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Isolation And Diagnosis Of Skin Fungi That Causes Tinea Capitis In The Children

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Abstract :- *One hundred clinical samples of hair and scalp flakes were collected for children with tinea capitis aged from 1 year to 12 years from the dermatology consultant affiliated with Tikrit Teaching Hospital and outpatient clinics, with the aim of isolating the pathogenic fungi that cause tinea capitis and diagnosing them in children. Out of the total, 77 samples were found in the laboratory culture, while the findings of the direct microscopic examination indicated the presence of 55 samples. Several dermatophyte species from the genera Trichophyton and Microsporum were identified. T. mentagrophytes was the most prevalent with 18 isolates (23%), followed by T. violaceum and T. rubrum, each with 12 isolates (15%). Next, there were 10 isolates of the fungus T. schoenleinii (13%), compared to 4 isolates (10%) of each of the two species of fungus, T. tonsurans and T. verrucosum. While fungi belonging to the genus Microsporum were isolated at a rate of 10 isolates (13%) of the type M. canis, while 7 isolates of the M. gypsum type were isolated (9%). The incidence of tinea capitis among was greater in men than in women., as the number of infected males was 62(62%), and females were 38 (38%) infected out of the total number. Regarding age groupings, 20% of children between the ages of one and four have head ringworm. The infection rate for children aged 5-8 was 32%, and the highest risk of infection was for those aged 9-12, who were at risk for 48%. It was also found that the rate of infection with the fungi that cause tinea capitis in the children from whom the samples were taken was high among patients coming from rural areas, at 80%, compared to patients coming from urban areas, at 20%.*
Keywords*: Tinea captis, Fungi, children.*

Introduction

Dermatophytes are a group of fungal infections caused by skin molds [1]. Fungal skin diseases are considered one of the most serious health problems that some people around the world suffer from, as between 20% and 50% of the world's population suffer from them, especially in developing countries, due to population density, poor health conditions, and malnutrition. Determinants. water supplies. A humid, dark and warm climate represents the ideal factor for the growth of skin fungi (25-28 °C) [2]. Fungi cause various diseases in humans and other organisms. When it infects the superficial layers of the skin, it causes what are called superficial fungal diseases [3]. Dermatophytes have a degree of variation regarding the nature of their preferred host and are classified as anthropophilic (this generally promotes resistant chronic infections with minimal inflammatory response), zoophilic and geophilic fungi that attack keratinous tissues in humans and

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animals, such as hair and skin. And nails, which causes what is known as dermatophytosis. These fungi include three genera: *Trichophyton, Microsporum* and *Epidermophyton* [4].

Several studies have been carried out on diseases caused by dermatophytes. Pathogenic fungi's capacity to induce disease relies on various factors, such as environmental conditions, host immunity, pathogen virulence, and the presence of chronic diseases like lymphatic and diabetes. Virulence is defined as those means and mechanisms through which the fungus can cause infection and penetrate the host's body, and includes enzymes, toxins, and the ability to adhere, and others [5].

The extent of the prevalence of superficial infections in different living conditions. Tinea capitis Scalp dermatophytosis is a highly contagious infection that is distributed worldwide. It occurs in the scalp and hair follicles and is widespread worldwide and appears primarily Before puberty in children, four clinical types of disease can be identified are black point Black dot, which is non-inflammatory but may become inflammatory, Favus, Inflammatory kerion, and Scaly type depending on the method of hair invasion, the type of fungus causing it, and the host's immune response [6].

The infection of ringworm of the head belongs to species of the genus *Microsporum* and the genus *Trichophyton*. The keratinophilic fungi are usually present in the layers of the skin and its appendages and the superficial infections, which are confined to the stratum corneum, hairs and the nails. The fungus continues to grow in the hair and invade the keratin as it forms. It appears on the surface of the skin within 12-14 days, and by the third week the infected hair is broken [7].

