

Survey of dermatophytic fungal infections in Thi-Qar proviance

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Abstract

Objective Dermatophytoses spread world wide and caused by pathogenic filamentous fungi which infect skin, hair, and nails. The study aimed to determine the frequency and state of skin fungal infections in Nasiriyah city/ South of Iraq.

Methods The samples under study were including: hair, Skin and nail fragments that collected from 500 patients with suspected dermatophytosis from private clinics during 2021, Fungal infections were detected according to standard diagnostic techniques.

Results Dermatophytes infection was detected in 51 patients (10.2%), the frequency of dermatophytes was higher in males (68.63%) than females (31.37%), the incidence of fungal infection was 64.71% in urban areas, when compared with rural areas, fungal infection in the scalp (tinea capitis) was more frequent, followed by face and arm of the patient's body.

Conclusion Fungal skin infections have high frequency among dermatological diseases especially in male and urban area with high frequency of tinea capitis infection.

Key words

Dermatophytes; Deramptophytosis; Clinical samples; Human skin infections.

Introduction

Dermatophytoses spread in approximately 25% of the world population. Dermatophytoses are caused by pathogenic filamentous fungi that generally cause superficial infections. These filamentous fungi feed on keratinized substrates such as skin, hair, and nails.¹ The prevalence of dermatophytes is environmentally influenced by humidity, rainfall, temperature, environment light, climate, chemical composition in soil and pH.² However, dermatophytes are more prevalent in warm and humid regions such as Iraq than colder regions.³

There are several ways in which dermatophytes can be directly transmitted from person to person. Dermatophytes can spread from other humans (anthropophilic organisms), or it is transmitted from animals to humans (zoophilic organisms) or the infection may be acquired from the soil (geophilic organisms). Dermatophytes is also transmitted indirectly by contaminated objects such as polluted hairbrushes or hats (fomites).⁴

Many studies confirmed the occurrence of dermatophytosis in human of every age, race and gender.^{5,6} Skin infections spread over large areas of the human body if the patient suffers from immunodeficiency due to diabetes or other chronic diseases. It can penetrate deep layers of the skin such as dermis and hypodermis (Faway *et al.*, 2018).⁷ Dermatophytosis is considered a problematic infections in worldwide and

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especially in southern of Iraq.⁸ This study was aimed to survey dermatophyte infections in warmer region of Iraq, which is Thi-Qar province depending on standard diagnostic method by KOH (10%).

Methods

The samples under study were including: hair, skin and nail fragments that collected from 500 patients with suspected dermatophytosis from private clinics in Al-Nasiriyah city/South of Iraq during 2021. All patients were carefully assessed clinically by specialists, their age ranging from one to sixty-five years.

Direct microscopic examination was performed using potassium hydroxide (KOH) 10% for skin and hair samples and 20% of KOH for nail samples. A 50µL of descriptive agent was added to the portions of specimen on a clean microscopic slide. After 20 min, the wet preparation from skin or hair was examined for the determination of fungal components and their diagnostic morphology for example hyphae, whereas the nail sections were studied microscopically after one day for the same purposes.⁹

The bacterial isolation and identification were performed by using standard bacteriological techniques.¹⁰

Results

More than 500 patients with superficial infections were examined in this study. All patients had clinical symptoms of different dermatophytosis (**Figures 1,2**). Dermatophytes infection was confirmed in 51 patients (10.2%) by KOH examination. The frequency of Dermatophytes infection was higher in males (68.63%) than females (31.37%). However, when comparing on the basis of age groups, we

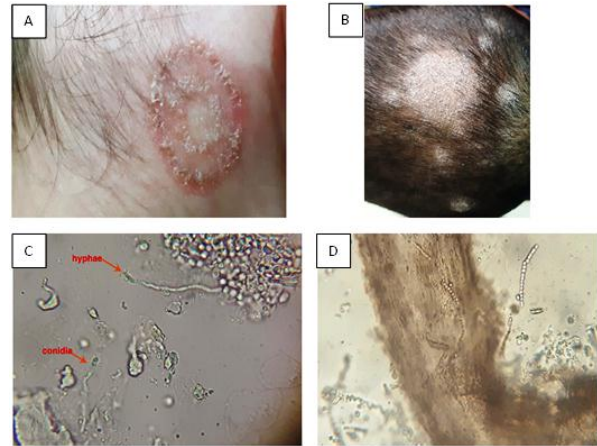


Figure 1 A & B symptoms of fungal infections in patients, C & D fungal elements in hairs sample.

