

Trends in Skin Fungal Infection in Tripoli, Libya, during 2007–2015

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Abstract

Background: Skin infection is common worldwide and continues to rise. This study was undertaken to determine the trends in skin fungal infection in patients attending a tertiary hospital. **Methods:** A total of 253 patients, suspected of superficial and cutaneous skin infections, referred to the Medical Mycology Laboratory of Berussta-Milad Hospital, Libya, were included from attendees over the past 8 years (January 2007–December 2015). Specimens were attained from clinically atypical skin lesions, hair or nail samples of infected patients through scraping. Dermatophyte isolates were identified by studying macroscopic and microscopic characteristics of their colonies. **Results:** Of 253 samples, fungi were detected in 179 (70.8%) by potassium hydroxide, of which 70 (39.1%) samples were *Aspergillus* infection followed by 55 (30.7%) samples which were culture positive of *Trichophyton* spp., 33 (18.4%) samples were isolates of *Candida*, and 21 (11.8%) due to other opportunistic fungi. Patients with the age group of 17–28 years were more affected. **Conclusion:** Skin fungal infections are common there is a need to increase the awareness of risk factors contributing to skin fungal infections. Further larger and more detailed epidemiological studies of fungus-induced dermatophytosis which have public health implication are needed.

Keywords: Dermatophytic, infection, mycosis, skin

INTRODUCTION

Skin fungal infections are fungal diseases that involve the skin, nails, hair, and mucous membrane.^[1] Fungal dermatosis are caused by a heterogeneous group of fungi that have the ability to attack the superficial layers of the skin involve stratum corneum, the outermost layer of the skin, and the high keratin-concentration containing appendages, the hair, and nails of the living host.^[2] Superficial fungal infection can be categorized as dermatophytic and non-dermatophytic fungal infection. Dermatophytic infections, also known as tinea, affect keratinized tissues. Meanwhile, non-dermatophytic fungal contagions involve tinea versicolor, tinea nigra, piedra, and candidiasis.^[3] Dermatophytosis and other superficial and cutaneous fungal infections are still globally regarded as a major health concern.^[4,5]

Fungal skin infection is becoming common in tropical countries such as Libya due to environmental factors such as heat and humidity but often preventable which necessitates early diagnosis, quick treatment to avert complications, and hospitalizations. Notwithstanding their common incidence,

they are often not perceived to be a substantial health alarm.^[6]

According to the World Health Organization, the global incidence of superficial fungal infection has been reported to be 20%–25%.^[7] Studies from different parts of Africa suggest a prevalence of superficial skin fungal infections between 20% and 90%.^[8] In Libya, previous studies have documented rates of skin fungal infections ranging from 4.9% to 52.2%.^[7,9] The variance in occurrence was significantly attributed to differences in climatic and other geographical conditions in the studied areas.^[9]

Skin fungal diseases are rarely lethal, but they pose vast economic and psychological problems for patients. They have

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a major influence on the quality of life, particularly when they result in disability, deformity, and symptoms such as pain, itchiness, and stinging.^[10-12]

Yet, there are very limited data published on the frequency of the skin disease, particularly Tripoli the capital city of Libya. This study was, therefore, designed to determine the prevalence of superficial skin fungal infections among patients attending Berustta-Milad Hospital in Tajoura district, Tripoli, Libya, during 2007–2015.

METHODS

This was a clinic-based descriptive cross-sectional retrospective study conducted during 2007–2015 at the outpatient department of Berustta-Milad Hospital (the largest skin hospital), Tripoli, Libya.

The review of data archives over the past 8 years (January 2007–December 2015), available at the Mycology Laboratory of Berustta-Milad Hospital, provided the demographic characteristics of patients assumed to have skin fungal infections. The specimens were attained from clinically atypical skin lesions, hair or nail samples of infected patients through scraping.

Fresh smears were prepared by with 10% potassium hydroxide and were observed directly under a light microscope as described previously.^[13] The retrieved data involved sex, age, place of residence (i.e., urban and rural areas) type of infection, and lesion site. The epidemiological statistics were recorded in laboratory checklists.

