# The effect of risk factors and etiology on the distribution of clinical cases with dermatomycoses

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**ABSTRACT:** The common cases of skin infections are dermatophytoses which included different clinical types. Aim of this study was evaluated the effect of risk factors such as age, gender, residency, chronic diseases and existence of domestic animals. In addition to identification of dermatophytic species by direct microscopic examination and cultured on Sabouraud`s Dextrose Agar (SDA). Shows through the results that have been reached for clinical samples to 91 sample (46.66%) out of 195 samples were positive by direct microscopic examination, while the number of positive samples in culture 132 sample (67.69%). Tinea corporis was the most common (43.07%) of dermatophytoses, formed all kinds of Tinea exception of Tinea capitis ratio infected in females higher than in males. Also, all kinds of Tinea given a larger proportion of the infection of patients who live in rural areas from who live in urban areas. The highest rate of Tinea were in the age group 31-40 years. That most of the pathological cases of dermatophytoses associated with lack of chronic diseases of the 195 cases only 26 (13.33%) were infected with chronic diseases. The dominant species of fungus isolated was *E. floccosum* (34.84%).

**KEYWORDS:** Clinical samples, Dermatophytoses, Tinea, Risk factors, Direct microscopic examination.

## INTRODUCTION

Dermatomycoses were the common human diseases in which increased significantly in recent years, however that these diseases are not life threatening, but they are among the most prevalent diseases in the world and that cost millions of dollars to treat, According to Gräser *et al*., (2008) that more than 500 million dollars annually is spent worldwide for drugs targeted against dermatophytoses, while some sources pointed out that in the United States alone, about more than 400 million dollars spent annually to treat dermatophytoses (Gaedigk *et al*. 2003; Jackson *et al*.,2006; White & Henn, 2007; Achterman and White, 2012). And therefore cause economic and public health problems together (Mirzahoseini *et al.*, 2009).

Although dermatophytoses is a nonfatal condition and not life threatening , this may have significant clinical consequences such as secondary bacterial infection, chronicity, disfigurement and therapeutic difficulties often necessitating long-term treatment, in addition to serving as a reservoir of infection especially onecomycosis (Malik *et al*., 2009; Yamaguchi *et al*.,2009).

Although the penetration of tissue by the dermatophytes is usually quite superficial, adsorption of products from the fungi such as proteases leads to sensitization of the host, an event that is manifested by specific delayed hypersensitivity and other sorts of allergic responses especially zoophilic and geophilic dermatophytes are responsible for quite severe inflammatory reactions (Howard *et al*., 2003; Zuzarte *et al*., 2011).

The diseases caused by anthropophilic dermatophytes are commonly mild, while those caused by zoophilic dermatophytes are mostly sever and more inflammatory (Refai *et al*.,2013). This diseases can appear in different anatomical

areas of the body, so are classified according to the body areas that are affected such as Tinea capitis, Tinea coporis, Tinea cruris, Tinea pedis, Tinea unguium, Tinea faciei and others (Nejad *et al*., 2007).

The aim of our study was to evaluate the risk factors and etiology effected on the dermatophytoses in clinical cases based on assess the prevalence of age and gender, the site of lesion, residency, existence of domestic animals and presence of chronic disease.

## MATERIAL AND METHODS

### SAMPLES COLLECTION

A total of 195 specimens were collected from patients with dermatophytoses which including 60/195 (30.76%) specimens from male and 135/195 (69.23) specimens from female who clinically diagnosed by dermatologist. There are three types of specimens as follow: 20(10.25%) nails clips, 23(11.79%) hair fragment and 152(77.94%) skin scraps. The characteristics of the patient such as age, gender, the site of lesion, residency, existence of domestic animals and presence of chronic disease were collected in advance forms.

### DIRECT EXAMINATION AND CULTURE TEST

For direct microscopic examination, specimens were mounted in 10% potassium hydroxide (KOH), for identification of dermatophytes were cultured on Sabouraud`s Dextrose agar (SDA) with chloramphenicol and cycloheximide and cultured at 26˚C for up to 4 weeks. The identification of fungal agents were based on macro- and micromorphological characteristics. In addition, fungal identification was confirmed by the in vitro hair perforation test, urease production in Christensen's medium and vitamin requirements in Trichophyton agar media (Kannan *et al*, 2006).

Statistical analysis was performed by using the chi-square test to find the significant correlation at ($p< 0.05$) level .

## RESULTS AND DISCUSSION

The results of routine examinations revealed that 78/195 (40%) specimens were positive in both direct examination (KOH) and culture, 54/195 (27.69%) specimens were positive in culture and negative in KOH, and 13/195 (6.66) specimens were negative in culture and positive in KOH, while the specimens of negative in both direct examination and culture were 50/195 (25.64) (Figure 1).

