Research Article:

RETROSPECTIVE STUDY ON CASE FLOW PATTERN AT LIVESTOCK SERVICE OFFICE, CHITWAN, NEPAL

Durga Bohara[a], Sabita Gyawali[b], Bishal Parajuli[a] and Chet Raj Pathak[a*]

[a]Faculty of Animal Science, Veterinary Science and Fisheries, Agriculture and Forestry University, Rampur, Chitwan, Nepal

[b]Livestock Service Office, Bharatpur, Chitwan, Nepal

*Corresponding author: crpathak@afu.edu.np

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ABSTRACT

A retrospective study of all cases presented at Livestock Service Office (LSO), Chitwan during two fiscal years 2023/24 and 2024/25 was conducted to determine the prevalence of different diseases and abnormalities by species and seasons. During this period a total of 10,111 cases were registered at LSO, Chitwan. Data was collected, processed and analyzed to get meaningful insights. The cases of the canine species (49.25%) were highest among all species followed by cattle (24.31%), buffalo (14.45%), feline (10.45%), porcine (0.16%) and other species (0.2%). The majority of cases were brought for fecal examinations as diagnostic (33%). The internal parasitic infections and season had significant statistical relationship ($P < 0.05$) with higher prevalence in summer season 27.36% (913/3336). A total of 95.57% (n = 768) of the milk samples were positive for subclinical mastitis using California mastitis test (CMT). Gentamicin (67.74%) was the most sensitive, while penicillin (72.30%) was the most resistant antibiotics. Clinical cases related to integumentary system (22.14%) were most frequently registered among systemic diseases. During summer, 35.45% (n = 1504) of systemic diseases were prevalent. Ehrlichiosis was recorded as the major tick-borne blood pathogen in canine species with prevalence 50.91% (n = 110). A total of 2,392 cases were immunized against rabies, and 830 cases were immunized against DHPPiL (canine distemper, canine hepatitis, canine parvo virus, canine parainfluenza and Leptospirosis) during two fiscal years. The result of this study can be used to develop prevention and control strategies of disease according to season and species, consideration of proper vaccination schedule and deworming schedule.

Keywords: Diseases, epidemiology, livestock service office

INTRODUCTION

Chitwan, located in the central region of Nepal, lies in inner terai region and experiences a tropical climate. The district has four seasons: winter (December- February), spring (March-May), summer (June-August) and autumn (September-November) (Devkota & Bohora, 2009; Gautam, 2017). Chitwan District has suitable climate and geography for raising different farm animals and domesticated pet animals where 80,704 cattle, 54,057 buffalos, 2,824 sheep, 272,117 goats, and 24,258 pigs have been recorded (MoALD, 2024). Moreover, Chitwan is basket for poultry and egg production (Gautam, 2017). The population of pet animals or companion animals like dogs and cats is increasing in the Chitwan District. While they are companion animals, they are being part of family member, they also bring risk of zoonotic disease. As 62.28% of land of Chitwan is covered by forest connected with wildlife (Adhikari et al., 2022), provide an opportunity for disease transmission between domesticated livestock and wildlife. Highly fatal zoonotic disease rabies is frequently observed in livestock transmitted

through sylvatic cycle and urban cycle gives threat for public health (Acharya et al., 2020; Devleesschauwer et al., 2016). The overall livestock production from 2017/18 to 2022/23 of Chitwan District is increasing.

This study was conducted in Livestock Service Office (LSO), of Bharatpur, Chitwan to understand the animal health situation in Chitwan. Many livestock and pet owners from neighboring areas bring their animals for treatment of their animals. At LSO, several diagnostic techniques such as conventional techniques as well as some modern technique like rapid diagnostic kit (RDK), radiographic examination, California mastitis test (CMT), Liver function test, Renal function test and Complete blood count are performed for diagnosis of disease. The objective of this research is to describe the epidemiology of disease based on season wise systemic disease pattern and species wise disease pattern of livestock. It also gives idea about prevention and control of zoonotic and non-zoonotic disease of pet animal.