The collected information was evaluated and analyzed, using SPSS version 22 (IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY, USA). Chi-square test was used to compare the collected data. $P < 0.05$ was considered statistically significant.

RESULTS

Of 253 superficial and cutaneous fungal infections in the suspected patients, referred to the Mycology Laboratory of Berustta-Milad Hospital, 179 (70.8%) patients were found to have superficial and cutaneous fungal infections. In a total of 179 patients, 97 (54.2%) were male and 82 (45.8%) were female ($P < 0.001$) [Table 1].

The majority of infected patients were within the age range of 17–28 years (55.3%), and the lowest occurrence of skin infections was reported in the age range of 3–8 years (6.1%). Overall, 142 (79.3%) of the patients exist in urban areas. The most commonly affected area in *Trichophyton* dermatophytic lesions was the scalp (32.7%), while the least affected site was the back region (1.8%). Among *Candida* infections, the most frequently affected region was the nail (63.3%), while the least commonly affected region was the scalp (3.0%). Furthermore, in *Aspergillus* lesions, the most commonly affected regions were the nails (68.6%), whereas the least commonly affected site was the back region (2.8%), as shown in Table 2.

Table 1: Distribution of fungal infections according to gender in patients referred to the mycology laboratory of Berustta-Milad Hospital, Tripoli, over 8 years (2007-2015)

Type of infection	Gender (%)		P
	Male	Female	
<i>Aspergillus</i> dermatomycosis	34 (35)	36 (43.9)	0.075
<i>Trichophyton</i> spp	37 (38.1)	18 (21.9)	
Cutaneous candidiasis	18 (18.5)	15 (18.2)	
Dermatomycosis due to other opportunistic fungi	8 (8.2)	13 (15.8)	
Total	97 (54.2)	82 (45.8)	

DISCUSSION

This clinic-based retrospective cross-sectional study reported the frequency of skin fungal lesions among patients who attended the outpatient department of a skin hospital in Tripoli, Libya. Superficial and cutaneous fungal contagions are among the most extensive groups of mycoses. The occurrence of superficial mycotic infections has expanded over the past few decades.^[5]

Dermatophytic infections are more widespread in the developing and undeveloped countries, and the infection is cumulative in these areas of the world.^[6,14] Despite this fact, studies on dermatophyte infections in Libya are insufficient, and therefore, our aim was to determine the disease pattern and the prevalence of dermatophyte infections in patients attending a tertiary care hospital in Tripoli.

Of all the collected clinical samples from patients with cases of suspected dermatophytosis during the study period, dermatophytes were detected in almost three quarters of the samples. The current incidence rate of culture-confirmed dermatophytic infection was relatively high, compared to previous local studies (Libya) among clinical samples with rates between 52.2% and 4.9%.^[5,15] Nevertheless, a prevalence rate of culture-proven dermatophytic infections of 83.7% has been reported by another local study.^[9] The differences between the two reports rates of dermatophytosis in different studies could result from variances in the lifestyle, socioeconomic situations, risk factors linked with study subjects, and environmental influences of the study area.^[16]

The current study exhibited a high rates of cutaneous and superficial fungal infections in males than females (54.2%, 45.8%, respectively). These findings were similar to those reported by the earlier studies in Zliten, another city in the west of Libya which also revealed a higher prevalence of dermatophytes in males in comparison with females.^[15] In addition, Naseri *et al.* reported a higher prevalence of dermatophytosis in males in comparison with females.^[17] On the other hands, some other studies recorded a higher prevalence of dermatophytes in females than males.^[18-20]

The major clinical manifestations of dermatophytosis differ significantly in different studies described in literature. In

Table 2: Distribution of fungal infections according to the localization of the affected lesion

