Journal of Environmental Studies [JES] 2016.15: 59-66

Original Paper

Mycological study on skin diseases in Taiz City,Yemen

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Rec. 13 Aug, 2016 Accept. 27 Sept, 2016

Abstract
In this study, the dermatophytic infections in patients referred to Department of Dermatology, AL-Gotham Hospital, Taiz, during May 2013 to May 2014 were examined. The direct microscopic examination was positive in 67.3 % of the cases.Tinea capitis was the commonest fungal disease (48 cases out of 150) followed by tinea versicolor (46) and tinea corporis (38). Males were more affected by these diseases than females. The majority of tinea capitis (85.42%) and tinea corporis (47.4 %) was in the age group of 1 to 15 years. Culturing of specimens yielded 10 fungal species and the common dermatophytes were *Trichophyton violaceum* and *Microsporum canis*. *Candida* spp. (including *C. albicans*) were associated with 46.2 % of tinea pedis. The prevalence of various superficial mycotic infections in this study seemed to be associated with socioeconomic, sanitary and hygienic conditions in Taiz that are generally poor and substandard.

Keywords: Dermatophytes, fungal infection, Tinea, Yemen.

Introduction

Superficial mycoses are infections of skins, hairs and nails caused by dermatophtes, yeast and non- dermatophtes molds (Seebacher *et al*., 2008; Miklic *et al*., 2010). Dermatophtes are fungal agents of dermatophtosis and named after anatomic localization of lesions (Behzadi *et al.,* 2014: Sharma *et al.*, 2016). Dermatophtes including 3 genera; *Trichophton*, Microsporumand *Epidermophyton* (Weitzman & Summerbell, 1995).

According to their habitats, these fungi are classified into anthropophilic, zoophilic and geophilic. Geophilic fungi grow on keratin present in the soil and derived from human and/ or animal keratin of its debris. Zoophilic fungi are parasites of animal keratin, and anthropophilic fungi digest human keratin (Gupta *et al.*, 2003; Sageeraban *et al.*, 2011; Chaudhary and Kumar, 2016).

Malassezia and *Candida* spp. are among the yeasts that cause skin infections. *Malassezia*spp., the agents of superficial mycosis, are strictly lipophilic and parts of the normal microbiota of the skin and scalp (Ruiz and Zaitz, 2001; Zeinali *et al.*, 2014). Although without keratinolyic activity, these species live on the skin around the hair and use epithelial debris or waste products as energy sources for development (Oliveira *et al.*, 2006; Chiacchio *et al.*, 2014).

Many studies on superficial mycoses in different parts of the world have confirmed that host susceptibility may be enhanced by moisture, warmth, specific skin chemistry composition of sebum and perspiration, age, heavy expourem genetic predisposition, use antimicrobial, Immunosuppressive drugs as well as the emergence of AIDS, has been reported as predisposing factors of the increased incidence of dermatophytoses

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(Silveira- Gomes *et al.*, 2013; Murtaza *et al.*,2013; Kantarcioglu *et al.*,2015; Rouzaud *et al.* 2016).

In Taiz City, there were no studies dealing with the occurrence, incidence or prevalence of dermatophytosis among population. Thus, this study was designed to determine the diversity of dermatophytes responsible for different types of tinea, the nature of the etiological agents according to age and gender in patients visiting the dermatology clinic in Taiz city.

Materials and Methods

Collection of samples:

150 samples of skin scrapings and hair roots from patients clinically suspected for skin and hair infections, which were attending to Dermatology and Venereology outpatient clinic at AL-Gotham hospital were collected during the period from May 2013 to May 2014, The infected area were thoroughly cleaned with 70% ethanol cotton swabs to remove dirt and contaminants, then after drying, skin scrapings were collected from the active edge of the lesions with sterilized scalpel blade. In Tinea capitis, a scalpel may be used to scrape scales and excavate small portions of the hair root. The samples were transferred to the Mycological Laboratory, Microbiology Department, Faculty of Science, Taiz University, for fungal analysis as following:

1- Direct Microscopic Examination:

The samples were treated with an aqueous solution of 10 % potassium hydroxide (KOH) and examined under microscope to see mycelium and/or arthrospores in skin scales (Panasiti *et al.,* 2006) or either ectothrix or endothrix infection of hair (Ayaya *et al.*, 2001).