RESEARCH METHODS

Data were collected from case register book of LSO, Chitwan of last two fiscal year (FY) 2023/2024 and 2024/2025 (FY 2080/81 and 2081/82). Case register book include all animal information, age, sex, case history, tentative diagnosis and treatment. The follow up case was not included. Study population was bovine, canine, feline, caprine, ovine, porcine, equine and others. Other include monkey, guinea pig, parrot, pigeon, duck, that were presented at LSO. Diagnosis of disease or abnormalities was based on clinical evaluation and lab work. Clinical evaluation included owner complaint, patient history, clinical parameter and clinical sign and symptoms. Clinical parameters included rectal temperature, respiratory rate, pulse rate, capillary refill time, appearance of mucus membrane, hair coat appearance and discharge from body orifices. Lab work included fecal examination by sedimentation technique for diagnosis of ruminant endoparasite, The CMT for diagnosis of subclinical mastitis using milk sample, antimicrobial sensitivity test using milk culture for antibiotics recommendation in case of mastitis. Another lab work was using of RDK for diagnosis of viral disease (Rabies, Canine Distemper and Canine Parvo Viral Diarrhea) and hemo-protozoan diseases (anaplasmosis, babesiosis and ehrlichiosis).

The cases that were registered at LSO were broadly divided into seven major categories namely deworming, immunization (Prophylaxis treatment), surgical cases (Castration), fecal examination, CMT/AST, ectoparasitic infestation and systemic disease. The systemic disease further divided into 10 sub categories: (1) Gastrointestinal disease (bloody diarrhea or only diarrhea, bloat, gastritis, stomatitis, acidosis, indigestion, tympany, vomiting, constipation), (2) Respiratory system affecting disease (coughing, epistaxis, nasal discharge, gasping, respiratory distress), (3) Urinary system affection (urine retention, anuria, red urine, urolithiasis), (4) Integumentary system affection (Alopecia, dermatitis, eczema, itching, hoof related problem, disbudding, nail affection), (5) Musculoskeletal system affection (fracture, joint inflammation, rickets, maggot infestation, arthritis, osteoporosis, hernia), (6) Reproductive system disease (Canine transmissible venereal tumor, dystocia, repeat breeding, vaginal discharge and orchitis), (7) Nervous system affection (paralysis, lameness, locked jaw and star gazing) (8) Cardiovascular system disease (hem protozoan disease namely anaplasmosis, babesiosis and ehrlichiosis), (9) Multiple system affecting disease (more than one system affecting symptoms and viral disease: canine parvo virus, canine distemper, lumpy skin disease, pox and PPR) and (10) other cases (anorexia, fever and anemia).

The collected data was entered in the MS-Excel Sheet, managed and grouped into tabular form. Then the data were analyzed and summarized using descriptive statistics and interpreted to

determine occurrence of disease, seasonal pattern and distribution of disease. The p-value and chi-square value were calculated by using Open Epi software version 3.01. The p-value was less than 0.05, while >0.05 was considered as no significance.

RESULTS AND DISCUSION

Species wise overall case flow pattern

Out of 10,111 cases 4,540 and 5,571 cases were registered in FY 2023/24 and 2024/25 respectively. Approximately the case flow in FY 2024/25 increased by 22% compared to previous FY 2023/24. Out of total cases, 54.71% were female, 22.81% were male and while information was missing in 22.48%. By month, the highest cases were admitted during June and July 10.68% (1080/10111). In other four months, most cases admitted were Jan-Feb, May-June, Feb-March and Aug-Sep with their frequency 9.50% (960/10111), 9.20% (930/10111), 8.90% (899/10111) and 8.87% (897/10111) respectively. Regarding species highest number of cases was of canine (49.25%) followed by cattle (24.31%). The percentage of buffaloes, caprine, feline, porcine and other species were 14.45%, 10.45%, 1.12%, 0.16% and 0.2% respectively (Table 1)

The case of canine species was highest which isn't consistent with the Gautam et al., 2017. This is because the LSO is in the city area and the population of pets or companion animals increased day by day. This was very low case of birds because of the poultry and other bird cases brought to LSO referred to National Avian Disease Research Laboratory, Chitwan.

