Incidence of Dermatomycosis in Human and Pet Animals in Egypt

Hanady H. Kamel[1*]; Abd-El Azeem, A. M.[2]; Hassan, G. H. R.[3]; Enany, M E.[4]; and Taha, M.[5]

[1] General Administration of Information Technology Training, CAPMAS, Cairo, EGYPT; [2]Department of Botany, Faculty of Science, Suez Canal University, Ismailia, Egypt; [3]Department of Microbiology, Faculty of Science, Zagazig University, Zagazig, Egypt; [4]Department of Microbiology, Faculty of Veterinary Medicine, Suez Canal University, Ismailia, Egypt; [5] Department of Microbiology, Faculty of Veterinary Medicine Zagazig University, Zagazig, Egypt*

Abstract:

A total of 60 specimens were collected from superficial mycosis (50 from humans and 10 from pet animals). Human cases were recruited to a private laboratory for mycological examination in Cairo while samples from pet animals were collected from veterinary private clinics in Zagazig, Damietta and Cairo in the period of 2019-2021. All samples were subjected to mycological examination including KOH, direct microscopy, and isolation of causative agents.

Concerning human samples, the Dermatophytes were isolated from 46% of the samples where T. *rubrum* and *T. mentagrophytes* were recovered from Tinea corporis and Tinea pedis cases in respect, followed by *M. canis* and *T. violaceum*. From Tinea capitis, *M. canis* and *T. violaceum* dominated the scene. Non-dermatophytes were isolated from 27% of the samples mainly from onychomycosis and the recovered isolates were *Aspergillus (A) nidulans, A. flavus, A. niger* followed by Fusarium, acremonium and Chrysosporium.

Yeast isolates were obtained from 27% of Onychomycosis and Tinea pedis cases and were represented by *C. albicans* followed by *C. tropicalis,*

C. parapsilosis and C. *krusei*.

From pet animals, dermatophytes incidence was 57% where *M. canis* was obtained from ringworm cases. *C. albicans* was recovered from 29% of the samples while the only isolated non-dermatophyte was *Scopulariopsis brevicaulis* (from 14% of the total samples).

Key words: Dermatomycosis, Human, Pet animals

Introduction:

Superficial mycotic diseases in animals received much less attention than mycoses in humans, ***(Scorzoni et al., 2017)***. Superficial fungal infections are not life threatening, but they spread to other skin regions and may become widespread, are transmitted to other people, and can cause secondary bacterial skin infections and permanent hair loss that can negatively affect the quality of a person's life ***(Rai et al., 2017)*** .Superficial mycosis in animals represents a high zoonotic risk plus economical losses in hide of infected animals ***(Abdel- Fattah et al., 2018).***

Cats are becoming increasingly popular as pet and companion animals. ***Seyedmousavi et al. (2018).***

Skin fungal infections in EGYPT caused by three groups of fungi: dermatophytes, yeasts, and non-dermatophyte molds. Dermatophytes as *T. violaceum, M. canis,T. verrucosum, T. schoenleinii* are main etiologies of Tinea Capitis ***(Amer et al., 1981; Omar, 2000)***

T. rubrum, T. violaceum. canis,T. verrucosum are the main causes of Tinea Corporis ***(Farag et al., 1994; Omar, 2004)***.

Tinea pedis and tinea cruris are mostly caused by *Trichophyton rubrum* (*T. rubrum*), *T. mentagrophytes and Epidermophyton flocosum* ***(Amer et al., 1981; Omar, 2004).***

Onychomycosis is a common fungal infection affecting both fingernails and toenails which is usually caused by dermatophytes, yeasts and molds ***(Faergemann and Baran, 2003).*** Further, the most common isolated fungi were candida where *Candida tropicalis* was the most prevalent causative species in onychomycosis in Egypt ***(Bedaiwy et al., 2017).***

Of the non-dermatophyte moulds, aspergillus was found in more than 70% of the onychomycosis cases ***(Ahmed et al., 2020).***

The incidence of cutaneous mycoses continues to increase, particularly in tropical countries because of the heat and humidity, whereas the prevalence of the causative species of fungi involved has shifted or changed due to migration and changes in socioeconomic status and lifestyle ***(Ameen, 2010).***

The clinical pictures of cutaneous mycoses can be subdivided into infections that induce minimal or no inflammatory response, e.g., pityriasis versicolor, tinea nigra, or piedra, and those inducing cutaneous inflammation such as cutaneous candidosis and tinea ***(Taha & Zaghloul, 2018).***

Materials and Methods:

1. Collection of Samples:

The present study was carried out on 60 specimens obtained from superficial mycosis cases, 50 from human and 10 from pet animals. Human samples were obtained from private laboratory for mycological examination in Cairo while pet animals' samples were obtained from veterinary private clinics in Zagazig, Damietta and Cairo in the period of 2019-2021. Samples were in the form of hairs, skin scrapings, nail clippings and nail scrapings in human cases, while pet animals' samples were skin scrapings, hairs, and claws clippings. The specimens were collected, after cleansing by 70% alcohol, in sterile petri-dishes.

