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Study of the Fungal Infections Associated with Dermal Infections in Samarra City

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Abstract

One hundred and ninety two (192) specimen (skin scrapings ,hair and nail) were collected and examined from (192) patients from both sex (110 female and 82 male) after that diagnosed clinically by a specialist doctor as Tinea , and by direct microscopic examination and culture have been diagnosed with dermatophytes one hundred and seventy five (157) patients with rate of (81.11%), . It was clear from the current study, males infection with Tinea was (41.40%) while in females (58.60 %) it was found through the statistical analysis, existence of significant differences at the level of probability (p‹ 0.05). Sources of fungal infection include zoophilic fungi which represent 74(47.13%), followed by Anthropophilic type 45 (28.66%), and Geophilic fungi 38 (24.20%). Dermatophyte species of fungi were isolated from Tinea patients including: *Trichophyton rubrum, Trichophyton Mentagrophytes var mentagrophyte,Trichophyton Mentagrophytes var interdigtal, Trichophyton tonsoranse, Trichophyton tonsoranse, Microsporum canis, Epidermaphyton flocosum* with different percentage, *Candida species* were identified by the manual and biochemical methods and we found that the *C.albicans, C.tropicalis, C.krusei ,C.parapsilosis* and *C.glabrata* isolated during the study. And isolation of non-dermatophyte isolated during the study : *Aspergillus niger, Aspergillus flavus, Aspergillus versicolar* and *Penicillium chrysogenum*. Also New record of *Penicillium vanoranjei* in Iraq during the present study.

Keywords: *Dermatophyte; Fungal infection; Tinea.*

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1. Introduction

Dermatophytes are keratinophilic fungi growth. superficial infections of the skin, hair and nails caused by Dermatophytes which spread through contact from other people, animals and soil, as well as indirectly frome formats [1]. Dermatophytes are a group of keratinophilic fungi, which invade the superficial area of the body like skin, hair and nails". The skin provides a remarkably good barrier against bacterial infections. "Although many bacteria come in contact with or reside on the skin, they are normally unable to establish an infection. When bacterial skin infections do occur, they can range in size from a tiny spot to the entire body surface". They can range in seriousness as well, from harmless to life threatening [2]. "Dermatophytesare grow in environment warm and humid and area, which consider common in regions tropical and subtropical and this probablyexplains wh y they are very common in Africa "species of dermatophytes such as *Trichophyton mentagrophyte var. interdigitale, Microsporum canis, Epidermaphyon floccosum* and *T. rubrum* are distributed all over the world. However, other species probably have partial geographic restriction. For example, *T. schoenlenii* is found in Africa" and Eurasia while *T. soudanense*[3] . Others *T.violaceum* are associated to Asia, Africa and Europe and *T. concentricum* is known to be common in the Fareast, India and the Pacific's [4,5,6].

2. Materials and Methods

Samples collection Samples of fungi were collected from 157 patients (1.5 to 66 years old of both sexes) suffering from dermal infection (Tinea) in different part of the body, (as clinically identified by a physician), during the period of November/2016 to March/2017 from the Public hospital in Samara city ,Salah Al Deen governorate. The samples were obtained by scraping the infected area of skin with unshaped blade, and examining under microscopic KOH and culturing on the sabouraud dextrose agar. Specimen were placed on a microscope slide, and few drops of 10% KOH were added on the specimen, and then a cover slip was applied and warming over a small flame just before boiling because that leads to precipitates KOH 220 crystals. The slide was examined under the low power and high dry objectives to detect fungi and their septet hyphae and/or barrel-shaped or rounded arthrospores [7,8,9]. Scraped samples were cultured on sabouraud’s dextrose agar (SDA) supplemented with 0.05 mg/ml cycloheximide and 0.04 mg/ml chloramphenicole (to inhibit the growth of saprophytic fungi and bacteria), then incubated at 30 °C (for molds) and 37 °C (for pathogenic yeast) and examined every 4 to 7 day for at least 4 weeks before it was discarded. Reference [10] A small piece of transparent-adhered tape was touched to the surface of the suspected colony, and then adhered to the surface of a microscope slide to which a drop of lactophenol cotton blue was added. Shape and arrangement of the spores were examined under microscopically [11,12].