Table 1. Month-wise animal case-flow patterns during FY 2023/24 and FY 2024/25 at LSO, Chitwan

Month	Canine	Cattle	Buffalo	Caprine	Feline	Porcine	Others	Total
Jul-Aug	399 (8.01)	233 (9.48)	129 (8.82)	111 (10.46)	8 (7.08)	3 (18.75)	Rat=1	884 (8.74)
Aug-Sep	405 (8.13)	233 (9.48)	143 (9.78)	107 (10.08)	8 (7.08)	1 (6.25)	0	897 (8.87)
Sep-Oct	328 (6.59)	197 (8.01)	97 (6.63)	79 (7.45)	4 (3.54)	0 (0.00)	Rat =1 Monkey = 1	707 (6.99)
Oct-Nov	273 (5.48)	115 (4.68)	93 (6.36)	67 (6.31)	5 (4.42)	2 (12.50)	0	555 (5.49)
Nov-Dec	365 (7.33)	181 (7.36)	104 (7.11)	95 (8.95)	9 (7.96)	3 (18.75)	Equine =2	759 (7.51)
Dec-Jan	367 (7.37)	133 (5.41)	92 (6.29)	64 (6.03)	17 (15.04)	2 (12.50)	0	675 (6.68)
Jan-Feb	539 (10.82)	188 (7.65)	140 (9.58)	74 (6.97)	16 (14.16)	0 (0.00)	Ovine =3	960 (9.49)
Feb-Mar	495 (9.94)	209 (8.50)	131 (8.96)	58 (5.47)	4 (3.54)	2 (12.50)	0	899 (8.89)
Mar-Apr	465 (9.34)	230 (9.36)	98 (6.70)	78 (7.35)	10 (8.85)	0 (0.00)	Equine=1 Monkey=1 Rabbit=1	884 (8.74)
Apr-May	390 (7.83)	219 (8.91)	165 (11.29)	100 (9.43)	4 (3.54)	1 (6.25)	Duck =1 Rabbit =1	881 (8.71)
May-Jun	438 (8.80)	253 (10.29)	134 (9.17)	85 (8.01)	15 (13.27)	1 (6.25)	Rabbit =2 Pigeon=1 ovine=1	930 (9.20)
Jun-Jul	516 (10.36)	267 (10.86)	136 (9.30)	143 (13.48)	13 (11.50)	1 (6.25)	Rabbit=2 Ovine= 1 Parrot =1	1080 (10.68)
Total	**4980**	**2458**	**1462**	**1061**	**113**	**16**	**21**	**10111**

Note: digits in the parenthesis indicate the percentage of respective numbers.

Categories wise case flow pattern

The overall case flow pattern was divided into 7 major categories. Out of them the highest case were of Parasitic infection (33%) which is similar to finding of (Afrah & Atif, 2014; Peter, 2015; Sarker et al., 2015), followed by vaccination (31.87%), systemic disease (14.87%), Milk test by CMT (7.59%), deworming (7%), ectoparasitic infestation (3.50%) and castration (2.17%). Total 708 animals were dewormed. Among them 60.08% (425/708) cases of were canine, 16.53% (117/708) were of caprine, 11.44% (81/708) were cattle, 10.03% (71/708) were of buffalo, 1.70% (12/708) were of feline and 0.30% (2/708) were of Porcine (Table 2).

Canine 87.85% (311/354) was the major species suffer from ectoparasites infestation, followed by caprine 6.80% (24/354). The systemic disease cases were also higher for canine 73.67% (1108/1504) than other livestock. This may be due to difficulty in bringing livestock at LSO as compared to other pet animals and high cost of transportation. And, due to increasing number of private vet clinics and veterinary service directly to livestock farm (Gautam et al., 2017).