2- Culturing and isolation of the causal agents:

A portion of each sample was also cultured on Sabouraud dextrose agar supplemented with chloramphenicol (0.5 mg/ml) and cycloheximide (0.5 mg/ ml) to prevent the growth of bacteria and fast-growing fungi respectively. All cultures were incubated at 28C° for up to four weeks.

3- Identification of the causal agents:

Identification was based on macroscopic and microscopic examination of culture isolates. The microscopic examination of fungal growth was observed with lactophenol cotton blue stain. Nature of mycelium and conidia formation (macro - and microconidia) helped to differentiate various genera and species. Fungi were identified according to the keys of Kwon- Chung and Bennett (1992); Milne (1996); Collee *et al.* (1996); Kane *et al.* (1997); Irene and Richard (1998); De Hoog *et al.* (2002) and Burns *et al.* (2010).

Budding yeast cells of *Candida* spp. were identified microscopically. *Candida* species were classified as *albicans* and non- *albicans* group by the production of chlamydospores on corn meal agar and germ tube formation. *Malassezia* spp. were identified using direct microscopic examination.

Results:

In the current study, the total number of examined patients was 150, of which, 86 were males (57.3%) and 64 were females (42.7%), aged 1-60 years old. There are 59 (39.3%) patients aged 1-15 years, 19 (12.7%) aged 16-30 years, 45 (30%) aged 31-45 years and 27 (18%) aged 46- 60 year (Table 1).

Among patients, Tinea capitis (32%) was the predominant clinical followed by tinea versicolor (30.7 %), Tinea corporis (25.3%), tinea pedis (8.7%), and tinea cruris (3.3%). The direct microscopic examination of skin and hair samples showed fungal elements (hyphae, spores or yeast cells) in 67.3% of total cases (Table 1).

Clinical diagnosis of diseases	No. of cases	%	Sex				Age group by years								Direct microscopic examination	
			male		female		1-15		16-30		31-45		46-60		+ve cases	% of +ve cases
			N	%	N	%	N	%	N	%	N	%	N	%		
Tinea capitis	48	32.0	26	54.2	22	45.8	41	85.4	4	8.3	-	-	3	6.2	36	75.0
Tinea versicolor	46	30.7	30	65.2	16	34.8	-	-	6	13.0	33	71.7	7	15.2	40	86.9
Tinea corporis	38	25.3	21	55.3	17	44.7	18	47.4	9	23.7	7	18.4	4	10.5	19	50.0
Tinea pedis	13	8.7	5	38.5	8	61.5	-	-	-	-	3	23.0	10	76.9	4	30.8
Tinea cruris	5	3.3	4	80.0	1	20	-	-	-	-	2	40.0	3	60.0	2	40.0
Total No. of cases	150		86	57.3	64	42.7	59	39.3	19	12.7	45	30.0	27	18.0	101	67.3

Table (1): Distribution of skin mycotic diseases in Taiz city according to sex, age, number and percentage of positive cases shown by direct microscopic examination**.**

Culturing of dermatophytic samples on Sabouraud's dextrose agar revealed the isolation of 10 fungal species belonging to 6 genera (Table 2). *T. violaceum* was the commonest dermatophyte isolated from 46 (44.2 %) cases followed by *M. canis* from 22 (21.2%), *T.rubrum* from 7 (6.7%), *T. verrucosum* from 6(6.7%), *E. floccosum* from 6 (5.8 %), *T. mentagrophytes* from 3 (2.9%) and *M. gypseum* from 2 (1.9%). Non-dermatophytic moulds were isolated from 5 cases. *Candida* spp. appeared in 6 cases representing 5.8 % of total cases.

