



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; 12(6): 3550-3554
© 2023 TPI

www.thepharmajournal.com

Received: 15-03-2023

Accepted: 23-05-2023

NS Malik

Department of Veterinary Clinical Medicine, Ethics and Jurisprudence, COVAS, Parbhani, MAFSU, Nagpur, Maharashtra, India

MFMF Siddiqui

Assistant Professor, Department of Veterinary Clinical Medicine, Ethics and Jurisprudence, COVAS, Parbhani, MAFSU, Nagpur, Maharashtra, India

MP Sakhare

Assistant Professor, Department of Veterinary Epidemiology and Preventive Medicine, COVAS, Parbhani, MAFSU, Nagpur, Maharashtra, India

ST Borikar

Professor, Department of Veterinary Medicine, KNPCVS, Shirwal, MAFSE, Nagpur, Maharashtra, India

PV Yeotikar

Associate Professor, Department of Veterinary Biochemistry, COVAS, Parbhani, MAFSU, Nagpur, Maharashtra, India

S Sajid Ali

Assistant Professor, Department of Veterinary Animal Genetics, COVAS, Parbhani, MAFSU, Nagpur, Maharashtra, India

TA Shafi

Assistant Professor, Department of Veterinary Epidemiology and Preventive Medicine, COVAS, Parbhani, MAFSU, Nagpur, Maharashtra, India

Corresponding Author:

MFMF Siddiqui

Assistant Professor, Department of Veterinary Clinical Medicine, Ethics and Jurisprudence, COVAS, Parbhani, MAFSU, Nagpur, Maharashtra, India

Study of prevalence of canine demodicosis in Parbhani and its associated risk factors

NS Malik, MFMF Siddiqui, MP Sakhare, ST Borikar, PV Yeotikar, S Sajid Ali and TA Shafi

Abstract

The prevalence of canine demodicosis was studied from May 2022 to December 2022 by screening 103 dogs, exhibiting dermatological signs with skin scraping examination, presented to the Department of Veterinary Clinical Medicine, Ethics and Jurisprudence, Veterinary Clinical Complex, College of Veterinary and Animal Sciences, Parbhani. Out of 103 dogs, 29 dogs were found to be positive for *Demodex spp.* mites under the microscope. The overall prevalence of canine demodicosis was recorded to be 28.16% with the prevalence of generalised demodicosis (45.46%) being higher than localised demodicosis (23.46%). A non-significant association was established between clinical form and the disease. The age-wise prevalence was recorded to be 58.33%, 29.27%, 3.45% and 22.22% in dogs belonging to age groups less than 1 year, 1 to 2 years, 2 to 6 years and more than 6 years, respectively with a significant relationship between the age of the dog and canine demodicosis. The prevalence of canine demodicosis was observed to be highest in Neutered Males (45.46%), followed by Intact Males (42.86%), Intact Females (19.64%) and Neutered Females (12.50%) and the statistical analysis showed a non-significant association between sex, neutering status and canine demodicosis. A non-significant association between the breed of dog and canine demodicosis was established with the highest prevalence in the Dalmatian breed (100.00%) and the lowest prevalence in the German Shepherd breed (18.18%). The statistical analysis demonstrated a non-significant association between the type of food and demodicosis and also the nature of the diet and canine demodicosis.

