

ISSN 1996-3351

Asian Journal of
Biological
Sciences



Research Article

Prevalence of Dermatophytic fungi in Cats of Shah Alam, Selangor, Malaysia

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Abstract

Background and Objective: Fungal dermatophytes cause infection in skin and hairs of cats and when come in contact with humans can cause infection in them. Therefore, the present work has been carried out with an objective to assess the fungal load in cats of Shah Alam, Selangor, Malaysia. **Materials and Methods:** The hair samples from cats of Shah Alam region were collected and transferred to potato dextrose agar media by maintaining all aseptic conditions. The fungi isolated from these samples were identified by standard protocols and their prevalence was estimated. **Results:** Out of 155 hair samples, 98 hair samples came out with fungal growth. The maximum occurrence and prevalence was of *Penicillium* sp. (65) in comparison with *Microsporum* sp. (5), *Aspergillus* sp. (6), *Trichophyton* sp. (10) and *Epidermatophyton* sp. (12). **Conclusion:** Public health officers must conduct awareness programs in this region, since the cats of Shah Alam harbor a large number of dermatophytic fungal pathogens.

Key words: Potato dextrose agar, dermatophytic fungi, *Penicillium* species, zoonotic infections

Received: November 28, 2018

Accepted: January 30, 2019

Published: March 15, 2019

Citation: Nor Fazliyana Binti Hj Mohammad Tuah and Kartikeya Tiwari, 2019. Prevalence of dermatophytic fungi in cats of Shah Alam, Selangor, Malaysia. Asian J. Biol. Sci., 12: 291-294.

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Competing Interest: The authors have declared that no competing interest exists.

Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

Zoonotic infections are the infections caused by animals to humans and common all over the world. Feline dermatophytosis is one example, where the dermatophytic fungi transmitted to humans from cats. Prevalence of these dermatophytic fungi depends on seasonal variation and geographical distribution. Any fungus which comes in contact to humans from cats has capacity to breach the anatomical barriers of the body and cause infection in optimum conditions¹.

Dermatophytes classified into three different categories based on their natural habitat: (1) Geophilic, (2) Zoophilic and (3) Anthropophilic. Geophilic dermatophytes live in the soil and are occasional pathogens of both animals and humans. Zoophilic dermatophytes normally parasitize the hair and skin of animals and can transmit to humans. Anthropophilic dermatophytes generally infect humans and transmit directly or indirectly from person to person.

The environmental factors such as humidity and temperature makes favorable atmosphere for these fungi to grow and cause infection. The prevalent species of dermatophytes, however, may vary considerably from country to country and from region to region within a country. Not all species of dermatophytes are cosmopolitan in their distribution throughout the world. While some have been recorded from every continent, others have geographically limited areas of greater or lesser extent².

Common fungal dermatophytes in cats include *Microsporum* sp., *Trichophyton* sp., *Epidermatophyton* sp., *Aspergillus* sp., *Penicillium* sp. and other related genera³. These fungi are aerobic and infect the stratum corneum of skin, the hair shaft and the nail by producing enzyme proteases that digest keratin and allows colonization and invasion⁴.

Dermatophyte colonization is characteristically limited to the dead keratinized tissue of the stratum corneum and results in either a mild or intense inflammatory reaction. Although the cornified layers of the skin lack a specific immune system to recognize this infection and rid itself of it, nevertheless, both humoral and cell-mediated reactions and specific and nonspecific host defense mechanisms respond and eventually eliminate the fungus, preventing invasion into the deeper viable tissue⁵.

Domestic Cats in Shah Alam, Selangor state, Malaysia are increasing in population year by year⁶. These cats are unclean and therefore are reservoir for infection⁷⁻¹⁰. Keeping these points in mind the present study was designed to assess the prevalence of fungal dermatophytes in cats of this region.

MATERIALS AND METHODS

The present study was carried out over a period of 1 year, from September, 2017 to August, 2018, in the Department of Microbiology, International Medical School, MSU, Shah Alam, Selangor, Malaysia. This study included 98 isolated dermatophytic fungal strains from hair samples of infected cats.

Isolation of dermatophytic fungi: A total of 155 hair samples from different cats of Shah Alam area were collected and transferred in sterilized polybags before processing. These hair samples were transferred to sterilized potato dextrose agar plates by maintaining all aseptic conditions. After 7 days of incubation, the fungal hyphae came out from these samples. These fungi transferred into another sterilized potato dextrose agar plates for purification and storage.

Identification of dermatophytic fungi: The isolated fungi were identified by cultural and microscopic characteristics. The microscopic identification of fungi was carried out by lacto-phenol cotton blue method.

RESULTS

Dermatophytic fungal taxon: The dermatophytic fungi isolated and identified from hairs of cats belong to 5 fungal taxon, *Aspergillus* sp., *Penicillium* sp., *Microsporum* sp., *Trichophyton* sp. and *Epidermatophyton* species. The pure culture of all dermatophytic fungal pathogens were maintained in potato dextrose agar medium. *Penicillium* sp. pure culture on potato dextrose agar medium shown in Fig. 1 and broom shape structure of *Penicillium* sp. under microscope shown in Fig. 2.

