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Superficial pyoderma in canines in southern part of Rajasthan-A detailed epidemiological study

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Abstract
A study was undertaken to determine the prevalence of different dermatological affections in dogs during the period from July 2017 to June 2018. Out of 987 dog cases reported to the Veterinary Clinical Complex of college of Veterinary and Animal Science, Navania, Udaipur, 205 (20.77%) animals had different dermatological affections. Demodectic mange was the most common dermatological affection followed by Ectoparasite infestation, superficial pyoderma and Dermatomycosis, respectively in decreasing order. Most of the skin affections were observed during rainy season (39.51%) followed by summer season (36.58%) and winter season (23.90%). The dogs of one to three year of age were the most affected (40.62%). Of the dogs with skin affections, 50.73% were males, 40.97% were females, 5.36% were castrated and 2.92 % were spayed. Epidemiological analysis of the dermatological affections data revealed an increasing trend of skin disorders in dogs during the study period which may probably either be due to more awareness among dog owners about the health of their pets or increasing pet population or the environment becoming more favorable for the various etiological agents of skin disorders.

Keywords: Prevalence, dermatological affections, dogs, superficial pyoderma

Introduction
Dogs as companion animals gaining popularity with the fast changing socio-economic scenario in our country. Dogs may perform a variety of tasks including herding or guarding livestock, pulling sledge, tracking/ retrieving game animals, destroying vermin, locating lost people or disaster victims, assisting handicapped people, providing companionship, in the defense services and crime investigation. The skin is a large, metabolically active system that serves to protect the body from injury and infection, aid in temperature control, immune regulation and also act as a storage reservoir for certain nutrients. It has been estimated that 20–75% cases of small dogs have skin problems as the main or concurrent complaint (Scott *et al* 2001 and) [14].

Bacterial infections are common in small animal practice (Hiller, 2009) [6]. Pyoderma is one of the most common skin diseases in dogs. Pyoderma can be defined as a pyogenic or pus-producing bacterial infection of the skin (Angus, 2009) [1]. Pyoderma is more common in dogs due to certain characteristics of dog's skin like thin stratum corneum with less lipid material and unprotected hair follicles that are at increased risk for bacterial invasion and subsequent colonization and overgrowth. This may lead to a higher incidence of primary inflammatory disease that affects the first-line defenses (Pinchbeck, 2010) [10].

Superficial pyoderma is a bacterial infection confined to the superficial portion of the hair follicle. Bacteria may cause an infection secondary to local trauma, scratching, contamination due to poor grooming, seborrhea, parasitic infestation, hormonal factors, local irritants and allergies in dogs (Bajwa, 2016) [2]. Pyoderma varies in severity from a transient involvement of the skin surface to deep discharging infection which may be non-responsive to therapy and commonly relapse. Ninety per cent of canine pyoderma is associated with staphylococci bacteria.

The diagnosis of superficial bacterial pyoderma is based on the presence of variable gross cutaneous lesions (papules, pustules, epidermal collarettes, erythema, crusting, lichenification and hyperpigmentation), positive findings on microscopic examination of skin cytology (acetate tape or glass slide impression smears observing neutrophils with intracellular bacteria) and, less commonly, by histopathological findings. Treatment of superficial bacterial

pyoderma frequently involves the use of systemic and topical antimicrobial agents (Raven *et al*, 2014) [12].

Materials and Methods

The present investigation was carried out to study prevalence, various diagnostic and therapeutic aspects of superficial pyoderma in dogs in southern part of Rajasthan. Dogs presented with different dermatological affections at Veterinary Clinical Complex, CVAS, Navania, Udaipur and surrounding veterinary institutions were included in the present investigation. The present investigation was undertaken for a period of 12 months i.e. July 2017 to June 2018.

Complete history including breed, sex, age, general behavior, body condition, condition of hair coat, diet, type of feed, seasonal occurrence of disease, duration of illness, intensity and frequency of itching, occurrence of lesions in other dogs of same kennel if any, past history, any lesions in family members of owners, disinfectant used for cleaning of floor, soap or shampoo used to bath the dog and any other relevant information were collected from the dog owners. All these dogs were subjected to detailed clinical examination followed by routine haematology, biochemistry and markers of oxidative stress, skin scraping, bacterial, fungal isolation and in vitro antibiotic sensitivity test.

Dogs of different breeds, age groups and of either sex were included. The dogs having history of pruriginous dermatitis and lesions characterised by erythema, papules, pustule, epidermal collarettes, crusts, alopecia, lichenification and hyperpigmentation were included in present investigation. Pyoderma in dogs was diagnosed on the basis of history and clinical examination. The dogs having superficial pyoderma was subjected to detailed physical examination viz. general condition, signs of itching, general appearance, behavior, body condition etc. each dog was subjected to general clinical examination and special examination of skin. Each dog was thoroughly examined by recording of the vital parameter like rectal temperature, pulse rate and respiratory rate.