2. Direct Microscopic Examination:

It was done for the detection of fungal elements after treating samples with 20% (KOH) potassium hydroxide.

a. **Isolation**:

Each specimen was inoculated onto: (1) SDA+C (Conda, Spain) for the isolation of yeasts and non-dermatophyte molds. (2) DTM (Himedia) with modified agar supplement to facilitate the isolation of dermatophytes. Cultures were incubated at 30°C.

b. Identification:

Identification of dermatophytes and non-dermatophyte molds were based on macro- and microscopic examination by lactophenol cotton blue treatment and subculture on the differential media bromocresol purple (BCP)for dermatophytes and potato dextrose agar for other molds.

Yeasts were identified by Gram-stained smears and subculturing onto Candida chromogenic agar (CCA) ***(Klich, 2002; Taha, 2011).***

Results:

Of 60 samples collected from superficial mycosis (Tables 1&2 and Figures 1-9),50 human cases were diagnosed as, tinea capitis 5 cases (10%), tinea corporis 10 cases (20%), tinea pedis 5 (10%) and onychomycosis 30 (60%). While pet animals' cases were clinically diagnosed as ringworm 8 cases (80%) and 2 dermatitis (20%).

Mycological examination:

KOH preparations and cultures revealed that 55 samples were positive with KOH and cultures distributed as 48 from human samples (96%) and 7 samples from pet animals (70%).

In human samples: tinea capitis, tinea corporis and tinea pedis samples were detected by KOH and culture in 100% of the samples. In onychomycosis cases, 28 were positive with KOH and culture while 2 were negative (Table.3 and Figures 10-14).

In pet animals, 7 cases were positive with KOH and culture in 70% (Table.4 and Figure 15)

Identification:

The total of 55 isolates obtained from 60 samples from human and pet animals were identified as dermatophytes 26, non-dermatophytes 14 and 15 yeast (Tables 5 and 6)

Identification of Dermatophytes isolates

Dermatophytes isolates from Human cases were identified according to macro – and micromorphological characters and PCB differential media as: *T. violaceum* 2, *M. canis* 3, *T. rubrum*, 10, *T. mentagrophytes* 7.

While on the other hand, 4 dermatophytes isolates obtained from pet animals were identified as M. *canis* (Tables 5&6 and figures 16-20).

Identification of non-dermatophytes isolates

Isolates of non-dermatophytes molds obtained from human cases were identified according to macro and micromorphological charchters into 9 Aspergillus, 2 Fusarium and one of each Acremonium and Chrysporium (Table.6 and Figures 22-30).

Isolates of aspergillus were identified into: *A. nidulans* 3, *A. flavus* 2,

A. niger 2 and one from each *A. versicolor* and *A. terreus*.

Isolates of Fusarium were identified into: *F. solani* 1, *F. oxysporum* 1

Isolates of Chrysporium was identified as *C. Keratinophilic*.

Isolates of Acremonium was identified as *A. falciform*.

In pet animals, one isolate of non-dermatophytes molds was isolated from dog and identified as *Scopulariopsis brevicaulis*.

Identification of Yeast isolates

Yeasts were identified according to CCA into 13 isolates as following:

C. albicans 5, *C. tropicalis* 3, *C. parapsilosis* 3 and *C. krusei* 2.

In pet animals, only two isolates of yeast were obtained from dermatitis in dog and identified as *C. albicans* (Tables 5&6 and figures 21 and 31).

Table 1*: Clinical forms and types of specimens collected from Human cases.*

Clinical form/Human	Samples	%	Type of Specimen
Tinea capitis	5	10%	Hair and skin scrapings
Tinea corporis	10	20%	Skin scrapings
Tinea pedis	5	10%	Skin scrapings and swabs
Onychomycosis	30	60%	Nail scrapings and clippings

Table 2: *Clinical forms and samples collected from pet animals' cases.*

Pet animal	Clinical form	Cases	Samples
Dogs	Ringworm	3	Hair and skin scrapings samples
	Dermatitis	2	Scales
Cats	Ringworm	5	Hair and skin scrapings

Table 3: *Fungal elements of direct microscopic examination (20% KOH) in Human samples.*

Clinical form	Cases	Positive KOH	%	Fungal elements
1. Tinea capitis	5	5	100%	Ectothrix, endothrix, long septated hyphae
2. Tinea corporis	10	10	100%	Long branched septated hyphae
3. Tinea pedis	5	4	90%	Long septated hyphae
		1	10%	Yeast cells.
4. Onychomycosis	30	28	93%	Irregular Hyphae &spores
Grand total	**50**	**48**	**96%**	

Table 4: *Fungal elements with direct microscope with 20% KOH in pet animals' cases.*

