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## Prevalence and clinico-pathological studies on canine demodicosis in and around Namakkal region

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### Abstract

This study investigates the prevalence and clinico-pathological features of canine demodicosis in the Namakkal region over a one-year period (October 2023–October 2024). Out of 5,371 dogs presented to the Veterinary Clinical Complex, 76 cases of generalized demodicosis were diagnosed, accounting for 9.06% of dermatological cases and 1.41% of total cases. The highest prevalence was observed in non-descriptive breeds (40.78%), followed by German Shepherds (25%) and Pugs (11.84%). Age-wise, dogs under one year were most affected (48.68%), with males showing a higher prevalence (61.84%). Clinical signs included erythema, alopecia, and papules, with secondary lesions such as hyperpigmentation and crusting. Haematological analysis revealed anemia, leucocytosis, and neutrophilia, while biochemical findings indicated decreased albumin and elevated globulins, reflecting an inflammatory response. Seasonal peaks were noted during warmer months. Treatment with fluralaner, sarolaner, and ivermectin resulted in complete recovery. The study underscores the importance of early diagnosis and targeted therapy in managing canine demodicosis effectively.

**Keywords:** Canine demodicosis, dermatological disorders, Namakkal

### Introduction

Dogs have long been cherished as loyal companions and are integral members of many households worldwide. Healthy skin and a well-maintained coat are not only critical for the pet's aesthetics but also reflect the overall wellness of the dog. Skin is the largest organ in a dog's body, playing vital roles in functions such as thermoregulation, immune protection, sensation, and Vitamin D synthesis. Skin infections are caused by disruptions in the skin's cellular composition or the body's immune system (Udayasree, 2004)<sup>[20]</sup> and occurrence varies with season, climatic factors, and management practice adopted in particular area (Singh *et al.*, 2012)<sup>[16]</sup>. The most frequent and challenging issue that veterinarians in small animal medicine report to face is dermatological issues. Dermatological issues are some of the most frequent concerns brought to veterinary clinics, with skin-related disorders estimated to comprise between 12% and 75% of the caseload (Scott & Paradis, 1990 and Feijo *et al.*, 1998)<sup>[12, 3]</sup>. Demodex mites are common commensal organisms found in the hair follicles of many mammals, including dogs. They are transmitted from the mother to the pups in dogs during the early stages of life, but if mite populations increase, they have the potential to cause illness (Greve & Gaafar, 1966)<sup>[4]</sup>. Demodex canis also called as demodectic mange or red mange or follicular mange, is the most common species present (Shipstone M., 2000)<sup>[14]</sup>. The cigar-shaped mite lives in the hair follicles and sebaceous glands and feeds on epidermal debris and sebum. Demodicosis is not contagious and is acquired from the dam during nursing (Sivajothi *et al.*, 2015)<sup>[17]</sup>. It is not advisable to breed dogs whose parents have generalized demodicosis (Mueller *et al.*, 2020)<sup>[8]</sup>. Multiplication of mites in hair follicle is aided by suppression or any defect in skin immune system, leading to clinical demodicosis (Mueller *et al.*, 2012)<sup>[8]</sup>.

### Materials and Methods

Prevalence of demodicosis dermatoses in dogs were evaluated for a period of one year between October 2023 to October 2024. A total number of 5,371 dogs were presented to the small animal medicine outpatient unit of the Veterinary Clinical Complex, Veterinary College and Research Institute, Namakkal. A thorough history and signalment of each case

were recorded, and the prevalence of demodicosis was analysed based on factors such as age, breed, sex, stage and clinical signs aimed to assess the prevalence of demodicosis in dogs. Animal showing signs like greyish discoloration, papules, pustules, pruritis, alopecia, erythema, scaling, crusting, erosions, hyper pigmentation, epidermal collarettes, lichenification, pododemodicosis and keratinization were considered (Figure 1–3). Information about breed, age and sex was also recorded. Seventy-six cases were diagnosed as generalized demodicosis based on signalment, anamnesis and examination of skin scrapings. Deep skin scraping samples were collected by using a No. 10 blunt scalpel blade from different affected parts revealed cigar shaped mites with elongated oval shaped egg (Figure 4) suggestive of *Demodex canis* (Soulsby, 1982)<sup>[18]</sup>.