There are three types of capillary infection in vivo on the outer surface of the hair: Ectothrix microsporidium the species that cause this infection are *T. verrucosum T. equinum, T. mentagrophytes, M. canis and M. gypseum* and *M. audouinii*, lesions the nuclei They are patches of partial alopecia, but show many dull, brittle gray hairs due to their coating of arthropod spores. The species that cause this infection are *T. verrucosum, T. equinum, T. mentagrophytes, M. canis , M. gypsum* and *M. audouinii* or within the hair shaft (Endothrix), patchy baldness characterized by a relatively non-response is observed. inflammatory in infections caused by *T. tonsurans* and *T. violaceum*. The formation of blackheads, which are swollen hair shafts, occurs when the affected hair breaks on the surface of the scalp in this condition. Favorites. *T. schoenleinii* infection is currently rare and sporadic in different countries. This organism normally produces cup-shaped yellow scales known as scutula in its classic presentation. Which causes hair breakage and the formation of blackheads indicating remaining fragments. [8].

As for Kerion is the most severe pattern and is known as a kerion It is a painful, inflamed mass where any remaining hairs are loose. This is a form of dermatophytosis characterised by the development of a yellowish substance around the hair follicles, leading to the formation of crusts, hair loss, and the creation of a bald spot on the scalp. Usually, the violent reaction is triggered by a zoophilic species, such as *T. Verrucosum* or *T. mentagrophytes* var. mentagrophytes, but sometimes a geophilic organism may be found.

It is spread through contact with infected people or contact with infected animals such as cats, dogs, and livestock and their belongings, such as a headdress. Swimming and sports clothing or contaminated tools such as hair combs and brushes, as well as [9].

The current study was prepared including the following objectives. From the above, the aim of the study was to isolate the types of fungi that cause cases of tinea capitis, diagnose them in children.

Materials and Methods

Collection of the Specimens :- 100 samples were obtained from children with tinea capitis, of both genders, aged 1 to 12 years. The samples were collected by extracting hair and scalp from the infected area, which was diagnosed by a dermatologist at the Tikrit Teaching Hospital's dermatology consultant and outpatient clinics.,. He used sterile tweezers and the brush to take a sample of the affected hair and dandruff from the scalp after the affected area was sterilized with 70% alcohol, and a section of the affected dandruff and hair was placed directly on a spotless glass slide intended for in-person microscopic analysis using a 10% potassium hydroxide solution, KOH , while the other section was placed in Sterilized dishes, then stored well until grown on sabouraud dextrose SDA medium [10].

Direct microscopic examination: - After transferring the samples to the laboratory, I prepared a sterile glass slide and placed hair or scalp flakes infected with skin fungi on it. I then added drops of a 10% potassium hydroxide solution, covered the slide with a lid, and gently heated it over the flame of a Bunsen lamp two or three times to dissolve the keratinous materials without boiling. Finally, I gently pressed the slide. After being left for 15 minutes, the slide was examined under a microscope at 10X and then at 40X magnification to observe the sizes and shapes of the fungi, types of conidia, and to identify chlamydial spores and arthropod spores. The isolates were then transferred to slanted culture media to preserve them in the refrigerator. The specimens were cultured on SDA medium and incubated at 28°C for 1–4 weeks. The plates were regularly checked every 2–3 days to monitor fungal growth. [11].

Solutions and culture media used

Potassium hydroxide solution KOH (10%): - The solution was created for direct microscopic analysis by dissolving 10 g of potassium hydroxide in 100 ml of distilled water and storing it at room temperature. [12].

Sabouraud Dextrose Agar (SDA): - This medium was used to isolate and diagnose skin fungi. The Sabouraud dextrose agar medium was prepared by dissolving 65 g of the powder in 1000 ml of distilled water, heating it until boiling on a Hot Plate, sterilising it with an autoclave, and then adding 0.5 g of the antifungal cycloheximide dissolved in 10 ml. Acetone and 0.5 g of streptomycin antibiotic were dissolved in distilled water. The solution was thoroughly mixed, pH adjusted, and then poured into sterile Petri dishes. After cooling, the dishes were stored in the refrigerator until needed. [13].

