria are kept for dual-purposes the indigenous breeds produce both beef and milk in the country.

Dairy production is mainly subsistence oriented and the average milk production per cow per annum is about 213 litres (Makun, 2018). It is important to know that there are uses of indigenous methods in almost all aspects of cattle production including health management. The larger proportions of these animals' population are concentrated in northern part of the country. Specifically, about 90% of the country's cattle populations is concentrated in northern part (Lawal, 2017).

Adequate knowledge and management of cattle diseases and parasites is important for the improvement and development of livestock subsector of Nigeria economy. Pastoralists in north east Nigeria get access to only limited and traditional knowledge and management of cattle diseases and parasites. Cattle diseases and parasites cause reduction in the growth performance, market value and sometimes death of the cattle if not properly managed and controlled. Similarly, zoonotic diseases and parasites such as Tuberculosis, Anthrax, Brucellosis, foot and mouth disease among other diseases could affect both the pastoralists and the general public through the consumption of not well handled and processed product of cattle such as meat and milk from the affected animals. This study seeks to assess pastoralists' knowledge and prevalent cattle diseases and parasites in North-East, Nigeria. Therefore the specific objectives are to:

- i. identify the prevalent cattle diseases and parasites in the study area;
- ii. examine pastoralists' awareness of cattle diseases and parasites in the study area;
- iii. assess pastoralists knowledge of cattle diseases and parasites in the study area;

The null hypothesis is stated in the study:

$H_{01}$ : There was no significant relationship between pastoralists' knowledge of cattle diseases and parasites and their management practices.

## **METHODOLOGY**

### **The Study Area**

The study was carried out in North East Nigeria. The region comprises of Adamawa, Bauchi, Borno, Gombe, Taraba and Yobe States. It lies between latitude  $6^{\circ}26'$

and  $13^{\circ}45'N$  and Longitude  $8^{\circ}42'$  and  $14^{\circ}39'E$  (Usman, 2010). North East Nigeria was created from the Northern region on the 27<sup>th</sup> of May 1967 and covers close to one third ( $280,419km^2$ ) of Nigeria's land area ( $909,890km^2$ ) with a population of 18,984,299 people that is 13.5% of the country's population (NPC, 2006). The National Population Commission projected an annual growth rate of 13.6% which brought the population figure to 32,137,094 as at 2020. The region shares international border with the Republic of Cameroon to the East, Republic of Chad to the North East and Republic of Niger to the North (Yurco, 2011). This area is largely located in the Sudan and Northern Guinea Savannah zones which are characterized by relatively high temperature throughout the year with an annual average temperature varying from  $23.2^{\circ}C$  to  $32.5^{\circ}C$  while rainfall ranges between 467 mm to 1091 mm (Usman, 2010).

### **Sources of Data and Sampling Procedure**

Primary data was used in the study. The primary data was sourced by administering questionnaires to the pastoralists. A multi stage sampling procedure was adopted in selection of the pastoralists.

Stage 1: Involved a purposive selection of Four (4) states of Adamawa, Bauchi, Gombe and Taraba. This is for the fact that the researcher could not go into Borno and Yobe states on account of insecurity that affected most of the communities that pastoralists normal resides in the states.

Stage 2: It involved purposive selection of six, five, four and five local government areas from Adamawa, Bauchi, Gombe and Taraba states respectively. In all 20 local government areas with supportive vegetation for cattle rearing were selected for the study.

Stage 3: It involved the purposive selection of one community each from the 20 local government areas selected for the study that is 20 communities were selected.

Stage 4: Snow ball technique was employed to select pastoralists for the study as the exact population of the pastoralists in the communities were unknown.

State 5: Finally, 21 pastoralists were selected per community using a snow ball technique, in all 420 pastoralists were involved in the study. However only 417 questionnaires were finally analysed as three questionnaires could not be accounted for.

**Table 1: Sample Size Selection Plan**

Names of States selected	Local Government Areas	Names of communities selected	Number of pastoralists interviewed
Adamawa	Toungo	Toungo	21
	Yola-South	Ngorore	21
	Jada	Kojoli	21
	Ganye	Ganye	21
	Mayo-Belwa	Mayo-Belwa	21
	Mubi	Mubi	21
Bauchi	Alkaleri	Alkaleri	21
	Soro	Soro	21
	Darazo	Darazau	21
	Katagum	Azare	21
	Gamawa	Gamawa	21
Gombe	Gombe	Gombe	21
	Balanga	Cham	21
	Funakaye	Bajoga	21
	Akko	Tumu	21
Taraba	Wukari	Bantaje	21
	Gassol	Tella	21
	Ardo-Kola	Iware	21
	Bali	Garbachede	21
	Gashaka	Karamti	21
Total	20	20	420

Source: Field Survey, 2020.

**Method of Data Analysis**

The data for this study was analyzed using descriptive and inferential statistics. Descriptive statistics such as frequency, percentage distribution, mean rating scale were employed to analyze objectives I, II and III (Prevalent cattle diseases and parasites, pastoralists awareness of cattle diseases and parasites, pastoralists’ knowledge of cattle diseases and parasites) while logit regression were used to test the hypothesis of the study.