Table 2. Overall case-flow pattern at LSO during FY 2023/24 & 2024/25 Chitwan

Species	Deworming	Immunization	Castration	Fecal exam	CMT	Ectoparasite	Systemic disease	Total
Canine	425	3136	0	0	0	311	1108	4980
Cattle	81	2	0	1696	629	9	41	2458
Buffalo	71	7	0	1237	128	5	14	1462
Caprine	117	24	216	393	11	24	276	1061
Felline	12	49	0	0	0	4	48	113
Birds	0	0	0	0	0	0	3	3
Porcine	2	0	0	4	0	1	7	14
Ovine	0	0	3	4	0	0	0	7
Equine	0	0	0	1	0	0	2	3
Rabbit	0	2	0	1	0	0	3	6
Rat	0	0	0	0	0	0	2	2
Monkey	0	2	0	0	0	0	0	2
Total	708	3222	219	3336	768	354	1504	10111

Species-wise systemic disease pattern

Animals were mostly affected with integumentary system related disease with 22.14% (333/1504), gastrointestinal disease with 17.02% (256/1504) and Musculoskeletal system related disease with 15.34% (231/1504). About 27.35% (303/1108) of animals mostly suffered from integumentary system related disease. While in caprine gastrointestinal disease was major problem with 16.30% (45/276) and in feline musculoskeletal related problem was high with 35.42% (17/48) (Table 3). Urinary system related disease and reproductive system related disease were least prevalent systemic disease.

This higher integumentary system related problem was due to increases in cases of dermatitis, allergy, eczema, ectoparasitic infestation with tick, flea, lice and fly. Among species, musculoskeletal related problems were higher in canine with 67.09% (155/231). This may be due to high accidental cases of canines, bite cases of canine by themselves or other wildlife like foxes and wolves.

Table 3. Species-wise systemic disease pattern

Categories/Species	Canine	Cattle	Buffalo	Caprine	Feline	Others	Total
Cardiovascular system	110 (9.93)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	110 (7.31)
Gastrointestinal system	186 (16.79)	6 (14.63)	3 (21.43)	45 (16.30)	12 (25.00)	4 (23.53)	256 (17.02)
Respiratory system	48 (4.33)	0 (0.00)	0 (0.00)	37 (13.41)	1 (2.08)	(0.00)	86 (5.72)
Urinary system	8 (0.72)	0 (0.00)	1 (7.14)	23 (8.33)	0 (0.00)	0 (0.00)	32 (2.13)
Integumentary system	303 (27.35)	5 (12.20)	3 (21.43)	14 (5.07)	4 (8.33)	4 (23.53)	333 (22.14)
Musculoskeletal system	155 (13.99)	8 (19.51)	3 (21.43)	44 (15.94)	17 (35.42)	4 (23.53)	231 (15.36)
Reproductive system	33 (2.98)	1 (2.44)	0 (0.00)	13 (4.71)	2 (4.17)	1 (5.88)	50 (3.32)
Nervous system	88 (7.94)	2 (4.88)	1 (7.14)	42 (15.22)	5 (10.42)	1 (5.88)	139 (9.24)
Multiple system	95 (8.57)	8 (19.51)	0 (0.00)	12 (4.35)	1 (2.08)	0 (0.00)	116 (7.71)
Other	82 (7.40)	11 (26.83)	3 (21.43)	46 (16.67)	6 (12.50)	3 (17.65)	151 (10.04)
Total	1108	41	14	276	48	17	1504

Note: digits in the parenthesis indicate the percentage of respective numbers. Other categories include anemia, anorexia and fever.

Season-wise systemic disease pattern

The cardiovascular system diseases/hemo-protozoan diseases (anaplasmosis, babesiosis and ehrlichiosis) were highest in summer season with prevalence 35.45% (39/110) coincide with study of Phuyal et al., 2017. Similarly, integumentary system related disease and musculoskeletal system related disease also mostly occur in summer season with frequency 41.14% (137/333) and 38.15% (88/231) respectively (Table 4). While the nervous system prevalent in winter season while gastrointestinal diseases were prevalent in autumn season.

Systemic disease case flow was highest in summer was in line with Zegeye et al., 2013. This may be due to high environmental temperature, which might have suitable for vector and microorganism growth and increase in heat stress, increase in fly infestation and also high cases of accidental or collision fracture (Hasib et al., 2020).

