

Modifiable risk factors associated with patients of tinea corporis

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Abstract


Background: Dermatophytoses tend to recur, especially in tropical countries like India due to the hot and humid climate. Though, several risk factors can influence on dermatophytosis, few are modifiable. Clothing types and habits, poor personal hygiene, sharing of towels are some of the modifiable risk factors for development of dermatophytosis. Identifying such modifiable risk factors can help in deciding on specific interventions. The present study was conducted to know modifiable risk factors associated with patients of Tinea corporis. **Material and Methods:** A total of 187 patients clinically diagnosed as *Tinea corporis* who were fungal culture positive were included. A well-tested questionnaire schedule had been designed to collect data on personal habits. Samples were collected and direct microscopy by KOH and culture on SDA with antibiotics were done. **Results:** The number of patients who were accustomed to wear cotton clothes were almost double to those who wore synthetic clothes (1.9:1). Out of 187 patients, 124 were using loose clothing whereas 63 were using tight clothing. 109 cases were taking daily bath and 162 used simple non medicated soap for bathing. A total of 97 patients gave history of sharing of towels. 123 patients gave a history of routine soil contact and 45 had contact with household pet animals. The commonest addiction was tobacco chewing followed by smoking. **Discussion:** Poor personal hygiene and habits of sharing towels with others which could be one of the important risk factors responsible for transmission in this study population. People need to be educated about health risks associated with their habits.

Key Words: Dermatophytoses, modifiable risk factors, sharing towels, addiction.

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INTRODUCTION

Dermatophyte infections are one of the earliest known fungal infections of mankind and are very common throughout the world. Prevalence of superficial fungal infections has been estimated to be around 20-25% worldwide by World Health Organization (WHO)¹. Commonly the infection types are named with respect to affected body parts- tinea corporis or ring worm (general skin), tinea cruris (groin), tinea unguis (nail), tinea

capitis or ring worm of scalp, tinea barbae (beard area) and tinea manuum (hands)²⁻⁴. According to various studies tinea corporis is commonest followed by tinea pedis and tinea unguis. Generally, these infections do not account for mortality or significant degree of morbidity; however, they can cause severe discomfort and disability, thereby potentially impacting quality of life. Dermatophytoses tend to recur, especially in tropical countries like India due to the hot and humid climate, reasons for the recurrence could be continued exposure to the same source or persistence of some risk factors⁵. Though, several risk factors can influence on dermatophytoses, few are modifiable. With changes in few habits, dermatophytoses can be avoided up to some extent. Clothing types and habits, poor personal hygiene, sharing of towels with others, soap used for bathing, close contact with animals or soil harbouring and swimming habit are some of the modifiable risk factors for development of dermatophytoses⁶. Identifying such modifiable risk factors in a particular population or geographical area can help in deciding on specific

interventions. Thus the present study was conducted to know modifiable risk factors associated with patients of Tinea corporis.

MATERIAL AND METHODS

The present study of dermatophytoses was carried out over a period of one year, from January 2014 to December 2015. A total of 187 clinically diagnosed and culture positive cases of tinea corporis infection of all age groups of both sexes were taken for the study. A detailed history of selected cases was taken in relation to personal habits such as clothing types and habits, poor personal hygiene, sharing of towels, soap used for bathing, close contact with animals or soil harbouring and swimming habit. After the detailed history, a detailed clinical examination of patient was done. the affected area was swabbed with 70% alcohol and the active edge of lesion scraped with a sterile scalpel. The scrapings were collected from the margins of the lesion without injuring the skin surface. The scrapings were collected in a sterile petri dish. The samples were examined for dermatophyte hyphae, arthroconidia by using 10% KOH. Specimens were then cultured on Sabouraud’s Dextrose Agar (Merck, Germany) containing Chloramphenicol, Gentamycin and Cyclohexamide; and were kept at 26°C for four weeks. fungal growth was identified by slide culture and physiological and biochemical tests⁶.

RESULTS

A total of the 187 cases were clinically diagnosed as tinea corporis and culture positive. The maximum number of patients 66 (35.3%) were found in the age groups of 21 – 30 years. There were 109 males and 78 females showing more prevalence in males. *T. rubrum* was isolated from 136 patients (72.7%) and *T.mentagrophytes* from 51 (27.3%). Maximum number of patients, 92.5% patients had some level of education and 7.5% had not received any education. In our study 81.8% belonged to lower income group. In our study 24.1% of patients suffering from T. corporis lived in well ventilated houses which was less as compared to 75.9% of patients living in ill ventilated houses. Among modifiable risk factors found, out of the total 187 patients the number of patients who were accustomed to wear cotton clothes were almost double to those who wore synthetic clothes (1.9:1). Out of 187 patients, 124 were using loose clothing whereas 63 were using tight clothing. 109 cases were taking daily bath and 162 used simple non medicated soap for bathing. A total of 97 patients gave history of sharing of towels among other members in the house and almost similar i.e., 90 patients denied of sharing the towels. Only two patients in our study had a history of swimming that too in ponds only. Out of 187 patients, 72 (38.5%) did not use any oils on the skin, a large number (61.5%) however

had the habit of application of some oil (coconut, mustard etc) on the body. 123 patients gave a history of routine soil contact and 45 had contact with household pet animals. The commonest addiction was tobacco chewing followed by smoking. (Table 1).

