Prevalence of Dermatophytes Fungal Infection among Different Gender

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Abstract

The present study was designed to determine the prevalence of superficial fungal infections among the patients that were living in different circumstances in Diyala region, Iraq. From July 2018 to February 2019. There were (218) patients with ages (2-78) years were surveyed for dermatophyte fungal infections by history and clinical examination. The results revealed that (71.2%) of the patients were infected with skin lesions followed by scalp lesions (16.5%) and nail lesions (14.6%). The prevalence rates of dermatophyte fungal infections were linked to the types of tinea infections, including tinea corporis (17.4%), tinea pedis (13.7%), tinea capitis (16.5%), tinea ungium (14.6%), tinea cruris (17.4%), tinea faciale (3.6%). The proportion of fungal infection in rural area(63.6%) was more preponderant in comparison to urban areas (39.8%). Furthermore, the rate of percent infection by tinea capitis (66.6%), tinea corporis (60.5%), tinea cruris (57.8%), were higher in male whereas the percentage of tinea ungium (87.5%) and tinea faciale (62.5%) infections were highest in female. In addition, study demonstrated that indices of tinea infection has been significantly associated with age. This study suggested there has been an exigent need to ameliorate the edification of hygiene values of peoples in addition to increment the economic condition of the society.

Keywords: *Dermatophytes, fungal infection, living conditions*

Introduction

Fungi are typical eukaryotic cells, representing a distinct kingdom , estimate one quarter of a million species , only few are pathogens to humans , or other warm-blood animals [1] . Fungi may be broadly divided into two basic forms, the moulds and the yeasts. The moulds are made up of long multinucleated filaments called hyphae, which can infect the skin, hairs, nails and the internal organs. The yeasts are made up of unicellular ovoid to globes cell, which usually reproduced by budding or more rarely by fission, which can infect the skin, nails, mucous membrane and the internal organs [1] & [2]. Fungal infections of the skin may be divided into two types according to the level of skin involvement, the superficial and deep infections. The superficial infections, which are confined to the stratum corneum, hairs and the nails, which include: - dermatophytosis, candidiasis and other non-dermatophyte infections. Clinical manifestations of dermatophytosis vary depending on the site of infestation and the type of strain; therefore, accurate identification of the strain is crucial in order to facilitate rapid treatment and to prevent spread of the disease [3].

The prevalence of different types of superficial fungal infections of the skin is variable among different age group, gender, socio-economic levels and countries, in UK and other Western Europe countries, the prevalence is 5.1% and in USA is 8.1% and in general it is more prevalent in male's children [4] and [5].In Iraq two studies was done, one in Baghdad and the other in Diyala province, showed that the prevalence was 9.9% of all skin diseases [6]. Regarding the different types of superficial fungal infections of the skin, tinea capitis and corporis are more prevalent in males children aged 3-14 years and more in African countries Dermatophytes species belonging to three genera (Trichophyton, Microsporum, and Epidermophyton). Trichophyton and Microsporum genera are the most numerous and diverse, there are over 40 species belonging to these two taxonomic groups.

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Epidermophyton genus has only one representative – *Epidermophyton floccosum* species[7]. Transmission of dermatophytes may occur by direct contact with infected humans or animals or indirectly by contact with contaminated fomites[8],[9]. Dermatophytes require keratin for growth and they can cause superficial infections of the skin, hair, and nails. Dermatophytes may spread by direct contact from other people (anthropophilic organisms), animals (zoophilic organisms), and soil (geophilic organisms) as well as indirectly from fomites. The disease is widely distributed all over the world with various degrees and more common in men than in women [10].

So the aim of the present study is to demonstrated the correlation of gender, age, place of residence (rural or urban), and the nature of work practiced by the patient on dermatophyte infection.

Materials and Method

A sample size of Two hundred eighteen were collected from patients who have attended the dermatology unit at Baquba'a teaching Hospital, Baquba'a City, Diyala Province between first July 2018 to end February 2019. The association of frequency of dermatophytoses infection to the individual were investigated in terms of following aspects: place of residence (rural or urban); health history of the individual; marital status and the nature of work practiced. Diagnosis was made according to the diagnostic criteria listed by [3] in terms of patient's history and clinical examination.

Results and Discussion

Among the 218 cases, results (table 1) showed that the dermatophyte fungal infections were comprised

from the followings types: Tinea capitis (16.5%),and Tinea faciale (3.6%), Tinea cruris (17.43%), Tinea corporis (14.6%), Tinea ungium (14.6%), Tinea pedis (13.7%),

Evidences suggested that ringworm infections are quit prevalent and found to be one of the most frequent causes of dermatological complications [11].

