Original Research Article

A COMPREHENSIVE EPIDEMIOLOGICAL STUDYON DERMATOPHYTOSIS IN DOGSIN JABALPUR, INDIA

ABSTRACT

Dermatophytosis is a contagious fungal infection of keratinized tissue. The disease is of significant veterinary and public health importance due to its zoonotic potential, posing risks to both animals and humans. The present study was undertaken to investigate occurrence of dermatophytosis in dogs. During the study period, from May to October 2024, a total of 2468 dogs were screened which were presented at Veterinary Clinical Complex, College of Veterinary Science and Animal Husbandry, Jabalpur (M.P.). Among them, 225 dogs were suspected for dermatological disorders and 43 dogs were found to be positive for dermatophytosis.The occurrence of different dermatological disorders was recorded highest in Pyoderma (20.89%), followed by dermatophytosis (19.11%), others (18.67%), *Malassezia* dermatitis (15.11%), mange in (13.78%) and tick and flea infestation (12.44%). The overall occurrence of dermatophytosis in dogs was recorded as 1.74% and among the suspected dogs, the occurrence was 19.11%. Age wise occurrence was significantly higher in 0-1 years of age (38.10%). Gender wise occurrence was observed significantly higher in males (25.93%). The breed wise highest occurrence of dermatophytosis was recorded in the Labrador breed of dogs (24.39%). The most prevalent clinical signs observed in canine dermatophytosis were alopecia (86.00%), scales (74.40%), crusts (74.40%), circular lesions (72.10%), pruritis (58.10%), erythema (51.20%), hyperpigmentation (46.50) and pustules and papules (34.90%). The lesions were predominantly seen on hind limbs (69.77%) followed by forelimbs (67.44%), dorsum (65.12%), face, head and neck (62.79%), paws (55.81%), interdigital space (48.84%), tail (41.86%) and abdomen (13.95%).

Keywords: Dermatophytosis, Dermatological disorders, Occurrence, Dogs

INTRODUCTION

Dermatological affections are difficult to treat and one of the most frequently observed problems in dogs [1]. Several studies from India and abroad have documented that skin disorders make up to 12-75% of all affections in small animal population [2]. Dermatophytosis, which refers to the infection of the hair, claw, or stratum corneum of the skin by keratinophilic fungi, is one such condition. Dermatophytosis, commonly known as ringworm, is a highly contagious fungal infection affecting the skin, hair, and nails of various animal species, including dogs. It is caused by keratinophilic fungi, mostcommonly of the genera *Microsporum,Trichophyton* and *Epidermophyton,* which invade superficial keratinized tissues, leading to characteristic circular lesions, alopecia, crusting, and pruritus. Dermatophytosis is of significant veterinary concern due to its zoonotic potential, posing health risks to pet owners, veterinarians, and animal handlers. The disease is transmitted through direct contact with infected animals, contaminated environments, or fomites, making it a persistent challenge in both household and shelter settings.The prevalence and occurrence of dermatophytosis in dogs vary depending on factors such as geographical location, environmental conditions, breed predispositions, and the health status of the animals. The infection is common worldwide with higher prevalence in tropical countries like India [3].While the infection is often seen in young, immunocompromised, or animals living in overcrowded conditions, the spread of dermatophytes can be exacerbated by poor hygiene, lack of proper veterinary care, and close contact in animal shelters or breeding facilities.

This study aims to investigate the occurrence and distribution of dermatophytosis in dogs within a specific region and identify key risk factors.Early diagnosis, appropriate antifungal treatment, and stringent hygiene measures are crucial in controlling the spread of infection and minimizing its impact on both canine and human health.

MATERIALS AND METHODS

Location and place of work

The proposed study was carried out for six months from May 2024 to October 2024 at Department of Veterinary Medicine, College of Veterinary Science and Animal Husbandry, Nanaji Deshmukh Veterinary Science University (N.D.V.S.U), Jabalpur, Madhya Pradesh (M.P.). For this study, dogs presented with history of different clinical signs, such aspruritus, alopecia, erythema, hyperpigmentation, scaling, crusting, etc. were thoroughly examined.

Selection of Animals

For this study, a total of 2468 dogs of either sex, breed and age presented to Veterinary Clinical Complex, College of Veterinary Science & Animal Husbandry, NDVSU, Jabalpur (M.P) and different private clinics in Jabalpur were carefully screened.

Out of 2468 dogs, 225 dogs suspected of dermatological disorders with different clinical signs, i.e., pruritis, alopecia, erythema, hyperpigmentation, scaling, crusting, etc., were screened for dermatophytosis on the basis of Wood's lamp examination and direct microscopy.

