

# Retrospective Study of Diseases of Camel at Teaching Veterinary Clinical Complex of RAJUVAS, Bikaner

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## ABSTRACT

To determine the occurrence of camel diseases, a retrospective epidemiological study was undertaken at the Medicine Clinic of Teaching Veterinary Clinical Complex of the College of Veterinary and Animal Science, Bikaner, from January 2013 to December 2017. The data of five years were collected from the outpatient register. These cases were diagnosed after laboratory investigations related to clinical manifestations. A total of 984 sick camels were reported in the clinic. Out of these 740 (75%) were male and 244 (25%) were female camels. System and season wise, data were classified and studied. About 69 (7%) cases were related to respiratory diseases and of these a maximum of 34 (3.5%) cases of respiratory diseases were recorded in the winter season, the rest were in summer 20 (2%) and 15 cases (1.5%) were during the rainy season. Similarly 413 (42%) of clinical cases of gastro-intestinal diseases were recorded. Out of which 166 (16.9%) were recorded in winter, 130 (13.2%) of cases in rainy season and 117 (11.9%) cases in summer. Urinary system related diseases were recorded in 21 (2.1%) cases in which 8 (0.8%) were reported in winter, 7 (0.7%) in summer and 6 (0.6%) in the rainy season. A total of 136 (14%) cases were diagnosed as trypanosomosis of which 66 (7%) cases occurred in summer, 38 (4%) in rainy and 32 (3%) of cases detected in winter. Skin related diseases were found in 121 (12.3%) camels in which 49 (5%) were in winter, 45 (4.6%) in the rainy season and 27 (2.7%) in summer. As per the records 224 (22.7%) other non-systemic diseases were also recorded. Out of these 42 (4.3%) cases were of pyrexia of unknown origin, 34 (3.5%) camel pox, 6 (0.6%) arthritis, 5 (0.5%) tetanus, 22 (2.2%) general debility, 28 (2.8%) ticks infestation and 87 (8.8%) cases remaining undiagnosed.

**Keywords:** Retrospective; Epidemiological Study; Camel; Diseases.

## INTRODUCTION

The dromedary camel (*Camelus dromedaries*) is an important domesticated animal widely distributed over the northwestern parts of India, playing an important role in the social and economic life of the people (1). The camel in India has been an animal of utility from early Harappan level of civilization (3000-1800 BCE). The camel is a very important animal for transport, milk and a source of livelihood for pastoralists in

the Indian arid region. The camel has played a significant role in civil law and order, defense and battles from ancient times. Presently, the camel corps constitutes an important wing of Border Security Force of Indian Para-Military Services. Camels have a distinctive bio-physiology befitted as a symbol of adaptation in arid and semi-arid regions.

The total number of camels in the Rajasthan state is 0.32 million and the state's share is 81.37% in total camel population of India. The camels population has decreased from 0.49

million in 2003 to 0.32 million in 2012. The camels population has decreased by 23% during the inter census period (2007-2012). The district of Bikaner has the second highest contribution in the camel population of 57% in Rajasthan (2).

The diseases of camels cause significant economic losses in terms of decline in working capability, growth and productivity. But the major challenge in camel production system has been a loss of camel strength in numbers. This study was conducted from January 2013 to December 2017 in camels presenting at the Medicine Clinic of Teaching Veterinary Clinical Complex of the College of Veterinary and Animal Science, Bikaner, which is a reliable source of information about animal diseases.

Analysis of case records can give a picture of the disease problems of that local area. The aim of study was to categorize the diseases in camels giving a picture of the disease problems of that local area which would help to identify risk factors of diseases for developing future control measures.

## MATERIALS AND METHODS

### Source of data

The retrospective epidemiological study of diseases in camels was carried out using five years data at the Medicine Clinic of Teaching Veterinary Clinical Complex of College of Veterinary and Animal Science, Bikaner, from January 2013 to December 2017 and analyzed to determine the occurrence of diseases in relation to gender, affected system and seasonal pattern. The data of five years were collected from the outpatient register. These cases were diagnosed after clinical and laboratory examinations. Three seasons were considered, summer season from March to June, rainy season from July to October and winter from November to February.