**Mean Rating Scale Model**

$$3 + 2 + 1 = \frac{6}{3} = 2$$

$$\bar{x} = \frac{\sum Fx}{n}$$

Where:  $\bar{x}$  = mean rating scale

$\sum$  = Summation

F = Frequency of the Pastoralists

x = Number of pastoralists to the item

n = Total number of pastoralists

**Regression Model**

The regression model is explicitly specified as:

$$P = \exp \frac{(b_0 + b_1X_1 + b_2X_2 \dots \dots + b_pX_p)}{1 + \exp(b_0 + b_1X_1 + b_2X_2 + \dots + b_pX_p)}$$

One hypothesis was generated for the study and was tested as follow:

**Hypothesis**

There was no significant relationship between pastoralists’ knowledge of cattle diseases and parasites with the management practices of cattle diseases and parasites.

P = management practices of cattle diseases and parasites (Dependent variable)

X<sub>1</sub> = Blackleg)

X<sub>2</sub> = Streptothricasis)

X<sub>3</sub> = (Haemorrhagespticaemia)

X<sub>4</sub> = (CBPP)

X<sub>5</sub> = (Foot and Mouth Disease)

X<sub>6</sub> = (Trypanosomosis)

**Cattle Parasites:**

P = management practices of cattle diseases and parasites (Dependent variable)

X<sub>1</sub> = Ticks)

X<sub>2</sub> = Tsetse flies)

X<sub>3</sub> = Tape worms)

X<sub>4</sub> = Lice)

X<sub>5</sub> = Liver flukes)

**RESULTS AND DISCUSSION**

**Prevalence of Cattle Diseases**

Regarding the prevalence of cattle diseases, result in table 2 shows majority (98.6%) of the pastoralists attested that Contagious Bovine Pleuropneumonia (*Bunsude*), follow by Blackleg (*Suharu*) 92.6% and streptothricasis (*Nyanyere*) 78.4% were the prevalent cattle diseases in the study area. This implies that Contagious Bovine Pleuropneumonia (*Bunsude*) and blackleg (*Suharu*) were the most prevalent cattle

disease in the study area due to their constant occurrence which affects the performance or causes death of the cattle which could necessitate pastoralist to know the period and the prevalent nature of the diseases in among herds. The results is in correspondence to the findings of Niamir-Fuller (2016), Jonesa *et al.* (2019), Wungak *et al.* (2019) who reported that Contagious bovine pleuropneumonia (CBPP), Foot and mouth diseases and Trypanosomiasis diseases were some major prevalent cattle diseases common in pastoralism.

**Table 2: Distribution of pastoralists based on prevalent cattle diseases**

Diseases	Prevalence Freq(%)	Not prevalence Freq (%)
Contagious Bovine Pleuropneumonia (CBPP) ( <i>Bunsude</i> )	408(97.8)	9(2.2)
Foot and mouth Disease ( <i>Njobu</i> )	209(50.1)	208(49.1)
Bovine tuberculosis (TB) ( <i>Doiru</i> )	308(73.8)	109(26.2)
Streptothricasis (dermatophilosis) ( <i>Nyanyere</i> )	327(78.4)	90(11.6)
Trypanosomosis ( <i>Pasha</i> )	299(71.7)	118(28.3)
Blackleg ( <i>Suharu</i> )	386(92.6)	31 (7.4)
Haemorrhagesepticaemia ( <i>Konal</i> )	200(48.0)	217(52.0)

Source: Field Survey, 2021.

**Prevalence of Cattle Diseases**

The result in table 3 reveals the prevalence rate of cattle diseases in the study area in which Contagious Bovine Pleuropneumonia (*Bunsude*) was ranked 1<sup>st</sup> with a mean score of 2.81 was reportedly of high prevalence among cattle diseases, follow by Blackleg (*Suharu*) with a mean score of 2.61, foot and mouth disease with a mean score of 5.58, and Bovine tuberculosis (*Doiru*) with a mean scores of 2.50 were subsequently ranked as 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> in the study area. By implication of the prevalence rate of cattle diseases in the study area,

pastoralist could acquire more knowledge on management practices involve in cattle diseases among herds due to the prevalent level and could also prompt the pastoralists desire to know these management practices so as to tackle the adverse effects which may cause deficiency or reduction in the herds size. This is in line with the result of Olafadehan and Adewumi (2010), Grisi *et al.* (2014) and Elelu *et al.* (2016) who reported the prevalence of Contagious Bovine Pleuropneumonia, Foot and mouth diseases and blackleg in their studies.

