

An Epidemiological Study of Human Dermatophytosis in Karaj (2001)

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Summary

One of the problems of public health in Iran is mycotic infection which its incidence is not known. The most important disease of them is dermatophytosis. In this regard, determination of various species of etiologic agent, infection source, the risk of contact to animals, and public training are necessary to perform epidemiologic studies. In this research 750 suspected samples (including 560 male and 190 female) were studied, in which 157 cases (21%) suffering from dermatophytosis and out of them, 100 cases were positive culture. Out of isolated dermatophytes 69% were anthropophilic 30% zoophilic and 1% were geophilic. Zoophilic agents include *T. verrucosum* 11% (11 cases), *M. canis* 10% (10 cases) and *T. mentagrophytes* 9% (9 cases). The most impairments were observed in 0 – 9 years of age groups and the agent was *M. canis* appearing tinea capitis. The most prevalent ringworm agent was *E. floccosum* which was seen in groin. The most prevalent tinea unguis was in 0- 9 years and 10 – 19 years of age and its agent was *T. mentagrophytes*. The most prevalent tinea manuum was in 20 – 29 of age and its agent was *T. rubrum*.

Key words: Dermatophytosis, Dermatophyte, Zoophilic, Ringworm

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Introduction

The dermatophytes are among the commonest infections agents of man and no people or geographic area are without them (Rippon 1988). A dermatophyte is a fungus that invades the keratinized portions of the hair, skin and/or nail.

A dermatophytosis is mycotic infection of the hair, skin and nail. These infections should not be confused with a dermatomycosis, invasion of the cutaneous tissues by other fungi. In recent years, mycosis and dermatophytosis incidences in humans have increased. One of the reasons is the contact to domestic animals (Emami & Moghadami 1987). The dermatophytes are a closely related group of organisms that can use keratin as a nitrogen source. Most of the dermatophytes cause several different clinical manifestations and most of these clinical states can be caused by more than one dermatophytes. Skin infections in human beings affect on stratum corneum and its appendices (e.g. hair and nails). These infections are only limited to stratum corneum. But due to the existence of infective agent and its metabolites, widespread pathologic changes in the host occur. The main agents for infections are keratinophilic fungi that were called dermatophyte (Shadzy 1988).

Dermatophytes are the most prevalent in humans. One loose classification of dermatophytes group according to the preferred substrate includes; anthropophilic (people-loving), geophilic (earth-loving) and zoophilic (animal-loving) fungi (Rippon 1988). Anthropophilic dermatophytes are more likely to cause chronic infections eliciting relatively mild responses by the host. Zoophilic fungi produce more conidia and cause more severely inflammatory infections in human. Geophilic dermatophytes are the most active in conidiatation and cause painful inflamed lesions. On the basis of clinical, microscopic and morphologic three anamorphic genera are recognized as dermatophytes, epidermophyton, microsporum and trichophyton (Rippon 1988). Many factors such as temperature, humidity, job, living conditions, ignoring

health principles and age are important in the infection. Dermatophytes do not infect subcutaneous due to the existence of free vital materials particularly iron. The purpose of this epidemiological study was to determine dermatophytes distribution (patients for dermatophytosis) in karaj population area.

Materials and Methods

Sampling. First, suspected subject were referred to medical mycology lab for sampling three days after having a bath. They were also told not to use any anti – fungus drugs 7 – 10 day before sampling. Collection of specimens of infected hair, skin, or nail should be done according to procedure manual of laboratory. Generally the task is to decontaminate the affected area to remove as much of the normal skin flora as possible and to obtain tissues from the area most likely to contain viable organism. The most important element in transport of specimens believed to contain dermatophyte is to keep the specimen dry. This prevents over growth of the tissue and fungus by bacteria and preserver the fungus for culture. Containers such as test tubes that allow moisture to condense around the specimen should not to use. In these study specimens collected aseptically and transported to the laboratory in sterile and dry container. 750 subjects were selected. A questionnaire was filled in before sampling. Selected samples included scale, postule, vesicle, contaminated and decolorated hair and nail. Some dermatophytes fluoresce by wood's lamp. A wood lamp can be useful for detecting dermatophyte infections. Generally tissue infected with microsporum fluoresce bright yellow-green. Other dermatophyte generally does not cause fluorescence.

Direct microscopy. KOH (20%) was used for skin and nail samples. Lactophenol along or with heating was used for hair samples.

Culture. Samples were inoculated into Sabouraud Dextrose agar and SCC agar medium present in tubes. These tubes were kept at 26 – 30°C for four weeks. At intervals, subcultures

were prepared for some samples. Colony morphology has one feature that is helpful for distinguishing the dermatophytes from other pathogenic fungi. Colonies that have one pigment on the surface of the colony and another pigment-other than black-on the reverse are likely to be dermatophytes. Not all dermatophytes have this pattern of pigmentation.