3. Statistical Analysis

The results obtained were statistically analysed using SAS software (version 17; SAS Inc., Chicago, IL, USA) [13].

4. Results and Discussion

One hundred and ninety two (192) specimen (skin scrapings ,hair and nail) were The (110 female and 82 male)

after collected and examined from (192) patients from both sex that diagnosed clinically by a specialist doctor as Tinea , and by direct microscopic examination and culture have been diagnosed with dermatophytes one hundred and seventy) it had been shown cases were 1own in table (five (157) patients with rate of (81.11%), as shpositives direct microscopic examination and culture, while the number of positive cases by direct microscopic examination and negative by culture 14 (8.9 %), The number of negative pic examination and positive by culture examination 12 cases by direct microscosample(6.1%).from other hand the number of negative cases by direct microscopic examination [1]and culture was 11 (5.6%) as shown in the table **(1)**

Table 1: Sample collection of dermatophytoses.

The cases	Specimens		Numberof sample	Percentage
	Skin	Hair and nail		
Positive by direct microscopic examination and culture examination	80	**77**	**157**	**81.11**
Positive by direct microscopic examination and negative by culture examination	**7**	**7**	**14**	**7.142**
Negative by direct microscopic examination and positive by culture examination	**3**	**7**	**10**	**4.122**
Negative by direct microscopic examination and negative by culture examination	**6**	**5**	**11**	**5.612**
Total	**100**	**92**	**192**	**100**

The results of direct microscopic examination and culture range between positive and negative results negative due to several reasons including the small quantity of sample that was collected, it is not sufficient to give a positive result, and may be the sample was not taken from the margin area, but were taken from the central part of the affected area that may present local immunity so they are empty of dermatophytes [14]. Negative results of culturing specimens , may be explained that are patients infected with Tinea were used random treatments without consulting a specialist doctor because of discomfort caused by the infection which may result in a few cases to change vitality of dermatophytes and not their growth [15,16], or may be due to error in the method of samples storage until culturing , and stored in containers preserve moisture result in the growth of Saprophytic fungi which contaminate the original sample and negative result is presented [17]. It had been registered the number and percentage of infected patients by Tinea , depending on gender,table (2) have shown the statistical analysis of results and a significant difference at the level of probability ($P<0.05$) between sex and infection with this disease , the number of males (63) (40.21%) and the number of females reached (94) (59.87 %) to the consultative of the dermatology i hospital in Samaraa. It was clear from the current study, males infection with Tinea was (41.40%) while in females (58.60 %) it was found through the statistical

Table 2: sex distribution of patients with Tinea.

Sex				Total	
Male		Female		Infection	
Number	percentage	Number	percentage	Number	percentage
63	**40.12**	**94**	**59.60**	**157**	**100**

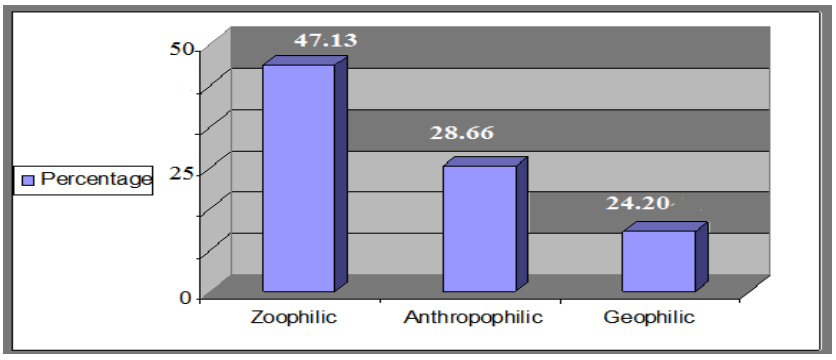

Figure 1: The types Sources of fungal skin infection of Tinea.

X^2= 10.182, indexed = 7.815 and a significant difference between sex (p‹ 0.05). Three groups of dermatophytes which classified according to their habitat include zoophilic fungi which represent 74(47.13%), followed by Anthropophilic type 45 (28.66%), and Geophilic fungi 38 (24.20%), figure(1).