Clinical diagnosis	Tinea capitis		Tinea corporis		Tinea cruris		Tinea pedis		Total cases	
Organisms	I	I%	I	I%	I	I%	I	I%	I	I%
Epidermophyton floccosum (Harz*)* Langeron&Milochevitach	-	-	2	5.3	4	80.0	-	-	6	5.8
Microsporum canis Bodin	10	20.8	12	31.6	-	-	-	-	22	21.2
M.gypseum (Bodin)	-	-	2	5.3	-	-	-	-	2	1.9
*Trichophyton mentagrophytes(*Robin)Blanchard		-	3	7.8	-	-	-	-	3	2.9
*T. rubrum(*Castellani*)* Semon	3	6.3	1	2.6	1	20.0	2	15.4	7	6.7
T. verrucosum Bodin	2	4.2	5	13.2	-	-	-	-	7	6.7
T. violaceum Sabouraud	33	68.7	13	34.2	-	-	-	-	46	44.2
*Fusarium solani(*Martins)Saccardo	-	-	-	-	-	-	3	23.0	3	2.9
Geotrichum candidum Link	-	-	-	-	-	-	2	15.4	2	1.9
Candida albicans(Robin)Berkhout	-	-	-	-	-	-	2	15.4	2	1.9
Candida spp.	-	-	-	-	-	-	4	30.8	4	3.9
Number of species	4		7		2		4		10	

Table (2): Incidence (I) and percentage incidence (I%) of fungi in the different mycotic diseases.

Discussion:

Dermatophytosis cannot be easily diagnosed on the basis of clinical manifestations as a number of other conditions mimic the clinical presentation (Richardson and Warnock, 2003). The etiology and frequency of dermatomycoses vary with changes in geographic and climatic conditions, different living habits and life style (Kantarcioglu *et al.,* 2015).

In this study, superficial fungal infections wer more frequently in males than females (57.3 % versus 42.7%). Our findings are in agreement with studies of dermatophytosis in Iran (Falahati *et al*., 2003), and India (Kumaran and Jeya, 2014). Moreover, there are many studies showed higher infection

among males such as: Hitendra *etal*. (2012); Murtaza *et al.* (2013); Hashemi *et al.* (2014); Jain *et al.* (2014). On the other hand several investigation showed more infections among females than males (Abanmi *et al*., 2008; Silveira – Gomes *et al*., 2013; Chiacchio *et al*., 2014).The reason for these variations is not fully understood, but it indicates that gender may influence susceptibility to particular form of tineas (Aghamirian and Ghiasian, 2007; Allaham *et al.*, 2011).

According to the current results, the incidence of superficial fungal infections caused by dermatophytes was more frequently seen in children aged 1-15 years than in other age groups. Many studies are in agreement with our finding (Ramakrishnaiah *etal.*, 2014; Mayorga *et al*, 2016). Tinea capitis was the main clinical type encountered and accounted 32% of all infections, more prevalent in males (54.2%) than in females (45.8 %) and its highest prevalence was in children before the age of 15 year. This is in accordance with studies of Shukla *et al*. (2013); Thakur (2013) and Adel *et al.* (2014). The reason for this has been mainly endorsed to sensitivity of dermatophytes to certain fatty acids secreted from sebaceous glands that appear at puberty. The higher incidence rate observed in adult postmenopausal women is due to hormonal changes which result in a reduction of sebaceous secretions (Frangoulis *et al.*, 2005).

In Taiz city, the large family size, contact with infected animals and infected children, and sharing of towels, clothing and hair accessories may lead to spread of dermatophytes.

