



## Prevalence of dermatophytic fungal infections at Al-Kindi Hospital in Baghdad

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**Background:** Dermatophytes are types of fungal infections affect skin, nails and hairs. These infections are predominant in moist and warm climate by which the growth of these organisms are sustained.

**Aim:** find out the prevalence of dermatophytic infection among patients attending dermatological outpatient clinic at Al-Kindi Hospital in Baghdad.

**Result:** *Tinea .pedis* was the most predominant clinical presentation reported in 31% of the sample.

### Introduction:

Dermatophytosis (tinea) infections are groups of filamentous fungal infections caused by dermatophytes (Martinez *et al*, 2012; Weitzman Summerbell, 1995), these superficial skin infections require keratin for growth so they infect only the stratum corneum, nails, and hair shafts (Robinson, 2012; Hainer, 2003). Dermatophytes comprise of three major genera, Trichophyton, Microsporum and Epidermophyton (Kaufman *et al*, 2005), transmission can occurs through direct contact with infected persons, fomites , animals or soil (Hay, 1995).

Dermatophytes are described according to preference of the host and natural habitat into “anthropophilic” species which mostly infect humans, zoophilic species that infect non-human mammals and geophilic (soil) which infect both humans and animals , Anthropophilic types are the most common sources of infections (Bonifaz *et al* , 2010). Clinically the dermatophytes infections can classify according to site into “*tinea capitis*” (infect scalp) , “*tinea pedis*” (feet) , “*tinea manuum*” (hands) , “*tinea unguium*” (or onychomycosis , nail), “*tinea barbae*” (Beard area) , “*tinea cruris*” (Groin), “*tinea corporis*” (Body including trunk and arms) (Hainer, 2003).

Dermatophytes infection have been reported worldwide; with the passage of time the epidemiology, incidence , distribution, etiology and target hosts are vary from one location to another ; some factors as geographic location, predominant climate (temperature, humidity, wind etc.) , wearing of dirty and pungent clothing , overcrowding , sports activities , immigration, environmental hygiene , low socioeconomic status , poor medical care, have great implication for their proliferations (Havlickova *et al*, 2008 ; Chowdhry *et al* , 2013) .

Infection with cutaneous tinea appear as central clearing which enclosed by an active border of redness and scaling, which gives rise to the more common name, “*ringworm*” (Hainer, 2003; Goldstein *et al* , 2000). Location of the infection is essential point in recognizing dermatophytes since only keratinized tissue are invade (no mucosal involvement) (Hainer, 2003).

### Material & Methods:

#### Collection of specimens

The study was conducted on a sample of forty-five patients showing lesions typical of dermatophytes infection on different part of the body (head, hand, body and feet) based on the clinicians’ preliminary diagnosis from outpatient department of dermatology at Al –Kindi Hospital during a period from August 2016- December 2016, both males and females patients with age ranging from (1-50) year were included in the study. Patient with history of chronic



diseases or under immunosuppressive therapy had been excluded from the study. Patients with bacterial infection or fungal in the skin folds and nails such as paronychia etc. were excluded. Ethical issue for conducting the study approved from Director of outpatient clinic with verbal consent from the patients. Information from patients were taken including age, sex, playing habit, socio-economic status and association with domestic animals.

### Culture and Microscopic Examination

After identification of the infected sites, cleaning of the lesion with 70% alcohol. Collection of samples were done by scrapings the edge of the skin lesion; the infected hair is collected through plucking with sterile forceps. In nail infection; samples were collected by clippings along with subungual debris. Scrapping was taken from the edge of the lesion using sterile razor blade.

Samples were divided into two parts; the first one used for microscopic examination by applying 10-40% KOH with a cover slip then sample was warmed for 5 minutes over a flame (Hainer, 2003) in which the slide was examined for the existence of fungal hyphae then cultured of the second part of the sample on “sabourauds dextrose” agar which slopes with “chloramphenicol (0.05%) and cycloheximide (0.05%)” (Ajello *et al*, 1966). Incubation of the cultures at 25<sup>0</sup>C for 4-6 weeks was done. Checking of the culture done twice a week for the existence of the growth.