The results mentioned showed that the Zoophilic fungi are dominant and this is agreed with the findings of each of [12], while this result disagreed with what reported by,[13], as the proportion of animal fungi and human fungi approximately equal. Also the current results disagreed with [20] they concluded that the human fungi Anthropophilic were the dominant on the animal fungi Zoophilic. Tinea infection transmitted in two ways, either through direct contact or indirectly through the hair falling and burrs for those that contain spores of dermatophytes, that knowing of transfer way this infection of important in diagnosis of fungus that causing disease [21], it is worth mentioning that the infection by indirect way occur more of direct way , the use of combs and hair brushes contaminated with one of the most indirect way for causing infection [3]. The humidity, lack of hygienic care, living in crowded places of the most important factors that increase the likelihood of the disease [4]. It was found that arthroconidia and fungal hyphae in the crust or hair falling has the capability to survive successfully in the environment for months or sometimes years [14]. The infection was recorded higher in people living in rural areas (92) (58.60 %), followed by urban areas (65) (41.40%), figure(2).

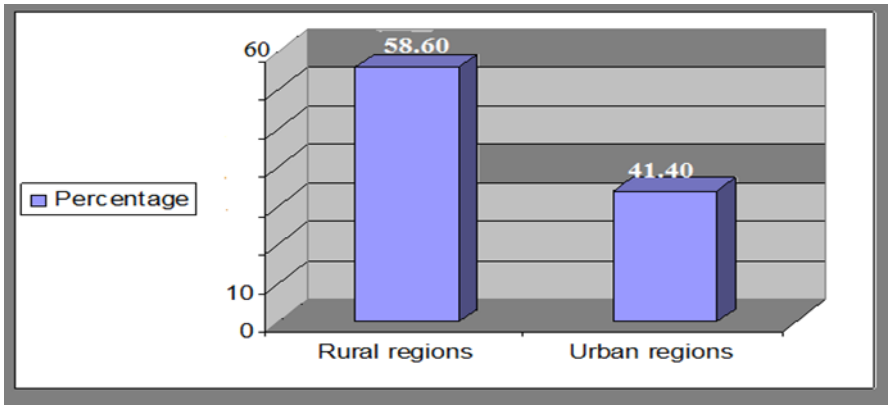

Figure 2: The relationship between Tinea infection and habitation areas of the patients.

The rural areas were recorded higher infection by rate (58.60 %),, while in urban areas were by rate (41.40%), and this result was agreed with what obtained by [20]. The result was different from the findings of [1], as the proportion of people living in urban areas are predominant, and the reason for these results is that many rural areas suffer from poor health and low standards of living, and overcrowding of population within and outside the home [7]. It was found in a study in Egypt that most fungal skin infections in rural areas were due to the animal genera Zoophilic and ground Geophilic , this could result from the direct transfer of dermatophytes through contact with the human and the animal, or by contact with contaminated soil with skin shells and the falling hair from these animals, or touching soil that contains already on spores of dermatophytes species which found in soil [15]. The relationship between sources of dermatophytes infection and habitation areas of the infection which showed no significant difference under level of probability (P>0.05) between the sources of dermatophytes infection and habitation areas of the infection, table (3).

Table 3: The relationship between sources of dermatophytes infection and habitation areas of the infection.

	zoophilic		anthropophilic		Geophilic		sumation	percentage
	The number	percetage	The number	percetage	The number	percetage		
Rural region	**40**	43.47	**22**	**23.91**	**30**	**32.60**	**92**	**58.60**
Urban region	**34**	52.30	**22**	**33.84**	**8**	**21.30**	**65**	**41.40**
Summation	**74**	**47.77**	**44**	**28.04**	**38**	**24.20**	**157**	**100**

X^2=1.31, X^2 = 5.991 indexed , no significant difference between the sources of infection and habitation areas of the infected (P>0.05).

