

## Original papers

## Factors leading to dermatophytosis

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**ABSTRACT.** Tinea or dermatophytoses are of skin superficial and fungus infections affecting keratinized tissues such as hair, nail, and superficial layer of epidermis. This study aimed at evaluating some predisposing factors for tinea corporis, because elimination or treatment of them not only ceases spreading of the lesion but also prevents reinfection. In this descriptive cross-sectional study patients who were visited in Sina Hospital in Tabriz and had confirmed tinea corporis with direct fungal smear were selected. Other regarding were age, sex, occupation and predisposing factors. Of 76 confirmed cases, 46(60.5%) were males and 30(30.5%) were females. Tinea corporis was common in the third decade. The main predisposing factor was dry skin. Diabetes was found only in 4(5.2%) patients. According to the results of the present research, xerosis was the most common factor leading to tinea corporis in these patients rather than diabetes or lymphoma that its diagnosis, treatment and some simple educations may enhance improvement of tinea corporis and prevents other superficial infections too.

**Key words:** dermatophytosis, fungus infections, tinea corporis

### Introduction

Tinea or dermatophytoses are of skin superficial and fungus infections affecting keratinized tissues such as hair, nail, and superficial layer of epidermis [1]. Different factors are involved in developing of dermatophytoses. Dermatophyte lesions appear because of delayed or type-4 hypersensitivity such that activation of T-cells helps type-2 in developing the lesions [2]. Therefore, it seems that all diseases leading to cell-mediated immunity disorders such as immunosuppression, AIDS, treating with corticosteroids and cytotoxics, mucocutaneous candidiasis and malnutrition result in chronic advanced infections [3]. Some dermatophytes including *Trichophyton rubrum* lead to cell-mediated immunity control and dermatophytosis treatment [4]. On the other hand, although dermatophytoses occur in a very humid medium or more perspiration chronic infections are seen in atopic individuals with dry skins [5]. Of course, human body has some controlling factors preventing from colonization of these fungi as possible. For example, excretion of

sebaceous glands prevents from connecting most of these organisms due to having some fatty acids such that most fungus infections are more prevalent before maturation when sebaceous glands are inactive [6]. Serum factors such as transferrin may also prevent colonization. Additionally, epidermis exfoliation limits the infection as far as possible [7]. Dermatophytosis is common all over the world such that it involves about 3.6% of outpatients of the skin clinic. It should be mentioned that chance of suffering from dermatophytosis is 20% for everybody during his life [8]. High prevalence of dermatophytes in men has been justified in some studies, for example, progesterone prevents from dermatophytes multiplication in vitro. Different drugs such as griseofulvin and imidazoles (such as itraconazole) are used to treat dermatophytosis [9]. Tinea corporis is one of the common kinds of dermatophytosis which is prevalent all over the world and sometimes involves 22% of all dermatophytoses [10]. The disease is recognized with exfoliative red platelets appearing on body and extremities with a completely distinct and

sometimes vesicular margin. Some researchers believe that tinea corporis should be rejected in every case of exfoliative red rash on body and extremities. Important segregative diagnoses of the disease include second stage syphilis, contact dermatitis, pityriasis rosea, psoriasis, dermal lymphoma, squamous cell carcinoma, annulare granuloma, annular sarcoidosis, in-between leprosy, and annular urticaria [11]. This study aimed at evaluating the factors leading to dermatophytosis.

## Materials and Methods

The present study was conducted for one year in Sina skin outpatient clinic. This study was approved by Ethic Committee of Tabriz University of Medical Sciences. Written consent was obtained from all the patients. Before starting the research, a questionnaire including variables of age, gender, occupation, suffering from Cushing syndrome, suffering from diabetes, family records of diabetes, records of swimming in pool, exercising, consuming special drugs such as immunosuppressive ones, chronic dermal diseases, xerosis, results of fungal smear conducted from the lesions was designed. Those patients clinically susceptible to tinea corporis were selected. Research samples were constituted of cases with positive results of lesions fungous smear. Although patients susceptible to tinea corporis are high in number, the smear was positive and the information of all data was complete only in 76 cases. Considering age, the patients were divided into eight groups: 1–9, 10–19, 20–29, 30–39, 40–49, 50–59, 60–69 and 70–79 years old. The results of the study were statistically analyzed using SPSS, version 16. To account for statistical differences in two groups, a Chi<sup>2</sup> test or independent sample T-test and Pierson correlation test was used, as appropriate. A p-value of <0.05 was considered significant.

## Results

Out of 76 patients, 46 (63.1%) were male and 30 (36.9%) female. There were 24 (31.58%) patients in 20–29, 14 (18.43%) cases in 1–9, 14 (18.43%) cases in 10–19, 8 (10.52%) patients in 40–49, 5 (6.57%) cases in 50–59, 60–69, and 30–39, and 1 (1.31%) patient in the 70–79 years old age group. As observed, most patients are in 20–29 years age group. In males, 10–19 years old age group with prevalence of 26.08% and then 1–9 years old group