Pet animal	Clinical form	Cases	Positive KOH	%	Fungal elements
Cats	Ringworm	5	3	60%	Ectothrix, long septated hyphae, yeast cells
Dogs	Ringworm	3	2	90%	Ectothrix and arthrospores
	Dermatitis	2	2		Large spores and yeast cells

Table 5: *Identification of 7 fungal isolates obtained from superficial pet animal's mycosis:*

Clinical form	Family	Genus	No.,	Species
Ringworm (10 cases)	Dermatophytes (4 cases)	Microsporum	4	*M. canis*
	Yeast (2 cases)	Candida	2	*C. albicans*
	Non-dermatophytes (1 cases)	Scopulariopsis	1	*S. brevicaulis*

Table 5: *Identification of (55) fungal isolates obtained from superficial human mycosis.*

Clinical form	Family	Genus	No.,	Species
Onychomycosis (30 cases)	Yeast (12 cases)	Candida	4	*C. albicans*
			2	*C. krusei*
			3	*C. tropicalis*
			3	*C. parapsilosis*
	Non-Dermatophytes (13 cases)	Aspergillus	1	*A. versicolor*
			3	*A. nidulans*
			2	*A. flavus*
			2	*A. niger*
			1	*A. terreus*
		Chrysporium	1	*C. Keratinophilic*
		Fusarium spp.,	1	*F. solani*
			1	*F. oxysporum*
		Acremonium spp.,	1	*A. falciform*
	Dermatophytes (3 cases)	Trichophyton	2	*T. rubrum*
			1	*T. mentagrophytes*
Tinea Corporis (10 cases)	Dermatophytes (10 cases)	Trichophyton	8	*T. rubrum*
			2	*T. mentagrophytes*
Tinea Capitis (5 cases)	Dermatophytes (5 cases)	Microsporum	3	*M. canis*
		Trichophyton	2	*T. violaceum*
Tinea Pedis (5 cases)	Dermatophytes (4 cases)	Trichophyton	4	*T. mentagrophytes*
	Yeast (1 case)	Candida	1	*C. albicans*

Photos of Human Clinical Cases:

Figure 1: Tinea Capitis-Scaly

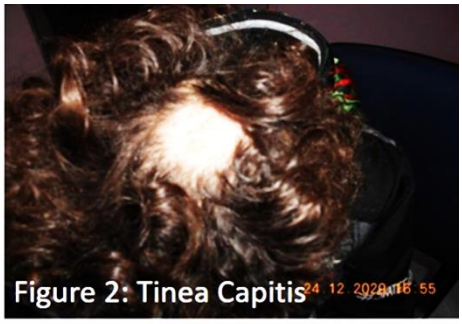


Figure 2: Tinea Capitis

Figure 3: Tinea Capitis- Kerion

Figure 4:Tinea Corporis

Figure 5: Tinea pedis-Vesiculobolus

Figure 6: Tinea pedis-Interdigitalis

Figure 7: Onychomycosis-Toe nail

Figure 8: Onychomycosis-Finger nail

Photos of Pet Animals' Clinical Cases

Figure 9: Pet animals different dermatomycosis in cats and dogs

Direct Microscopic Examination of Samples Treated with KOH 20%:


Figure 10: Direct microscopy showing arthrospores in the form of coccobacilli


Figure 11: Direct Microscopy showing long septated hyphae


Figure12: Direct Microscopy showing irregular hyphae and spores

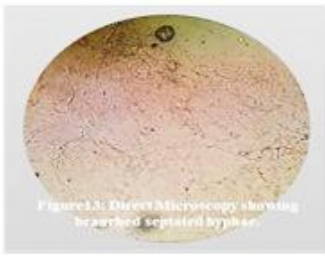


Figure13: Direct Microscopy showing branched septated hyphae.


Figure14: Direct Microscopy showing collections of yeast cells

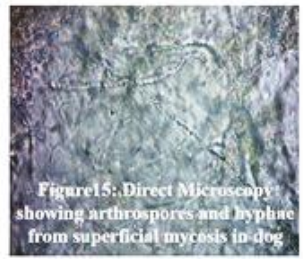
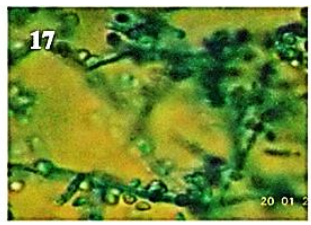
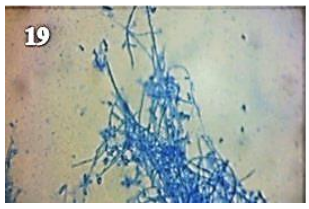


Figure15: Direct Microscopy showing arthrospores and hyphae from superficial mycosis in dog

Figures of Identification:





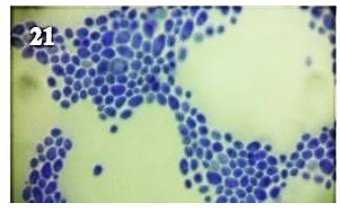


Figure16: *T. mentagrophytes,* elongated thin wall Macroconidia (LPCB)
Figure 17: *T. mentagrophytes,* microconidia clavate to pyriform along the sides of hyphae (LPCB)
Figure 18: *T. rubrum,* small microconidia laterally along hyphae, arranged as bird on the tree
Figure 19: *T. rubrum,* abundance of microconidia
Figure 20: *M. canis,* macroconidia with hook and thick, rough wall after LPCB
Figure 21: Candida, oval and rounded small blastoconidia with absence of pseudohyphae (LPCB)

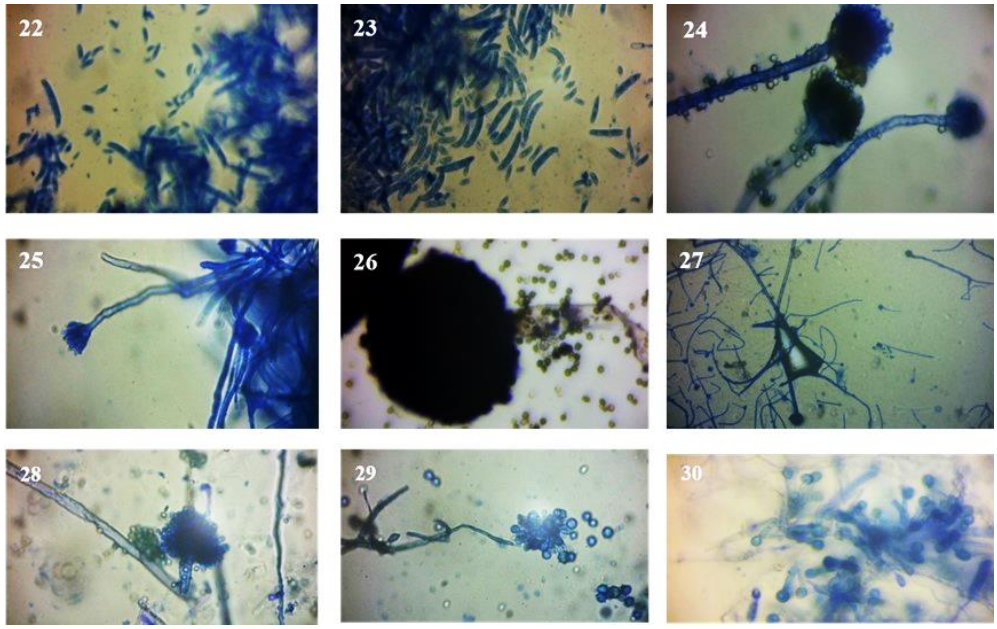


Figure 22 and 23: Fusarium showed macroconidia in sickle appearance have 3-5 cells (LPCB).
Figure 24: *A. flavus* showed conidiophore is rough, vesicle is globose and biseriate, head is radiated (LPCB)
Figure 25: *A. versicolor* showing: globose and biseriate vesicle with spherical conidia (LPCB)
Figure 26: *A. niger* showing: Large spherical head (LPCB).
Figure 27: *A. nidulans* showing long conidiophore (LPCB)
Figure 28: *A. flavus* showing radiated head (LPCB
Figure 29: Scopulariopsis from dog case showing lemon to globose conidia (LPCB).
Figure 30: *Scopulariopsis brevicaulis*: numerous lemons to globose conidia with broadly truncated base, rough and has projections. (LPCB)

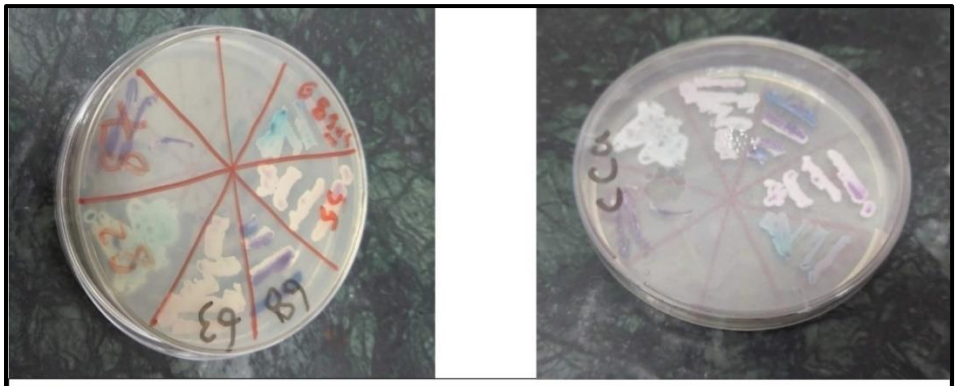


Figure 31: Identification of Candida species isolates on chromogen

Discussion:

In this study, 60 samples were collected and mycologically examined from human and pet animals skin affections (50 human and 10 animal samples).

Human cases were diagnosed by dermatologists as: Tinea capitis 5 cases, Tinea corporis 10 cases, Tinea pedis 5 cases and 30 as Onychomycosis (10%,20%,10% and 60% respectively).