### Clinical examinations

Clinical examination of each camel was carried out as per the methods described by Radostits *et al.* (3). It included history of illness, duration of illness, changes in appetite of the animal, abnormalities in behavior, gait, posture, defecation (quantity, consistency and frequency), salivation, nasal discharge, distension of the abdomen, examination of visible mucous membranes, eyes, skin and anus, physical condition, clinical manifestations and general clinical examinations. Different parts and systems of the body of each of the sick animals

**Table 1:** Percentage of gender distribution of camels presented at the Teaching Veterinary Clinical Complex from January 2013 to December 2017

Year	Male	Female	Total
2013	191	38	229
2014	227	49	276
2015	159	86	245
2016	67	19	86
2017	96	52	148
Over all	740 (75%)	244 (25%)	984

were examined following the procedure of palpation, percussion, and auscultation. The various techniques were applied in relation to sampling procedures and laboratory investigations. Microscopic examination of feces, blood, urine and skin scrapings were carried out where required for confirmation of diagnosis as described by Rosenberger (4).

## RESULTS AND DISCUSSION

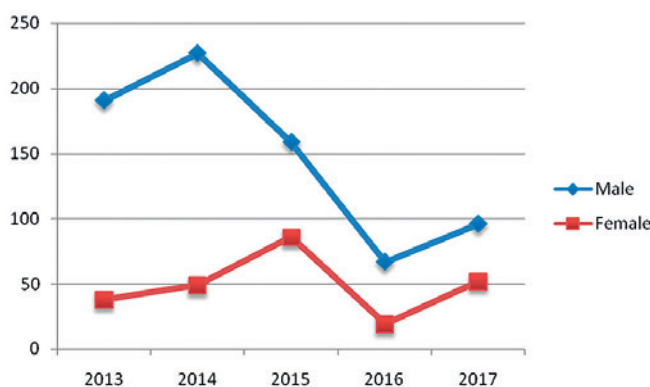
A total of 984 sick camels were reported in the clinic. Out of these 740 (75%) were male and 244 (25%) were female camels (Table 1 and Fig. 1).

The percentage of male camels was much higher in the present study probably due to the higher population of males (78%) than females (22%) in urban areas of Rajasthan (2).

### System and gender wise distribution of diseases

#### A. Respiratory diseases

A total of 69 (7%) cases out of 984 total cases were related to respiratory diseases. Out of 69 patients, 24 (35%) cases



**Figure 1:** Gender wise distribution of camels presented to the Teaching Veterinary Clinical Complex from January 2013 to December 2017

were pneumonia, 12 (17%) cases bronchitis, 30 (44%) cases upper respiratory tract infection and 3 (4%) cases epistaxis (Table 2). Out of these 69 cases 52 (75%) cases were diagnosed in males and 17 (25%) in females. Similar results of the prevalence of pneumonia were recorded by Mehta *et al.* (5), Fraz (6 and 7) and Chaudhry *et al.* (8) in camels.

The camels affected with respiratory diseases showed nasal secretions sometimes epistaxis, pyrexia and anorexia. An increase in body-temperature with depression, anorexia, watery nasal discharge, cough and lachrymation were indicative of the onset of disease. A definitive etiology of most respiratory diseases of camels was not determined as there is a variety of viruses, fungi, bacteria and parasites which maybe possible causes of respiratory outbreaks among camels. The most important predisposing factors were sudden climatic changes, poor management practices, exposure to various diseases, excessive exercise and low-grade nutrition (9).

## B. Gastro-intestinal diseases

Out of total 984 cases about 413 (41.9%) clinical cases of gastro-intestinal diseases were recorded which included tympany, constipation, abdominal pain, diarrhoea and gastrointestinal obstruction in camels. Similarly, Mehta *et al.* (5) reported high prevalence (34%) of digestive disorders in camels. Among the digestive problems enteritis, pica (sand licking), rumen impaction and abdominal pain were the major problems reported by Kachhawaha *et al.* (10) in the camels of southern Rajasthan. Out of 413 cases of digestive problems, pica was (13.6%) a primary disorder ranked in first position, second place was of simple indigestion (12%) and the least presenting problem was that of acidosis (0.5%) (Table 3). The high prevalence of pica and simple indigestion might have been due to poor availability of quality feed particularly deficiency of minerals like calcium and phosphorus in the region due to drought conditions. Tanwar *et al.* (11)

**Table 2:** Percentage of respiratory diseases in camel at the Teaching Veterinary Clinical Complex from January 2013 to December 2017

Name of the diseases	Total		Over all Total (%)	Percentage (Total cases 984)
	Male	Female		
Pneumonia	19	5	24(35%)	2.5
Bronchitis	8	4	12(17%)	1.2
Upper respiratory tract infection	22	8	30(44%)	3.0
Epistaxis	3	0	3(4%)	0.3
<b>Total</b>	<b>52 (75 %)</b>	<b>17 (25%)</b>	<b>69</b>	<b>7</b>