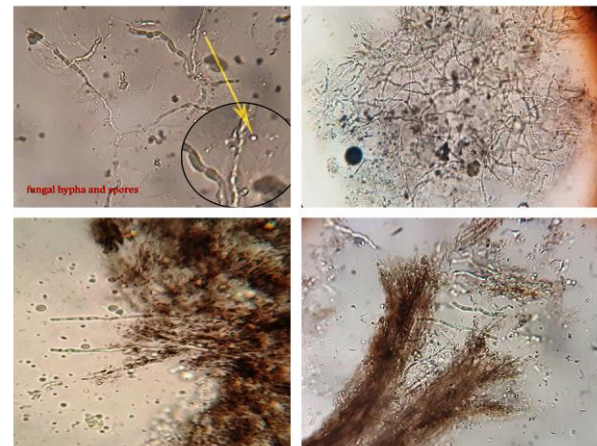


Figure 2 Fungal elements in various samples collected from patients

found that the incidence of infection was higher in females with young age groups compared to extreme age groups in males (the elderly and children) (**Figure 3**).

The frequency of chronic fungal infection was 21.57% of the total Dermatophytes infections, which is a low percentage compared to the frequency of non-chronic infections (78.43%). On the other hand, the frequency percentage of both spores and hypha in a fungal infection was greater than the presence of hyphae alone, based on direct microscopic examination. Moreover, statistically, there was a very strong correlation between the presence of both spores and hypha with chronic infection of the fungi, while there

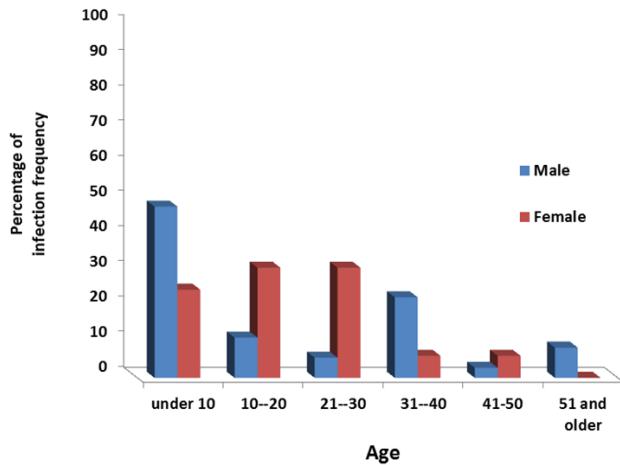


Figure 3 Percentage of fungal infection frequency depending to gender and age of patients. (Male=68.63%, Female=31.37%)

Table 1 Correlation test among the presence hypha, spores and chronic infections using tools in SPSS software

	Spore with hypha	Hypha
Hypha		
Pearson Correlation	0.345*	
Sig. (2-tailed)	0.013	
Chronic		
Pearson Correlation	-0.385**	-0.021
Sig. (2-tailed)	0.005	0.881
N	51	51

*. Correlation is significant at the 0.05 level (2-tailed).
 **. Correlation is significant at the 0.01 level (2-tailed).

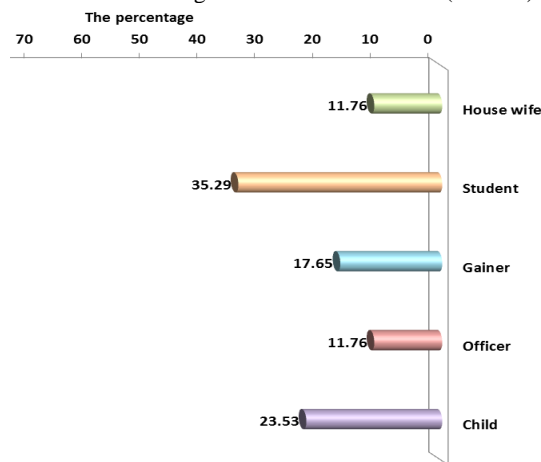


Figure 4 Distribution of fungal infections according to jobs of patients.

was no relationship between the chronic infection and the presence of the fungi in the form of hyphae alone in infection site (**Table 1**).