Fungal isolates were examined visually and microscopically. Macroscopically by examining rate of the growth, morphology of the colony and pigment production. Microscopic examination done with “lactophenol cotton blue mount” for the existence, arrangement and shape of macro or micro-conidia. Tests like urease test and “hair perforation” test, had been done for differentiation of dermatophyte species (Weitzman & Summerbell, 1995).

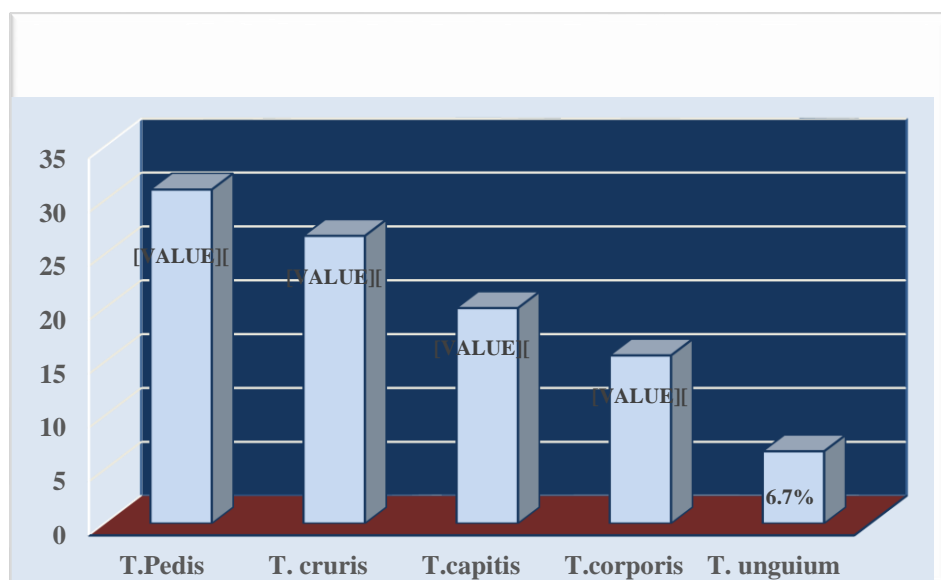
### RESULTS:

From the whole forty – five patients included in the study, higher rate of Dermatophytes infections found in male (60%) than in female (40%) with more occurrence of infection within age group (21-30) and (31-40) years. Table (1)

**Table (1): Distribution patients according to age and gender**

Gender	Age in years					Total
	<=10	11-20	21-30	31-40	41-50	
Male	5	2	9	7	4	27 (60%)
Female	4	3	5	4	2	18 (40%)
Total	9	5	14	11	6	45

The current study showed that *Tinea .pedis* was the most predominant clinical presentation reported in 31% percent of the sample followed by *Tinea cruris* (26.7 %) and *Tinea capitis* (20%) Figure (1).



**Figure (1)**  
**Clinical presentation of dermatophytes infections among the studied sample**

Infection with *T. pedis* and *T. capitis* found in higher percentage among age groups (21-30) and (31-40) years respectively while *T. capitis* showed more in children aging 10 years and below. Table (2)

**Table (2): Distribution of dermatophytes species according to the age**

Clinical presentation	Age in years					Total
	<=10	11-20	21-30	31-40	41-50	
<i>T. pedis</i>	-	2	7	3	2	14 (31%)
<i>T. capitis</i>	7	2	-	-	-	9 (20%)
<i>T. corporis</i>	2	1	3	1	-	7 (15.6%)
<i>T. cruris</i>	-	-	3	6	3	12 (26.7%)
<i>T. unguium</i>	-	-	1	1	1	3 (6.7%)
<b>Total</b>	9(35.6%)	5(13.3%)	14(22.2%)	11(17.8%)	6(11.1%)	45(100%)

Results also revealed that *Trichophyton rubrum* was the main etiological agent isolated in (44.4 %) of the patient followed by *Trichophyton mentagrophytes* (17.8%) , *Trichophyton tonsurans* (15.6%) , *Microsporum canis* and *Epidermophyton floccosum* (8.9%) then *Trichophyton verrucosum* (4.4%) . Table (3).