**Table 3: Distribution of Pastoralists Based on Prevalence Rate of Cattle Diseases**

Diseases	Prevalence rate			Mean ( $\bar{X}$ )	Rank
	Very high Freq/( $\bar{X}$ )	High Freq/( $\bar{X}$ )	Low Freq/( $\bar{X}$ )		
Contagious Bovine Pleuropneumonia (CBPP) ( <i>Bunsude</i> )	342(2.5)	60(0.29)	6(0.01)	2.81	1 <sup>st</sup>
Foot and mouth Disease ( <i>Njobu</i> )	128(1.83)	81(0.78)	0(0.00)	2.61	2 <sup>nd</sup>
Bovine tuberculosis (TB) ( <i>Doiru</i> )	214(2.08)	42(0.27)	52(0.17)	2.52	3 <sup>rd</sup>
Streptothricasis (dermatophilosis) ( <i>Nyanyere</i> )	140(1.28)	54(0.33)	133(0.41)	2.02	6 <sup>th</sup>
Trypanosomosis ( <i>Pasha</i> )	152(1.53)	57(0.38)	90(0.30)	2.21	5 <sup>th</sup>
Blackleg ( <i>Suharu</i> )	265(2.06)	51(0.26)	70(0.18)	2.50	4 <sup>th</sup>
Haemorrhagesepticaemia ( <i>Konal</i> )	89(0.89)	57(0.57)	30(0.15)	1.61	7 <sup>th</sup>

Source: Field Survey, 2021.

### Prevalence Cattle Parasites

Table 4 reveals prevalence of cattle parasites. The result showed that 99.3% of the pastoralists admitted to the prevalence of Tsetse flies (*Bubi*) in the study area, 98.1% reported the prevalence of Ticks (*Lelleli*), 97.6% reported the prevalence of Lice (*Tendi*), 96.4% reported the prevalence of Liver flukes (*Gildihengre*) while 88.0% admits the prevalence of tape worms (*Gildiredu*) in the study area. This implies that pastoralists are

aware of Tsetse flies (*Bubi*), Tape worms (*Gildiredu*), Ticks (*Lelleli*), Lice (*Tendi*) and Liver flukes (*Gildihengre*) as the major prevalent cattle parasites due to their occurrence in the study area, this could prompt the pastoralists to go through series of management practices which could also yield a higher knowledge of cattle parasites management among pastoralist in the study area. This is in correspondence with the findings of Maigari *et al.* (2017) who also reported the prevalence of Tsetse flies among herds in their study.

**Table 4: Distribution of pastoralists based on prevalence of cattle parasites**

Diseases	Prevalence Freq/%	Not prevalence Freq/%
Tsetse flies ( <i>Bubi</i> )	414(99.3)	3(0.7)
Tape worms ( <i>Gildiredu</i> )	367(88.0)	50(12.0)
Ticks( <i>Lelleli</i> )	409(98.1)	8(1.9)
Lice ( <i>Tendi</i> )	407(97.6)	10(2.4)
Liver flukes ( <i>Gildihengre</i> )	402(96.4)	15(3.6)

Source: Field Survey, 2021.

### Prevalence of Cattle Parasites

Table 5 reveals that Tape worms (*Gildiredu*) with a mean score of 2.77 was ranked 1<sup>st</sup> as highly prevalent cattle parasite, followed by Tsetse flies (*Bubi*) with a mean score of 2.74 which was ranked 2<sup>nd</sup>, Lice (*Tendi*) with a mean score of 2.64 was ranked 3<sup>rd</sup>, while Liver flukes (*Gildihengre*) with a mean score of 2.56 was ranked 4<sup>th</sup>. This result implies that the rate of prevalence of cattle parasite in the study area could

prompt the pastoralist to acquire more knowledge on the various management practices of cattle parasites due to the level of occurrence and prevalence in their herds. The result is in correspondence with Sam-Wobo *et al.* (2016); Scasta (2016); Ola-Fadunsin (2017); Usman *et al.* (2017); Ola-Fadunsinet *al.* (2020), who reported that Tapeworms, lice and flies were highly prevalent cattle parasite found in herds as such are well known by pastoralists in Nigeria.

**Table 5: Distribution of pastoralists based on prevalence rate of cattle parasites**

Diseases	Prevalence rate			Mean ( $\bar{X}$ )	Rank
	Very high Freq/( $\bar{X}$ )	High Freq/( $\bar{X}$ )	Low Freq/( $\bar{X}$ )		
Tsetse flies ( <i>Bubi</i> )	318(2.30)	87(0.42)	9(0.02)	2.74	2 <sup>nd</sup>
Tape worms ( <i>Gildiredu</i> )	301(2.46)	47(0.26)	19(0.05)	2.77	1 <sup>st</sup>
Ticks( <i>Lelleli</i> )	241(1.76)	102(0.50)	66(0.16)	2.42	5 <sup>th</sup>
Lice ( <i>Tendi</i> )	307(2.26)	58(0.28)	42(0.10)	2.64	3 <sup>rd</sup>
Liver flukes ( <i>Gildihengre</i> )	327(2.44)	20(0.09)	14(0.03)	2.56	4 <sup>th</sup>

Source: Field Survey, 2021.