Table 1: Modifiable risk factors associated with Tinea corporis infection

Risk factor	T. rubrum	T. mentagrophytes	Total n (%)
Clothing types			
Cotton	92	30	122 (65.2%)
Synthetic	44	21	65 (34.8%)
Clothing habits			
Loose	92	32	124 (66.3%)
Tight	44	19	63 (33.7%)
Daily bath			
Yes	84	25	109 (58.3%)
No	52	26	78 (41.7%)
Towel sharing			
Yes	67	30	97 (51.9%)
No	69	21	90 (48.1%)
Swimming habits			
Pond	02	--	2 (1.1%)
Free flowing	--	--	--
Sea water	--	--	--
No swimming	134	51	185 (98.9%)
Types of soaps			
Simple	124	38	162 (86.7%)
Medicated	11	13	24 (12.8%)
Detergent	01	--	01 (0.5%)
Soil type contact			
Routine	96	27	123 (65.8%)
Farmer	--	--	--
Gardener	--	--	--
Others	40	24	64 (34.2%)
Use of oil on skin			
Yes	87	28	115 (61.5%)
No	49	23	72 (38.5%)
Contact with pets			
Yes	29	16	45 (24.1%)
No	107	35	142 (75.9%)
Addiction			
Tobacco	56	18	74 (39.5%)
Smoking	36	06	42 (22.5%)
Alcohol	31	03	34 (18.2%)
Drugs	--	--	--
No addictions	13	24	37 (19.8%)

DISCUSSION

Tinea or dermatophytoses superficial skin fungus infections affecting keratinized tissues such as hair, nail, and superficial layer of epidermis⁶. It should be mentioned that chance of suffering from dermatophytoses is 25% for everybody during his life⁷. Different factors such as climatic factors, age, gender etc., which are non-avoidable, contribute in developing dermatophytoses, but few of them such as clothing types and addiction are avoidable. It is assumed that tight clothing without

aeration, unhygienic habits and close associations among the people are the reasons for more predominance of dermatophytic infection⁸. In our study, there were more number of patients (1.9:1) who wore cotton clothes than synthetic clothes (Table 1). Most of our patients were involved in exhausting physical work with long working hours under the sun, which leads to profuse sweating. The tight synthetic clothes worn by them result in conditions like increased dampness and warmth of the body facilitating the skin surface suitable for growth of dermatophytes⁹. In a study by Binduet *et al* it was seen that the use of occlusive clothing and synthetic fabrics was seen in 64% of male patients and 80% of female patients compared to 22% and 32% controls respectively¹⁰. In a study by Poluri *et al* use of occlusive or synthetic fabric dressing regularly was seen in 40.32% of tinea corporis out of 110 patients studied by them¹¹. Hygiene status of an individual's skin has been sited as one of the risk factors associated with acquisition of dermatophyte infections. The poorer the hygiene, the higher the chances of acquiring infection. In present study 109 (58.3%) patients were taking daily bath. Over 75% of participants reported bathing atleast once daily in the study by Chepchirchir *et al*¹². High frequency of bathing reduces rate of colonisation of skin by fungal agents following contact with infective agents¹². In a study by Das *et al* in 2009, it was recorded that 65.2% of affected individuals took bath atleast once a day which is in conformity with our studies¹³. Accordingly, it could be possible that daily bath may result in exfoliation of skin scales resulting in a decreased load of fungus even in established skin infection like *T.corporis*. Sharing of towels has been incriminated in transmission of dermatophyte infection from person to person. In our study, it was observed that A total of 97 patients shared towels. This could be an indication that an increased human to human transmission could increase the virulence of pathogens. In a study done by Chepchirchiret *et al* in 2015, it was noted that sharing of beddings and toiletries was a common practice among participants at home. Over 66% of participants shared bath towels and combs with family members while 78.5% shared beds and beddings¹². Fomites play an important role in transmission of infection. In a study by Moto *et al*, it was reported that most of the children came from poor settings and 92% confirmed sharing items especially bath towels¹⁴. In our study only 2 patients (1.1%) among 187 gave a history of swimming and those too in a pond. None of the patients used swimming pools. There are growing rates of people attending swimming pools for recreational, rehabilitative treatment or sport, especially in tropical area. Dermatophytoses is a communicable disease mainly transmitted by human sources and swimming pools have high potential to transfer this