**Table (3): Dermatophytes species isolated in patients with dermatophytes**

Dermatophyte species	No.	%
<i>Trichophyton tonsurans</i>	7	15.6
<i>T. rubrum</i>	20	44.4
<i>Microsporum canis</i>	4	8.9
<i>T. mentagrophytes</i>	8	17.8
<i>T. verrucosum</i>	2	4.4
<i>Epidermophyton floccosum</i>	4	8.9
<b>Total</b>	45	100



### Discussion:

Dermatophytosis have been recorded all over the world but vary in distribution and target hosts from one location to another. Geographic location, overcrowding, climate as temperature, humidity, wind ; also health care, environmental hygiene culture, immigration, and socioeconomic conditions have been considered as major factors for these variations.

In this study, males had higher percentage of dermatophytes than female (60% versus 40%), similar findings have been reported by Al-Kayalli *et al* , 2011 and Mohammed *et al*, 2013 , Surich & Sunite , 2014 and Bhatia & Sharma, 2014; but it in contrast with studies of (Balakumar *et al* , 2012; Teklebirhan & Bitew , 2015) ) which reported that females were more affected. The reason behind that may be attributed to the fact the male had more outdoor exposure, more physical work which increased sweating furthermore; males have less cosmetic consciousness compared to females. (Kumar *et al* , 2007)

As clinical manifestations of dermatophytosis vary considerably in different studies , the current study showed that *Tinea pedis* and *Tinea cruris* then *Tinea capitis* were the common forms of clinical manifestations ; same finding reported by ( Sarika *et al* , 2014) . A study conducted in Diyala revealed that *Tinea corporis* was the most predominant dermatophytic infection (23.8%) (Al-Kayalli *et al*, 2011) while that in Baghdad, showed that *Tinea capitis* was the commonest one with (47.5%) incidence (Mohammed *et al*, 2013).

In India, Ramaraj *et al* , 2016 ; found that *Tinea corporis* was the predominant clinical type (63.27%) and *Tinea cruris* was the next one (13.86%).

It had been found that the Common age affected by *Tinea pedis* and *Tinea cruris* in this study was (21-30) and (31-40) year. The reason for this may be due to increased level of physical activity in these particular age groups that leads to excessive sweating which favors the growth of dermatophytes ( Kumar *et al* , 2007). Wearing socks and shoes for a long period providing excessive moisture and sweating, occlusive foot wear, or frequent usage of public showers and pools may enhanced the infections with *Tinea pedis* while using of tightly worn synthetic clothes particularly in males provide damp conditions resulting in increased humidity and temperature of the body which makes skin as a suitable growth for *Tinea cruris* ( Venkatesan *et al* , 2007; Sarika *et al* , 2014).

*Tinea capitis* was predominant clinical presentation among children ( $\leq 10$  year) in this study; similar results by (Peerapur *et al* , 2004) and Bindu (Bindu , 2002) , this is because , *Tinea* is directly transmitted by contact with infected person or animals as well as infectivity occur through contamination of fomites or soil (Andrew's & Burns , 2008) , Infection also occur as result of frequent shaving of the scalp , sharing combs, caps ,brushes, and pillows among children ( Hay *et al* , 1996). The scope of *T.capitis* is decrease with increasing age due to changes in post puberty hormones that results in acidic sebaceous gland secretions (Philpot , 1997).

*Trichophyton rubrum* is the common species isolated in the studied patients . Incidence of *Trichophyton rubrum* has increased significantly in Asia as in Europe (Hayette & Sacheli, 2015). Some strains of *T.rubrum* have higher capacity to spread than others in socially and economically developed countries; in addition; evolution of the life-style which remarkable by more widespread travel (economic migration and mass tourism), increased use of public sports facilities and increased ownership of companion animals, all these are contributing factors in the development of dermatomytosis (Male, 1990).





### Conclusions:

Higher rate of *Dermatophytes* infections found in male within age group (21-30) and (31-40) years, *Tinea pedis* was the most predominant followed by *Tinea cruris* and *Tinea capitis* which found more in children aging 10 years and below. *Trichophyton rubrum* was the main etiological agents isolated in this study.

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