with the prevalence of 21.73% are the most common age group. In females, 20–29 years old age group with prevalence of 53.3% is the most common age group. In males, most occupational groups were consisted of students (11 cases, 23.9%), stock breeders (6 cases, 13.04%), farmers (8 cases, 17.3%), self-employed and employees. Among females, 20 cases (66.6%) were housewives and it regarded as the most occupational group. The rest (10 cases, 33.4%) were students. Considering leading factors, out of 76 patients, 49 ones (64.47%) suffered from xerosis. It is regarded as the most common leading factor. In this study, 4 patients (5.26%) were diabetic and under treatment. Family records of diabetes were observed in 2 patients (2.63%) but results of their blood glucose tests were normal. Two cases (2.63%) swam in the pool and 1 patient (1.31%) suffered from Cushing syndrome. Considering drug consumption, records of occasionally consuming the sedatives were seen in 1 patient. The rest patients (except to diabetics and those suffered from Cushing syndrome) did not use any special drug. About 100% and 45.8% of patients suffered from xerosis in 10–19 (all patients) and 20–29 years old age group (11 patients out of 24 ones), respectively. The relationship between age and leading factors was evaluated using Chi<sup>2</sup> test. There was a meaningful relationship between age and xerosis (P<0.05). Out of 46 male patients, 1 (2.17%), 29 (63.04%) and 3 (6.52%) cases suffered respectively from xerosis, Cushing syndrome, and diabetes, 2 (4.34%) cases had experienced swimming in pool, 1 (2.17%) patient had family records of diabetes. The rest patients had no special problem. Out of 30 female patients, 1 (3.33%) and 20 (66.6%) cases suffered respectively from diabetes and xerosis, 1 (3.33%) patient had family records of diabetes. None of them had experienced swimming in pool. The rest females had no special problem. Out of 76 patients, there was no professional athlete and, as mentioned, only two patients had experienced swimming in pool.

## Discussion

Tinea corporis is of the prevalent and important kinds of dermatophytosis developed as a result of different strains including *Trichophyton rubrum*, *Microsporum canis*, *Trichophyton mentagrophytes*, and *Trichophyton tonsurans*. Rarely, *Trichophyton schoenleinii* is seen [12]. The disease is developed as a result of direct contact with the lesion or

contaminated animal, but contamination via apparatus and soil may also occur [13]. There are different statistics regarding its prevalence all over the country. According to two different reports, 30.2% and 6% of cases are related to tinea corporis [14,15]. Different references have pointed out to its high prevalence among children especially those having contact with domestic animals such as kitten, puppy dog, rarely, foal and other domestic animals. Of course, the disease has been reported in all ages and it has been more observed in children living at moderate zones [16]. This is while most patients (31.58%) of the present study are in 20–29 years old age group. Some epidemics of tinea corporis have been observed in old rest homes which can be attributed to malnutrition and cell-mediated immunity disorders. On the other hand, dermatophytosis are more common among males [17]. It was true about our study, too (63.1% males vs. 36.9% females). Tinea corporis is most prevalent in athletes, veterinarians, stock breeders and those working outdoors. Considering direct skin contact in wrestling, tinea corporis is prevalent in wrestlers and is also known as tinea gladiatorum [18]. In the present study, there were just 8 (10.52%) farmer and stock breeder among our patients. But, those females categorized as housewives (20 cases out of 30 ones, 66.66%) had records of contact with domestic animals or birds. None of the patients were professional athlete and only two males (2.63% of all patients) experienced swimming in pool. Trauma, maceration, and high humidity may be regarded as leading factors of tinea corporis [19]. Although most patients were old, some diseases such as mucocutaneous candidiasis, AIDS, treating with corticosteroid, malnutrition and disorder of the immune system for any reason including diabetes, lymphoma, Cushing syndrome or atopy are seen in these patients [20]. Additionally, in patients who have cell-mediated immune disorder, immunoreactions are at low level and lead to chronic infection [21]. In the present study conducted on 76 patients, only 4 cases (5.26%) suffered from diabetes and were under treatment, 1 patient (1.31%) suffered from Cushing syndrome, 2 cases (2.63%) had family records of diabetes, and most patients did not suffer from any special systemic disease and did not consume drugs. As mentioned, very moisture skin and sweating may predispose the person to tinea corporis. One of the conducted studies demonstrated that there were no significant number of atopic cases and those suffering from

xerosis [22]. But, some researchers have pointed out to high prevalence of this kind of dermatophytosis considering dry skin. Also, it has been emphasized that tinea corporis becomes chronic in atopic persons [23]. There are different hypotheses for stability of fungous infections in xerosis, for example, hypersensitivity type I is more and severe than hypersensitivity type IV in these individuals [24]. Considering that controlling system of fungous infections is in fact delayed hypersensitivity or type IV, chronic and severe lesions may appear such that serum level of IgE is high in chronic cases as well as cases occurring, for example, due to *Trichophyton rubrum* [25]. The present study demonstrated that 49 patients (64.47%) suffered from xerosis which is regarded as the most prevalent leading factor. In the 20–29 years old age group consisting of high number (24 cases, 31.58%) of the patients, 11 ones (45.8%) suffered from xerosis. Interestingly, in the 10–19 years old age group, all patients suffered from xerosis (100%).

## Conclusions

According to the results of the present research, xerosis was the most common factor leading to tinea corporis in these patients rather than diabetes or lymphoma. The subject is important because most patients were young (in 20–29 and 10–19 years old age groups) and constitute highest number of educational and labor force of the country. Every patient should bear costly treatments and spend more time. Xerosis can be recovered through offering some practical approaches including not using detergents to repeatedly washing the skin, using moisturizing products and not having contact with dust. Evidently, improving skin conditions may prevent from being affected by other skin infections such as bacterial infections or spread virus in addition to stopping and optimizing treatment response of the present lesion.

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