### Awareness of Cattle Diseases

Result in Table 6 shows respondent's awareness of cattle diseases. The result reveals that 97.8% of the pastoralists were aware of TB (Doiru) of 92.6% were aware Contagious Bovine Pleuropneumonia (*Bunsude*),

73.8 were aware of blackleg (*Suharu*), 50.1% were aware of Foot and mouth diseases (*Njobu*), 48.0% were aware of Trypanosomiasis (*Pasha*). This could be due to pastoralists' interaction with friends, during

association meetings, or extension services delivery in this aspect awareness can be created regarding cattle diseases among the respondent. This implies that the high level of prevalence of Contagious Bovine Pleuropneumonia (*Bunsude*) and Foot and mouth diseases (*Njobu*) in pastoralists herd within their communities in the study area may also results to an extreme level of awareness among pastoralists. These could be evident that awareness had been created

among pastoralists and they had understanding on how these diseases occur in their heard. This result is similar to the findings of Baker (2012); Niamir-Fuller (2016); Zinsstag *et al.* (2016) and Majekodunmi *et al.* (2018) who found out that Contagious Bovine Pleuropneumonia and Foot and mouth diseases were two diseases that pastoralists are highly aware of their presence in their herds due to its occurrences and threats to animal health.

**Table 6: Distribution of pastoralists based on awareness of cattle diseases**

Diseases	Aware Freq/%	Not aware Freq/%
TB (Bovine tuberculosis) ( <i>Doiru</i> )	408(97.8)	9(2.2)
Contagious Bovine Pleuropneumonia (CBPP) ( <i>Bunsude</i> )	386(92.6)	31(7.4)
Blackleg ( <i>Suharu</i> )	309(73.8)	108(26.2)
Streptothricasis (dermatophilosis) ( <i>Nyanyare</i> )	327(78.4)	90(11.6)
Haemorrhagesepticaemia ( <i>Konal</i> )	299(71.7)	118(28.3)
Foot and mouth Disease ( <i>Njobu</i> )	209(50.1)	208 (49.9)
Trypanosomosis ( <i>Pasha</i> )	200(48.0)	217(52)

Source: Field Survey, 2021.

#### Level of Awareness on Cattle Parasites

Result in table 7 shows pastoralists' awareness of cattle parasites in the study area. The result showed that 99.0% of the pastoralists were aware of Liver flukes (*Gilfihenge*), 98.1% admitted to the awareness of Tape worms (*Gildiredu*), 97.4% and 97.1% were aware of Lice (*Tendi*) and Tsetse flies (*Bubi*) in the study area. This implies that, the prevalent nature associated with these parasites could create high awareness of cattle

parasites in the study area which could also trigger the pastoralist to acquire for more knowledge on the cause and management of these parasites. This is in agreement with the findings of Grange *et al.* (2014); Siddiqi and Ashraf (2016); Robert *et al.* (2016); Usman *et al.* (2017); Lemy and Egwunyenga (2018) all reported that Tape worms, Ticks and Flies were common parasites extremely been aware of by pastoralists.

**Table 7: Distribution of Pastoralists based on of Awareness of Cattle Parasites**

Parasites	Aware Freq/%	Not aware Freq/%
Liver flukes ( <i>Gilfihenge</i> )	413(99.0)	4(1.0)
Ticks ( <i>Lelleli</i> )	367(88.0)	50(22.0)
Tape worms ( <i>Gildiredu</i> )	408(98.1)	8(1.9)
Lice ( <i>Tendi</i> )	406(97.4)	11(2.6)
Tsetse flies ( <i>Bubi</i> )	405(97.1)	12(2.9)

Source: Field Survey, 2021.

#### Pastoralists Knowledge of Cattle Diseases

Adequate knowledge about the dynamics and distribution of cattle diseases in Nigeria at large may help in the designing of therapeutic and epidemiological control of the diseases (Takeet *et al.*, 2016). Result in Table 8 shows that Contagious Bovine Pleuromonia was ranked 1<sup>st</sup> among the

diseases pastoralist have knowledge on with a mean score of 1.89, and Foot and mouth disease (*Njobu*) with a mean score of 1.86 was ranked 2<sup>nd</sup>, Trypanosomiasis (*Pasha*) was ranked 3<sup>rd</sup> with a mean score of 1.80, Tuberculosis (*Doiru*) with a mean score of 1.51 was ranked as 4<sup>th</sup> in order of the pastoralists knowledge. This implies that pastoralists high

knowledge of the diseases may be as a result of prevalent nature associated the diseases in the study area. This is In line with the findings of Jatau *et al.* (2011); Ogudo *et al.* (2015); Sam-Wobo *et al.* (2016)

reported that Foot and Moth diseases, Trypanosoma spp, Contagious Bovine Pleuropneumonia and TB are diseases pastoralist have certain level of knowledge and their management practices.