In this survey the anthropophilic *T. violaceum* was reported to be the main causative organism of tinea capitis (68.7%) and was the major etiologic agent of tinea corporis (34.2%). In this respect, *T. violaceum* has been detected as the most prevalent species of dermatophytic infections in several Asian countries, including Saudi Arabia (Venugopal and Venugopal, 1992), Iran (Lari *et al*., 2005; Jahromi and Khaksar, 2006), Nepal (Jha *et al*., 2006), Pakistan (Ansari & and Siddiqui 2006) as well as in African countries such as Libya (Ellabib, *et al.* 2002), Kenya (Chepchirchir *et al.*, 2009) and Egypt (Amer *et al*., 2014). Sporadic cases of *T.violaceum* infection are reported in America (Magill *et al*., 2007), Australia (Marleu and Andrew, 1997), Europe (Valari *et al*., 2012).

M. canis was the second common causal agent of tinea corporis (31.6%) and tinea capitis (20.8%). *M. canis* was the most commonly isolated dermatophyte species recorded in Kuwait (Adel *et al*., 2007), Iraq (Al-Hmadani *et al.*, 2014), Palestine (EL-Khair, 2014), Italy (Cervetti *et al*., 2014), Saudi Arabia (Alseikh, 2009), Egypt (Azab *et al*., 2012) and Nigeria (Ndako *et al.*, 2012). The incidence of *M.canis* infection in our study had recorded from patients with histories of animal contact. Such result confirm the scientific fact that the *M. canis* is a zoophilic fungus (Cafarchia *et al.*, 2011; Mohammed, 2013; Yin *et al*., 2013).

Tinea versicolor was recorded in 46 cases, of which 30 were males (65.2%) and 16 were females (34.8%). Similar finding was recorded in previous studies (Rahman *et al.*, 2011; Zeinali *et al*., 2014). In this study, most cases of *Malassezia* spp. infection occurred in age group 31-45 year. A possible explanation is that, because of the lipophilic nature of this yeast and post-puberty hormonal stimulus inherent in this age group, there is stimulation of sebaceous glands accompanied by an increase in fat content of skin, which serves as asbstrate for the fungus. Thse results are in agreement with those reported in the literature (Furtado *et al.* 1997; Oliveria *et al.* 2002; Chiacchio *et al.* 2014).

Tinea pedis was more frequently in females over 45 years (76.9%) and *Candida* spp. was often the most associated with these cases. This finding concurred with those of the results of Abbas, *et al.* (2012), Elfekih *et al*. (2012) and Manjula and Parameswari (2016).

Tinea cruris was found in 5 cases, *Epidermophyton floccosum* was isolated in 4 cases and *T. rubrum* in one case. *E. floccosum* was reported as the main causal agent of tinea cruris in Egypt (Moubasher *et al.*, 1993); Iran (Shahindokht and Khaksari, 2009) and Saudi Arabia (Alsikh, 2009).

Conclusion:

The spectrum of various fungi causing skin mycosis has not been documented from Taiz

City. Therefore, the present study was undertaken to describe the prevalence and distribution of various fungal isolates causing skin mycosis.Tinea capitis was the most common dermatophytosis followed by tinea corporis. They were mainly caused by the anthropophilic *T. violaceum.* The zoophilic dermatophyte*M.canis* ranks next in frequency, which reflects the degree of contact between the human and animal populations. The geophilic dermatophyte *M. gypseum* was isolated from clinical specimens, confirming the frequent contact with environment.

The present study provides data that are valuable for determination of superficial mycoses among the population in Taiz city. These data provide a preiminary an assessment of the prevalence and etiological profiling of the infections. This could help in the estimation of the problem more accurately in the future and thence in the prevention of spread of superficial mycoses. Moreover, awareness of the preventive measures regarding public health and maintenance of personal hygiene could reduce the incidence of these mycoses.

References:

Abanmi, A., Bakheshwain, S., El Khizzi, N., Zouman, A.R., Hantirah, S., Al Harthi, F., Al Jamal, M., Rizvi, S.S., Ahmad, M. and Tariq, M. (2008). Characteristics of superficial fungal infections in the Riyadh region of Saudi Arabia. Int. J. Dermatol., 47: 229–235.

