

Original Research Article

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Prevalence of *Malassezia* Infection in Dogs of Nagpur City

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ABSTRACT

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Skin is the largest organ in terms of the surface area acquires 16% of the weight of the body. It is also an organ of innate immunity that prevents the entry of pathogens into the host. Various commensals form the microbiota of the skin, under stress or immune-suppression, the commensals may invade the skin and produce infection. *Malassezia* is a common yeast that causes dermatitis and associated clinical symptoms. The prevalence of *Malassezia* was studied in the dogs of Nagpur city. The study was carried out during September 2019 to August 2020 at the TVCC wherein total 10204 dogs were presented for various affections. A total of 255 dogs were found positive for *Malassezia* dermatitis based on history, clinical signs like hyper-pigmentation, thickening of skin with foul smelling exudation, pruritis, erythema and further confirmation by microscopic examination. Based on the study, breed-wise, sex-wise, and age-wise prevalence was estimated for *Malassezia* in Dogs of Nagpur city.

Introduction

Skin provides an innate protection from the invading pathogens. Innate protective defense mechanisms like production of lactic acid and normal microflora prevents the invasion by opportunistic pathogens. Skin has a unique mechanism to maintain its health and prevent infection. There are sebaceous glands and sweat glands that open at the skin surface, secretions of these glands are important in maintaining the health of the skin. Sweat glands produce lactic acid and salts that check the invading pathogens and prevent skin diseases. The normal microflora also plays a

vital role by competing with the invading pathogens for space and nutrition. However, in certain situations due to loss of innate immunity or due to immune suppression certain commensals may invade the skin and produce clinical infection Kennis *et al.*, (1994).

Various skin affections have been identified in dogs including dermatitis which may be of infectious or non-infectious origin. Many species of yeast are commensals of dog skin, and majority of the healthy dogs carry it on their skin Kennis *et al.*, (1994). However, due to immune-compromised micro environment,

the yeast may invade the skin. *Malassezia* is a lipophilic basidiomycetous yeast, ovoid or ellipsoid in shape. The cell walls are thick and lack a pseudomycellium. There are numerous reports of dermatitis of *Malassezia* origin throughout the world Nardoni *et al.*, (2004), Chaudhary & Mirakhur (2002). Various studies have provided insights into the factors predisposing dogs to incidences of dermatitis.

The majority of the identified factors include tropical climate which is characterized by high temperature and humidity, seborrhoea, excessive moisture, persistent dermatoses, bacterial infection etc. *Malassezia* may also be secondary malady to persistent endocrinopathies like hypothyroidism, diabetes mellitus etc., neoplastic changes and auto immune diseases Scott *et al.*, (2005), Nardoni *et al.*, (2004), Cafarchia *et al.*, (2005).

The disease is characterized by alopecia, local or general erythema, crusty scales on the affected skin, erythematous papules and macules. Clinical cases are often presented with intensive pruritis accompanied with a strong rancid odour Bond *et al.*, (1996). In long standing cases due to intense itching secondary complications including bacterial infection, lichenification and hyperpigmentation have been reported. The prevalence and its variation have been thoroughly studied, breeds like Cocker Spaniel, German Shepherds, Labrador Retriever, Basset Hound, Dachshund, West Highland White Terrier, Poodle and Australian Silky Terrier breeds of dogs were found to be highly susceptible Seetha *et al.*, (2018), Nascente *et al.*, (2015). Under the Indian context, Labradors, German Shepherds, Dobermans, Spitzs, Dachshund, Great Danes were found to be more susceptible (Kumar *et al.*, 2011). Both the sexes were found to be equally affected by *Malassezia*. The incidences are known to peak in summers due to high temperature of

the tropical region Patterson and Frank (2002) while in the temperate climate the cases peak in the autumn Conkova *et al.*, (2011). The prevalence was found to be highest in the age group of 1-3 years Girao *et al.*, (2006). In the current study the prevalence of *Malassezia* was studied in dogs of Nagpur city and prevalence in various breeds, sex, season and age was inferred.

Materials and Methods

The study was conducted from September 2019 to August 2020 at Teaching Veterinary Clinical Complex, Nagpur Veterinary College, Nagpur in dogs showing clinical symptoms of pruritis, alopecia, varying degrees of erythema, scaling, oily skin, a rancid or yeast odour, hyperpigmentation, lichenification, malodorous exudation and brownish discoloration of the skin, hair or nail plate Plant *et al.*, (1992), Negre *et al.*, (2009). A thorough anamnesis, clinical examination, haematological and serum biochemical tests were undertaken. As mentioned by Eluk *et al.*, (2003) tape impression smears were collected from affected dogs and studied. Glass slide smears were prepared and stained by fresh methylene blue and examined (Muse 2000). Roll swab smears were obtained from ear canal based on the technique used by Gotthelf and Young (1997). Isolation and Culture was carried out using Sabouraud's dextrose broth (Huang *et al.*, 1993). The isolates were studied at high magnification to identify the characteristic foot print or peanut pattern indicative of *Malassezia*.