**Table 8: Distribution of Pastoralists based on Knowledge of Cattle Diseases**

Diseases	High Freq( $\bar{X}$ )	Low Freq( $\bar{X}$ )	Mean ( $\bar{X}$ )	Rank
Contagious Bovine Pleuromonia ( <i>Bunsude</i> )	275(1.78)	34(0.11)	1.89	1 <sup>st</sup>
Foot and mouth Disease ( <i>Njobu</i> )	180(1.72)	29(0.14)	1.86	2 <sup>nd</sup>
TB ( <i>Doiru</i> )	208(1.01)	200(0.5)	1.51	4 <sup>th</sup>
Trypanosomosis ( <i>Pasha</i> )	160(1.6)	40(0.2)	1.80	3 <sup>rd</sup>
Streptothricasis ( <i>Dermatophilosis</i> ) ( <i>Nyanyare</i> )	152(0.93)	175(0.53)	1.46	5 <sup>th</sup>
Blackleg ( <i>Suharu</i> )	108(0.55)	278(0.72)	1.28	6 <sup>th</sup>
Haemorrhagesepticaemia ( <i>Konal</i> )	82(0.55)	217(0.73)	1.25	7 <sup>th</sup>

Source: Field Survey, 2021.

**Pastoralists Knowledge of Cattle Parasites**

Table 9 reveals that Tape worm (*Gildiredu*) is a highly known parasite among pastoralists with a mean score of 2.66 which was ranked 1<sup>st</sup> followed by Liver flukes (*Gildihengre*) with a mean score of 2.59, ticks (*Lelleli*) with a mean score of 2.47 and lice (*tendi*) with a mean score of 2.31 which also highly known by the pastoralist were also ranked as the 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> respectively. This could be due to the fact that the pastoralism regions are conducive for the survival of these parasites. This finding implies that the pastoralists have knowledge of parasites. A similar report by

Regassa *et al.* (2016) showed that lice and flies were realized to be the common parasites found to have accompanied cattle to different locations with different geographical regions (rainfall, temperature, wind and sunshine) within the sub-Saharan regions of Africa. Similarly, Ola-Fdunsin *et al.* (2020) reported that lice, tsetse flies and ticks has a greater impacts on cattle production in sub-Saharan Africa including Nigeria, due to the availability of a wide range of agro-ecological factors suitable for diversified hosts and these parasite species.

**Table 9: Distribution of pastoralists based on knowledge of cattle parasites**

Parasites	High Freq( $\bar{X}$ )	Low Freq( $\bar{X}$ )	Mean ( $\bar{X}$ )	Rank
Tsetse flies ( <i>Bubi</i> )	275(1.39))	125(0.31)	1.70	3 <sup>rd</sup>
Ticks ( <i>Lelleli</i> )	197(1.07)	170(0.46)	1.53	4 <sup>th</sup>
Lice ( <i>Tendi</i> )	300(1.48)	106(0.26)	1.74	2 <sup>nd</sup>
Tape worms ( <i>Gildiredu</i> )	350(1.72)	58(0.14)	1.86	1 <sup>st</sup>
Liver flukes ( <i>Gildihengre</i> )	159(0.77)	254(0.62)	1.39	5 <sup>th</sup>

Source: Field Survey, 2021.

**Testing of Hypothesis**

The results in Table 10 shows that, Blackleg (0.0092), Foot and Mouth Diseases (0.0317) were found to be positive and statistically significant at 5% levels of significance while the coefficient of Trypanosomiasis (0.0127) were negative and statistically significant at 5% . This implies that an increase at 5% knowledge on vaccination could also increase the pastoralists’ ability to manage cattle diseases such as Blackleg and Foot

and Mouth Diseases in the study area. Thus, the null hypothesis which states that there was no significant relationship between pastoralists knowledge on management practice (vaccination) and use of management practices is rejected and therefore accepts the alternative hypothesis that there is a significant relationship between pastoralists knowledge on management practice (vaccination) and management of cattle disease in the study area. By implication, gaining

more knowledge on the type of vaccine, dosage, timing and cattle to be vaccinated could result to a proficient cattle management. This is in line with the findings of Mandado *et al.* (2016) and Abubakar (2019) who

reported that adequate knowledge on diseases and parasites management practices could significantly increase productivity, especially in terms of herd's increase and performances.

**Table 10: Logit regressions analysis of relationship between knowledge of disease and management practices(vaccination)**

Variables	Regression Coefficient	Standard error	Z-statistics	Prob.
X <sub>1</sub> (Blackleg)	0.952668	0.886605	2.602987	0.0092*
X <sub>2</sub> (Streptothricasis)	0.913803	1.194038	-1.02128	0.3163 <sup>NS</sup>
X <sub>3</sub> (Haemorrhagesepticaemia)	0.947664	0.965618	0.112973	0.9101 <sup>NS</sup>
X <sub>4</sub> (CBPP)	1.823455	1.087200	1.677203	0.0935 <sup>NS</sup>
X <sub>5</sub> (Foot and Mouth Disease)	0.953712	1.156159	2.147736	0.0317*
X <sub>6</sub> (Trypanosomosis)	0.862814	1.116929	-2.491571	0.0127*
C	5.096630	1.947431	2.617104	0.0089
R-square	0.485909			

5% level of significance \*  
 NS - Not significant

Source: Field Survey Data, 2021.