Our results of routine examinations were consistent with the results of other workers (Kannen *et al*., 2006; Madhavi *et al*., 2011), the negative result of direct examination or culture may be due to little of specimens volume or the patients previously treated with antibiotics or take specimen from center of lesion which acquired local immunity but must be taking from margin of lesion and others reasons (Miline,1996; Cortez *et al*., 2012), also the low positivity in direct examination of Tinea unguium is because of nail specimen take long time to dissolve and fungal element may not release and high positivity in culture could be due to use of selective media which does not allowed contaminates to grow (Mathur *et al*., 2012).
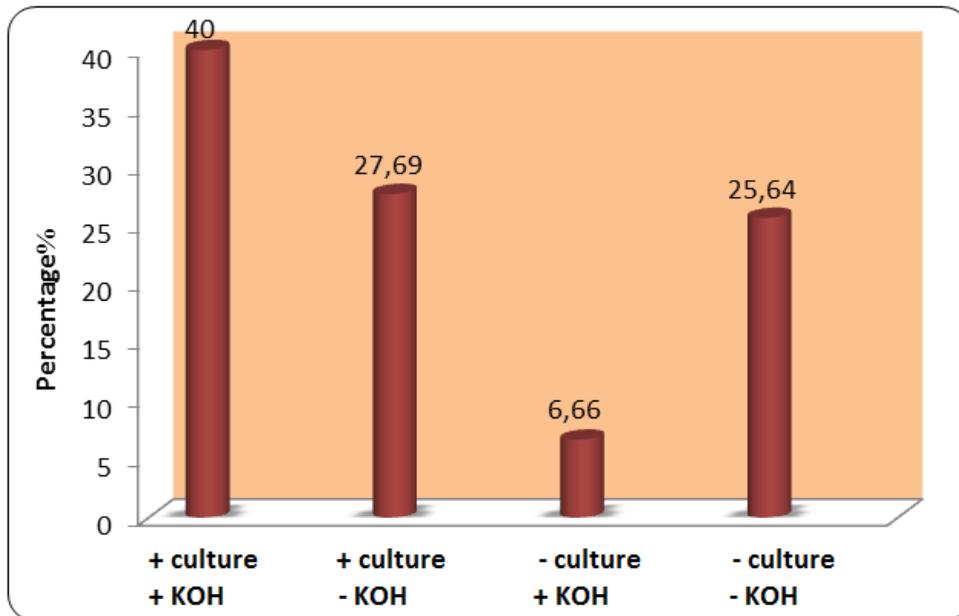
*Figure (1): Infection  percentage of the direct examination and culture results*

In this study Tinea corporis is the most common clinical form of dermatophytoses (43.07%) followed by T. cruris (18.46%), T. capitis (11.76%), T. unguium (10.25%), T. faciei (8.71%), T. manum (4.61%) and T. pedis (3.07%) respectively (Figure 2). These results were consistent with the other studies (Ellabib & Khalifa , 2001; Mathur *et al*., 2012; Prasad *et al*, 2013) which showed that tinea corporis often have occupied the first place of dermatophytoses.
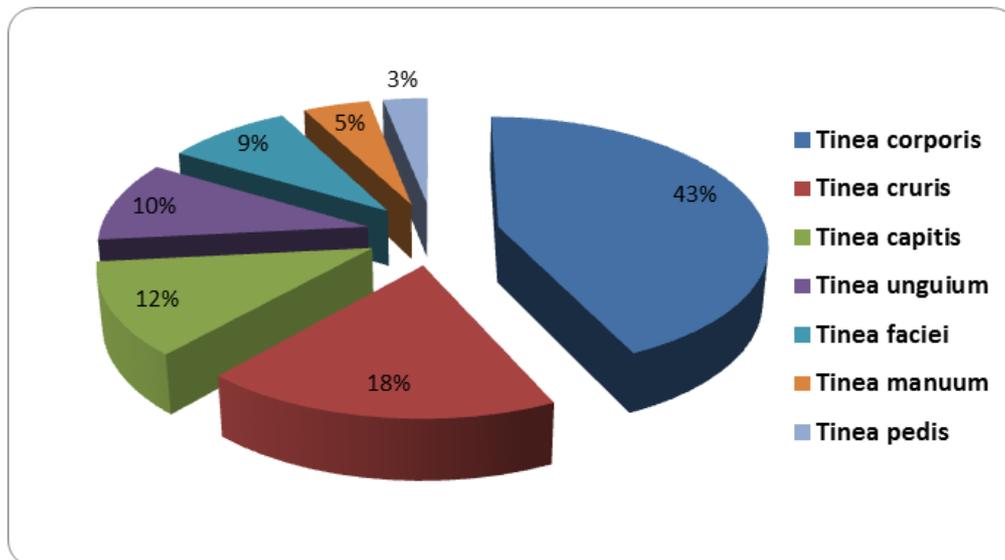