Direct microscopy from colony sample. By using slides and LCB suspected colony was studied under a microscope. Each genus has a distinctive pattern of conidiation that is considered characteristic. Differentiation relies heavily on the kind microconidia and macroconidia produced the size, shape, septation, and attachment to the hyphae of the conidia and the vegetative hyphal structures present.

Complementary and specific examinations. After culture and direct microscopy, samples on which were not determined any fungi species, complementary examinations were applied such as urease test and Pigmentation on Corn Meal agar medium. To isolate and differentiate *M. canis* from *M. audouinii*, rice medium was used. Suspected samples to *T. verrucosum* were incubated at 37°C.

Results

In this research 750 suspected samples (including 560 male cases and 190 female cases) were studied , in which 157 cases (21%) suffering from dermatophytosis and out of them of 100 cases were positive culture .Out of isolated dermatophytes 69% anthropophilic 30% zoophilic and 1% were geophilic sources. The most observed zoophilic dermatophyte in this study was *T. verrucosum* and *M. canis*. *T. mentagrophytes* were less frequently observed. Based on the location of lesion *M. canis* 50% (6 cases), *T. rubrum* 16.6%(2 cases), *T. verrucosum* 6.6%(2 cases), *T. mentagrophytes* 8.4% (1 case) and *M. gypseum* 8.4%(1 case) were isolated in tinea capitis. *M. canis* was isolated in 22.2% (2 cases) of tinea corporis, 14.3% (1 case) of tinea manuum and 9% (1 case) of tinea barbae. *T. verrucosum* was isolated in 16.6% (2 cases) of tinea capitis, 10% (2 cases) of tinea pedis, 40% (2 cases) of tinea unguium and 45.5% (5 cases) of tinea barbae. *T. mentagrophytes*

was isolated in 8.4% (1 cases) of tinea capitis, 2.8% (1 cases) of tinea cruris, 22.2% (2 cases) of Tinea corporis, 28.5% (5 cases) of Tinea manuum, 40% (8 cases) of Tinea pedis, 60% (3 cases) of tinea unguium and 9% (1 cases) of tinea barbae (Table 1).

Age groups of 0 – 9 years and 10 – 19 years had the most prevalent of infection to zoophilic dermatophyte agents such as *T. verrucosum* and *M. canis*. In age groups of 0 – 9 years, *verrucosum* and *M. canis* had 26. 8% and 34.78% of infection respectively. Male subjects had the most incidences with *T. verracosum* and *M. canis*. In Table 2, Tinea capitis, tinea cruris, tinea manuum and tinea barbae lesions were mostly seen in male subjects, but tinea pedis, tinea capitis and tinea unguium were mostly seen in female subjects (Table 3). In age groups of 0 – 9 years mostly seen lesion was tinea capitis and the least was tinea cruris. In age groups of 10 – 19 years mostly seen lesion was tinea barbae and the least was tinea cruris. In age groups of 20 – 29 years mostly seen lesion was tinea unguium and the least was tinea capitis and tinea manuum. In age groups of 40 – 49 years mostly seen lesion was tinea cruris and the least as tinea capitis, tinea barbae and tinea corporis.

Table 1. Frequency and relative frequency of dermatophyte species due to anatomical site of lesion in Karaj (2001)

Clinical singn	T. Copitis		T. Cruis		T. Corporis		T. Manuum		T. Pedis		T. Unguium		T. Barbae		Total	
	No	Per.	No	Per.	No	Per.	No	Per.	No	Per.	No	Per.	No	Per.	No	Per.
<i>Dermatophyte</i>																
<i>T.verrocsum</i>	2	16.6	0	0	0	0	0	0	2	10	2	40	5	45.5	11	11
<i>M.canis</i>	6	50	0	0	2	22.2	1	14.3	0	0	0	0	1	9	10	10
<i>T. rubrum</i>	2	16.6	10	27.7	2	22.2	4	57.2	9	45	0	0	3	27.5	30	30
<i>E. floccosum</i>	0	0	25	69.5	2	22.2	0	-	1	4	0	0	0	0	28	28
<i>T.mentagrophytes</i>	1	8.4	1	2.8	2	22.2	2	28.5	8	40	3	60	1	9	18	18
<i>M. gypseum</i>	1	8.4	0	0	0	0	0	0	0	0	0	0	0	0	1	1
<i>T. violaceum</i>	0	0	0	0	1	11.2	0	0	0	0	0	0	1	9	2	2
Total	12	100	36	100	9	100	7	100	20	100	5	100	11	100	100	100