Clinical examination

The dogs were clinically examined for presence of any visible skin lesions like alopecia, scales and crusts, erythema and hyperpigmentation with special attention to commonly affected sites like face, paws, abdomen, limbs and tail.

Statistical analysis

The recorded data was analyzed as per the standard procedures outlined by [4]. The chi-square test of significance was applied for the qualitative data about the occurrence of the disease.

RESULTS AND DISCUSSION

Distribution of different dermatological disorders in dogs

The distribution of different dermatological disorders in dogs was recorded. Out of 225 dogs, pyoderma was reported to be the highest in 20.89% of dogs (47 out of 225), followed by dermatophytosis in 19.11% (43 out of 225), others in 18.67% (42 out of 225), Malassezia dermatitis in 15.11% (34 out of 225), mange in 13.78% (31 out of 225) and tick and flea infestation in 12.44% dogs (28 out of 225). The details are summarized in Table 01

Table 01: Distribution of different dermatological disorders in dogs

Clinical condition	Number of cases (n=225)	Occurrence (%)
Pyoderma	47	20.89
Dermatophytosis	43	19.11
Others	42	18.67
Malassezia dermatitis	34	15.11
Mange	31	13.78
Tick and flea infestation	28	12.44

The results of the present study are consistent with the findings of Khoshnegah*et al*. [15] and Varughese and Chitra [16] reported the highest prevalence of pyoderma as (18.03%) and (60.80%), respectively. These findings were in contrast to the findings of Singh *et al*. [17], Thapa and Sarkar [18] and Haritha *et al*. [19] who reported highest prevalence of ectoparasite infestation followed by pyoderma. However, Anikar*et al*. [20] recorded the highest occurrence of dermatophytosis (31.64%).

The variations observed might be due to differences in diagnostic methodologies, inconsistencies in recording observations such as diverse classifications used within diseases, non-specific or overlapping miscellaneous conditions and the influence of geographic factors, including climatic and seasonal biases.

Overall occurrence of dermatophytosis in dogs

A total of 2468 dogs were screened out of which 225 dogs showing visible signs of dermatological disorders were suspected for dermatophytosis and 43 dogs were tested positive. The overall occurrence of dermatophytosis in dog population was 1.74% while it was 19.11% in suspected dogs.

The results of the present study are in close proximity to the findings of Seker and Dogan [5], Debnath *et al*. [6] and Nafie *et al*. [7], who reported an occurrence of 20.1%, 20.93% and 17.77%, respectively. Sever *et al*. [8], Cunha *et al*. [9], Prakash *et al*. [10] and Tarra *et al*. [11] reported an occurrence of 29.6%, 26.9%, 26.32% and 25% respectively. On the contrary, Patel, *et al*. [12] reported a lower occurrence of fungal dermatitis as 4.77%, and Khosravi and Mahmoudi [13] indicated that 8.2% of samples from dogs were found positive for dermatophytosis. Whereas Minnat and Khalaf [14] recorded a higher occurrence of 62.42%.

The overall occurrence of dermatophytosis in dogs varies widely across different studies, influenced by factors such as geographical location, climate and host conditions.

Age wise occurrence of dermatophytosis in dogs

The age-wise occurrence of skin disorders in dogs revealed the highest prevalence of 38.10 % (16 out of 42) in the age group of 0-1 year, followed by 23.91 % (11 out of 46) in dogs aged 1-3 years, 12.50 % (9 out of 72) in the 3-6 years age group and 10.77 % (7 out of 65) in dogs older than 6 years. A significant difference ($p < 0.05$) was observed in the age-wise occurrence of skin disorders in dogs. The details are outlined in Table 02.

Table 02: Age wise occurrence of dermatophytosis in dogs

Age group	Number of dogs screened	Number of dogs affected (n=43)	Occurrence (%)
0-1	42	16	38.10
1-3	46	11	23.91

3-6	72	9	12.50
>6	65	7	10.77
x^2= 15.431*		**Significant at p-value ≤ 0.05)**	

The observations recorded in the current study are in close agreement with, Kaitiraee*et al*. [21], Prakash *et al*. [10] and Reddy *et al*., [22] who reported the highest occurrence of dermatophytosis in 0-1 years of age. In contrast to these findings, Seker and Dogan [5] and Sigirci*et al*. [23] detected statistically no significant difference between the age groups and the prevalence rate. Similar findings were reported by Minnat and Khalaf [14] but Murmu *et al*. [24] recorded a higher occurrence of dermatophytosis in adult dogs (61.1%).