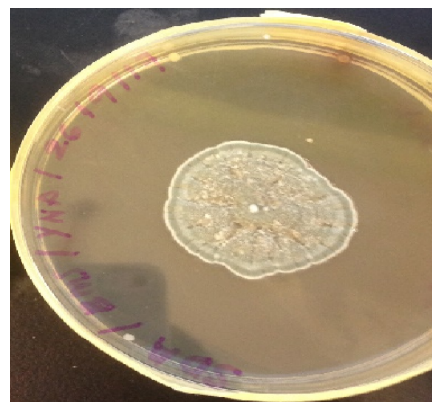


Fig. 1: Culture of *Penicillium* species after 5 days of incubation at 28°C

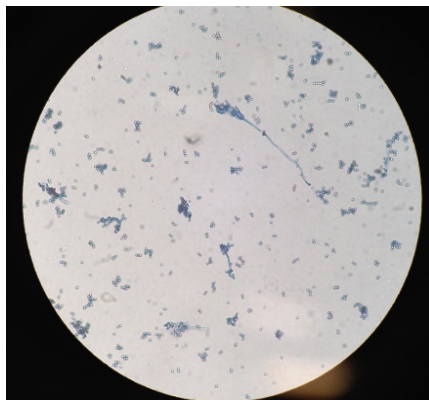


Fig. 2: Microscopic view of *Penicillium* sp. under 10X magnification showing broom shape structure (metulae, phialides bearing conidia)

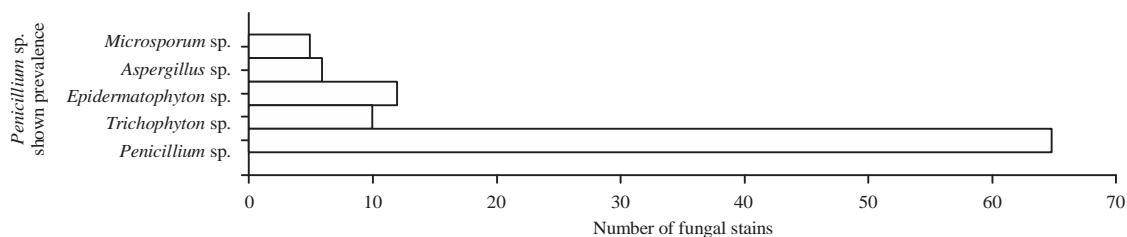


Fig. 3: Occurrence and prevalence of fungal dermatophytes in hairs of cats of Shah Alam, Selangor state, Malaysia

Prevalence and occurrence: Out of 155 hair samples, 98 hair samples came out with dermatophytic fungal growth (Fig. 3). The *Penicillium* species (65) was found most prevalent in comparison with *Aspergillus* sp. (6), *Microsporum* sp. (5), *Trichophyton* sp. (10) and *Epidermatophyton* sp. (12).

DISCUSSION

The results shown that *Penicillium* species was most prevalent dermatophytic fungi in comparison with *Aspergillus* sp., *Microsporum* sp., *Trichophyton* sp. and *Epidermatophyton* species in cats of Shah Alam region. Although earlier researchers found *Microsporum* species as dominant fungal dermatophyte in cats of this region.

Similar findings reported by Chah *et al.*¹¹ that anthropophilic dermatophytes were among the fungal agents associated with dermatophytosis in animals in Nsukka Agricultural Zone. These dermatophytes could constitute health risks to humans in contact with the animals.

Cafarchia *et al.*¹² in contradiction found that young dogs and cats, especially those younger than one year, showed a statistically significant higher prevalence of *M. canis* infection than older animals. No statistically significant

association was found between infection and sex in cats, while male dogs were more affected by dermatophytes.

Moriello¹³ discussed the treatment strategies for various dermatophytic fungi causing infection in cats at various level of situations and mentioned that the prevalence and occurrence of dermatophytic fungi depends upon geographical distribution and location all over the world.

In contradiction, Sharma *et al.*¹⁴ and Debnath *et al.*¹⁵ reported and found *Microsporum canis*, *Microsporum gypseum* and *Trichophyton mentagrophytes* prevalence in semi-arid region and eastern part of India. This is because of the different geographical conditions and habitat.

Frymus *et al.*¹⁶ also found that *Microsporum* sp. is the most common cause of dermatophytosis in cats. In rare cases the opportunistic fungi can cause infection in cats.

Furthermore, Morubagal *et al.*¹⁷ found dermatophytosis is one of the commonly encountered fungal infections in developing countries including Malaysia.

The cats of this region are infected with fungal dermatophytes. Therefore the public health officers must look into the conditions of cats and conduct awareness programs in coming future for zoonotic infections, especially in Brunsfield apartments and Menara U buildings.

CONCLUSION

These infected cats must be treated with effective treatment strategies and awareness programs to be conducted to control zoonotic infections.

SIGNIFICANCE STATEMENT

The study discovered that the dermatophytic fungi *Penicillium* species is prevalent in hair samples of cats of Shah Alam region, Selangor, Malaysia. Therefore, it will help the public health officers to apply specific topical medication in the cats of this region.

ACKNOWLEDGMENT

Many thanks are addressed to the International Medical School, Management and Science University (MSU) for the research funds and facilities.

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