Table 4. Seasonal pattern of systemic disease

Categories/Seasons	Winter	Spring	Summer	Autumn	Total
Cardiovascular system	25 (6.76)	27 (9.85)	39 (7.91)	19 (5.18)	110 (7.31)
Gastrointestinal system	76 (20.54)	43 (15.69)	56 (11.36)	81 (22.07)	256 (17.02)
Respiratory system	16 (4.32)	13 (4.74)	29 (5.88)	28 (7.63)	86 (5.72)
Urinary system	9 (2.43)	5 (1.82)	9 (1.83)	9 (2.45)	32 (2.13)
Integumentary system	68 (18.38)	45 (16.42)	137 (27.79)	83 (22.62)	333 (22.14)
Musculoskeletal system	46 (12.43)	47 (17.15)	88 (17.85)	50 (13.62)	231 (15.36)
Reproductive system	11 (2.97)	6 (2.19)	21 (4.26)	12 (3.27)	50 (3.32)
Nervous system	46 (12.43)	17 (6.20)	42 (8.52)	34 (9.26)	139 (9.24)
Multiple system	30 (8.11)	44 (16.06)	22 (4.46)	20 (5.45)	116 (7.71)
Other	43 (11.62)	27 (9.85)	50 (10.14)	31 (8.45)	151 (10.04)
Total	370	274	493	367	1504

Note: digits in the parenthesis indicate the percentage of respective numbers. Other categories include anemia, anorexia and fever.

Different diagnostic approaches for diagnosis of disease

Findings on fecal examinations

A total of 3,336 ruminant fecal examinations were conducted during fiscal year 2023/24 and 2024/25. Approximately 50.83% (1,696/3,336) cases were of cattle, 37.08% (1,237/3,336) of buffalo, 11.78% (393/3,336) of caprine and only 0.30% (10/3,336) of other cases. Other cases included pigs, sheep, horses and rabbits. The prevalence of endoparasite infection was found

to be 71.43% (2,383/3,336). Study revealed that in helminth, higher prevalence was found of nematode (31.20%) similar to finding of (Bastakoti et al., 2023) but not in accordance to the finding of Adhikari et al., 2022followed by trematode (30.25%) and cestode (21.04%). The prevalence of protozoan was found 10.55% (353/3,336). According to season nematode and trematode prevalence were higher in summer season corroborate with the finding of Bista et al., 2018. But cestode and protozoan prevalence was highest in spring season. In the class of nematode, the prevalence was higher in summer seasons with prevalences of *Strongyle* spp., *Toxocara vitulorum*, *Trichuris* spp. were 33.82% (210/621), 16.91% (105/621) and 4.025% (25/621) respectively that support the finding of Das et al. (2019). Similar for trematode class species, namely *Paramphistomum* spp. and *Fasciola* spp. have higher prevalences in summer season with 33.98% (211/621) and 30.24% (189/621) agrees with Das et al. (2019). In this study, *Toxocara vitulorum*, *Balantidium coli* and *Fasciola* spp. are of zoonotic importance (Magar & Ghimire, 2023). There was significant statistical relation between season and endoparasite species for all except *Fasciola* spp. (Table 5).

Table 5. Statistical temporal pattern of endoparasites' infection on fecal examinations

Parasitic species	Winter	Spring	Summer	Autumn	P- value
Toxocara vitulorum	39 (5.64)	103 (11.04)	105 (10.53)	80 (11.20)	< 0.05
Strongyles spp.	97 (14.02)	162 (17.36)	210 (21.06)	161 (22.55)	< 0.05
Trichuris spp.	20 (2.89)	12 (1.29)	25 (2.51)	27 (3.78)	< 0.05
Fasciola spp.	123 (17.77)	180 (19.29)	189 (18.96)	161 (22.55)	> 0.05
Paramphistomum spp.	32 (4.62)	77 (8.25)	211 (21.16)	36 (5.04)	<0.05
Moneizia spp.	182 (26.30)	224 (24.01)	202 (20.26)	94 (13.17)	< 0.05
Balantidium spp.	77 (11.13)	155 (16.61)	89 (8.93)	18 (2.52)	< 0.05
Eimeria spp.	5 (0.72)	0 (0.00)	0 (0.00)	8 (1.12)	< 0.05
Total	692	933	997	714	

Note: digits in the parenthesis indicate the percentage of respective numbers.