This finding can be attributed to several factors. Immature epithelial development and the absence of specific immunity, which is typically acquired after initial exposure, make the dog more vulnerable at a younger age. Additionally, young animals face high nutritional demands and are often housed in overcrowded conditions, further increasing their susceptibility. The biochemical composition of their skin and secretions also plays a significant role. Sebum in young dogs contains lower levels of fungistatic fatty acids, such as linoleic acid, which are essential for inhibiting fungal growth. These factors collectively contribute to the higher incidence of dermatophytosis and other skin infections in younger animals.

Gender wise occurrence of dermatophytosis in dogs

The gender-wise occurrence of skin disorders in dogs revealed a higher prevalence in males, with 25.93 % (28 out of 108) affected, compared to 12.82 % (15 out of 117) in

females. A significant difference ($p < 0.05$) was observed in the gender-wise occurrence of skin disorders in dogs. (Table 03)

Table 03: Gender wise occurrence of dermatophytosis in dogs

Gender	Number of dogs screened	Number of dogs affected (n=43)	Occurrence (%)
Male	108	28	25.93
Female	117	15	12.82
x^2= 6.240*		**Significant at p-value ≤ 0.05)**	

The observations recorded in the present study were in coherence with the findings of Cafarchia*et al*. [25], Debnath *et al*. [6], Seker and Dogan [5], Murmu *et al*. [14] and Tarra *et al*. [11]. On the contrary, Cunha [9] and Prakash *et al*. [10] recorded a higher incidence of dermatophytosis in female dogs as compared to males. In contrast to the present findings, Katiraee*et al*. [21] and Minnat and Khalaf [14] documented no statistically significant association found between the sex of dogs and the presence of dermatophytosis.

This variation could be a result of difference in composition of sebum of male dogs when compared with female dogs as male dogs tend to produce more sebum than females, largely due to the influence of testosterone which can increase the activity of sebaceous glands. Other study-specific variables, such as population demographics may also play roles in disease prevalence.

Breed wise occurrence of dermatophytosis in dogs

The breed-wise occurrence of skin disorders in dogs revealed the highest prevalence in Labrador Retrievers, with 24.39 % (10 out of 41) affected, followed by German Shepherds at 22.22 % (8 out of 36) and Golden Retrievers at 20.69 % (6 out of 29). Other breeds, including Bulldogs, Shih Tzus, Beagles, Dachshunds and Great Danes, showed an occurrence

of 20.00 % (5 out of 25). Saint Bernards and Pugs each had an occurrence of 18.18 % (2 out of 11), while non-descript dogs showed an occurrence of 14.81 % (8 out of 54). The lowest occurrence was observed in Pomeranians, with 11.11 % (2 out of 18). No significant difference was observed in the breed-wise occurrence of skin disorders in dogs. The details are outlined in Table 04.

Table 04: Breed wise occurrence of dermatophytosis in dogs at Jabalpur

Breed	Number of dogs screened	Number of dogs affected (n=43)	Occurrence (%)
Labrador retriever	41	10	24.39
German shepherd	36	8	22.22
Golden retriever	29	6	20.69
Others (Bull dog, Shih Tzu, Beagle, Dachshund, Great Dane)	25	5	20.00
Saint Bernard	11	2	18.18
Pug	11	2	18.18
Non-descript	54	8	14.81
Pom	18	2	11.11
$x^2 = 2.426^{NS}$		**Non-significant**	

The results of the present study are consistent with the findings of Anikar*et al*. [20], Tarra *et al*. [11] and Patel *et al*. [12] who recorded the highest occurrence in Labrador retrievers. On the contrary, Minnat and Khalaf [14] and Prakash *et al*. [10] reported the highest breedwise occurrence in German Shepherds.

The increased susceptibility to dermatophytosis in certain dog breeds can be attributed to qualitative and/or quantitative differences in their non-specific cutaneous defences, such as variations in sebum composition, sweat gland activity and hair coat characteristics. Dogs with thicker skin are observed to have a greater number of keratinocytes compared to thin-skinned

breeds. This abundance of keratinocytes may predispose thick-skinned dogs to infections caused by keratinophilic fungi like dermatophytes, as these fungi thrive on keratin as a nutrient source. It could be influenced by owners' breed preferences in different regions, the purpose for which dogs are kept, variations in breed behaviour and the population of specific breeds in a given area.