Table 2. Distribution of frequency and the relative frequency of dermatophyte species due to sex in Karaj (2000) genus

Dermatophyte	T. verrocsum		M. canis		T. rubrum		E. floccosum		T. mentagrophytes		M. gypseum		T. violaceum		Total	
	No	Per	No	Per	No	Per	No	Per	No	Per	No	Per	No	Per	No	Per
Sex																
Male	7	63.6	9	90	20	66.6	17	60.7	6	33.4	0	0	0	0	59	59
Female	4	36.4	1	10	10	33.4	11	39.3	12	66.6	1	100	2	100	41	41
Total	11	100	10	100	30	100	28	100	18	100	1	100	2	100	100	100

Table 3. *Distribution of frequency and the relative frequency of dermatophytosis in the age groups*

Dermatophyte	T. verrocosum		M. canis		T. rubrum		E. floccosum		T. mentagrophytes		M. gypseum		T. violaceum		total	
	No	Per.	No	Per.	No	Per.	NO	Per.	NO	Per.	NO	Per.	NO	Per.	NO	Per.
0-9	6	54.5	8	80	4	13.3	0	0	3	16.6	1	100	1	50	23	23
10-19	5	45.5	1	10	5	16.7	3	10.7	1	5.6	0	0	1	50	16	16
20-29	0	0	1	10	10	33.3	17	60.7	7	38.9	0	0	0	0	35	35
30-39	0	0	0	0	3	10	4	14.4	3	16.6	0	0	0	0	10	10
40-49	0	0	0	0	2	6.7	3	10.7	4	22.3	0	0	0	0	9	9
50<	0	0	0	0	6	20	1	3.5	0	0	0	0	0	0	7	7
Total	11	100	10	100	30	100	28	100	18	100	1	100	2	100	100	100

Discussion

Higher prevalence anthropophilic dermatophytes shows that urban area was mostly studied (Bassirh & Khaksar 2003). In children *M. canis* and *T. verrucosum* due to their contacts with animals were more common (Khosravi & Mahmoudi 2003). Therefore tinea capitis induced by *M. canis* and *T. verrucosum* were commonly seen. In the present study, the majority of infected patients to dermatophytosis were male. Of course, sex differences merely cannot be the reason for a difference in frequency. But other factors as neglecting health regulations, more usage of public areas by males, swimming-pool, public baths, using others personal sportswear, shoes and bathroom accessories, resting in others bed, staying at hotels, etc can be effective in making such differences (Hashemi & Rokoei 2004).

Tinea capitis were seen mostly in boys because of their more contact with the soil, their short hair-cut, having no cover on their heads referring more to hair-dressers, involving more in animal farming, existing hair keratine, the absence of fungistatic lipids and sexual hormones. In both sexes after maturity, tinea capitis is less prevalent due to secretion of fatty acid (Zeraei 1998).

Tinea cruris was more prevalent in men rather than women due to wearing pant, sport activities, job conditions and cultural factors (Sadri & Farnaghi 2000). The male-female ratio is 3 to 1. Females get infected by direct contact and using infected tools (Andalib 1988). The reason for tinea rubrum infection was because of being bare-foot in cattle-farms. Regarding that 60% cases face lesions were before maturity, and that, children has high sensitivity to *T. verrucosum*, *T. rubrum* and *M. canis*, it is possible to justify the isolation of this microorganism (Vidimos 1991).

T. verrocusum is the main ringworm agent in rural areas, which causes family epidemy. Lesions in young boys can be seen in their faces and in adults in their beards and arms (Mikaeili 2004). Direc contact to cows and not washing the hands are the main factors (Nosrollai & Hashemi 2005) chiefly zoophilic dermatophytosis like *T.mentagrophytia* and *T. verrocusum* cause ringworm in

beard. Both can be transferred from cow to human. *T. mentagrophytis* can also be transferred from horses and dogs. Most of tinea barbe cases are due to head ringworms. By knowing that 60% of lesions are before puberty and children are sensitive to *T. verrocosum*, *T. rubrum* and *M. canis*. It is possible to justify the isolation of these organisms (Hashemi *et al* 2004). In the study, *T. rubrum*, *T. mentagrophytis* were the chief agents for tinea pedis. Two cases were infected by *T. verrocosum* caused by being bare-foot in cattle farms. Tinea pedis is mostly visible after maturity (Sadri & Farnaghi 2000). All dermatophytes can infect hands is often related to tinea pedis. The agent is normally the same (Suejgaard 1986).

Two cases tinea manuum caused by *M. canis* were due to contact with dogs and cats. It is suggested that all people in contact with animals should be trained and examined then cured by health centers, regarding that *T. verrocosum* include high zoophilic rates causing ringworm in cattle.

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