Type of infection	Nail (%)	Feet (%)	Abdomen (%)	Groin (%)	Back (%)	Scalp (%)	Others (%)	Total (%)
<i>Aspergillus</i> dermatomycosis	28 (40)	3 (4.2)	5 (7.1)	17 (24.2)	2 (2.8)	9 (12.8)	6 (8.5)	70 (39.1)
<i>Trichophyton</i> dermatophytes	13 (23.6)	10 (18.1)	2 (3.6)	7 (12.7)	1 (1.8)	18 (32.7)	4 (7.2)	55 (30.7)
Cutaneous candidiasis	21 (63.3)	3 (9.1)	-	2 (6.0)	-	1 (3.0)	6 (18.2)	33 (18.4)
Dermatomycosis due to other opportunistic fungi	7 (33.3)	9 (42.8)	-	2 (9.5)	-	3 (14.2)	-	21 (11.8)

a study conducted in Tripoli city of Libya, tinea versicolor, *Candida albicans*, and *Trichophyton violaceum* were the major etiological agents isolated.^[6] A similar study conducted in Sabha, Libya, in 2012 by Altayyar^[9] revealed that *Aspergillus* spp. (52.47%), *Penicillium* spp. (22.27%), and *Candida* spp. (16.3%) were the most common clinical manifestation. Another survey of dermatophytosis in Tripoli conducted by Al-Dwibe *et al.*^[21] revealed that *Tinea* spp. and *Candida* spp. were the predominant clinical manifestations. Others surveys conducted outside Libya revealed similar findings. A study conducted in Egypt and Ethiopia depicted that *Tinea* spp. and *Candida* spp. were the most frequent clinical manifestations. In our study, *Aspergillus* spp. and *Trichophyton* spp. were the main clinical manifestations involving 39.1% and 30.7% of the total cases of dermatophytosis, respectively, followed by *candida* spp. (18.4%). Our finding in this regard was compatible with the results of others.^[6,9,21]

Two classes of dermatophyte, *Trichophyton rubrum* and *Trichophyton interdigitale*, are the most common causes of most onychomycosis. Nevertheless, the infectious agents are not only dermatophytes but also yeasts and molds of the genus *Candida*.^[22] Phudang *et al.*^[23] performed a recent epidemiological survey in 2019 of superficial fungal diseases in India showed that *Trichophyton* and *Candida* were the frequency of superficial. Our results showed that *Trichophyton* dermatophytes were responsible for 30.7% of all superficial fungal diseases, while molds of the genus *Candida* were in 18.4% of the cases.

Globally, the incidence of superficial and cutaneous fungal infections has recently upraised, making these fungal infections the most frequently encountered infections. In overall, the etiological agents and main infection sites differ depending on the environmental factors and geographical area.^[24]

CONCLUSION

This study has reported the prevalence of culture-confirmed dermatophytic skin infections, which was considerably high. The current study has also showed that *Aspergillus* spp. were the dominant clinical manifestation involving 39.1% of the entire cases of dermatophytosis. Of the whole number of 179 dermatophyte isolates, 30.7% was accounted for by *Trichophyton* spp. followed by the mold of *Candida* spp. by 18.4%. More focus should be given to enhancing hygiene status and living environments to diminish the risk of skin infection. Therefore, it seems essential to emphasis on the prevention and

control of such infections. Despite experiments on infected skin is demanding, new knowledge of onychomycosis would be beneficial in improving diagnosis and ideal therapeutic prescription. Heath education programs are essential for averting and controlling the diseases, with the aim to decline long-term morbidity and the socioeconomic impact.

Authors' contribution

Concept and design data collection and/or processing: Abdulsalam Ashour; analysis and/or interpretation: Najla Elyounsi; writing and critical reviews: Ahmed Attia.

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Conflicts of interest

There are no conflicts of interest.

Compliance with ethical principles

This study was approved by the ethical committee of University of Tripoli, Tripoli, Libya.