Keywords: Demodicosis, prevalence, age-wise, sex-wise, breed-wise, Parbhani

Introduction

Dermatological ailment accounts for a sizeable percentage and is estimated to range between 12 and 75 percent as the chief or concurrent complaint from pet parents in small animal clinics^[1]. Demodicosis, a parasitic skin disease, is among dogs' most severe skin diseases and is complicated to treat^[2,3]. It is also known as follicular mange or red mange and is characterized by the presence of larger-than-normal numbers of demodectic mites *viz. Demodex canis, Demodex injai* and *Demodex cornei*^[4]. The traditional understanding of demodicosis as a disease developed due to the unchecked proliferation of mange mites has been changing in recent years to a newer perspective that demodicosis develops as a result of an interplay of a nexus of risk factors and predisposing elements. Mueller *et al.* (2012)^[5] suggest that immunosuppression or a defective skin immune response contributes towards the development of clinical disease. Endo-parasitism, malnutrition and debilitation in young animals and chemotherapy, neoplasms, hypothyroidism, or hyperadrenocorticism in adult animals may lead to immunosuppression, triggering mite proliferation. However, studies proving a cause-effect relationship between these factors and demodicosis are lacking⁽⁵⁾. A genetic basis of the disease has also been speculated and Ferrer *et al.* (2014)^[2] propose that one combination, or several, of genotypes increases the probability of developing the disease phenotype as a likely explanation of the hereditary basis of canine demodicosis. With this understanding of the disease, the following study was conducted to study the prevalence of demodicosis and its association with various risk factors.

Methodology

The study was conducted over a period of 8 months from May 2022 to December 2022. The dogs with dermatological signs such as alopecia, erythema, pruritus, crust and scab formation, papules, hyperpigmentation and hyperkeratosis presented to the Department of Veterinary Clinical Medicine, Ethics and Jurisprudence, Veterinary Clinical Complex, College of

Veterinary and Animal Sciences, Parbhani were screened by skin scraping examination for the presence of *Demodex spp.* mites and detailed history regarding various risk factors viz. clinical form of the disease, age of the dog, sex and neutering status of the dog, breed, and diet of the dog were recorded. The dogs with the presence of *Demodex spp.* mites under the microscope were considered positive for demodicosis. The dogs were categorised as dogs with localised demodicosis and dogs with generalised demodicosis based on the extent of the skin lesions. Since the definition of localised versus generalised demodicosis has been a matter of debate, the dogs were categorised into localised demodicosis if there were no more than four skin lesions with a diameter of up to 2.5 cm and generalised demodicosis was characterised by five or more affected areas or by lesions covering an entire region of the body and/or podo-demodicosis involving two or more paws⁽⁶⁾. The data so obtained were assessed statistically using an appropriate test.

Results and Discussion

Over a period of 8 months from May 2022 to December 2022, a total of 103 dogs exhibiting dermatological signs presented to the Department of Veterinary Clinical Medicine, Ethics and Jurisprudence, Veterinary Clinical Complex, College of Veterinary and Animal Sciences, Parbhani and the cases referred by private practitioners and field veterinarians in and around Parbhani were examined clinically and screened for *Demodex spp.* mites by skin scraping examination. Twenty-nine out of 103 dogs presented were found positive for *Demodex spp.* upon skin scraping examination. Thus, the overall prevalence of canine demodicosis in and around Parbhani was reported to be 28.16% for a period of 8 months from May 2022 to December 2022 (Table 1). The recorded prevalence of 28.16% was in agreement with the findings of Shrestha *et al.* (2015)^[7], Sharma *et al.* (2018)^[8], Pawar *et al.* (2021)^[9], Rahman *et al.* (2021)^[10] and Patowary *et al.* (2022)^[11] who reported the prevalence of canine demodicosis to be 29.1%, 31.42%, 27.78%, 27%, and 25.67% respectively.

Table 1: Overall prevalence of canine demodicosis

Sr. No.	Number of dogs examined by skin scraping examination	Number of dogs positive for <i>Demodex spp.</i>	Prevalence (%)
1.	103	29	28.16

In contrast, Rodriguez-Vivas *et al.* (2003)^[12], Raut *et al.*

Table 3: Age-wise prevalence of canine demodicosis

Sr. No.	Age groups	Number of dogs examined	Number of dogs positive	Prevalence (%)	Chi-square value
1.	Less than 1 year	24	14	58.33	11.0869
2.	1 to 2 years	41	12	29.27	
3.	2 to 6 years	29	1	3.45	
4.	More than 6 years	9	2	22.22	
		103	29		S