infection. Environmental surfaces of swimming pools maybe contaminated by many species of fungi especially in tropical climates¹⁵. Therefore, they could play as one of the most important sources for fungal transmission to swimmers. Isolation of dermatophytes from public swimming pools have been investigated and reported by a number of investigators. Existence of pathogenic fungi in environmental public places is one of the most important transmission key. Areas such as public showers, health club bathing facilities, swimming pools, changing rooms and toilets will contain layers of skin shed from an infected person. The shed skin contains fungal spores and individuals with fissured or hyperhydrotic skin conditions are at risk for infection¹⁵. Usage of the type of soaps used by the patients in our study revealed that 12.8% of patients used medicated soaps and 86.7% of the patients used non medicated simple soaps (Table 1). There was no significant difference regarding use of soaps in the two groups. In a study by Das *et al*¹³, regular use of soap was reported in 51.8% of patients of dermatophytoses. In our study all the 187 patients (100%) gave history of use of either simple or medicated or detergent soap for regular use. In a study by Dinkelaet *et al* in Tanzania¹⁶ compared the efficacy of medicated soap against superficial dermatomycosis. There was no significant difference between medicated and simple bar soap users during follow up after 2 months for any of three forms of dermatophytoses namely *T.corporis*, *T.pedis*, *T.capitis*. As there was no significant difference the results were combined to assess overall effect of soap use on dermatomycoses. In our study most of the individuals had low paying jobs and residing in slums with distinct lack of basic amenities like electricity, proper sanitation and access to piped water¹². Poor garbage disposal has been associated with presence of zoophilic type of dermatophytes owing to presence of rodents i.e. rats. This is a common phenomenon in slums characterised by heaps of garbage around living houses. Rodents scavenging into houses in search of food maybe reservoirs of fungal pathogens. Such mammals harbour dermatophytes like *T.mentagrophytes*¹². In a study by Poluriet *et al* in 2015, 32.25% of patients were reported to be in contact with soil regularly because of their occupation¹⁷. In a study by Sharma and Borthakur, 39% of patients were engaged in agricultural work, the probable factors put forward for this association include constant contact with soil and plants, increased sweating and unhygienic conditions associated with poverty as they belonged to lower income groups¹⁸. Soil carries arthrospores of dermatophytes and exposure to it increases risk of infection in these patients with excessive soil contact⁶. In our study, 72 (38.5%) did not use any oils on the skin, a large number (61.5%), however, had the

habit of application of some oil (coconut, mustard etc.,) on the body. Basnet et al, in Nepal in 2001, reported that regular application of mineral oil was practised by 87.8% of rural children as compared to 54.7% of urban children. The prevalence of *T. capitis* in these children was 45.5% and 54.5% respectively suggesting that oil use has some protective effect against dermatophytes¹⁹. This indicated towards protection by oil from developing resistant infections. Oil is also a factor for fungal skin disease development. In a study by Naharet al in 2009, oil was shown that the distribution of dermatomycosis was 37.33% versus 62.67% in oil users and non users respectively²⁰. In a study done in 1992 by Garg et al who interviewed 329 persons (61.7% males and 38.3% females) mustard oil use was reported by 39.4% males on skin and 19.8% females on skin. Coconut oil was used in 9.9% males on skin and 8.7% females on skin. Mustard oil exhibited highest growth inhibition (90-100%) of the test species studied. They observed that mustard oil and coconut oil being cheapest were accessible to each section of the society²¹. The use of oils as potential anti fungal agents is supported by the fact that the incidence of *T. capitis* in India, inspite of favourable subtropical climate is rare. Contact with domestic animals (dogs and cats) was a factor observed in 45 out of 187 (24.1%) patients in our study. In a study by Madhavi et al in rural population 15% patients gave history of contact with animals²². In our study it was 24.1%. In the present day living conditions, humans and domesticated animals live their life in close proximity to one another and are housed under same roof or sleep on a common floor. In such a situation, skin and other infections are contracted easily and perpetually multiplied as dermatophytes are spread by direct contact from other people, animals and soil as well as indirectly from fomites. In a study by Sepavh and et al, it was reported that out of 172 patients, 45.9% had contact with animals, 19.8% had contact with cows, 18% with sheep, 5.8% with goat, 1.7% with dog, 6% with domestic birds²³. These domestic animals are an important factor in infection with zoophilic dermatophytes. In a study by S. Raoin 2004 on 200 patients attending alcohol de-addiction camps, it was found that dermatophyte infection was prevalent in 4.5% of patients but that was comparable with a 3% prevalence in general population²⁴. The nicotine associated with tobacco chewing and smoking may lead to vascular changes which have been proposed as contributory factors for onychomycosis. Tobacco chewing was the commonest addiction found in our study, this was followed by smoking and alcohol drinking but there was no significant difference between responsive and resistant groups as well as between *T. rubrum* and *T. mentagrophytes* infections pertaining to any of the

addictions. Tobacco usage is associated with release of nicotine which has an effect on peripheral blood supply and peripheral vascular disease is also found to be a contributory factor for onychomycosis²⁵. In conclusion, it was observed that the living condition of the patients played a major role in development of dermatophytoses. Poor personal hygiene and habits of sharing towels with others which could be one of the important risk factors responsible for transmission in this study population. People need to be educated about health risks associated with their habits.

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