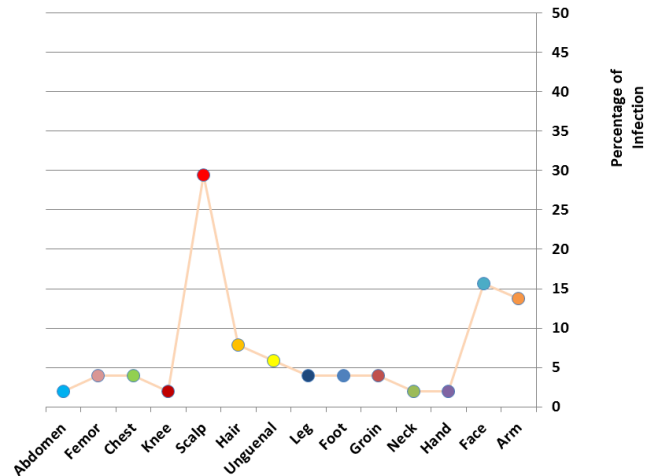


Figure 5 Distribution of fungal infections according to infection sites.

According to the patient's occupation, we found that the frequency of fungal infection was higher for students and children, compared to people who have other professions (**Figure 4**). The frequency of fungal infection was not affected by whether the patient has history of fungal infections because the infection percentage was high regardless of the patient's history for fungal infections. Fungal infection in the scalp (tinea capitis) was more frequent, followed by fungal infection in the face and arm of the patient's body. While, the frequency of fungal infection was very low in other body parts (**Figure 5**).

The incidence of fungal infection was 64.71 for patients in urban areas, which was higher than the incidence of infection (35.29) for patients in rural areas. The incidence of fungal infection increases in the unmarried compared to the married patients, according to the data in the current study (**Table 2**).

Discussion

This study was designed to investigate the superficial skin infections in Thi-Qar governorate during the period 2021. Five hundred patients had clinical symptoms of the skin infections but with KOH examination,

Table 2 all data in percent values calculated based on positive samples (51 samples).

	Spore	Hypha	Chronic	History	Bacteria	Urban	Rural	Marital
Positive	64.71	49.02	21.57	42.29	21.57	64.71	35.29	33.33
Negative	31.37	25.49	78.43	153.79	78.43	0.00	0.00	66.67

dermatophytosis was confirmed in only 51 patients (10.2 %) by the presence of true hypha or fungal spores. This is considered a negative indicator that coincides with the three epidemic infections (corona virus infections, hemorrhagic fever and cholera infections). This is confirmed by the previous studies that skin infections occur as secondary infections in immunocompromised patients.¹¹ In other hand, Patients with certain skin diseases, especially superficial fungal infections and psoriasis, may be more susceptible to COVID-19.¹²

Although the detection of skin infections by the potassium hydroxide method is considered one of the traditional techniques,¹³ it is still used globally and achieves clear results in the rapid detection of skin infections with filamentous fungi (Kurade *et al.*, 2006).¹⁴

Thi-Qar governorate located in the southern part of Iraq and characterized with a hot and humid climate in summer and mild winter. These environmental conditions encourage the prevalence of dermatophytes as well as other factors such as age, gender and lowering of immunity system.³ The continuous infection by dermatophytosis become chronic infection.¹⁵ An increase in the incidence of chronic skin infection may lead to an increase in strains resistant to antifungals due to the continuation of treatment for long periods.¹⁶ Thus, the fungi in their forms, spores and hyphae acquired additional strength in penetrating the skin layers to become invasive and disseminated dermatophytes.¹⁷ This was confirmed by the current study, through a strong statistics correlation between the presence of fungal elements (hyphae and spores) at the sites of infection and chronic fungal infection.

Immunocompromised patients and young persons are more susceptible to dermatophytes infections^{6,18} This is in agreement with the results of the current study, the highest percentage of dermatophyte infection have been recorded at elderly men followed by young ages.

The highest incidence of tinea capitis was recorded compared to other parts of the body, and this is consistent with many previous studies.¹⁹⁻²¹ There are various conflicting opinions regarding the sexual dominance of tinea capitis which may be attributed to hairdressing and styling practices such as tight braiding, scalp shaving, curling and the use of hair oils that may promote transmission of the disease.²¹ Dermatophyte infections were most prevalent in persons inhabit in urban areas compared to rural areas. This was in agreement with previous study which indicated that urban areas are the most suitable reservoirs for dermatophytes influenced by environmental factors close to humans (Pontes *et al.*, 2013).²

Conclusion

This study conducted that the fungal skin infections have high frequency among dermatological diseases especially in male and urban area with high frequency of tinea capitis infection.

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