(The p-value is 0.011265. The result is significant at $p < 0.05$)

A higher prevalence rate of canine demodicosis in dogs less than 1 year of age and dogs belonging to 1 to 2 years of age as compared to dogs belonging to 2 to 6 years and more than 6 years of age was observed, implying that young animals are more susceptible to the infection. The findings of the Chi-square analysis of the data established a significant relationship between the age of the dog and canine

(2006)^[13], Yi Zhou *et al.* (2012)^[14], Fatima *et al.* (2017)^[15], Kaya *et al.* (2018)^[16], Chander *et al.* (2020)^[17], and Thakur *et al.* (2020)^[18] reported the prevalence of canine demodicosis to be 23%, 2.76%, 13.31%, 11.64%, 21%, 10.42%, and 21.73% respectively which was lower in comparison to the findings of this study. The differences in prevalence documented in different research articles can be attributed to multitudinous factors viz. the sample size and the duration of the study, regional managemental practices, the level of awareness among pet parents, geographical factors and unaccounted stressors acting upon the animal.

In this study, it was observed that 45.46% (10/22) of dogs exhibited generalised demodicosis while 23.46% (19/81) of dogs exhibited localised demodicosis i.e., the prevalence of dogs with localised demodicosis was found to be lower than the dogs with generalised demodicosis, also a non-significant association was established between the clinical form of the disease (Table 2).

Table 2: Prevalence of clinical form of canine demodicosis

Sr. No.	Form of demodicosis	Number of dogs examined	Number of dogs positive	Prevalence (%)	Chi-square value
1.	Generalized	22	10	45.46	2.1221
2.	Localized	81	19	23.46	
		103	29		NS

This was in accordance with Pawar *et al.* (2021)^[9] who reported a higher prevalence of generalized demodicosis (36.06%) than localized demodicosis (17.02%) and a non-significant association between clinical form and the disease. Nayak *et al.* (1997)^[19], Sharma *et al.* (2018)^[8], Chander *et al.* (2020)^[17] and Patowary *et al.* (2022)^[11] reported a similar trend in the clinical form-wise prevalence of demodicosis i.e., the prevalence of localised demodicosis to be lower than that of generalised demodicosis. The variations in the form-wise prevalence of demodicosis can be due to the differences in the criteria used for the categorisation of clinical form and the duration for which the animal is diseased.

The age of the dogs presented was recorded and its association with demodicosis was studied and is tabulated in Table 3. The age-wise prevalence was recorded to be 58.33%, 29.27%, 3.45% and 22.22% in dogs belonging to age groups less than 1 year, 1 to 2 years, 2 to 6 years and more than 6 years, respectively.

demodicosis. Shrestha *et al.* (2015)^[7] and Rahman *et al.* (2021)^[10] both reported similar findings. Shrestha *et al.* (2015)^[7] documented the prevalence of demodicosis to be 49% in dogs up to 2 years of age, 6.9% in dogs between 3-8 years of age and 33.3% in dogs over 8 years of age with a significant association established. Rahman *et al.* (2021)^[10] too found the prevalence of demodicosis to be 35% in young

dogs, 24.32% in adult dogs and 17.39% in old dogs however with a non-significant association. Islam *et al.* (2013) [20] found the prevalence of demodicosis to be 50% in dogs less than 12 months of age and 71.42% in dogs more than one year of age, these findings are in contrast with this study. The higher prevalence of demodicosis in young, growing dogs can be attributed to their naive immune system, endo-parasitism, malnutrition and their close proximity with the bitch and littermates which facilitates contact transmission of *Demodex spp.* mites. Furthermore, the comparable prevalence of demodicosis in old aged dogs has been attributed to their immunocompromised status, co-occurrence of neoplasia and endocrinopathies like hypothyroidism, hyperadrenocorticism and debilitation in general health status [21].