Pet animals' cases were 8 ringworm and 2 dermatitis, in percentages of 70% and 30% in order.

Results of this study revealed the prevalence of onychomycosis followed by tinea corporis in human cases and ringworm in pet animals.

On KOH examination, a total of 55 samples gave positive results from a total of 60 cases from both human and animals with 96% and this comes in accordance with the findings of ***Lakshmanan et al. (2015), Bitew (2018)*** and ***Araya et al. (2021)*** who reported high prevalence of dermatophytosis (66.98%-67.7%)**.**

In this study, 26 dermatophytes were identified, 22 from human and 4 from pet animals. The 22 dermatophyte isolates obtained from 48 human superficial mycosis cases in total percent of 45.8% were identified as:

T. violaceum 2, *M. canis* 3, *T. rubrum*, 10, *T. mentagrophytes* 7 with percentages of: 9%,14%,45.4%,31.8%, respectively.

While the 4 dermatophyte isolates of pet animals were mainly 4 *M. canis in* 100% prevalence.

Dermatophytes' incidence was 45.6% and 57% in human and pet animals, respectively.

This comes in accordance with ***Enany et al. (2017)*** who isolated dermatophytes in a percentage

40% from human samples while the percentage was 61% in animal samples. and ***Sayed (2008)*** who revealed that *M. canis* was the only dermatophyte species isolated from clinically affected dogs and cats at a rate of 41.7% and 56.7% respectively.

This argument concludes that incidence of dermatophytes in superficial mycosis in pet animals were much higher than in human.

The most prevailed dermatophytes in human samples were *T. rubrum* 45% and *T. mentagrophytes* 32% followed by *M. canis* 14% and *T. violaceum* 9%. While in pet animals' the higher incidence of dermatophytes was for *M. canis* (100%).

This comes in agreement with the reports of ***Nichita & Marcu (2010), El-Fangary et al. (2011), Aboueisha & El-Mahallawy (2013); Enany et al. (2017); Araya et al. (2021) and Yahia et al. (2021)*** who found that the overall dermatophytes infection rates among the examined patients were 81.5% and 61.9% by direct microscopic and cultural examinations in order. The most common isolated species were *T. violaceum* (37.3%), *M. canis* (28.6%) followed by *T. rubrum* (12.4%), *T. tonsurans* (9.9%) and *T. mentagrophytes* (6.8%). However, the anthropophilic species dominated the etiologies of human dermatophytosis, the zoophilic species exhibit about one third of the totally identified isolates represented by *M. canis* and *T. mentagrophytes.*

Outerbridge (2006) mentioned that the most common fungal isolates identified in dogs or cats dermatophytosis were *M. canis, M. gypseum*, and *T. mentagrophytes*.

Regarding the non-dermatophyte molds, 13 isolates of human samples were identified as: 9 Aspergillus, 2 Fusarium and one of each Acremonium and Chrysporium (69%,15.3%,7.6%,7.6%, respectively).

Isolates of Aspergillus were identified into: *A. nidulans* (3), *A. flavus* (2), *A. niger* (2) and one of each *A. versicolor* and *A. terreus*. In (23%,15.3%,7.6% and7.6%, respectively).

Isolates of Fusarium were identified into: *F. solani* (1) and *F. oxysporum* (1).

Isolates of Chrysporium was identified as *C. Keratinophilic*.

Isolates of Acremonium was identified as *Acremonium falciform*.

In pet animals' cases, only one isolate of non-dermatophytes molds was recovered and identified as *Scopulariopsis brevicaulis* in percentage of 7.6%.

The prevalence of non-dermatophytes in human in this study was 27% while ***Abdel-Fattah Abdel et al. (2018)*** reported

less prevalence (18.6%). In this study, *Aspergillus spp*. isolates represent 16.3% from total of 55 fungal isolates which agrees with ***Diso et al. (2020)*** who reported that the prevalence of *Aspergillus spp*., was 19.1% among secondary school student in Kano State, Nigeria.

In the current study, dermatophyte infections were more prevalent than non-dermatophytes (45.8% vs 27%) in human samples. While ***El-Fangary et al. (2011)*** reported that non-dermatophytes molds isolated from Tinea pedis, and Onychomycosis were 11.7% & 46.4%, respectively.

In this study, 13 yeast isolates were identified from Human samples in a percentage of 27% and were mainly obtained from onychomycosis with one isolate in percent of (2%) from Tinea Pedis.

Yeasts were identified as *C. albicans* (5), *C. tropicalis* (3), *C. parapsilosis* (3) and *C. krusei* (2) with percentages of 38%,23%,23% and15%, respectively. While in pet animals, two isolates of yeasts were obtained from dermatitis cases and identified as *C. albicans*.