California mastitis test (CMT) for diagnosis of mastitis

The CMT was done to detect subclinical mastitis (SCM) by using milk sample brought at LSO. Total 768 milk samples were tested for SCM by CMT method (Table 6). Study revealed that 95.57% samples were positive for SCM in total which is devoid from the result of Shrestha et al. (2021) and Tiwari et al. (2022). Approximately 95.04% samples were positive for SCM in FY 2023/24 while 96% in FY 2024/25. This high prevalence of SCM may be due to farmers bringing highly susceptible milk samples for SCM tests.

Antimicrobial sensitivity test (AST) for bacteria responsible for mastitis

A total of 621 milk samples which were positive for SCM by CMT test were further processed for antimicrobial sensitivity test (AST). This test was done to identify most effective antibiotics for treating SCM, reducing antimicrobial resistance (AMR) and to minimize production loss of farmers. At LSO, mostly used antibiotics disc for AST were enrofloxacin, gentamycin, tetracycline, ciprofloxacin, ceftriaxone and penicillin. The sensitivity of antibiotics was categorized into three classes namely sensitive, intermediate and resistant on the basis of zone of inhibition (Table 6).

The result showed that approximately 67.47% samples were sensitive to gentamycin which is similar to finding of Regmi et al. (2020) and Tiwari et al. (2022). The sensitivity towards enrofloxacin and ciprofloxacin was 62.48% and 56.20% respectively. While penicillin was the most resistant antibiotic. Approximately 72.30 % sample were found to be resistant against penicillin which contradicted to the findings of Shrestha et al. (2021). This may be due to use of

antibiotics without an AST test (Tiwari et al., 2022).

Table 6. Antimicrobial sensitivity test result:

Sensitivity	Gentamicin	Ciprofloxacin	Tetracycline	Ceftriaxone	Enrofloxacin	Penicillin
Sensitive	419 (67.47)	349 (56.20)	301 (48.47)	251 (40.42)	388 (62.48)	107 (17.23)
Intermediate	147 (23.67)	185 (29.79)	144 (23.19)	126 (20.29)	174 (28.02)	65 (10.47)
Resistance	55 (8.86)	87 (14.01)	176 (28.34)	244 (39.29)	59 (9.50)	449 (72.30)
Total	621	621	621	621	621	621

Note: digits in the parenthesis indicate the percentage of respective numbers.

Rapid diagnosis kit (RDK) based diagnosis

A total of 180 Rapid diagnostic kit (RDK) was used for diagnosis during fiscal year 2023/24. Among them 38.89% (70/180) test were done to diagnose viral disease namely canine distemper virus and canine parvo viral disease and 61.11% (110/180) for hemoprotozoan disease (Table 7).

Study revealed that the prevalences of viral disease was highest in spring season with prevalences 54.28% (38/70). The higher prevalences of hemoprotozoan disease found in summer season with prevalences 35.45% (39/110) is in accordance with Phuyal et al. (2017). This may be due to the increase in the activity of tick vector for hemo-protozoan disease. The prevalence of ehrlichiosis is highest among hemoprotozoan disease which is inconsistent with the findings of Pathak et al. (2023).

Table 7. Rapid diagnostic kit in seasonal pattern at LSO, Chitwan.

Categories	Disease	Winter	Spring	Summer	Autumn	Total
Viral disease	Canine distemper	5 (25.00)	17 (44.74)	4 (50.00)	0 (0.00)	26 (37.14)
	Canine parvo	15 (75.00)	21 (55.26)	4 (50.00)	4 (100.00)	44 (62.86)
	Total	20	38	8	4	70
Hemo-protozoan disease	Ehrlichiosis	9 (36.00)	18 (66.67)	17 (43.59)	12 (63.16)	56 (50.91)
	Anaplasmosis	7 (28.00)	1 (3.70)	8 (20.51)	3 (15.79)	19 (17.27)
	Babesiosis	2 (8.00)	5 (18.52)	9 (23.08)	1 (5.26)	17 (15.45)
	Combo test	7 (28.00)	3 (11.11)	5 (12.82)	3 (15.79)	18 (16.36)
	Total	25	27	39	19	110

Note: digits in the parenthesis indicate the percentage of respective numbers.