The sex-wise prevalence of canine demodicosis was studied by analysing data regarding dogs' sex (Male/Female) and

neutering status (Intact/neutered) and is shown in Table 4. The prevalence of canine demodicosis was observed to be highest in Neutered Males (45.46%), followed by Intact Males (42.86%), Intact Females (19.64%) and Neutered Females (12.50%). The statistical analysis with the Chi-square test showed a non-significant association between sex, neutering status and canine demodicosis. Yi Zhou *et al.* (2012) [14], Shrestha *et al.* (2015) [7] and Rahman *et al.* (2021) [10] in their study reported a non-significant association between sex and demodicosis with higher prevalence in male dogs. Islam *et al.* (2013) [20] on contrary observed a higher prevalence of demodicosis in female dogs (72.73%) than in male dogs (55.56%). These differences in the sex-wise prevalence of demodicosis can be attributed to regional variations and preference over specific sex and acceptability of neutering as a management practice in the region.

Table 4: Sex-wise prevalence of canine demodicosis

Sr. No.	Sex	Number of Dogs examined	Number of dogs positive	Prevalence (%)	Chi-square value
1.	Intact Female	56	11	19.64	4.1321
2.	Intact Male	28	12	42.86	
3.	Neutered Female	8	1	12.50	
4.	Neutered Male	11	5	45.46	
		103	29		NS

(The p-value is 0.247547. The result is not significant at $p < 0.05$)

The breed-wise prevalence of canine demodicosis was studied and from the data obtained in this study, Dalmatians had the highest prevalence of 100.00% and German shepherds had the least prevalence of 18.18%. Other breeds like Dobermann pinschers, Labrador retrievers, Mongrels, Nondescript dogs, Pugs and Rottweilers showed a prevalence of 26.67%, 23.08%, 33.33%, 32.35%, 33.33% and 25.00%, respectively (Table 5). Statistical analysis using the Chi-square test showed non-significant results hinting at a lack of association between the breed of dog and canine demodicosis. Chakraborty and Pradhan, (2015) [22]; Fatima *et al.* (2017) [15]; Sakhare, (2017) [23]; Sharma *et al.* (2018) [8]; Patowary *et al.*

(2022) [11] and Satasiya *et al.* (2022) [24] too recorded breed-wise prevalence of canine demodicosis in their studies, however, there was variation among the prevalence recorded. While Sharma *et al.* (2018) and Patowary *et al.* (2022) [11] respectively recorded the highest prevalence of 36.36% and 47.36% in non-descript dogs, Fatima *et al.* (2017) [15] and Satasiya *et al.* (2022) [24] recorded Labrador had the highest prevalence of 35.30% and 34.78% respectively. These discrepancies in the breed-wise prevalence of canine demodicosis can be reasoned due to the over or under-representation of certain breeds and region-wise preference of breed by the pet parents.

Table 5: Breed-wise prevalence of canine demodicosis

Sr. No.	Dog breeds	Number of Dogs examined	Number of dogs positive	Prevalence (%)	Chi-square value
1.	Dalmatian	1	1	100.00	1.706
2.	Dobermann Pinscher	15	4	26.67	
3.	German Shepherd	11	2	18.18	
4.	Labrador Retriever	26	6	23.08	
5.	Mongrel	9	3	33.33	
6.	Nondescript	34	11	32.35	
7.	Pug	3	1	33.33	
8.	Rottweiler	4	1	25.00	
		103	29		NS

(The p-value is 0.97430. The result is not significant at $p < 0.05$)

The data on the diet of the dog with demodicosis was recorded as vegetarian, non-vegetarian, or vegetarian plus non-vegetarian diet mixed and commercial, home-cooked, or home-cooked plus commercial food mixed. From the data, it was evident that 44.83% and 41.38% of dogs with demodicosis were offered home-cooked food and commercial plus home-cooked food mixed, respectively while 13.79% of dogs with demodicosis were offered commercial food. However, the statistical analysis demonstrated that there is no significant association between the type of food and

demodicosis (Table 6). It was also observed that 58.62% of dogs with demodicosis were offered vegetarian plus non-vegetarian food mixed while 41.38% of dogs with demodicosis were offered a vegetarian diet alone. Also, according to the data, no dog among those presented with dermatological signs was solely reared on a non-vegetarian diet. Upon statistical analysis, a non-significant relationship was established between the nature of the diet and canine demodicosis (Table 7).