**Logit regressions analysis of relationship between pastoralists’ knowledge of parasites and management practices (Deworming)**

Result of analysis presented in Table 11 showed that the coefficient for Tsetse flies (0.0002), Lice (0.0435) and Tape worms (0.0655) were positive and statistically significant at 5% levels respectively, while the coefficient of Ticks (0.0053) and Liver flukes (0.0099) were negative and statistically significant at 5% levels of significance. The positive coefficient of Tsetse flies, Lice and Tapeworms means that there exist a relationship between the pastoralists’ knowledge on cattle parasite and use of management practice (deworming). Deworming as a parasite management practice is said to be a measure that could properly manage the prevalence of parasites in the study area. Therefore, the null hypotheses which states that there

was no significant relationship between pastoralists knowledge of cattle parasite with their management practice (deworming) is rejected and the alternatives hypotheses which states that there was no significant relationship between pastoralists knowledge of cattle parasite management practice (deworming) is accepted. By implication, increase of knowledge on management practice (deworming) could efficiently increase cattle productivity as well.

This corroborates Alkareem *et al.* (2012) who reported that 100% of all the sample cattle carried ticks, lice and Tapeworms which were controlled by deworming the cattle. Similarly, Mattioli *et al.* (2010) and Afolabi *et al.* (2017) reported that pastoralist dewormed their cattle against the prevalence of Tapeworms, Liver flukes, Ticks, Tsetse and Lice.



**Table 11: Logit regressions analysis of relationship between pastoralists’ knowledge of parasites and management practices (Deworming)**

Variables	Regression Coefficient	Standard error	Z-statistics	Prob.
X <sub>1</sub> (Ticks)	0.641806	0.056063	-2.804587	0.0053*
X <sub>2</sub> (Tsetse flies)	0.743968	0.066167	3.817320	0.0002*
X <sub>3</sub> (Tape worms)	0.714487	0.056420	1.847065	0.0655*
X <sub>4</sub> (Lice)	0.719185	0.062105	2.025110	0.0435*
X <sub>5</sub> (Liver flukes)	0.636303	0.066686	-2.590852	0.0099*
C	0.816392	0.102919	7.932347	0.0000
R-square	0.126626			

5% level of significance \*

Source: Field Survey Data, 2021.

### CONCLUSION AND RECOMMENDATIONS

Based on findings of the study, the study concluded that pastoralists were aware of bovine tuberculosis and liver flukes. Pastoralists had high knowledge on Contagious Bovine Pleuromonia and tape worm as one of the major diseases and parasites in North-East Nigeria.

Based on the findings of the study, the following recommendations were made:

- i. It is therefore recommended that disease and parasite resistant breeds of cattle should rise among pastoralist so as to improve the cattle sector.
- ii. Pastoralism a gesture of instability with both the cattle and herder, which ensures that the cattle breeders moves from one place to another in search of quality grazing field, various mobility measures and devices as applicable to extension services should be provided to ensure that majority of pastoralists get access to various extension services provided at different places and time.
- iii. With the examination that pastoralists acquires more knowledge in management of cattle diseases and parasite as they grow older, extension services as well should target the teenage pastoralists so as to aid them grow and practice modern pastoralism with a higher level of knowledge on the cattle diseases and parasites management overtime.

- iv. There is also the need by the various NGOs, government agencies and other stakeholders in extension communication to expose the pastoralists to modern cattle management practices and subsequently reduce technological fright that most of them exhibit at present. This will help them exploit, to the maximum, the benefits from use of ICTs such as the mobile phones, TV, and Radio as well.
- v. Pastoralists should try to embark on other forms of cattle diseases and parasites management other than the default vaccination, deworming and the traditional measures of smoked and manual ticks’ removals so as to aid them curtail the dangers attached to the prevalence of these diseases and parasites.

### REFERENCES

Abubakar, S. (2019).Ethno Veterinary Medicine in Ormaland Kenya, MSc Thesis in Tropical Animal Production and Health, Edinburgh, UK.

Afolabi, O.J., Simon-Oke, I.A., and Ademiloye, A.O. (2017).Gastro-intestinal parasites of Bovine in Akure abattoirs, Nigeria.*Journal of Entomology and Zoology Studies*, 5(5), 1381-1384.

Alkareem, I.B.G., Abdelgadir, A.E., and Elmalik, K.H. (2012). Study on prevalence of parasitic diseases in cattle in Abyei area – Sudan. *Journal of Cell and Animal Biology*, 6(6): 88-98.