Abbas, A.K., Mohammed, Z.A. and Mahmoud, I.S. (2012). Superficial fungal infections. Mustansiriya Medical Journal, 11(1): 75-77.

Adel, A.A.R., Sultan, A., Basmiah, and *et al.* (2007). Prevalence of tinea capitis in Southern Kuwait. Mycoses, (50): 317-320.

Adel, E., Mohammed, H.S.S. and Asghar, F. (2014). Tinea capitis in primary and middle school students in south-east of Iran. Science Journal of Public Health, 2(3): 205-208.

Aghamirian, M.R. and Ghiasian, S.A. (2007). Dermatophytoses in outpatients attending the dermatology center of Avicenna Hospital in Qazvin, Iran. Mycoses, 51: 155–160.

Al-hmadni, A.H., Al-dhalimi, M.A. and alrufae, M.M. (2014). Epidemiology study of dermatophytosis in Al-Najaf government. Magazin of Al-Kufa University for Biology, 6 (1): 1-14.

Allaham, N., Abdelateef, N. and Naieem, M. (2011). Dermatophytosis among outpatients in Gaza particularly tinea capitis. Journal of Al Azhar University-Gaza (Natural Sciences), 13: 17-30.

Alsheikh, H. (2009). Epidemiology of dermatophytes in the eastern province of Saudi Arabia. Res. J. Microbiol., 4(6): 229-234.

Amer, M., Refai, M., Hegazi, A. and Rashid, A. (2014). Dermatophytosis in Egypt with special reference to immunological studies on patients with *Trichophyton violaceum* infection. Biotechnol. & Biotechnol. Eq., (9)4: 52-54.

Ansari, F. and Siddiqui, S.A. (2006). Prevalence of dermatophytic infection in Karachi, Pakistan. Pak. J. Bot., 38(3): 833-836.

Ayaya, S.O., Kamar, K.K. and Rakai, R. (2001). Etiology of tinea capitis in school children. East Afr. Med. J., 78: 531-535.

Azab, M.M., Mahmoud, N.F., Abdallah, S. and *et al.* (2012). Dermatophytes isolated from clinical samples of children suffering from tinea capitis in Ismailia, Egypt. Australian Journal of Basic and Applied Sciences, 6(3): 38-42.

Behzadi, P., Behzadi, E. and Ranjba, R. (2014). Dermatophte fungi: infections, diagnosis and treatment. S. M. U. Medical J., 1(2): 50-62.

Burns, T., Breathnach, S., Cox, N. and Griffiths, C. (2010). Rook's Textbook of Dermatology.Vol 2, 8th ed. Blacwell publishing .22:1814-1829.

Cafarchia, C., Figueredo, L.A., Coccioli, C., Camarda, A. and Otranto, D. (2011): Enzymatic activity of *Microsporum*

canis and *Trichophytonmentagrophytes* from breeding rabbits with and without skin lesions. Mycoses, 55: 45–49.

Cervetti, O., Albini, P., Arese, V. and *et al.* (2014). Tinea capitis in adults. Advances in Microbiology, 4:12-14.

Chaudhary, J.K. and Kumar, A. (2016). A clinico-mycological profile of dermatophytosis at a tertiary care hospital in Bihar. Int. J. Curr. Microbiol. App.Sci., 5(2):181-189.

Chepchirchir, A., Bii, C. and Ndinya-Achola, J.O. (2009). "Dermatophyte infections in primary school children in Kibera Slums of Nairobi." East African Medical Journal, 86 (2): 59–68.

Chiacchio, N.D., Silva, C.S., Madeira, C.L. and Fernandes, l.H.G., Humair, C.R. and Reis, A.l.D. (2014). Superficial mycoses at the hospital do Servidor Publico Municipal de Sao Paulo between 2005 and 2011. An. Bras. Dermatol., 89(1): 67-71.

Collee, J.G., Fraser, A.G., Marmion, B.P. and Simmons, A. (1996). Practical medical microbiology. 14th ed., vol. 1. Churchill Livingstone.