REFERENCES

- Kelly BP. Superficial fungal infections. *Pediatr Rev* 2012;33:e22-37.
- Weitzman I, Summerbell RC. The dermatophytes. *Clin Microbiol Rev* 1995;8:240-59.
- Narasimhalu CR, Kalyani M, Somendar S. A cross-sectional, clinico-mycological research study of prevalence, aetiology, speciation and sensitivity of superficial fungal infection in Indian patients. *J Clin Exp Dermatol Res* 2016;7:1-10.
- Pakshir K, Hashemi J. Dermatophytosis in Karaj, Iran. *Indian J Dermatol* 2006;51:262-264.
- Havlickova B, Czaika VA, Friedrich M. Epidemiological trends in skin mycoses worldwide. *Mycoses* 2008;51 Suppl 4:2-15.
- Ellabib MS, Khalifa Z, Kavanagh K. Dermatophytes and other fungi associated with skin mycoses in Tripoli, Libya. *Mycoses* 2002;45:101-4.
- World Health Organization. Epidemiology and management of common skin diseases in children in developing countries. Geneva: World Health Organization; 2005. Available from: <http://WHO/FCH/CAH/05>. [Last accessed on 2019 Jun 27].
- Nweze EI, Eke IE. Dermatophytes and dermatophytosis in the eastern and southern parts of Africa. *Med Mycol* 2018;56:13-28.
- Altayyar I. Opportunistic pathogenic fungi from the dust in Sebha medical centre, Libya. *Sebha Med J* 2012;11:87-93.
- Villa L, Krishna G. Epidemiology and prevalence of dermatological diseases among schoolchildren of Medak district, Telangana. *Int J Med Sci Public Health* 2016;5:1475-8.
- Jain S, Barambhe M, Jain J, Jajoo U, Pandey N. Prevalence of skin diseases in rural Central India: A community-based, cross-sectional, observational study. *J Mahatma Gandhi Inst Med Sci* 2016;21:111-5.
- Ramamuthie G, Verma RK, Appalasamy J, Barua A. Awareness of risk factors for skin infections and its impact on quality of life among adults in a Malaysian City: A cross-sectional study. *Trop J Pharm Res* 2015;14:1913-7.

13. Kurade SM, Amladi SA, Miskeen AK. Skin scraping and a potassium hydroxide mount. *Indian J Dermatol Venereol Leprol* 2006;72:238-41.
14. Teklebirhan G, Bitew A. Prevalence of dermatophytic infection and the spectrum of dermatophytes in patients attending a tertiary hospital in Addis Ababa, Ethiopia. *Int J Microbiol* 2015;2015:653419.
15. Arshah T, Al-Bakosh A, Ali M, Ramadan H, Alshawish S, Algonady M, *et al.* Epidemiology of superficial fungal skin infections in patients attending Zliten teaching hospital. *J Humanities Appl Sci* 2015;27:83-93.
16. Ameen M. Epidemiology of superficial fungal infections. *Clin Dermatol* 2010;28:197-201.
17. Naseri A, Fata A, Najafzadeh MJ, Shokri H. Surveillance of dermatophytosis in Northeast of Iran (Mashhad) and review of published studies. *Mycopathologia* 2013;176:247-53.
18. Balakumar S, Rajan S, Thirunalasundari T, Jeeva S. Epidemiology of dermatophytosis in and around Tiruchirapalli, Tamil Nadu, India. *Asian Pacific J Tropical Dis* 2012;2:286-9.
19. Rassai S, Feily A, Sina N, Derakhshanmehr F. Some epidemiological aspects of dermatophyte infections in Southwest Iran. *Acta Dermatovenerol Croat* 2011;19:13-5.
20. Maraki S, Nioti E, Mantadakis E, Tselentis Y. A 7-year survey of dermatophytoses in Crete, Greece. *Mycoses* 2007;50:481-4.
21. Al-Dwibe H, El-Fergani N, El-Zurghany A, Sharfiddin S, Khalifa Z. Superficial fungal infection among patients with immune bullous diseases. *Libyan J Med Sci* 2017;1:16-7.
22. Monod M, Méhul B. Recent findings in onychomycosis and their application for appropriate treatment. *J Fungi* 2019;5:20.
23. Phudang R, Vasant P, Jayanthi S. Clinico-mycological study of dermatophytosis and dermatomycosis in tertiary care hospital. *Int J Curr Microbiol App Sci* 2019;8:1297-306.
24. Zarrin M, Poosashkan M, Mahmoudabadi A, Mapar M. Prevalence of superficial fungal infection in primary School Children in Ahvaz, Iran. *Maced J Med Sci* 2011;4:89-92.

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