**Table 3:** Occurrence of gastrointestinal diseases in camel at the Teaching Veterinary Clinical Complex from January 2013 to December 2017

Name of the diseases	Total		Over all Total (%)	Percentage (Total cases 984)
	Male	Female		
Simple Indigestion	93	25	118(29)	12
Enteritis	62	16	78(19)	7.9
Pharyngitis	20	5	25(6)	2.5
Stomatitis	7	3	10(2)	1.0
Ruminal impaction	21	5	26(6)	2.6
Pica	91	43	134(33)	13.6
Acidosis	3	1	4(1)	0.5
Constipation	5	1	6(1)	0.6
Colic	8	4	12(3)	1.2
<b>Total</b>	<b>310 (75 %)</b>	<b>103 (25%)</b>	<b>413</b>	<b>41.9</b>

Figures in parenthesis indicates per cent

**Table 4:** Occurrence of Urinary diseases in camel at the Teaching Veterinary Clinical Complex from January 2013 to December 2017

Name of the diseases	Total		Over all Total (%)	Percentage (Total cases 984)
	Male	Female		
Urinary tract infection	6	1	7(33)	0.7
Haematuria	11	3	14(67)	1.4
<b>Total</b>	<b>17 (81%)</b>	<b>4 (19%)</b>	<b>21</b>	<b>2.1</b>

Figures in parenthesis indicates per cent

reported simple indigestions (55%), acid indigestions (10%) and enteritis (9%) as alimentary diseases of camels.

## C. Urinary tract diseases

Urinary system related diseases were recorded in 21 (2.1%) cases (Table 4). The urinary tract infections (n=7) and haematuria (n=14) were diagnosed during laboratory examina-

tions. The urine of affected animals was light to dark red in color.

#### D. Haemoprotozoan diseases

The overall recorded prevalence of trypanosomosis was 14% (136) (Table 5). These results were similar to the results of Tekle and Abebe (12), Mehta *et al.* (5), Hussain *et al.* (13) and Shah *et al.* (14); they reported 11%, 8%, 13% and 14% prevalence of *Trypanosoma evansi* in camels, respectively.

The common clinical manifestations of trypanosomosis in camels were pyrexia, weakness, anaemia, incoordination of muscular movements. Although these signs are only indicative they cannot be considered as pathognomonic without confirmation by laboratory examinations.

#### E. Skin diseases

In this study the percentage of mange in camels was 10% out of the total cases and rest of other dermatological disorders were 3%. Out of total skin diseases 78% cases were of mange and 22% of other dermatological disorders (Table 6). Similar prevalence was also reported by Dinka *et al.* (15) who reported 11% prevalence from Eastern Ethiopia and Feyera *et al.* (16) who reported in 17% in Northern Ethiopia and 32% in Eastern Ethiopia.

Mange was diagnosed in skin scrapping in the laboratory by using a microscope. The affected camels showed erythema, pruritus, alopecia, hyperpigmentation dark black crusting, reddish marks and sometimes blood discharge. The causative agent was *Sarcoptes scabiei* var. *cameli*. Pruritus, hair loss and loss of condition are clinical observations of the disease in camels.

#### F. Miscellaneous diseases

Other systemic/nonsystemic/infectious diseases were also recorded in this study and their prevalence is presented in Table 7. A total of 8.8% diseases remained undiagnosed and were treated symptomatically. A lowest prevalence of tetanus (0.5%) was recorded. Camel pox was recorded in 3.5% of camels while ticks infestation was also recorded as a major problem.

Among the miscellaneous diseases, pox in the form of

**Table 5:** Occurrence of trypanosomosis in camel at the Teaching Veterinary Clinical Complex from January 2013 to December 2017

Name of the diseases	Total		Over all total	Percentage (Total cases 984)
	Male	Female		
Trypanosomosis	115 (85%)	21 (15%)	136	14

**Table 6:** Occurrence of skin diseases in camel at the Teaching Veterinary Clinical Complex from January 2013 to December 2017

Name of the diseases	Total		Over all Total (%)	Percentage (Total cases 984)
	Male	Female		
Mange	61	33	94 (78)	10
Other dermatological disorders	22	5	27 (22)	3
<b>Total</b>	<b>83 (69%)</b>	<b>38 (32%)</b>	<b>121</b>	<b>12</b>

Figures in parenthesis indicates percentage

**Table 7:** Occurrence of miscellaneous diseases in camel at the Teaching Veterinary Clinical Complex from January 2013 to December 2017