De Hoog, G.S., Guarro, J., Gene, J. and Figueras, M.J. (2002). Atlas of clinical fungi. 2nd ed. Utrecht/Reus: Centra albureau voor Schimmel cultures.

Elfekih, N., Belghith, I., Trabelsi, S. and *et al*. (2012). Epidemiological and etiological study of foot mycosis in Tunisia. Actas Dermosifiliogr., 103(6):520-524.

Ellabib, M .S., Khalifa, Z. and Kavanagh, K. (2002). Dermatophytes and other fungi associated with skin mycoses in Tripoli, Libya. Mycoses, 45:101–104.

El-Khair, E.K.A., Taleb, M.H., Albasyony, L. and Khoder, N. (2014). Tinea capitis in north Gaza strip- Palestine. Asian J. Dermatol., 6(1):1-15.

Falahati, M., Akhlaghi, L., Lari, A.R. and Alaghehbandan, R. (2003). Epidemiology of dermatophytosis in an area south of Tehran, Iran. Mycopathologia, 156:279-287.

Frangoulis, E., Papadogeorgakis, H., Athanasopoulou, B. and Katsambas, A. (2005). Superficial mycoses due to *Trichophytonviolaceum* in Athens, Greece. A 15-year retrospective study. Mycoses, 48:425-429.

Furtado, M.S.S., Cortez, A.C.A. and Ferreira, J.A. (1997). Pitiriase versicolor/em Manaus. Amazonas, Brasil. An. Bras. Dermatol., 72:349-351.

Gupta, A.K., Chaudhry, M. and Elewski, B. (2003). Tinea corporis, Tinea cruris, Tinea nigra, and piedra. Dermatol. Clin., 21: 395-400.

Hashemi, S.J. Qomi, H.A., Bayat, M. and Haghdost, I.S. (2014). Mycoepidemiologic study of superficial and cutaneous fungal zoonotic disease in patients who referred to skin clinic of Arak. Euro. J. Exp. Bio., 4(1):5-8.

Hitendra, B.K., Dhara, M.J., Nidhi, S.K. and Hetal, S.S. (2012).A study of superficial mycoses with clinical mycological profile in tertiary care hospital in Ahmedabad, Gujarat. Natl. J. Med. Res., (2):160-164.

Irene, W. and Richard, C.S. (1998). Clinical microbiology reviews: The dermatophytes, American Society for Microbiology, 8: 240–259.

Jahromi, S.B. and Khaksar, A.A. (2006). Aetiological agents of tinea capitis in Tehran (Iran). Mycoses, 49:65-67.

Jain, N., Sharma, M., Sharma, M. and Saxena, V.N. (2014). Spectrum of dermatophytoses in Jaipur, India. Afr. J. Microbiol. Res., 8(3): 237-243.

Jha, B.N., Garg, V.K. and Agrawal, S. and *et al.* (2006). Tinea capitis in eastern Nepal. Int. J. Dermatol., 45(2): 100-102.

Kane, J., Summerbel, R.C., Sigler, L.,Krajden, S. and Land, G. (1997). Laboratory handbook of dermatophytes. Sarpubl., Belmont.

Kantarcioglu, A.S., Guney, N., Kiraz, N. and *et al.* (2015). Causative agents of superficial mycoses in outpatients attending cerrahpasa medical faculty hospital, in Istanbul,Turkey (01 April

2010 – 01 June 2014). J.Turk. Acad. Dermatol., 9(1):159-162.

Kumaran, G. and Jeya, M. (2014). Clinico mycological profile of dermatophytic infections. Int. J. Pharm. Bio. Sci., 5(2):1-5.

Kwon-Chung, K.J. and Bennett, J.E. (1992). Medical mycology. Philadelphia, Lea and Febinger. London, PP:105-155.

Lari, A.R., Akhlaghi, L., Falahati, M. and Alaghehbandan, R. (2005). Characteristics of dermatophytoses among children in an area south of Tehran, Iran. Mycoses, 48:32–37.