Fungi of human origin Anthropophilic contact between people play a role in transmission of dermatophytes this is agreed with what obtained of,[22], which indicated that dermatophytes infections deployed in crowded areas, especially areas of poor health, with regard to fungi of animal origin and that animal breeding in the major role in the infection, that dermatophytes may be isolated from humans and animals together [9]. The results revealed that there were eight clinical types as presented.

percentage sumation Geophilic anthropophilic zoophilic Rural region percet age Summation No. Clinical Type The number Percentage% 1 Tinea corporis 46 29.29 2 Tinea capitas 8 5.09 3 Tinea Facial 11 7 4 Tinea Barbae 5 3.18 5 Tinea Manum 11.46 6 Tinea Unigum 10.19 The predominant one is tinea corporis which represent 29.29%, that's may be related to the site of infection in most of humanbody in addition to erethrama [5] The infection with tinea corporis differes from patients to others based on age and gender also the nature of the weather is lead to spread infection spatially in hot and humid areas [9]. The infection with tinea corporis followed by Tinea Pedis which represent 24.20%, this perecentage may be related to the part of sample collected from the student in college of educational sports Tinea pedis infection is considering the most important dermatophytes infections being the most common dermal infection worldwide [2]. Tinea pedis spreads via the transfer of interdigital skin fragments in various environments, such surface include bathroom floors and communal areas or by towels, sock and shoes, due to this cross infection among family members is common [22].

Table4: Distribution of dermal infections in patients according to their clinical types.

1	**Tinea corporis**	**46**	**29.29**
2	**Tinea capitas**	**8**	**5.09**
3	**Tinea Facial**	**11**	**7**
4	**Tinea Barbae**	**5**	**3.18**
5	**Tinea Manum**	**18**	**11.46**
6	**Tinea Unigum**	**16**	**10.19**
7	**Tinea Cruris**	**15**	**9.54**
8	**Tinea Pedis**	**38**	**24.20**
Total		**157**	**100%**

Dermatophyte fungi invade the superficial keratin of the skin, and the infection remains limited to this layer. Dermatophyte cell walls contain mannans, which can inhibit the body's immune response; *Trichophyton rubrum* in particular mannans that reduce keratinocyte proliferation, and the concomitant decrease in the rate of sloughing results in a chronic state of infection [1]. Enzymes and other diffusible substances produced by the dermatophyte, including the transepidermal leukocyte chemotaxis and protolytic enzymes, reach the viable layers of the skin and induces the inflammatory response, this is called the colonisation phase and occurs in the stratum corneum [5]. The third clinical presentation Tinea Hand with a frequency of 11.46%. that was observed in the present study infection in female with number 10 more than male with number 8 that may be related to

continuous exposure the women spatially the housewife to humidity at the other hand the male infection in present study may be attributed to most of them work in agriculture and constriction[17]. The infection in tnia unigum recorded in in 16 cases (10.19%) also which in female more than male this results may be related to the nature of the women work spatially continuous exposure to water during the day [22], or may be related to the immunodeficiency or diabetes in some cases during the study this causes work as a factors increase the infection as presented in Previous reports in Iraq and the world [9]. Tinea cruris was detected in 9.54% of total cases in different age and gender spatially in children 7 Tinea Cruris 9.54 8 Tinea Pedis 24.20 Total 157 100% which Wearing baby diapers [9,2] stated that ringworm of the groin is mainly a post pubertal disease of male probably due to pubertal development of sex specific a porcine glands in which its secretion plays a role in susceptibility to infection. On the other hand, the scrotum and wearing of trousers facilitate localization of fungi in the groin of male and that female have less chance of contagion[13]. The most predominant type of dermatophytose was tinea facial with frequency of 7%. Previous reports in Iraq showed that tinea capitis and tinea facial were probably the most prevalent clinical types existing in this country [18]. Tinea capitis shows that was predominant clinical type which occurrence in 8 patients (%). Which followed by tinia barbae the most predominant type of dermatophytoses. Perhaps due to the low interest in personal hygiene as well as the use of other towels and barber tools. Tinea capitis cases have been reported in adults around the world, including [4] cases of African women living in Caribbean islands between the ages of 23-45 In Greece, studies were carried out between 1981 and, in which 35 adults were diagnosed with diphtheria Adult hemorrhagic infection is due to their immunodeficiency, which facilitates skin infection [22].

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