Table 6: Type of food offered to demodectic dogs

Sr. No	Type of Food	Number of dogs that consume food	Number of dogs positive	Prevalence (%)	Chi-square value
1.	Commercial	4	4	13.79	3.9052
2.	Home cooked	52	13	44.83	
3.	Commercial plus Home cooked	47	12	41.38	
		103	29		NS

(The p-value is 0.141906. The result is not significant at $p < 0.05$.)

Table 7: Nature of food offered to demodectic dogs

Sr. No	Nature of Feed	Number of dogs that consume food	Number of dogs positive	Prevalence (%)	Chi-square value
1.	Vegetarian	48	12	41.38	0.2489
2.	Non- Vegetarian	0	0	0	
3.	Vegetarian plus Non - Vegetarian	55	17	58.62	
		103	29		NS

(The p-value is 0.617819. The result is not significant at $p < 0.05$.)

Conclusions

From the study, it was observed that the overall prevalence of canine demodicosis in and around Parbhani was 28.16% with the prevalence of generalised demodicosis (45.46%) being higher than localised demodicosis (23.46%). The age-wise prevalence of demodicosis was highest in dogs less than 1 year of age (58.33%) and lowest in dogs between 2 to 6 years of age (3.45%) and the prevalence of demodicosis was found to be 45.46% in neutered males, 42.86% in intact males, 19.64% in intact females and 12.50% in neutered females. Dalmatians recorded the highest prevalence amongst all the presented dog breeds. And a non-significant association was established between the diet of the dog and the disease canine demodicosis.