The prevalence of superficial pyoderma was calculated among the total number of dermatological cases screened. The prevalence was further determined in relation to breed, sex, age and season. One swab containing skin exudates was used for preparing smears and microscopically examination for the presence of bacteria, yeast/ fungi. The smears were examined after staining with Gram's stain and Lacto phenol cotton blue stain (Hi Media Laboratory Ltd., Mumbai).

Results and Discussion

The present study was conducted on 205 dogs of various groups of age, sex and breed suffering from dermatological affections during July 2017-June 2018. Bacterial *spp.* identification was done by using biochemical test with evaluation of their antibiogram, with an objective of making the accurate diagnosis and accordingly planning of rational and effective therapeutic measures against identified pyoderma cases.

Prevalence rate for dermatological disorder was studied in total 987 dogs, during period from July 2017- June 2018. All the dogs included in the study were analyzed by direct microscopic examination, bacterial and fungal culture. Based on analysis, out of 987 dogs, 205 dogs (20.77%) was positive for dermatological affections; 32 dogs, out of 205 dogs, (15.61%) 32 dogs were found to be positive for canine superficial pyoderma. The percent prevalence of superficial pyoderma was 15.61 percent of the dermatological affections (Table 1).

Table 1: Prevalence of superficial pyoderma in dogs in and around Udaipur

Total Number screened dogs	Number having skin diseases	Percentage having skin diseases	Number of dogs affected with superficial pyoderma	Percentage of superficial pyoderma over skin diseases
987	205	20.77 %	32	15.61 %

Overall prevalence rate of canine dermatological affections was 20.77% (205 cases) out of 987 dogs' case registered. Results are in close agreement with the observation of other researcher Sharma *et al*. (2013) [19]. screened 566 dogs and reported 118 (20.85%) dogs had different skin disorders. Khurana *et al*., (2016) [7]. screened 22,193 dogs during the period from July 2010 to June 2015 and reported 4,736 (21.34%) animals had different dermatological disorders. Similarly, and also observed overall prevalence rate of skin disorders 17%. The percent prevalence of dermatological affections was higher than the earlier reports of Sarma *et al*. (2013) [13]. and Summers *et al*. (2014) [22], who reported the prevalence of dermatological affections as 5.6% and 1.3%, respectively. On the contrary, Singh *et al*., (2012) [18]. and Senapati *et al*., (2014) [15]. reported higher prevalence 23.51 % and 36% percent, respectively. Higher occurrence of dermatological problems could be attributed to season, climatic factors, and to managemental practices adopted in a particular area (Sharma *et al*., 2008) [8].

Sex wise prevalence

Sex wise prevalence was studied in 205 dogs with various dermatological affection, and results of which were shown in Table 2 and Figure 2 Results indicates a higher rate in male (50.73%) in compare to female (40.97%) and 5.36% prevalence was calculated in castrated dogs and 2.92% in spayed bitches. In reference to canine superficial pyoderma results indicates a higher rate in male (71.87 %) as compare to females (21.87%) and 6.25% prevalence was calculated in castrated dogs. (Table 2)

These results showed close resemblance with Koshnegah *et al* (2013) [8]. (57.91%) male dogs and (42.09%) female bitches was positive to dermatological affections out of 221affected dogs. Similarly Sarma *et al* (2013) [13], and Thapa and Sarkar (2018) [23] also reported that higher prevalence rate of pyoderma in male than female cases. Khurana *et al*. (2016) [7]. also reported that higher (64.1%) incidence in male dog and 35.9% in bitches affected with pyoderma. This fact remain that male pet dogs are kept by most of the owners.

Table 2: Sex-wise incidence of canine dermatological affections & canine superficial pyoderma

S. No.	Particulars	Sex				Total
		Male	Female	Castrated	Spayed	
1.	All dermatological affections	104	84	11	6	205
2.	Percentage	50.73%	40.97%	5.36%	2.92%	100%
3.	Canine superficial pyoderma	23	7	2	0	32
4.	Percentage	71.87%	21.87%	6.25%	0	100%

Breed wise prevalence

Breed-wise prevalence of canine superficial pyoderma shown in table 3 and Figure 3 revealed that higher cases of pyoderma were of Labrador (28.12%) followed by German shepherd (21.87%), Pug (18.75%), Pomeranian (15.62%), Beagle (9.37 %) and lowest prevalence rate in St. Bernard (3.12%) and Doberman (3.12%). It seems to be related with dominant dog population in these areas. The reports of previous workers were variable in relation to breed susceptibility. However, the breed predilection to dermatological problems varied with the breed composition of canine population in a particular region and popularity of individual breeds (Pocta and Svoboda, 2007) [11].