*Figure (2): Percentage of clinical cases of dermatophytoses*

According to the patients age it was found that statistically significant effect (P< 0.05) on the distribution of dermatophytoses, The results exhibited that the age 31-40 years had the highest frequency 50/195 (25.6%), while age group ≥ 60 years recorded the lowest frequency 2/195 (1.02%), the results was agreement with Pique *et al*. (2002) who found the highest frequency of dermatophytoses in age 30-40 years while the lowest frequency in age more than 70 years. The higher incidence in young males could be due to greater physical activity and increased sweating (Peerapur *et al*., 2004). And the reason for less infection in higher ages can be justified as cellular immunity system perfection and the skin fatty acid augmentation (Nejad *et al*., 2007).

*Table (1): Distribution of dermatophytosis patients according to age*

| Clinical type | Age (year) | | | | | | | Total No.(%) |
|---|---|---|---|---|---|---|---|---|
| | ≤ 10 (%) | 11-20 (%) | 21-30 (%) | 31-40 (%) | 41-50 (%) | 51-60 (%) | ≥ 60 (%) | |
| Tinea corporis | 8 (4.1) | 16 (8.2) | 25 (12.8) | 24 (12.3) | 5 (2.56) | 5 (2.56) | 1 (0.51) | 84 (43.07) |
| Tinea cruris | 3 (1.53) | 6 (3.07) | 8 (4.1) | 10 (5.12) | 7 (3.58) | 2 (1.02) | _ | 36 (18.46) |
| Tinea capitis | 19 (9.74) | 2 (1.02) | _ | 1 (0.51) | 1 (0.51) | _ | _ | 23 (11.79) |
| Tinea unguium | _ | _ | 8 (4.1) | 8 (4.1) | 1 (0.51) | 3 (1.53) | _ | 20 (10.25) |
| Tinea faciei | 4 (2.04) | 4 (2.04) | 2 (1.02) | 3 (1.53) | 2 (1.02) | 2 (1.02) | _ | 17 (8.71) |
| Tinea manuum | 1 (0.51) | 2 (1.02) | 1 (0.51) | 3 (1.53) | 2 (1.02) | _ | _ | 9 (4.61) |
| Tinea pedis | _ | 1 (0.51) | 1 (0.51) | 1 (0.51) | 1 (0.51) | 1 (0.51) | 1 (0.51) | 6 (3.07) |
| Total No. | 35 (17.9) | 31 (15.9) | 45 (23.1) | 50 (25.6) | 19 (9.74) | 13 (6.66) | 2 (1.02) | 195 (100) |

The effect of risk factors on clinlcal types of dermatophytosis was found that statistically significant effect (P< 0.05) (Table 2), the gender relationship were that all types of Tinea exception Tinea capitis were female infection highest frequency from male infection while infection rate in Tinea capitis (9.23%) male and (2.56%) female. Patients with tinea corporis recorded the highest frequency (13.33%) males and (29.74%) females while the lowest frequency in male was of Tinea unguium (0.51%) and in female was of Tinea pedis (2.05%), usually males infected with Tinea capitis more than females because of hormones that are play a role in increase, or may br the reason due to attributed to the easy implantation of spores because of short hair and frequency of sharing comb , brushes , and cups (Woldeamanuel *et al.*, 2005; Ilkit and Demirhindi , 2008; Younes *et al.*; 2012).

The influence of residence on distribution of dermatophytosis showed that 57.94% patients was from rural area while 42.05% patients was from urban area, in addition, all types of tinea were highest frequency in rural area exception tinea cruris was more prevalent in urban area (11.79%) compared with rural area (6.66%), the reason for elevation rural area infection may be its poor socioeconomic environmental that due to increase of infectious diseases especially among children (Inanir *et al.*, 2002).

Often of cases were not suffering from any chronic disease (86.6%) compared with cases that suffering from chronic disease (13.3%). Tinea corporis recorded the highest frequency including 6.15% cases with chronic disease followed by Tinea cruris while all of Tinea faciei and tinea manuum without chronic disease. This results refer to the disease with dermatophytes infected both immunocompetent or immunocompromised patients. Almost affect 10-20% of the world's population and it is possible to infect immunocompetent hosts, in many cases, the treatment methods are very difficult, or may re-infection after recovery (Recurrent) (Grumbt *et al.* 2011). In patients with diabetes, hyperglycaemia itself has been shown to decrease phagocytic activity further, thus dermatophytes infections (Bristow & Mak, 2009).