- Ashfaq, M., G. Muhammad, Shamsheer-ul-Haq and A. Razzaq. (2018). Effects of livestock disease on dairy production and incomes in district Faisalabad, Punjab, Pakistan. Pakistan Strategy Support Program, Working Paper No. 23, International Food Policy Research Institute (IFPRI), Washington DC, USA.
- Baker, J. K. (2012). *Animal Health - A Layperson's Guide to Disease Control*. Prentice- Hall, Incorporated: Upper Saddle River, NJ. March 2012.
- Balogun, J., Biobaku K.T. and Shamaki B.U. (2012). A preliminary Trypanocidal Study of Natural and Synthetic supplementation of Zinc and Magnesium in combination with Diminazeneaceturate in wistar rats. *Sahel Journal of Veterinary Sciences*, 9:55-61.
- Bhasin, V. (2011). Pastoralists of Hilmalayas. *Journal of Human Ecology*, 33(3):147-177
- Elelu., Lawal, A., Bolu, S.A., Jaji, Z., and Eister, M.C (2016) Participatory Epidemiology of Cattle Diseases among Fulani Pastoralists in Bacita Market, Edu Local Government Area, Kwara State, North Central Nigeria. *EC Veterinary Science Journal*, 2(3), 133-144
- FAOSTAT (2018). Food and Agricultural Organization of the United Nations. [www.fao.org/faostat/en/#data/QA](http://www.fao.org/faostat/en/#data/QA) 3: 12 – 15. Retrieved 6 July 2020.
- Federal Ministry of Agriculture and Rural Development (FMARD, 2018). Annual Population Data, Federal Ministry of Agriculture and Rural Development Abuja.
- Grange, J.M., Daborn .C, and Cosivi, O. (2014). HIV-related tuberculosis due to *Mycobacterium bovis*. *EurRespir Journal* 1994;7: 1564–1566.
- Grisi, L, CerqueiraLeite R, de Souza Martins JR, Medeiros de Barros AT, Andreotti R, and Duarte Cançado P.H, (2014). Reassessment of the Potential Economic Impact of Cattle Parasites in Brazil. *Brazil. Journal of Veternary Parasitology*, 23(2):150-156. Accessed 19 January 2020.
- Hassan, A. H. (2017). Financial Analysis of Small-Scale Beef Fattening Enterprise in Bama Local Government Area of Borno State. M.Sc. Thesis, Ahmadu Bello University, Zaria, Nigeria. Accessed 18 December 2019.
- Inuwa, M. (2013). Nigerian Livestock Resources, the need to Harness. A Review. *Journal of Agro-Science*, 3(2):98-111.
- Jatau I.D, Abdulganiyu A, Lawal A.I, Okubanjo O.O and Yusuf, K.H.s (2011). Gastrointestinal and haemoparasitism of sheep and goats at slaughter in Kano, northern-Nigeria. *Sokoto Journal of Veterinary Sciences*, 9(1): 7-11.
- Jonesa, B.A., Alib, E. T., Katherine M., and Homewoodc, D. U. P. (2019). Pastoralist knowledge of sheep and goat disease and implications for peste des petits ruminants virus control in the Afar Region of Ethiopia. *Journal of Preventive Veterinary Medicine* 174 (2020) 104808.
- Kubkomawa, H. I. (2017). Indigenous Breeds of Cattle, their Productivity, Economic and Cultural Values in Sub-Saharan Africa: A Review. *International Journal of Research Studies in Agricultural Sciences (IJRSAS)*, 3 (1): 72-78
- Lawal, U., (2017). Economic Analysis of Small-Scale Cow Fattening Enterprise in Bama Local Government Area of Borno State, Nigeria. *Production Agriculture and Technology (PAT)*, 4(1):1-10.
- Lemy, E.E, and Egwunyenga, A.O. (2018) Epidemiological Study on Some Parasitic Helminths of Cattle in Delta North, Delta State, Nigeria. *Journal of Animal Health Behavioural Science* 2: 113.
- Maigari A.K., Idris H.Y., and Abubakar A. (2017). Perceptions on Tsetse and Trypanosomiasis Diseases Among Butchers and Livestock Marketers at Kano Abattoir, Northern Nigeria. *Research Journal of Pure Science and Technology* 1 (2): 7-12. ISSN 2579-0536 [www.iiardpub.org](http://www.iiardpub.org). Retrieved 4 January, 2020.
- Majekodunmia, A.O.; Dongkumc, C.; Idehenc, C.; Langsd, D.T. and Welburna, S.C. (2018). Participatory epidemiology of endemic diseases in West African cattle – Ethnoveterinary and bioveterinary knowledge in Fulani disease control. *One Health* 5 46–56.
- Makun, H.J. (2018). Dairy Production Systems in Nigeria. Presentation Delivered at the Technical Meeting of Africa Sustainable Livestock 2050, April, Abuja.
- Mandado, T. Argaw, S. and Garedew, L. (2016). The Prevalence of mange infestations in small