Name of the diseases	Total		Over all Total (%)	Percentage (Total cases) 984
	Male	Female		
Undiagnosed	54	33	87 (39)	8.8
Pyrexia of unknown origin	31	11	42 (19)	4.3
Camel pox	28	6	34 (15)	3.5
Arthritis	6	0	6 (3)	0.6
Tetanus	3	2	5 (2)	0.5
Debility	18	4	22 (10)	2.2
Ticks Infestation	23	5	28 (12)	2.8
<b>Total</b>	<b>163</b>	<b>61</b>	<b>224</b>	<b>22.7</b>

Figures in parenthesis indicates percentage

outbreaks was the commonest viral disease observed during the winter season. More commonly, the disease affected young animal and lesions were mostly found on belly, face, neck and limbs. Mostly, animals recovered within two – four weeks while some animals developed long lasting opacities of the cornea (10).

Among the locomotor diseases, arthritis (0.6%) was the only major problem reported in the camel. The animals were found to be sitting down with difficulty and continued recumbency due to pain.

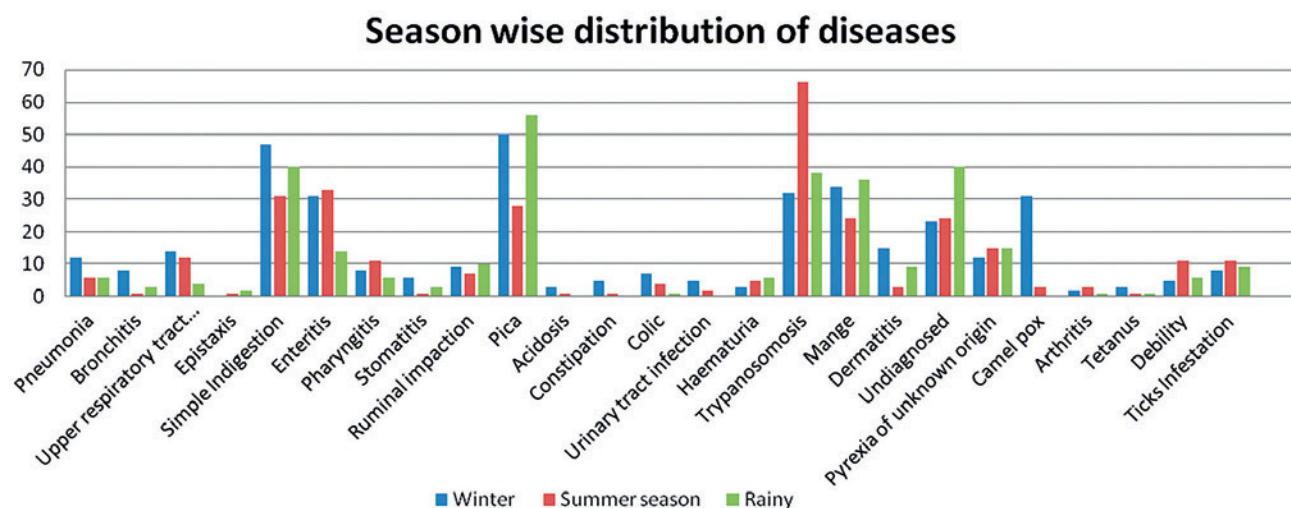
Ticks infestation was present in 2.8% of camels but it was not considered as a serious health problem by the herders as camels are not kept in enclosures and remain mostly on

**Table 8:** Season wise occurrence of diseases in camel at the Teaching Veterinary Clinical Complex from January 2013 to December 2017