Magill, S.S., Manfredi, L., Swiderski, A. and *et al*. (2007). Isolation of *Trichophyton violaceum* and *Trichophyton soudanense* in Baltimore, Maryland. J. Clin. Microbiol., 45:461-465.

Manjula, V. and Parameswari, K. (2016). Epidemiological characteristics of patients with infection by Microsprum canis. Dermatol. Rev. Mex., (60):18-23.

Marleu, M. and Andrew, P. (1997). Tinea due to *Trichophyton violaceum* in Victoria, Australia. Aust. J. Dermatol., 38:124-128.

Mayorga, J., Gonzalez, P.L.E., Trillo, A.P. and *et al*., (2016). Clinical and epidemiological characteristics of patients with infection by Microsporum canis. Dermatol., Rev. Mex.,(60):18-23.

Miklik, P., Skerlev, M., Budimcic, D. and Lipozenc, I.C. (2010). The frequency of superficial mycoses according to agents isolated during a ten-year period (1999-2008) in Zagreb area, Croatia. Acta. Dermatovenerol. Croat. 18(2):92-98.

Milne, L.J.R. (1996). Fungi. In: Practical medical microbiology, by Collee, J.G., Fraser, A.G., Marmion, B.P. and Simmons, A. (eds). Longman Singapore Publishers Ltd, pp: 695 – 717.

Mohammed, S.J. (2013). Dermatophytes isolated from dogs suspected of dermatophtosis in Baghdad city. Diyala Journal for Pure Sciences, 9(4):61-66.

Moubasher, A.H., El-Naghy, M.A., Maghazy, S.M. and El-Gendy, Z. (1993). Prevalence and distribution of some dermatophytosis in relation to age and sex of patients in Minia, Egypt. The Korean J. Mycology, 21(2):133-139.

Murtaza, M., Rajainthran, S. and George, B. (2013). A mycological study of superficial mycoses at the skin clinic in Sabah, Malaysia. Int. J. Pharm. Sci. Invention, 2(3): 45-48.

Ndako, J.K., Osemwegie, O.O., Spencer, T.H.I. and *et al.* (2012). Prevalence of dermatophytes and other associated fungi among school children. Glo. Adv. Res. J. Med. Med. Sci. 1(3):49-56.

Oliveira, J.A., Barros, J.A., Cortez, A.C.A. and Oliveira, J.S.R.L. (2006). Superficial mycoses in the City of Manaus/AM between March and November/2003. An. Bras. Dermatol., 81(3):238-243.

Oliveira, J.R., Mazocco, V.T. and Steiner D. (2002). Pitiriase versicolor. An. Bras. Dermatol., 77:611-618.

Panasiti, V., Borroni, R.G., Devirgiliis, V., Rossi, M., Fabbrizio, L., Masciangelo, R., Bottoni, U. and Calvieri, S. (2006). Comparison of diagnostic methods in the diagnosis of dermatomycoses and onychomycoses. Mycoses, 49:26–29.

Rahman, M.H., Hadiuzzaman, M., Jaman and *et al.* (2011). Prevalence of superficial fungal infections in the rural areas of Bangladesh. Iran. J. Dermatol., 14:86-91.

Ramakrishnaiah, Y., Reddy, S., Bagyalakshmi, R. and *et al*. (2014). Mycology profile of dermatophyte infection in rural area. Indian J. Medical, Cases Reports, 3(1):78-81.

Richardson, M.D. and Warnock, D.W. (2003). Fungal infection, diagnosis and treatment, 3rd ed. Blackwell Publishing UK. pp. 38 – 43.

Rouzaud, C., Hay, R., Chosidow, O. and *et al.* (2016). Severe dermatophytosis and

acquired or innate immunodeficiency: A review. Journal of Fungi, 2(4):1-13.