Table 8. Diagnostic approach for different animal species (in numbers) at LSO, Chitwan

Categories	Technique	Canine	Cattle	Buffalo	Caprine	Others	Total
Fecal Exam	Qualitative		1696	1237	393	H=1, P=3, O=4	3336
CMT	Qualitative		627	128	10		768
Viral Disease							
Canine Distemper	RDT	28					28
Canine Parvo Virus	RDT	45					45
Hemoparasitic Disease							
Ehrlichiosis	RDT	56					56
Anaplasmosis	RDT	19					19
Babesiosis	RDT	17					17
Combo Test (E+A+B)	RDT	20					19
Ectoparasites	Physically	311	9	5	24	F=4, P=1	354

Note: E+A+B= ehrlichiosis + Anaplasmosis + Babesiosis, RDT = Rapid Diagnostic Test, CMT= California Mastitis Test. H= Horse, P= Porcine, F= Feline, O = Ovine.

Vaccination and prophylaxis scheme in Canine and other species

In total 3,222 canine animals were immunized against rabies and DHPPiL (canine distemper, canine hepatitis, canine parvovirus, canine parainfluenza and leptospirosis). Out of total vaccinated cases 97.33% were of canine species, 1.52% were feline, 0.75% caprine and only 0.03% were other species. Other species include cattle, buffalo, monkey and rabbit. Caprine (n=24) was the highest number for post bite rabies vaccination after canine species followed by feline (n=19). A total of 830 canine species were vaccinated against DHPPil. The ration for anti-rabies vaccine and DHPPiL was approximately 3:1 (Table 9).

The pre-anti-rabies vaccination was highest in spring season. This may be due to high incidence of rabies in upcoming season summer and the autumn is breeding season that increases case of physical contact as well as fighting and aggression (Devleesschauwer et al., 2016; Pal et al., 2021).

Table 9. Number of animals admitted for immunization at LSO, Chitwan

Seasons	Vaccine types	Canine	Feline	Caprine	Others	Total
Winter	Pre-exposure ARV	571	12			583
	Post-exposure ARV	29	10	7	3	49
	DHPPiL	272				272
	Total					904
Spring	Pre-exposure ARV	727	3			730
	Post-exposure ARV	42	2	9	2	55
	DHPPiL	232				232
	Total					1017
Summar	Pre-exposure ARV	507	13			520
	Post-exposure ARV	42	3	5	7	57
	DHPPiL	178				178
	Total					755
Autumn	Pre-exposure ARV	351	2			353
	Post-exposure ARV	37	4	3	1	45
	DHPPiL	148				148
	Total					546

Note: ARV = anti-rabies vaccine.

CONCLUSION

The result of this study showed the pattern of different diseases. Endoparasitic infection is the major case observed at LSO. Some endoparasite such as *Balantidium coli* and *Toxocara vitulorum* have zoonotic importances. So, farmers and animal healthcare should conduct regular deworming. Studies also revealed that the disease due to viruses, hemo-protozoa, other systemic diseases and endoparasitic infections are seasonally variable. Concerned authority should pay attention for regular deworming, routine vaccination, biosecurity, housing management and other preventive measures to control and prevent various zoonotic and non-zoonotic disease to maintain them of one health.

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AUTHOR CONTRIBUTIONS

DB: Data Curation, Writing – Original Draft, Writing – Review & Editing; **SG:** Resources, Data Curation, Writing – Review & Editing, Supervision; **BP:** Data Curation, Writing – Review & Editing; **CRP:** Conceptualization, Methodology, Software, Validation, Formal Analysis, Investigation, Writing – Review & Editing, Supervision.

CONFLICT OF INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

ETHICAL APPROVAL AND PERMITS

Not applicable.

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