This difference may be attributed to the fact that the secretion of androgen peaks during adolescence and therefore sebaceous secretion increases. for flaring up but there is no significant correlation regarding species identified and age group. The current study disagrees with [12] which differed from other studies results .In addition to Candidasis is more prevalent in adult females, pityriasis (tinea) versicolor is more prevalent in adult males [2].

Table (1) : no. of tinea types among male , female and age groups

Age group	Tinea capitis		Tinea faciale		Tinea cruris		Tinea corporis		Tinea unguim		Tinea pedis	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
0 – 10	18	9	0	1	1	1	6	3	0	0	0	0
11 – 20	6	3	1	2	3	1	6	5	0	0	0	0
21 –30	0	0	1	1	10	4	5	5	2	6	0	0
31 – 40	0	0	1	1	11	5	4	2	1	12	1	1
41 --50	0	0	0	0	1	1	0	1	1	2	2	2
51 --60	0	0	0	0	0	0	1	0	0	3	3	7
61 -- 70	0	0	0	0	0	0	0	0	0	1	3	7
71 --80	0	0	0	0	0	0	0	0			2	2
Tolal	36/218		8/218		38/218		32/218		32/218		30/218	

Distribution of dermatophyte fungal infections based on residence area

The result has shown that the highest ascendant of dermatophyte fungal infections within rural area (57.38%) compared to urban area (42.6%) ,:

The results revealed that the highest ascendant of dermatophyte fungal infections within urban areas were Tinea cruris (68.4%), Tinea corporis (63.1%), Tinea ungium (62.5%), and Tinea pedis (63.3%), whereas in rural areas the percentage of these fungal infections were found lowest, all other types of tinea infections were substantially higher in rural areas as compared to urban areas .

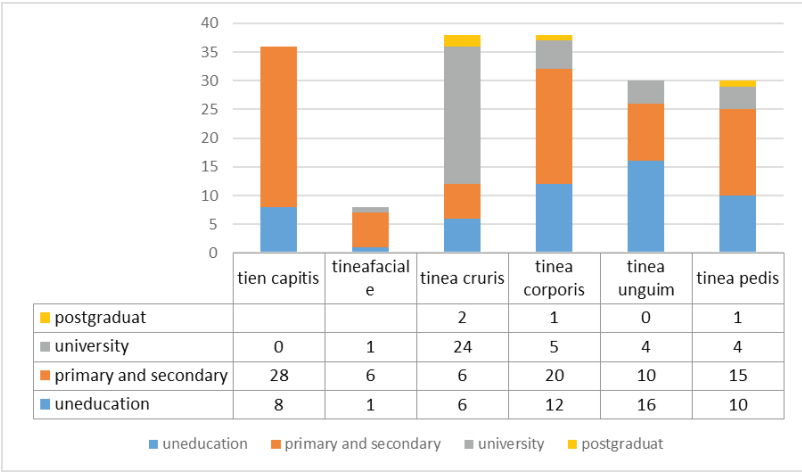
Evidences additionally suggested that residential area (rural and urban) is kenned to markedly affect the rate of infection as the most of rural areas are inhabited by the families with animal husbandry such as canines and cattle which are the source of Tinea infections,[13&14] .These factors are further kenned to spread fungal disease in the region where health accommodations are circumscribed in comparison to urban areas [15] and [16].

Some researchers additionally attributed the concept of self-pollination (autoinoculation) of ringworm types which have been known to be associated with climatic conditions of rural or urban area . Tinea capitis and Tinea faciale were significantly more common in rural area. In particular, Tinea capitis was more mundane in rural area as compared to urban area. One reasons for Tinea capitis infections in rural areas is associated with animal husbandry profession of the peoples.Other one due to over crowdedness in joint families which impart close contact with children and pophilic infectious agents [16] .

Our results showed Infections of Tinea cruris were higher in urban places than in rural areas and this to be consistent with earlier findings as described by Figueroa *etal*., that skin diseases are the second most common cause for medical consultation for children in rural communities [17]. It has additionally been shown that in regions with a poorer socioeconomic environment, the morbidity rates, especially with infectious diseases are found to be higher [18]. The most significant difference is in tinea capitis (52.7%)

The education level of the patients in this study results showed that the percentage of infection by Tinea capitis (77.7%), Tinea corporis (52.6%), Tinea pedis (50%),and Tinea faciale (75%) were found to be highest in primary and secondary education, while the Tinea cruris (63.1%) had the highest rate of infection in university education (fig.1): This result comes in accordance with [19] There is an increased activity of sebaceous glands under the hormonal influence in adolescents and young adults and this explains the increased frequency of tinea infection among the student population [16] .