Ruiz, L.R.B. and Zaitz, C. (2001). Dermatophytes and dermatophytosis in the city of Sao Paulo, from August 1996 to July 1998. An. Bras. Dermatol., 76:391-401.(In text. list 2001)

Sageeraban, O.O., Malini, A., Oudeacoumar, P.U. and dayashankar, C. (2011). Onychomycosis due to *Trichosporonmucoides*. Indian J. Dermatol. Venereol. Leprol., 77(1): 76-77.

Seebacher, C., Bouchara, J.P. and Mignon, B. (2008). Updates on the epidemiology of dermatophyte infections. Mycopathologia, 166:335-352.

Shahindokht, B.J. and Khaksari, A.A. (2009). Epidemiological survey of dermatophytosis in Tehran, Iran, from 2000 to 2005. Indian J. Dermatol. Venereol. Leprol., 75(2):142-147.

Sharma, B., Dutta, P., Bhaskar, G. and Bhaskar, N. (2016). A case report of recurrent tinea cruris and tinea corporis. Int. J. Adv. Res. Biol. Sci., 3(1): 259-265.

Shukla, P., Yaqoob, S., Shukla,V. and *et al.* (2013). Prevelance of superficial mycoses among outdoor patients in a tetiary care hospital. Nat. J. Medl. All. Sci., 2(2):19-26.

Silveira-Gomes, F., Oliverira, E.F., Nepomuceno, L.B. and *et al.* (2013). Dermatophytosis diagnosed at the Evandro Chagas Institute, Para, Brazil. Braz. J. Microbiol., 44 (2): 443-446.

Thakur, R. (2013). Tinea capitis in Botswana. Clin. Cosmet. and Investig. Dermatol., 6:37-41.

Valari, M., Stathi, A., Petropoulou, T. and *et al.* (2012). Cases of tinea capitis due to pale isolates of *Trichophyton violaceum* (*Trichophyton glabrum*) in south-east Europe. A challenge to the clinical laboratory. Medical Mycology Case Reports, 1:66-68.

Venugopal, P.V. and Venugopal, T.V. (1992). Superficial mycoses in Saudi Arabia. Aust J. Dermatol., 33: 45-48.

Weitzman, I. and Summerbel, R.C. (1995). The dermatophytes. Clin. Microbiol. Rev., 8:240-259.

Yin, B., Xiao, Y., Ran, Y. and *et al.* (2013).*Microsprum canis* infection in three familial cases with tinea capits and tinea corporis. Mycopathologia, 176:259-265.

Zeinali, E., Sadeghi, G. and Yazdinia, F. (2014). Clinical and epidemiological features of the genus *Malassezia* in Iran. Iran J. Microbiol., 6(5):354-360.

الملخص العربي

دراسات فطرية للأمراض الجلدية في مدينة تعز– اليمن

يهدف هدا البحث الى دراسة الإنتشار الفطري للإصابات الجلدية الفطرية بمحافظة تعز – اليمن. **تمت الدراسة في الفترة من** مايو ٢٠١٣ الي مايو ٢٠١٤. أثبت فحص الحالات أن تينيا الرأس هي الأكثر شيوعاً **وتمثل ٤٨ حالة من** ١٥٠حالة ثم جمعها تليها تينيا متعددة الألوان (٤٦) فتينيا الجسم (٣٨). وجد أن الاعمار الأكثر إصابه تتراوح بين **١- ١٥ سنوات وذلك في حالة** تينيا الرأس (٨٥,٤٢ %) وتينيا الجسم (٤٧,٤ %) **وأن الذكور أكثر إصابة من الإناث**. أظهر الفحص الميكروسكوبي **المب**اشرللعينات أن ٦٧,٣ % من الحالات موجبة للفطريات في حين أن زراعة العينات على الوسط الغذائي أظهرت ١٠ **أنواع** فطريه وكان فطر تريكوفيتون فيولاسيوم وميكرو سبورم كانس وتريكوفيتون ربرم. وكنت أكثر الفطريات شيوعاً في حين كانت فطرة الكانديدا أكثر تواجداً في حالة الإصابة بتينيا القدم ٧.٦% .