Table 3: Breed-wise prevalence of canine superficial pyoderma (July 2017- June 2018)

S. No.	Breed	Number of cases	Percentage
1.	German Shepherd	7	21.87
2.	Labrador	9	28.12
3.	Doberman	1	3.12
4.	Pomeranian	5	15.62
5.	Pug	6	18.75
6.	St. Bernard	1	3.12
7.	Beagle	3	9.37
Total		32	100

Age wise prevalence

Prevalence rate was recorded in relation to age groups. The highest prevalence rate was found in 1-3 year age group (40.62%) followed by less than 1 year age group (28.12%), 4-6 year age group (18.75%) and lowest prevalence rate (12.50%) was found in the age group of more than 6 years. (Table 5).

The findings of present study were almost in concurrence with those of Bloom and Rosser (2001) [3]. and Shyma and Vijay Kumar (2011) [16]. who recorded similar observations. In contrast, Curtseit *et al*. (2009) [4]. recorded higher prevalence of pyoderma in dogs aged between 9-14 years, while Sarma *et al.* (2013) [13], Khurana *et al.* (2016) [7]. and Thapa and Sarkar documented higher prevalence of dermatological disorders in dogs up to 1 year age. However, Koshnegah *et al.* (2013) [8]. opined that there were no age predilections for dermatological diseases.

Table 5: Age-wise prevalence of canine superficial pyoderma (July 2017- June 2018)

Particulars	< 1 year	1 – 3 years	4-6 years	>6 year	Total
No. of Cases	9	13	6	4	32
Percentage	28.12	40.62	18.75	12.50	100

Month-Wise prevalence

Prevalence rate of dermatological affections of dogs in different month from (July 2017- June 2018) was recorded 28, 24, 17, 12, 10, 13, 12, 14, 12, 23, 18 and 22 dogs respectively. The results have been displayed in (Table 6 Graph 6). The highest prevalence rate was found for overall dermatological affection and canine pyoderma respectively in July 2017 (13.65%) and similarly in July and August 2017 (2.43%) (Table 6).

Table 6: Month-wise Prevalence of canine dermatological affections and canine superficial pyoderma (July 2017- June 2018)

S.N.	Name of month	Total no of dermatological affections	Percentage	Total no of canine superficial pyoderma cases	Percentage
	July	28	13.65	5	2.43
2.	August	24	11.70	5	2.43
3.	September	17	8.29	2	0.97
4.	October	12	5.85	2	0.97
5.	November	10	4.87	0	0
6.	December	13	6.34	1	0.48
7.	January	12	5.85	2	0.97
8.	February	14	6.82	3	1.46
9.	March	12	5.85	3	1.46
10.	April	23	11.21	4	1.95
11.	May	18	8.78	2	0.97
12.	June	22	10.73	3	1.46
	Total	205	100	32	15.61

Solanki *et al* (2007) [21]. reported highest prevalence of the disease was found in the month of March (41.18%) and Sindhu *et al* (2018) [17]. who recorded a higher prevalence (42.55 %) in July month and minimum in December. In our study highest prevalence rate of dermatological affection and superficial pyoderma affected dogs was recorded in July and August, respectively. This can directly correlate with humid climatic conditions. The variation in dermatological affection with other worker may be attributed with different region practice.

Season wise prevalence

Season wise prevalence of some important dermatological affections revealed that in rainy season, winter season and summer season, it was found to be pyoderma 14(43.75%), 06 (18.75%) and 12 (37.50%), scabies was 05(38.46%), 03(23.07%) and 05 (38.46%) demodectic mange was 15(33.33%), 12 (26.66%) and 18(40.00%); Dermatomycosis 12 (52.17%), 05(21.73%) and 06 (26.08%) and Ectoparasite infestation 16(37.20%), 08 (18.60%) and 19 (44.18%) and mixed infection 19(38.77%), 15(30.61%), 15(30.61%) respectively. Highest prevalence rate was found 39.51% in rainy season and 36.58% in summer season and 23.90 % in winter season (Table: 7).

Table 7: Season wise Prevalence of dermatological affections in dog (July 2017- June 2018)

Dermatological Affections	Rainy Season	Winter Season	Summer season
Pyoderma	14(43.75%)	06 (18.75%)	12(37.50%)
scabies	05(38.46%)	03(23.07%)	05(38.46%)
Demodectic Mange	15 (33.33%)	12(26.66%)	18(40.00%)
Dermatomycosis	12(52.17%)	05(21.73%)	06 (26.08%)
Ectoparasite	16(37.20%)	08(18.60%)	19(44.18%)
Mixed infection	19(38.77%)	15(30.61%)	15(30.61%)
Total no of cases (205)	81(39.51%)	49(23.90%)	75(36.58%)

The findings of this study in close agreement of Kumar *et al.* (2006) [9]. also observed similar prevalence rate of skin disorders as highest incidence during July to September months (46.8%) as compared to winter and summer. Khurana *et al* (2016) [7]. screened 22,193 dogs during the period from July 2010 to June 2015 and reported Season-wise categorization of pyoderma Infected dogs were more in rainy season followed by summer, autumn and then winter season. Skin diseases in dogs particularly the fungal infections are more common in during hot and humid climate.

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