Statistical analysis: - The statistical analysis utilised a one-way Complete Randomised Design (CRD) and Duncan's multiple range test to assess the significance of differences between the coefficients [14].The data was analysed using the pre-existing statistical analysis software SAS (2002).

Results and Discussion

Direct microscopic examination and laboratory culture of samples:- The results of direct microscopic examination of the total positive samples of infected people showed that 55 samples (55%) were positive, while laboratory culture showed that the positive samples diagnosed clinically were 77 samples (77%) of the total number of samples. The results of the current study agreed with the findings of [15].as the percentages of laboratory culture results were higher than the results of microscopic examination, reaching 52% and 79%, respectively.

The negative results in the direct microscopic examination may be due to the samples being taken from the centre of the affected area, which has local immunity and is free of skin fungi, instead of from the edges of the active infection. The lack of a sufficient sample quantity may be the reason for not obtaining a positive result.

Regarding the unfavorable outcomes in lab culture, it may have been improperly stored in containers that hold moisture during transportation to the lab, which promotes the growth of saprophytic fungi. As a result, these fungi serve as the foundation sample for the culture or analysis, and a positive result for either of these processes may not show up. The patient overprescribed drugs without seeking medical advice, which lowers the skin fungi's vitality and prevents them from growing on the culture medium [16].

Distribution of numbers of fungal isolates causing Tinea capitis :-

- According to the types of isolates:- The results of diagnosing the fungi that cause tinea capitis fig. (1) showed that 77 isolates were isolated from the samples under study, of which 60 isolates (77.92%) from *Trichophyton*. and 17 isolates from *Microspore* (22.07%).

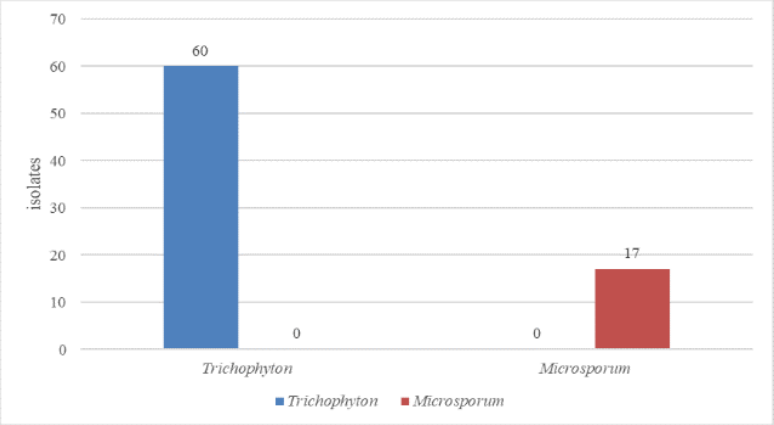

Figure (1): Number of isolates for *Trichophyton* and *Microspore.*

The study revealed that the skin fungi responsible for tinea capitis are classified under the genera *Trichophyton* and *Microsporum*. The genus *Trichophyton* was the most common, with 60 isolates (77.92%), while the genus *Microsporum* recorded 17 isolates (22.07%).

This study corroborated the findings of [17], indicating that the genus *Trichophyton* was more prevalent than Microsporium, in contrast to the findings of [18]. Who demonstrated that the genus Microsporium was more prevalent than the genus *Trichophyton*.

The variation is influenced by the sample size, collection time, and collection areas. *T. mentagrophytes* was one of the most commonly isolated fungi, accounting for 18 isolates (23%) in the results.

The reason that *T. mentagrophytes* is the most isolated species is probably due to direct and indirect contact with domestic animals such as cats, dogs, and livestock, and because it is a zoophilic fungus that causes many throat infections of the skin and has a greater ability to infect hard keratin, as well as related to the environmental condition and geographical diversification It did not agree with both [19] and [20]. The individual who discovered that the *Trichophyton rubrum* fungus is the most prevalent. The two fungal species that followed were *T. violaceum* and *T. rubrum*, each with 12 isolates representing 31% for each fungus. *T. schoenleinii* had 10 isolates, accounting for 13%. As for the two fungal species, *T. tonsurans* and *T. verrucosum* were isolated at a rate of 4 isolates (6%) each, while fungi belonging to the genus *Microsporum* were isolated at a rate of 17 isolates

(22%) of the *M. canis* type 10 isolated, while 7 isolates of the type *M. gypsum* were isolated at a rate of (9%) fig. (2).