- ruminants in three agro-ecological zones of Wolaita zone, southern Ethiopia. *Advances in Life Science and Technology*, 42(1): 18-24.
- Mattioli, R. C., V. S Pandey, M. Murray and J. L. Fitzpatrick, (2010). Immunogenic influences on tick resistance in African cattle with particular reference to trypanotolerant N'dama (*Bos Taurus*) and trypanosusceptible Gobra (*Bosindicus*) cattle. *ActaTropica* 75 (3), 263-277.
- National Agricultural Extension and Research Liaison Service (NAERLS) (2011). Agricultural Performance Survey for Wet Season, Taraba State, Nigeria: 1-2.
- Niamir-Fuller, M., (2016). Towards sustainability in the extensive and intensive livestock sectors. *Rev. Sci. Technol.* 35, 371–387.
- NPC (2006). *National Population Commission 2006 Figure*. Taraba State Government (2006, Ministry of Information, Taraba Annual Report.
- Ogudo, U.S., Oluwole, A.S., Mogaji, H.O., Alabi, M.O., Adeniran, A.A., and Ekpo, U.F.(2015). Gastrointestinal helminths in a ruminant livestock farm in Abeokuta, Southwestern Nigeria. *Annual Research & Review in Biology*. 8(4):1-8.
- Olafadehan, O.A., and Adewumi, M.K. (2010). Productive and Reproductive Performance of Strategically Supplemented Free Grazing Prepartum Bunaji Cows in the Agro-Pastoral Farming System. *Tropical Animal Health and Production*, 41:1275-1281.
- Ola-Fadunsin, S. D. (2017). Retrospective Occurrence and Risk Factors Associated with Cattle Parasitic Infections in Osun State, Nigeria. *Nigerian Veterinary Journal* 38(3),193-207.
- Ola-Fadunsin, S.D., Ganiyu, I.A., Rabi, M Hussain, K., Sanda, I.M., Baba, A.Y., Furo, N.A. and Balogun, R.B. (2020). Helminth infections of great concern among cattle in Nigeria: Insight to its prevalence, species diversity, patterns of infections and risk factors. *Veterinary World*, 13(2): 338-344.
- Regassa, F., Sori, T., Dhuguma, R. and Kiros, Y. (2016) Epidemiology of gastrointestinal parasites of ruminants in Western Oromia, Ethiopia. *International Journal of Applied Research in Veterinary Medicine*, 4(1): 51-57.
- Robert, F. K., Saidou, M. H., Kenton, L. M., Egbe, F., Victor, N. and Vincent, T. (2016). Knowledge of Bovine Tuberculosis, Cattle Husbandry and Dairy Practices amongst Pastoralists and Small-Scale Dairy Farmers in Cameroon. <https://doi.org/10.1371/journal.pone.0146538>. Retrived 16<sup>th</sup> october,2021
- Sam-Wobo, S. O., Uyigue, J., Surakat, O. A., Adekunle, N. O. and Mogaji, H. O. (2016). Babesiosis and Other Hemoparasitic Disease in a Cattle Slaughtering Abattoir in Abeokuta, Nigeria. *International Journal of TROPICAL DISEASE & Health* 18(2): 1-5.
- Scasta, Z. (2016). Prevalence of gastro-intestinal helminths in some ruminant species and documentation of ethnoveterinary practices in Cholistan Desert. Department of Zoology and Fisheries, Faculty of Sciences, University of Agriculture, Faisalabad-38040, Pakistan.
- Siddiqi, M.N., and Ashraf, M. (2016) Helminthiasis in goat slaughtered in the abattoirs of Peshwar, NWFP. *Pakistan Journal of Agricultural Research* 1: 64-75.
- Takeet, M. I., Badru, O. B., Olubgbogi, E and Abakpa, and S. A. V. (2016). Prevalence of gastrointestinal parasites of cattle in Abeokuta, Ogun State, Nigeria. *Nigerian Journal of Animal Science* (2):458 - 465
- Taraba Agricultural Development Programme (TADP, 2016). Crop Production Recommendations for Taraba State Government. Printing Press Jalingo Nigeria. 35-39.
- Usman, A. H. (2010). Traditional Methods Used to Treat Ruminant Animals Diseases in Toro Local Government Area of Bauchi State, Nigeria, Hallmark Press, Kaduna. Pp 5-19.
- Usman, I. S., Bzugu, P. M. and Pur. J. T (2017). Indigenous Control Methods for Parasites among Pastoralists Communities in Adamawa State, Nigeria. *Journal of Agricultural Extension*, 21 (1):109-121.
- Wungak, Y.S., Alhaji, N.B., Lazarus, D.D., Odetokun, I.A., Ularamu, H.G. (2019). Participatory Epidemiological Survey of Foot-And-Mouth Disease Among Some Cattle Diseases in Some Pastoral Communities of Niger, North Central, Nigeria. *Nigeria Vet. J.*, 40 (3): 239 -253.

Bashir, M.B; Ndaghu, A.A and Anonguku, I

Yurco, K. M. (2011), Pastoral Movements and Movements in Pastoralism: Shifting Traditions and Institutions of Modern Management Strategies in Laikipia, Kenya, a MSc. Natural Resources and Environment Project, University of Michigan, USA.

Zinsstag, J.B. Bonfoh, G. Zinsstag, L. Crump, I.O. Alfaroukh, M.F. Abakar, J. Kasymbekov, Z. Baljinnyam, K. Liechti, M.A. Seid, E. Schelling (2016). A Vision for the future of Pastoralism. *Review Science Technology*, 35, 693-699