### Results and Discussion

Based on through history, detailed clinical examination, dermatological examination out of the total registered cases, 838 cases were suspected for dermatological disorders. Demodicosis was diagnosed in 76 dogs, accounting for 9.06 per cent of dermatological cases and 1.41 per cent of total cases; similar to studies by Gunaseelan *et al.* (2011)<sup>[5]</sup> who observed similar trends, with demodectic mange prevalence of 10.2%. In the study of 76 cases breed-wise prevalence of demodicosis the highest prevalence was observed in non-descriptive with 40.78 per cent (31/76 cases), followed by German Shepherds with 25 per cent (19/76 cases), Pug with 11.84 per cent (9/76 cases), Labrador 9.21 per cent (7/76 cases), Doberman with 5.26 per cent (4/76 cases), Beagle with 2.63 per cent (2/76 cases), Bully Kutta, Rajapalayam, Spitz and Rottweiler with 1.31 per cent (1/76 cases) each (Table 1); studies by Sharma *et al.* (2018)<sup>[13]</sup> highlight a similar trend, with non-descriptive and mixed-breed dogs consistently showing a high incidence of demodicosis, likely due to limited control measures and potentially compromised immune systems. The age-wise prevalence of demodicosis in 76 cases showed that in Figure 5, the majority of affected dogs were below 1 year of age, accounting for 48.68 per cent (37/76 cases). Dogs aged between 1 and 5 years constituted 42.10 per cent (32/76 cases), while those above 5 years represented only 9.21 per cent (7/76 cases) aligning with findings by Nayak (1997)<sup>[9]</sup>; Sakina and Mandial (2011)<sup>[10]</sup> and Sharma *et al.* (2018)<sup>[13]</sup>, who also reported a peak prevalence in dogs under one year. Mites being sebophilic led to higher incidence of demodicosis in the younger age group of dogs, which might be due to more stimulation of sebaceous glands during puberty. Similarly, in cases sex-wise prevalence of demodicosis in 76 cases showed that in Figure 6, 61.84 per cent (47/76 cases) of the affected dogs were male, whereas 38.15 per cent (29/76 cases) were female these results are supported by Aujla *et al.* (2000)<sup>[1]</sup>, Sakina & Mandial (2011)<sup>[10]</sup> and Sharma *et al.* (2018)<sup>[13]</sup> who noted a higher rate of demodicosis in male dogs higher testosterone levels causing oilier skin, increase susceptibility to skin infections. The month-wise prevalence of demodicosis in 76 cases showed the majority of affected dogs were during the month of May, accounting for 17.1 per cent (13/76 cases), followed by July with 14.4 per cent (11/76 cases), April and June with 11.84 per cent (9/76 cases), August and September with 10.52 per cent (8/76 cases), October with 9.21 per cent (7/76 cases), February with 7.89 per cent (6/76 cases), and in March least prevalence with only 5.88 per cent (5 / 76 cases) similar to the findings, Khinchi *et al.* (2022)<sup>[6]</sup> observed that demodectic mange cases spiked in the summer warmer and humid

months, as environmental conditions appear to favour parasitic infestation and increase the risk of skin diseases.

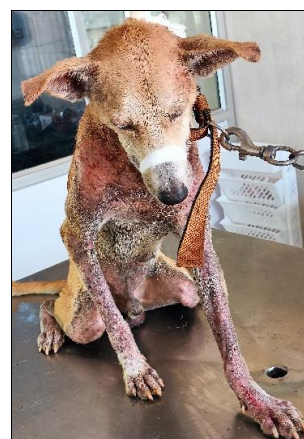
In dogs with parasitic dermatoses, the primary lesions included papules (24.10%), pustules (6.25%), erythema (66.07%), and alopecia (19.6%). Secondary lesions were noted as scales (8.9%), crusts (9.8%), ulcers (9.8%), epidermal collarettes (3.5%), erosions (12.5%), hyperpigmentation (3.5%), and lichenification (3.5%). Additional signs included pruritus (19.6%), pain (6.25%), oedema (11.6%), and affected contact animals (8.03%) consistent with findings by Sakina and Mandial (2011)<sup>[10]</sup> and Sivajothi *et al.*, 2015<sup>[17]</sup> erythema and papules are prominent in demodicosis, reflecting the inflammatory response to the mites.



**Fig 1:** Papular, erythematous localised alopecia on the face



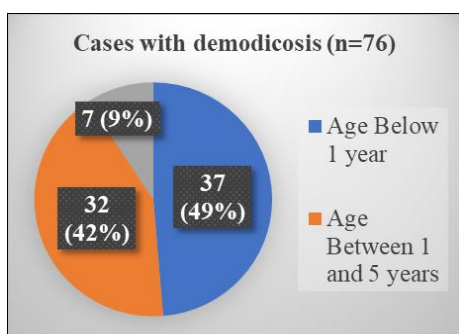
**Fig 2:** Spectacled eye appearance due to localised alopecia and erythema in periocular area