In this study the total identified 15 yeast isolates were recovered (27.2%) which comes in agreement with ***Low et al. (2020)*** who found that the top three pathogenic fungi of superficial mycosis isolated over 10 years from 2008 to 2018 in China were *Trichophyton rubrum, Trichophyton mentagrophytes* and Candida. ***El-Fangary et al, (2011)*** reported that yeasts were isolated from Tinea pedis, and onychomycosis (31.7% and 50%, respectively).

Also ***Araya et al., (2021)*** reported that yeasts were isolated from 12.8% of patients with *C. albicans* as a dominant isolate constituting 37.7% of the total yeast isolates.

Conclusion:

As found in this study, the most prevalent fungi in dermatomycosis in human were dermatophytes 45.8%, followed by 27% of each non-dermatophyte molds and yeasts.

While the most prevalent fungi in case of pet animals' dermatomycosis were dermatophytes with 57% followed by 29% yeasts and 14% non-dermatophytes.

In Tinea capitis, the prevalent etiologies were dermatophytes (*M. canis* 60% and *T. violaceum* 40%). In Tinea corporis the dominant dermatophytes were *T. rubrum* (80%) and *T. mentagrophytes* (20%). In Tinea pedis, the prevalent causative fungi were *T. mentagrophytes* (80%) followed by Yeasts (20%) represented by *C. albicans.* The most prevalent etiologies of onychomycosis were non-dermatophytes (46%) represented by *Aspergillus spp.*

(69%) followed by Yeasts (43%) represented by *C. albicans* and *C. Tropicalis*. Dermatophytes 'incidence was 11% represented by *T. rubrum and T. mentagrophytes*.

While in Pet animals, dermatophytes were represented by *M. canis* which was the major cause of ringworm cases followed by *C. albicans* and finally the non-dermatophyte molds.

Acknowledgment:

My gratitude to Professor Dr. Mohamed Enany, the main supervisor of my study and Professor Dr. Mohamed Taha who adopted all the mycological examination of human and pet animals' samples at his own private mycology laboratory in Cairo.

Also, I would like to recognize Dr. Tarek Allam and Dr. Marwa Elghobary who supplied me with the veterinary samples along the journey of my research.

References:

Abdel Fattah Samy Nermeen, Nayera, M. S., Ahmed, A. A., & Aya, H. E. (2018). Epidemiology and risk factors of superficial fungal infections in toukh primary health care centre. The Egyptian Journal of Hospital Medicine, 72(7), 4898–4902.

Abdel-Hafez, K., Abdel-Aty, M. A., Hofny, E. R. M. M., Hassanien, H. A., Sayed, R. H., Elyazeed, H. S. A., Chakrabarti, A., Bongomin, F., Gago, S., Oladele, R. O., Denning, D. W., Province, B., Rudramurthy, S. M., Shaw, D., Salama A. Ouf, Moriello, K., Araya, S., Abuye, M., Negesso, A. E., … Asz-Sigall, D. (2020). Isolation and Characterization of Some Fungi Associated with Superficial Fungal Infections. The Egyptian Journal Of Experimental Biology (Botany), *16*(1), 1–10. https://doi.org/10.20431/2456-0022.0501003

Diso, S. U., Adam, J. S., Mu'azu, L., Abdallah, M. S., & Ali, M. (2020). Isolation and Characterization of Some Fungi Associated with Superficial Fungal Infections. ARC Journal of Dermatology, *5*(1), 12-16.

Aboueisha, A. M., & El-Mahallawy, H. (2013). Public health significance of dermatophytes in Ismailia and Port Said Provinces, Egypt. Japanese Journal of Medical Mycology, 54(2), 123–129. https://doi.org/10.3314/mmj.54.123

Ahmed, F., Elkholy, I. M., El Mehalawy, A., & Abdou, D. A. M. (2020). Prevalence of onychomycosis due to non-dermatophyte yeasts and moulds in Cairo, Egypt. The Egyptian

Journal Of Experimental Biology (Botany), 16(1), 1–10.

Ameen, M. (2010). Epidemiology of superficial fungal infections. Clinics in Dermatology, 28(2), 197–201. https://doi.org/10.1016/j.clindermatol.2009.12.005

Amer, M., Taha, M., Vet., M., Zeinab Tosson, D., & El-Carf, A. (1981). The Frequency of Causative Dermatophytes in Egypt. International Journal of Dermatology, 20(6), 431–434. https://doi.org/10.1111/j.1365-4362.1981.tb02009.x

Araya, S., Abuye, M., & Negesso, A. E. (2021). Epidemiological characterization of dermatomycosis in Ethiopia. Clinical, Cosmetic and Investigational Dermatology, 14, 83–89. https://doi.org/10.2147/CCID.S292286

Bedaiwy, M., Metwally, M., Elzawawy, N., & saba, H. A. (2017). Epidemiology, Causative Agents and Clinical Features of Onychomycosis in El-Gharbia Governorate. Egyptian Journal of Botany, 0(0), 187–196. https://doi.org/10.21608/ejbo.2017.965.1080

Bitew, A. (2018). Dermatophytosis: Prevalence of Dermatophytes and Non-Dermatophyte Fungi from Patients Attending Arsho Advanced Medical Laboratory, Addis Ababa, Ethiopia. Dermatology Research and Practice, 2018. https://doi.org/10.1155/2018/8164757

El Fangary M, Saudi W, Nabil T, Taha, M. (2011). Prevalence of dermatophytes,yeasts and non-dermatophyte molds isolated from skin,hair and nail fungal infections in 6th october city (pp. 5–10). Journal of Dermatology and Venereology.