Clinical symptoms associated with dermatophytosis in dogs

During the study, different clinical symptoms associated with dermatophytosis in dogs were observed. Alopecia was found to be the most frequently observed symptom, affecting 86.0 % (37 out of 43) of cases. This was followed by scales and crusts, each observed in 74.4 % (32 out of 43) of cases. Circular lesions were present in 72.1 % (31 out of 43) of cases, while pruritus was seen in 58.1 % (25 out of 43). Other symptoms included erythema in 51.2 % (22 out of 43), hyperpigmentation in 46.5 % (20 out of 43) and pustules and papules, which were the least common, observed in 34.9 % (15 out of 43) of cases. (Table 05)

Table 05: Clinical symptoms associated with dermatophytosis in dogs

Clinical symptom	Frequency (n=43)	Distribution (%)
Alopecia	37	86.0
Scales	32	74.4
Crusts	32	74.4
Circular lesions	31	72.1
Pruritis	25	58.1
Erythema	22	51.2
Hyperpigmentation	20	46.5
Pustules and papules	15	34.9

The observations of the present study are in close proximity with the findings of Cunha *et al*. [9], Minnat and Khalaf [14], Moriello *et al.* [26].

The frequency and severity of clinical signs in dermatophytosis are influenced by a combination of factors like host's immune response, as a stronger immunity may limit lesion spread and severity. Lesion severity ranges from mild to severe, depending on factors such as the specific infecting organism, its virulence, the infection site, secondary bacterial infections, environmental conditions with warm and humid conditions favouring fungal growth, predisposing conditions and the presence of natural reservoirs of infection.

Distribution of lesions on body of dogs affected with dermatophytosis

The distribution of lesions on the body in dogs revealed the highest frequency on the hindlimbs, with 69.77 % (30 out of 43) of cases affected, followed closely by the forelimbs at 67.44 % (29 out of 43). Lesions were observed on the dorsum in 65.12 % (28 out of 43) of cases and on the face, head and neck in 62.79 % (27 out of 43). Other affected regions included the paws in 55.81 % (24 out of 43), interdigital space in 48.84 % (21 out of 43) and the tail in 41.86 % (18 out of 43). The abdomen was the least affected region, with lesions observed in 13.95 % (6 out of 43) of cases. (Table 06)

Table 06: Distribution of lesions on body of dogs affected with dermatophytosis

Regions on body	**Frequency (n=43)**	**Distribution (%)**
Hindlimbs	30	69.77
Forelimbs	29	67.44
Dorsum	28	65.12
Face, head and neck	27	62.79

Paws	24	55.81
Interdigital space	21	48.84
Tail	18	41.86
Abdomen	6	13.95

The result in the present study were in coherence with the findings of Prakash *et al.* [10] who recorded the highest distribution on hind limbs (40%) followed by forelimbs (33.33%). Minnat and Khalaf [14] noticed highest distribution of lesions on back region followed by hind limbs, forelimbs, tail, pinnae, face, paws and interdigital areas. On the contrary, Patel *et al.* [12] reported highest distribution of lesions on inner thighs, followed by abdomen and legs.

The distribution of lesions in canine dermatophytosis could be influenced by several factors, including the causative dermatophyte species, the dog's immune response and environmental conditions. Local skin factors, such as thickness, moisture levels and sebum composition also affect lesion distribution. Anatomical and functional gland involution such as variations in sweat or sebaceous gland activity may create environments that either promote or inhibit fungal growth. Furthermore, unidentified immunological factors may contribute to the variability in lesion patterns.

Duration of illness of dogs affected with dermatophytosis

The history of duration of illness was recorded in dogs affected with dermatophytosis. Among 43 dogs, 6.98% of dogs (3 out of 43) had a duration of illness of 0-1 weeks, 20.93% of dogs (9 out of 43) had a duration of 1-2 weeks, 18.60% of dogs (8 out of 43) had a duration of 2-3 weeks, 34.88% of dogs (15 out of 43) had a duration of 3-4 weeks and

18.60% of dogs (8 out of 43) had a duration of more than 1 month. The details are summarized in Table 07.

Table 07: Duration of illness of dogs affected with dermatophytosis

Duration of illness	Frequency (n=43)	Distribution (%)
0-1 weeks	03	6.98
1-2 weeks	09	20.93
2-3 weeks	08	18.60
3-4 weeks	15	34.88
> 1 month	08	18.60

Conclusion

The present epidemiological study on dermatophytosis in dogs at Jabalpur provides valuable insights into the prevalence, risk factors and clinical presentation of the disease. The overall occurrence of dermatophytosis in the dog population was recorded at 1.74%, with a significantly higher prevalence in younger dogs (0-1 year), male dogs and Labrador Retrievers. The most frequently observed clinical signs included alopecia, scales, crusts and circular lesions, with lesions predominantly distributed on the limbs, dorsum, and face.

These findings highlight the importance of early diagnosis and targeted management strategies to control dermatophytosis, particularly in high-risk groups. Further research on antifungal resistance and molecular characterization of dermatophytes could contribute to enhanced treatment protocols and better disease management.

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1.

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3.

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