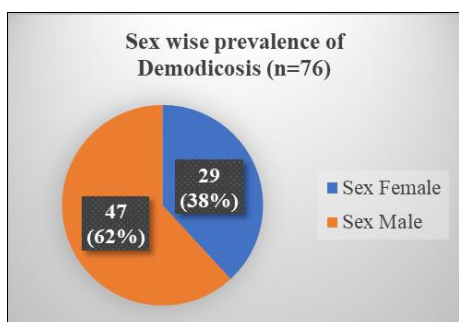
**Fig 3:** Generalised erythema, alopecia lethargic dog due to generalised demodicosis



**Fig 4:** Cigar shaped mite with elongated oval shaped egg – *Demodex canis*



**Fig 5:** Age wise prevalence of demodicosis



**Fig 6:** Sex wise prevalence of demodicosis

**Table 1:** Breed-wise occurrence of demodicosis

S. No	Breed	Cases with demodicosis (n=76)	Per centage (%)
1.	German Shepherd	19	25
2.	Labrador	7	9.21
3.	Non-descript	31	40.78
4.	Doberman	4	5.26
5.	Spitz	1	1.31
6.	Pug	9	11.84
7.	Beagle	2	2.63
8.	Rottweiler	1	1.31
9.	Rajapalayam	1	1.31
10.	Bully Kutta	1	1.31

The mean erythrogram values were haemoglobin (Hb)  $10.48 \pm 0.28$  g/dl, packed cell volume (PCV)  $34.83 \pm 0.73$  per cent, Red Blood Cells (RBC) count  $4.51 \pm 0.10 \times 10^6$  per cubic mm. The mean leukogram value of Group I in this study had a total white blood cell (WBC) count of  $22.16 \pm 0.38$  cells per  $\text{mm}^3$ , neutrophils  $76.36 \pm 0.89$  per cent, lymphocytes  $16.66 \pm 0.66$  per cent, monocytes  $4.16 \pm 0.19$  per cent, eosinophils  $2.81 \pm 0.26$  per cent. The biochemical parameters of apparently healthy group had a mean value of Total Protein (TP)  $6.91 \pm$

0.11 g/dl, Albumin  $2.65 \pm 0.07$  g/dl, Globulin  $4.26 \pm 0.12$  g/dl and Albumin to Globulin (A/G) ratio  $0.62 \pm 0.02$  g/dl. Dogs affected by demodicosis exhibited anaemia and leucocytosis. The anaemia, evidenced by significant reduction in haemoglobin levels, packed cell volume (PCV), and erythrocyte counts, may result from multiple factors, including chronic inflammation and the body’s increased utilization of nutrients to combat infection which is in accordance with Reddy (2015) [17]. Leucocytosis, marked by increase in white blood cells, primarily neutrophils, reflects the body’s inflammatory response to infection is another consistent finding. This significant leucocytosis marked by neutrophilia, lymphopenia observed in studies such as those by Reddy (2015) [17], and Mueller *et al.* (2020) [8], indicates an acute response to demodicosis infection. The presence of eosinophilia, particularly in parasitic infections as noted by Chandy *et al.* (2000) [2]; Reddy (2015) [17] and Thapa & Sarkar (2018) [19], suggests an immune response tailored towards parasitic antigens, as eosinophils play a significant role in combating parasitic infestations. The statistically significant reduction in serum albumin and A/G ratio with hyperglobulinemia in demodicosis aligns with previous studies by Reddy (2015) [17] who also reported reduced albumin levels, A/G ratios and hyperglobulinemia in dogs with demodicosis, attributing these shifts to inflammatory responses, immune dysregulation as well as globulins are often elevated in response to chronic inflammation or infection which are common in dermatoses cases.

Following one month treatment, all the cases responded, and skin scrapings were found negative for *Demodex*. Clinical signs disappeared in these cases after the 28th day of therapy with fluralaner, sarolaner, and ivermectin with owner concerned of specific therapy. Benzoyl peroxide shampoo which possesses keratolytic and follicular flushing activity was also recommended for the treatment of demodicosis. Demodicosis in dogs cause immune suppression; to boost immunity, immune boosters have been given to the dogs. All the presented cases showed good response to the treatment.

**Conclusion**

The prevalence of canine demodicosis was particularly high in male dogs, young dogs, and dogs of non-descriptive breeds in this study. Seasonal peaks were seen during the warmer, more humid months. Affected dogs showed secondary symptoms like hyperpigmentation and lichenification in addition to primary lesions like erythema and papules. The results of the haematological analysis showed an acute inflammatory response, including anemia and significant leucocytosis, mainly neutrophilia and lymphopenia. Immune dysregulation consistent with chronic inflammatory processes was suggested by the biochemical profile, which revealed decreased albumin and increased globulins.

**Conflict of Interest**

Not available

**Financial Support**

Not available

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