Enany, M., Tartor, Y., & Hassan, M. (2017). Incidence of Dermatophytes in Human and Animal Dermatophytosis and Their Isolation by Conventional Methods. Suez Canal Veterinary Medical Journal. SCVMJ, 22(2), 145–154.

Faergemann, J., & Baran, R. (2003). Epidemiology, clinical presentation and diagnosis of onychomycosis. British Journal of Dermatology, 149, 1–4.

Farag, A., Taha, M., & Halim, S. (1994). One-week therapy with oral terbinafine in cases of tinea cruris/corporis. British Journal of Dermatology, 131(5), 684–686. https://doi.org/10.1111/j.1365-2133.1994.tb04983.x

Klich, M. A. (2002). Identification of common Aspergillus species. CBS.

Lakshmanan, A., Ganeshkumar,

P., Raam Mohan, S., Hemamalini, M., & Madhavan, R. **(2015).** Epidemiological and clinical pattern of dermatomycoses in rural India. In Indian Journal of Medical Microbiology (Vol. 33, pp. S134–S136). https://doi.org/10.4103/0255-0857.150922

Low, D. E., Baumgardner, D. J., Wang, X., Ding, C., Xu, Y., Yu, H., Zhang, S., & Yang, C. (2020). Analysis on the pathogenic fungi in patients with superficial mycosis in the Northeastern China during 10 years. Experimental and Therapeutic Medicine, 20(6), 1–1. https://doi.org/10.3892/etm.2020.9411

Nichita, I., & Marcu, A. (2010). The fungal microbiota isolated from cats and dogs. Scientific Papers Animal Science and Biotechnologies, 43(1), 411–414. http://www.spasb.ro/index.php/spasb/article/view/804

Omar.**A.A (2000).** Alexandra infection and carriage .pdf. Eastern Mediterranean Health Journal.

Omar, A. A. (2004). Importance of mycological confirmation of clinically suspected cases of tinea corporis, tinea pedis and tinea cruris. The Journal of the Egyptian Public Health Association, 79 (1–2), 43—58. http://europepmc.org/abstract/MED/16916049

Outerbridge, C. A. (2006). Mycologic Disorders of the Skin. Clinical Techniques in Small Animal Practice, 21(3), 128–134. https://doi.org/10.1053/j.ctsap.2006.05.005

Rai, M., Ingle, A. P., Pandit, R., Paralikar, P., Gupta, I., Anasane, N., & Dolenc-Voljč, M. (2017). Nanotechnology for the Treatment of Fungal Infections on Human Skin. In The Microbiology of Skin, Soft Tissue, Bone and Joint Infections (1st ed., Vol. 2). Elsevier Inc. https://doi.org/10.1016/b978-0-12-811079-9.00019-7

Sayed, H. (2008). Dermatophytes in Animals and Their Zoonotic Importance in Suez Canal Area. Suez Canal Vet. M. J., 13(2), 625–642.

Scorzoni, L., de Paula e Silva, A. C. A., Marcos, C. M., Assato, P. A., de Melo, W. C. M. A., de Oliveira, H. C., Costa-Orlandi, C. B., Mendes-Giannini, M. J. S., & Fusco-Almeida, A. M. (2017). Antifungal therapy: New advances in the understanding and treatment of mycosis. Frontiers in Microbiology, 8(JAN), 1–23. https://doi.org/10.3389/fmicb.2017.00036

Seyedmousavi, S., Bosco, S., De Hoog, S., Ebel, F., Elad, D., Gomes, R. R., Jacobsen, I. D., Martel, A., Mignon, B., Pasmans, F., Piecková, E.,

Rodrigues, A. M., Singh, K., Vicente, V. A., Wibbelt, G., Wiederhold, N. P., & Guillot, J. (2018). Fungal infections in animals: A patchwork of different situations. Medical Mycology, 56, S165–S187. https://doi.org/10.1093/mmy/myx104

Taha, M. (2011). Medical mycology "Atlas of medically important & dermatomycosis." Mecca printing house, Cairo, Egypt.