Results and Discussion

The study was carried out during September 2019 to August 2020 at the TVCC wherein total 10204 dogs were presented for various affections. A total of 255 dogs were found positive for *Malassezia* dermatitis based on history, clinical signs like hyperpigmentation,

thickening of skin with foul smelling exudation, pruritis, erythema and further confirmation by microscopic examination (Table 1–3).

Breed prevalence

Out of the 255 positive cases that were confirmed in Nagpur city, Labrador breed formed the major proportion of the cases. The breed contributed to 45.49% proportion of all the cases treated for *Malassezia*. This was

followed by Pugs and German Shepherds which constituted 15.29 % and 14.11% of the total incidences in the city. Golden Retrievers contributed to 12.54% of the total incidences while Dobermen, Dachshund, Non-descript and Spitz contributed to 4.7%, 3.9 %, 2.7 % and 1.1 % respectively. The findings are in total agreement with reports of Kumar *et al.*, (2011). The tropical climate of Nagpur with high temperatures in summers is very favourable for the incidences of *Malassezia* in dogs.

Table.1 Table depicting the Breed wise Prevalence of *Malassezia* in Dogs in Nagpur City

Breed	No. of dog affected with <i>Malassezia</i> dermatitis	Prevalence
Labrador	116	45.49%
Pug	39	15.29%
German shepherd	36	14.11%
Golden retriever	32	12.54%
Doberman	12	4.7%
Dachshund	10	3.9%
Non-descript	7	2.7%
Spitz	3	1.1%
Total	255	

Table.2 Table depicting the Age wise Prevalence of *Malassezia* in Dogs in Nagpur City

Age	No. of dog positive for <i>Malassezia</i> dermatitis	Prevalence
<1 year	1	0.39%
1-3 year	10	3.92%
More than 3 and up to 6 year	33	12.94%
More than 6 and up to 9 year	127	49.80%
More than 9 and up to 12 year	77	30.19%
above12 year	07	2.7%

Table.3 Table depicting the Sex-wise Prevalence of *Malassezia* in Dogs in Nagpur City

Sex	No. of <i>Malassezia</i> spp. affected dogs	Prevalence (Percent)
Male	153	60
Female	102	40
Total	255	100

Age wise prevalence

The susceptibility of dogs to infections varies with age, this is due to the development of adaptive immunity in the later stages of life. In the current study, dogs of age group 6-9 years were found to be more susceptible to *Malassezia*, the group contributed to nearly half of the total cases presented at TVCC, Nagpur. This was followed by dogs of age group 9- 12 years which contributed to 30.19% of the total cases. The prevalence in the age groups 3-6 years, 1-3 years, less than 1 year and above 12 years was 12.94%, 3.92%, 0.39% and 2.7% respectively. The findings are in agreement with studies by Borkar *et al.*, (2014). However, studies by Khoravi *et al.*, (2008) reported highest prevalence in the age group of 2-5 years, Girao *et al.*, (2006) and Seetha *et al.*, (2018) also opined highest prevalence in the age group of 1-3 years. The above facts must be considered in the light of climatic factors and managerial practices which may influence the prevalence of *Malassezia* in dogs.

Sex wise prevalence

In the current study, males were found to be more susceptible to *Malassezia*, the prevalence in males was 60% against 40% in females, these findings are in complete agreement with the findings of Conkova *et al.*, (2011) and Seetha *et al.*, 2018. However, the results contradict the findings of Nardoni *et al.*, 2004 who advocated no significant difference in the prevalence in both the sexes. The skewing of the incidence towards the males could be attributed to the fact that androgen triggers greater production of sebum Conkova *et al.*, (2011) which predisposes the males to latent infection with *Malassezia*.

Prevalence studies are considered to be the backbone of epidemiology. Input about the prevalence in terms of host factors,

environment factors and pathogen associated factors are critical in weighing the impact of the disease in a community. They provide basic data to design the key thrust areas to contain a prevalent disease. The prompting factors that transmute *Malassezia* from a commensal to a pathogen are poorly understood, however, any alteration in host immunity, physical or chemical changes in micro-environment of the skin can predispose the host to opportunistic invasion by commensals. Thus, insights on the factors affecting spread, breed and age susceptibility must be regionally deduced to understand the prevalence of *Malassezia*. The current study provides important insights into the breed susceptibility under the tropical climate of Nagpur city. The study also identifies the age at which dogs are more susceptible to *Malassezia*. The values are of great importance in the clinical management and in the health management of dogs in general.

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