On the other hand, 20 stated that military personnel, athletes, and those doing hard works that usually associated with hyper sweating were more vulnerable to pityriasis versicolor infection. Furthermore, sebaceous glands secretion is increased in males 15 years and older compared to females, and that may also promote , pityriasis versicolor infection in males.



	tien capitis	tineafacial e	tinea cruris	tinea corporis	tinea unguim	tinea pedis
postgraduat			2	1	0	1
university	0	1	24	5	4	4
primary and secondary	28	6	6	20	10	15
uneducation	8	1	6	12	16	10

Figure (1) Distribution of patients with dermatophytes according to their education.

The results in table (2) have revealed that the highest ascendant of dermatophyte fungal infections in child and students were Tinea capitis (100%), Tinea cruris (47.3%), while the Tinea corporis (47.3%) had the highest rate of infection in self employers and workers, and Tinea ungium (62.5%), Tinea pedis (70%) is to be highest in housewives because of using detergents. In addition, students are also more involved in sports activities which predisposes them to increased sweating and hence, pityriasis versicolor [21].

Table (2) : tinea types distributed among different factors(study, self employed, housewife & salaried)

Type of tinea	**Child and student**	**Self employed And worker**	**House wife**	Salaried
Tinea capitis	36			
Tinea faciale	4	1	3	
Tinea corporis	4	18	4	12
Tinea cruris	18	8	7	5
Tinea ungium	1	4	20	5
Tinea pedis	0	5	21	4

The nature of the work could also affect the proportion of infection as our result revealed that 39.9% of infected patients were students whereas 33% patients were house wives and rest of 28% patients belongs to others diverse range of professions. The results also suggested that the marital status positively correlated with the proportion of dermatophyte infection.

Akcaglar reached to the same conclusion that the increasing occurrence of dermatophyte fungal infections could be attributed to living circumstances with increase the number of the people that living in close contiguity in addition to the patient's family history, lifestyle, immune status. Prevalence of different types of fungal infections varied according to geographical location, environmental conditions, and cultural factors, age, gender, socioeconomic status and predisposition to diabetes amongst others [22] and [23].

Host susceptibility may be enhanced by moisture, warmth, concrete skin chemistry, composition of sebum and perspiration, heftily ponderous exposure and genetic predisposition. The incidence of fungal infection is higher in sultry humid climates and in crowded living conditions [22] . The differences in the incidence of superficial infections between the age groups and genders may be reflected the differing rates of sebum production and fluctuations of immunity with aging [21].

The results have demonstrated that the highest ascendant of dermatophyte fungal infections in oily skin 107(60.79%), while19 (10.79%) were dry, and 50(28%) were normal fig.2):

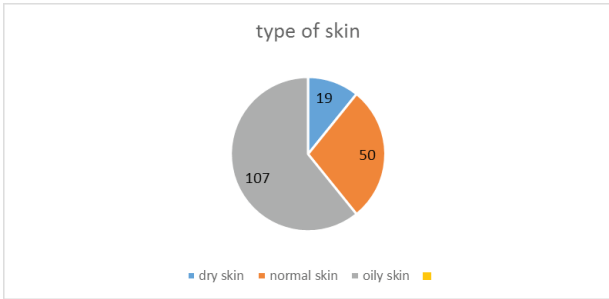


Figure (2) Type of skin

Unfortunately, why some people suffer from excessive sebum production while others endure dry skin remains difficult to explain. Numerous factors have been proposed to play a role in the pathogenesis of oily skin. Thus, pinpointing one successful treatment is challenging. Here, we review the physiology of sebaceous glands as well as current and up-and-coming treatment options that can be offered to patients

concerned about oily skin.[23]

Despite the pessimistic view of sebaceous glands as a result of their role in oily skin, they do play a vital role in the skin's well being. sebaceous glands display endocrine function (particularly androgen synthesis), compose the fetal vernix caseosa, and play a key role in the epidermal barrier and innate immunity. Here, we review current and up-and-coming treatment options that may be utilized to help patients with oily skin.[24,25] high level of sebum production in such age group which offer suitable condition to lipophilic malassezia for flaring up but there is no significant correlation regarding species identified and age group.[10]

Predisposing factors for the development of *Malassezia* infection include excessive production of sebum and/or decreased quality of sebum (seborrhoea), accumulation of moisture, damage of epidermis, concurrent dermatoses, atopy, and bacterial skin infections [26.]

Conclusion

The present study demonstrated that the dermatophytosis was more common in educated people and in low socio-economic regions that is because crowded and bad hygiene characteristics of such community. the types of tinea are varies between tinea corporis and tinea cruris especially with the adult age group Also, tinea capitis record high rate which found mainly in children .further studies are urgently required to fully understand the pathomechanisms of the doggedness of dermatophyte fungal infection in certain patient population by using more sensitive and precise methods for example polymears chain reaction with specific primers [conventional polymerase chain reaction and real time polymerase chain reaction],restriction fragment length polymorphism ,in situ hybridization of fluorinated neucleotides, nested polymerase chain reaction .

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