References

- Sarma K, Mondal DB, Sarvanan M, Kumar M, Vijaykumar H. Incidence of Dermatological Disorders and its Therapeutic Management in Canines. *Intas Polivet*. 2013;14(2):186-192.
- Ferrer L, Ravera I, Silbermayr K. Immunology and pathogenesis of canine demodicosis. *Vet Dermatol*. 2014;25(5):427-e65.
- Arsenović M, Pezo L, Vasić N, Ćirić R, Stefanović M. The main factors influencing canine demodicosis treatment outcome and determination of optimal therapy. *Parasitol Res*. 2015;114(7):2415–26.
- Miller WH, Griffin CE, Campbell KL. Muller and Kirk's Small Animal Dermatology. Elsevier Health Sciences. 7th ed.; c2012.
- Mueller RS, Bensignor E, Ferrer L, Holm B, Lemarie S, Paradis M, *et al*. Treatment of demodicosis in dogs: 2011 clinical practice guidelines. *Vet Dermatol*. 2012;23(2):86-96.
- Beugnet F, Halos L, Larsen D, De Vos C. Efficacy of oral afoxolaner for the treatment of canine generalised demodicosis. *Parasite*, 2016, 23(14).
- Shrestha D, Thapa B, Rawal G, Dhakal S, Sharma B. Prevalence of Demodectic Mange in Canines of Kathmandu Valley having Skin Disorder and Its Associated Risk Factors. *Int. J Appl. Sci. Biotechnol*. 2015 Sep 25;3(3):459-63.
- Sharma P, Wadhwa DR, Katoch A, Sharma A. Epidemiological, clinico-haematological and therapeutic studies on canine demodicosis. *Journal of Dairy, Veterinary & Animal Research*. 2018;7(3):109-13.
- Pawar MU, Sakhare MP, Shafi TA, Siddiqui MF, Chigure GM, Gayal SD. Prevalence of canine demodicosis in and around Parbhani. *The Pharma Innovation Journal* [Internet]. 2021;10(12):548–50. Available from: <http://www.thepharmajournal.com>
- Rahman M, Bostami MB, Datta A, Sabuj AAM, Rana EA, Mannan A, *et al*. Estimation of the prevalence and determination of risk factors associated with demodicosis in dogs. *J Adv. Vet Anim. Res*. 2021;8(1):116-22.
- Patowary P, Lahkar D, Barman U, Phukan A. A study on demodectic mange and its clinical management in dogs. *Multilogic in Science*. 2022;12(41):90-4.
- Rodriguez-Vivas RI, Ortega-Pacheco A, Rosado-Aguilar JA, Bolio GME. Factors affecting the prevalence of mange-mite infestations in stray dogs of Yucatán, Mexico. *Vet Parasitol*. 2003;115(1):61-5.
- Raut PA, Maske DK, Jayraw AK, Sonkusale VG. Ectoparasitism in dogs from the eastern zone of Maharashtra state. *Journal of Parasitic Diseases* [Internet]. 2006;30(2):138-41. Available from: www.parasitologyindia.org
- Yi Zhou C, Rui Qing L, Dong Hui Z, Hui Qun S, Fen C, Zi Guo Y, *et al*. Prevalence of Demodex infection in pet dogs in Southern China. *Afr. J Microbiol Res*. 2012;6(6):1279-82.
- Fatima L, Sreenivasamurthy GS, Kumar UM. Prevalence of Canine Demodicosis in Hyderabad of Telangana State. *International Journal of Agriculture Sciences* [Internet]. 2017;9(17):4145-7. Available from: <http://www.bioinfopublication.org/jouarchive.php?opt=&joid=BPJ0000217>
- Kaya ÖM, Akkücüük Ş, Karagöz M, Zerek A, Yaman M. A Survey of Mange-Mite in Stray Dogs from Hatay Province. *Van Veterinary Journal* [Internet]. 2018;29(2):67-70. Available from: <http://dergipark.gov.tr/vanvetj>
- Chander R, Choudhary S, Singh AP, Chahar A, Koli SK. Prevalence of canine demodicosis in Bikaner, Rajasthan. *Pharma Innov*. 2020;9(7):180-185.
- Thakur M, Prasad H, Kumar S, Samanta AK. Study on the incidence of demodectic mange in dogs in and around Mizoram. *J Entomol Zool Stud* [Internet]. 2020;8(3):97-103. Available from: <http://www.entomoljournal.com>
- Nayak DC, Tripathy SB, Dey PC, Ray SK, Mohanty DN, Parida GS, *et al*. Prevalence of canine demodicosis in Orissa (India). *Vet Parasitol*. 1997;73:347-352.
- Islam MM, Khanam SS, Rashid SMH, Islam MN. Prevalence and pathology of demodectic mange in stray

- dogs in Bangladesh. Journal of Science and Technology. 2013;11:118-121.
21. Tradhnesh P, Krishnakanth K, Sreelakshmi SS, Chandran D. The efficacy of combination therapy of Ivermectin + Amitraz for successful therapeutic management of canine demodicosis: A case study. The Pharma Innovation Journal [Internet]. 2021;10(7):1375-1377. Available from: <http://www.capcvet.org/capc-recommendations/>
 22. Chakraborty S, Pradhan NR. Canine demodicosis and its herbal and non-herbal treatments. Indian Journal of Canine Practice. 2015;7(2):115-119.
 23. Sakhare MP. Therapeutic management of canine demodicosis with immunomodulators; c2017.
 24. Satasiya CG, Vagh AA, Parasana DK, Bilwal AK. Prevalence of canine demodicosis in Saurashtra region of Gujarat. The Pharma Innovation Journal [Internet]. 2022;11(10):1113-5. Available from: www.thepharmajournal.com