The patients in contact with domestic animals were 73.8% of cases while that no contact with domestic animals were 26.2%, Tinea corporis recorded the highest frequency including 31.8% cases with existence of domestic animals and 11.2% cases with absent of domestic animals. These results were consistent with Ayesh (2013) when he studied dermatophytosis in Gaza, Palestine. Increase of dermatophytes infections in Tinea unguium may be because majority of people are farmer by occupation and there are more chances of transmission of geophilic and zoophilic species (Mathur *et al.*, 2012).

*Table (2): Relationship between clinical type of dermatophytosis with risk factors*

| Clinical type | Gender (%) | | Residency (%) | | Chronic disease (%) | | Domestic animals(%) | | Total No. (%) |
|---|---|---|---|---|---|---|---|---|---|
| | Male | Female | Rural | Urban | + | - | + | - | |
| Tinea corporis | 26 (13.33) | 58 (29.74) | 44 (22.56) | 40 (20.51) | 12 (6.15) | 72 (36.9) | 62 (31.8) | 22 (11.2) | 84 (43.07) |
| Tinea cruris | 5 (2.56) | 31 (15.89) | 13 (6.66) | 23 (11.79) | 5 (2.56) | 31 (15.9) | 20 (10.2) | 16 (8.2) | 36 (18.46) |
| Tinea capitis | 18 (9.23) | (2.56) 5 | 13 (6.66) | 10 (5.12) | 3 (1.53) | 20 (10.2) | 20 (10.2) | 3 (1.53) | 23 (11.79) |
| Tinea unguium | 1 (0.51) | (9.74) 19 | 13 (6.66) | (3.58) 7 | 4 (2.04) | 16 (8.20) | 15 (7.69) | 5 (2.56) | 20 (10.25) |
| Tinea faciei | 5 (2.56) | (6.15) 12 | 17 (8.71) | _ | _ | 17 (8.71) | 15 (7.69) | 2 (1.02) | 17 (8.71) |
| Tinea manuum | 3 (1.53) | (3.07) 6 | (4.61) 9 | _ | _ | 9 (4.61) | 9 (4.61) | _ | 9 (4.61) |
| Tinea pedis | 2 (1.02) | (2.05) 4 | (2.05) 4 | (1.02) 2 | 2 (1.02) | 4 (2.04) | 3 (1.53) | 3 (1.53) | 6 (3.07) |
| Total No. | 60 (30.76) | 135 (69.23) | 113 (57.94) | 82 (42.05) | 26 (13.3) | 169 (86.6) | 144 (73.8) | 51 (26.2) | 195 (100) |

Twelve of dermatophytes species were identified in specimens of examined patients, *E. floccosum* 46(34.8%) showed the highest frequency followed by *T. interdigetale* 19(14.4%) and *T. mentagrophytes* 18(13.6%) respectively (Table 3). *E. floccosum* was found to be predominant species in all types of Tinea cases exception Tinea capitis. These results were consistent with the other studies (Jha *et al.*, 2012; Abastabar *et al.*, 2013; Prasad *et al.*, 2013).

*Table (3): Distribution of dermatophytosis according to fungal isolates.*

| Fungal isolates | Tinea corpoi | Tinea cruris | Tinea capitis | Tinea unguium | Tinea faciei | Tinea manum | Tinea pedis | Total No. (%) |
|---|---|---|---|---|---|---|---|---|
| E. floccosum | 21 | 18 | _ | 3 | 1 | 2 | 1 | 46 (34.8) |
| M. audouinii | 2 | _ | _ | _ | _ | _ | _ | 2 (1.51) |
| M. canis | 8 | _ | 2 | _ | 2 | _ | _ | 12 (9.09) |
| T. equinium | 2 | 1 | _ | _ | _ | _ | _ | 3 (2.27) |
| T. interdigetale | 10 | 3 | 3 | _ | 1 | 2 | _ | 19 (14.4) |
| T. mentagrophytes | 8 | 5 | _ | _ | 4 | 1 | _ | 18 (13.6) |
| T. rubrum | 2 | 1 | 2 | _ | _ | _ | 2 | 7 (5.3) |
| T. schoenleinii | 1 | 1 | _ | _ | _ | _ | _ | 2 (1.51) |
| T. soudanense | 2 | _ | _ | _ | _ | _ | _ | 2 (1.51) |
| T. tonsurans | _ | _ | 2 | _ | _ | _ | _ | 2 (1.51) |
| T. verrucosum | 7 | _ | 3 | _ | 2 | _ | _ | 12 (9.09) |
| T. violaceum | 4 | 1 | 2 | _ | _ | _ | _ | 7 (5.3) |
| Total No. | 67 | 30 | 14 | 3 | 10 | 5 | 3 | 132 (100) |

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