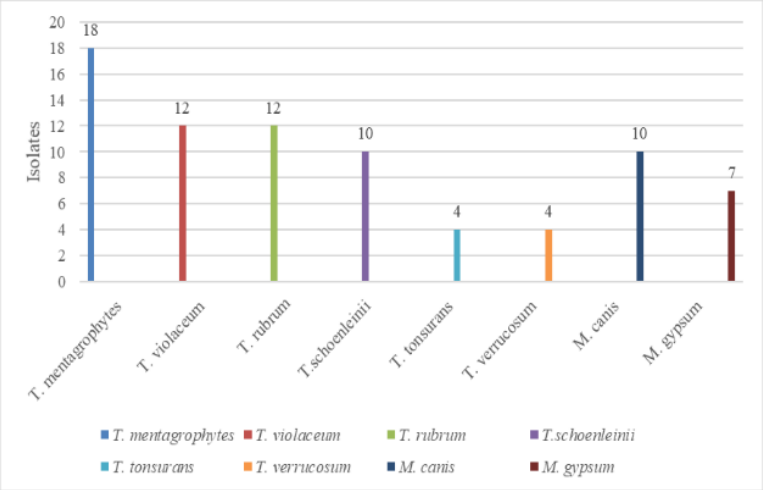

Figure (2): The fungal species isolated.

Distribution of the number of cases of tinea capitis in children:-

- Infection according to sex: - The results showed that the incidence of tinea capitis Male levels exceeded female levels., as the number of infected males was 62 (62%), and females were 38 (38%) infected out of the total number. The results of the current study showed in fig. (3) that the isolated dermatophyte species belong to both sexes, and this result is consistent with [21]. The results of the infection distribution by gender aligned with previous findings [22 and 23]. The infection rate was higher in males than in females due to males being more active and mobile, engaging in frequent movement and contact with infected pets. Various geographical regions offer favorable conditions for the spread of the disease and create an ideal environment for the growth of skin fungus. if they are sent to them Short hair in males compared to females makes it easier for spores contaminated with this fungus to be transmitted to the hair follicle. The gender disparity may be due to differences in exposure to causal factors, as males' frequent visits to barbers contribute to the occurrence of ringworm. Shaving tools can carry a type of fungus that can be easily transmitted and cause infection [24].

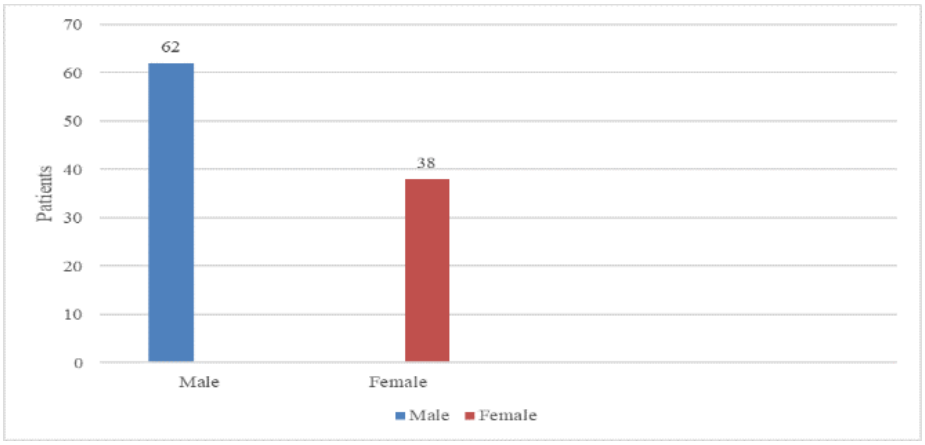

Figure (3): Infection according to sex.