Name of the diseases	Winter season	Summer season	Rainy season	Percentage (Total cases 984)
<b>Respiratory diseases</b>				
Pneumonia	12	6	6	<b>69 (7%)</b>
Bronchitis	8	1	3	
Upper respiratory tract infection	14	12	4	
Epistaxis	0	1	2	
<b>Sub total</b>	<b>34 (3.5%)</b>	<b>20 (2%)</b>	<b>15 (1.5%)</b>	
<b>Gastro-intestinal diseases</b>				
Simple Indigestion	47	31	40	<b>413 (42%)</b>
Enteritis	31	33	14	
Pharyngitis	8	11	6	
Stomatitis	6	1	3	
Ruminal impaction	9	7	10	
Pica	50	28	56	
Acidosis	3	1	0	
Constipation	5	1	0	
Colic	7	4	1	
<b>Sub total</b>	<b>166 (16.9%)</b>	<b>117 (11.9%)</b>	<b>130 (13.2%)</b>	
<b>Urinary diseases</b>				
Urinary tract infection	5	2	0	<b>21 (2.1%)</b>
Haematuria	3	5	6	
<b>Sub total</b>	<b>8 (0.8%)</b>	<b>7 (0.7%)</b>	<b>6 (0.60%)</b>	
<b>Blood protozoan diseases</b>				
<b>Trypanosomosis</b>	<b>32 (3%)</b>	<b>66 (7%)</b>	<b>38 (4%)</b>	<b>136 (14%)</b>
<b>Skin diseases</b>				
Mange	34	24	36	<b>121 (12.3%)</b>
Dermatitis	15	3	9	
<b>Sub total</b>	<b>49 (5%)</b>	<b>27 (2.7%)</b>	<b>45 (4.6%)</b>	
<b>Other miscellaneous diseases</b>				
Undiagnosed	23	24	40	<b>224 (22.7%)</b>
Pyrexia of unknown origin	12	15	15	
Camel pox	31	3	0	
Arthritis	2	3	1	
Tetanus	3	1	1	
Debility	5	11	6	
Ticks Infestation	8	11	9	
<b>Sub total</b>	<b>84 (8.5%)</b>	<b>68 (6.9%)</b>	<b>72 (7.3%)</b>	
<b>Over all total</b>	<b>373 (37.9%)</b>	<b>305 (31%)</b>	<b>306 (31.1%)</b>	

Figures in parenthesis indicate percentages





**Figure 2:** Season wise occurrence of diseases in camel

move, which are not favorable conditions for tick infestation. Pyrexia of unknown origin (4.3%) is one of the most difficult diagnostic challenges in medicine. Because fever can be caused by a variety of conditions and early specific testing during the early fever period may be inefficient and/or misleading.

### Season wise distribution of diseases

About 69 (7%) cases were related to respiratory diseases and of these a maximum of 34 (3.5%) cases of respiratory diseases were recorded in winter season, the remaining cases were in summer 20 (2%) and 15 (1.5%) were in the rainy season. Similarly 413 (42%) clinical cases of gastro-intestinal diseases were recorded. Out of which 166 (16.9%) were recorded in winter, 130 (13.2%) cases in the rainy season and 117 (11.9%) cases in summer. Urinary system related diseases were recorded in 21 (2.1%) cases in which 8 (0.8%) were reported in winter, 7 (0.7) in summer and 6 (0.6) in the rainy season (Table 8).

A total of 136 (14%) cases were of trypanosomosis of which 66 (7%) of cases presented in summer, 38 (4%) in the rainy season and 32 (3%) cases in the winter. Sobhy *et al.* (17) reported that the highest prevalence of *T. evansi* (26.77%) was recorded in spring season followed by summer (23.47%), winter (16.0%), and autumn (12.62%) seasons diagnosed using blood film examination. This might be related to a higher risk of camel's exposure to trypanosome infection due to the increased density of vector populations at this time of

the year as reported previously and coinciding with the results of Awad (18) and Barghash (19).

Skin related diseases were found in 121 (12.3%) camels in which 49 (5%) were in diagnosed in winter, 45 (4.6%) in the rainy season and 27 (2.7%) in summer. Other workers (20, 21) also observed the seasonal pattern of camel mange recorded in this study. The principal factor for skin diseases is poor condition and season, the disease being most acute during the cold season and in rainy periods. Although, age might be an important factor it was not studied here, although previous studies reported that both very young and very old camels are particularly susceptible (22).

As per the records, 224 (22.7%) cases of other non-systemic diseases were also recorded. Out of these 42 (4.3%) cases were of pyrexia unknown origin, 34 (3.5%) camel pox, 6 (0.6%) arthritis, 5 (0.5%) tetanus, 22 (2.2%) general debility, 28 (2.8%) infestation with ectoparasites and 87 (8.8%) cases remained undiagnosed.

The occurrence of the diseases was higher in male than female. More diseases were reported in the winter season 373 (38%) followed by the rainy and summer season 306 (31%) 305 (31%), respectively. the most common systemic diseases were gastrointestinal diseases (42%) and least affected system in camel was urinary system (2.1%).

### CONCLUSION

Retrospective epidemiological analysis for a period of 5 years or more may help to identify risk factors of diseases for de-

veloping future control measures to fight against infectious, parasitic diseases especially trypanosomiasis, pneumonia, and mange and other miscellaneous diseases. These results may serve as basic information, for strategic disease control schemes.

## CONFLICT OF INTERESTS

The authors do not have any conflicts of interest.

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