Taha, M. & Zaghloul, A. B. (2018). Superficial Fungal Infections. August 2018. https://doi.org/10.1007/978-3-319-69422-1(ebook)citations

Yahia, S., I. ElGhareeb, M., & A. Mokhtar, G. **(2021).** Clinico-mycological profile and Antifungal Susceptibility Testing of Dermatophytic Fungi isolated from Clinical Samples in Zagazig University Hospital, Egypt. Egyptian Journal of Medical Microbiology, 30(1), 133–141. https://doi.org/10.51429/ejmm30117

نسبة انتشار الإصابة بالفطريات الجلدية في الإنسان والحيوانات المنزلية في مصر

هنادى حسن كامل[1]، أحمد محمد عبد العظيم[2]، جمال حسن ربيع حسن[3]، محمد السيد عناني[4]، محمد طه محمود[5]

[1] الإدارة العامة للتدريب على تكنولوجيا المعلومات، الجهاز المركزي للتعبئة العامة والإحصاء، القاهرة، مصر

[2]قسم النبات والميكرو بيولوجيا، كلية العلوم، جامعة قناة السويس، محافظة الاسماعلية، مصر

[3]قسم النبات والميكرو بيولوجيا، كلية العلوم، جامعة الزقازيق، محافظة الشرقية، مصر

[4]قسم البكتريا والمناعة والفطريات، كلية الطب البيطري، جامعة قناة السويس، محافظة الإسماعلية، مصر

[5]قسم البكتريا والمناعة والفطريات، كلية الطب البيطري، جامعة الزقازيق، محافظة الشرقية، مصر

الملخص العربى

هدفت هذه الورقة البحثية الى دراسة مدى تسبب الفطريات في حالات العدوى الفطرية السطحية في الانسان والحيوان (التينيا) بأنواعها سواء تينيا الرأس، تينيا الجسم، تينيا القدم، تينيا الاظافر، والقوباء في الحيوانات الأليفة (القطط و الكلاب).

ويؤدى هذا النوع من العدوى الفطرية إلى إذابة طبقة الكرياتين فتؤدى إلى تساقط الشعر (الصلع)

ووجود بثور وتقرحات بالجلد في فروة الرأس. كما تؤدى إلى تشوه الأظافر وتقرحات بين الأصابع في القدم. أما في الحيوان فتظهر الأعراض على شكل حلقات محددة الحافة و لذا تعرف ب (Ringworm) و في الأغلب تكون أماكن العدوى حول العين و الأذن و الرقبة و حول الفم و يتساقط منها الشعر و تظهر بها الالتهابات الجلدية و القشور و يمكن أن تصيب الظلف فيصبح سميك و مشقق و مؤلم للحيوان و قد يكون مصدرا لعدوى الأطفال او المخالطين لها من الانسان حيث انها تندرج تحت مظلة الامراض المشتركة التي تنتقل من الحيوان الى الانسان.

في هذه الدراسة تم الحصول على 60 عينة من حالات عدوى سطحية ،50 من الانسان و 10 من القطط و الكلاب في صورة، شعر، أظافر، كشط الجلد و الأظافر من الانسان و كشط المخالب في حالات الكلاب و القطط. (الاشكال: 1-9)

وقد تم عزل وتصنيف 55 فطر بواقع 48 عينة إيجابية من الانسان و 7 من الحيوانات الأليفة.

و قد خلصت الدراسة الى عزل و تصنيف 3 مجموعات من الفطريات و هي : 26 (47.2%) من مجموعة Dermatophytes و 15 (27.2%) من Yeasts و 14 (25.4%) من Non - Dermatophyte Molds (الجداول 5-6 و الأشكال 10-31)

ووجد ان العدوى الفطرية السطحية فى الانسان تمثل dermatophytes بها 45.8% بينما في الحيوانات الأليفة تمثل 57%. اما Non -dermatophyte Molds and Yeasts فقد كانت نسبة تمثيلهم في العينات المعزولة 27% فقط. و بذلك تكون Dermatophytesهي اكبر مصدر للعدوى الفطرية السطحية في الانسان على الوجه الأعم و لكن تختلف في حالة عدوى الأظافر حيث تأتى Non-dermatophytes بنسبة 46.4%، تليها الخمائر yeastsبنسبة 42.8% ثم dermatophytes بنسبة 10% تقريبا و هذه النسب تمثل مقلوب الهرم.

. اما في حالة الحيوانات الأليفة فإن dermatophytes تسيد الموقف بنسبة 57% متمثلة في *M. canis*، تليها الخمائر بنسبة 28% متمثلة في*C. albicans* ثم Non-dermatophyte Molds بنسبة 14.2%

وعليه فإن نسبة عزل الفطريات من الأمراض السطحية في كل من الانسان والحيوان وصلت الى 91.6% (55 عينة إيجابية من أصل 60).

ان هذه النتائج تضع إنذارا وتنبيها صارما الى إعادة النظر في تكثيف توجيه البحث العلمي لإيجاد حلول للعلاج و الوقاية من حالات الامراض السطحية الفطرية superficial mycosis تكون أسرع في التأثير، اقوى في الفاعلية، اقل في الاثار الجانبية، أكثر مقاومة لتحورات الفطريات ،أكثر اقتصادية و أخيرا و ليس آخرا صديقة للإنسان و الحيوان و البيئة المحيطة.