- Infection according to age groups: - The prevalence of tinea capitis in children aged 1 to 4 years was 20%. Children aged 5-8 had an infection rate of 32%, while those aged 9-12 had a susceptibility rate of 48%.

The fig. (4) shows that the highest percentage of those infected with ringworm of the head, whose ages ranged between (9-12) years, was 48% during the study, The reason for the month may be due to the lack of application of proper health conditions, and lack of attention to personal hygiene, lack of awareness of the organs, and poor health awareness, or due to the immune state, as we know. Direct contact between children contributes to transmission among them, and they rarely contribute to this disease due to their simple social and economic level, poor health condition and customs. Personality and lack of concern for health status as well as environmental conditions are a major factor in causing pathogenicity the results did not agree with [22].

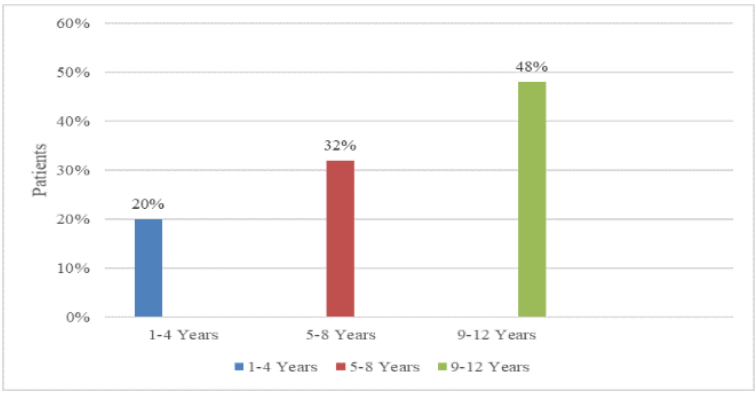

Figure (4): Infection according to age groups.

- Infection according to residential areas: - The results fig. (5) showed that the rate of infection with the fungi that causes tinea capitis in the children from whom the samples were taken was high among patients coming from rural areas, at 80%, compared to patients coming from urban areas, at 20%.

The results corroborated the findings of [15], indicating a higher infection rate in rural areas compared to urban areas. the lack of attention to health status, simple social and economic level, and health status. Deteriorating personal habits, as well as environmental conditions, are a major factor in causing pathogenicity.

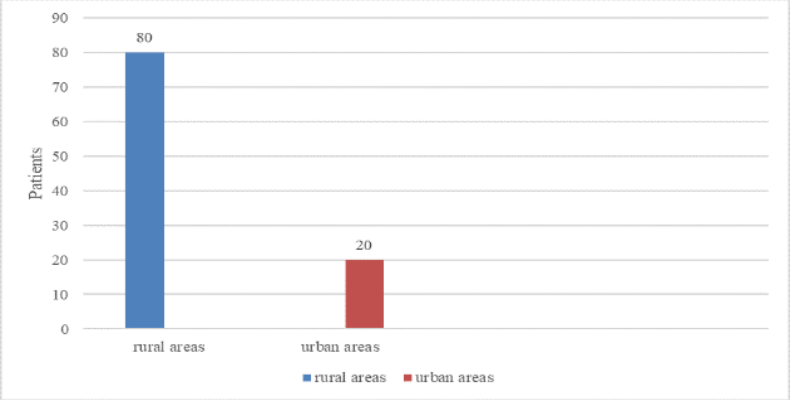

Figure (5): Infection according to residential areas.

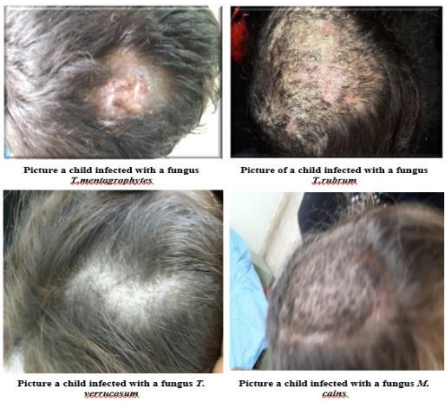

Figure (6): Pictures for some cases under study.

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