



Research Article

PREDISPOSING FACTORS AND SEASONAL DISTRIBUTION OF *TENIA* INFECTIONS IN TERTIARY CARE HOSPITAL

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Received: June 24, 2019; Revised: July 24, 2019; Accepted: July 26, 2019; Published: July 30, 2019

Abstract- The most emerging superficial fungal infection are dermatophytes which are commonly infecting humans and animals. These infections are capable of invading keratinized tissues of skin, nail and hair. *Trichophyton*, *Microsporum* and *Epidermophyton* are the three different genera on the basis of morphological characteristics. A total of 1432 patients with symptoms compatible with superficial mycosis were included in the present study. Tinea corporis was the most common clinical form of dermatomycoses both in males and females' patients followed by Tinea cruris. The patients with age group of 21-40 years were more susceptible to dermatophytes infections because of more physical active group and involves in the outdoor activities thereby increasing chance of exposure. Although 1.4% children between 7-10 years also infected with Tinea corporis, Tinea cruris and Tinea capitis. Maximum number of patients visited during the summer and rainy season from July to October which allows the growth of dermatophytes on the skin because of high temperature and humidity at Malwa region of Punjab. In the present investigation mostly patients have agriculture background. Therefore, unhygienic conditions, ignorance, poverty, less medical facility and high cost of medicine, people do not get timely and appropriate treatment, which leads to the severe dermatophytes infection.

Keywords- Dermatophytosis, Tinea Cruris, Tinea Corporis, Predisposing Factors

Citation: Kaur S., et al., (2019) Predisposing Factors and Seasonal Distribution of *Tenia* Infections in Tertiary Care Hospital. International Journal of Microbiology Research, ISSN: 0975-5276 & E-ISSN: 0975-9174, Volume 11, Issue 7, pp.-1641-1644.

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Academic Editor / Reviewer: Ameer Khuroo

Introduction

The most common type of superficial fungal infection are dermatophytes which commonly seen in humans and animals. These infections are capable of invading keratinized tissues of skin, nail and hair. *Trichophyton*, *Microsporum* and *Epidermophyton* are the three different genera on the basis of morphological characteristics [1]. The dermatophytes have 42 valid species in which *Trichophyton* have 24 valid species, *Microsporum* includes 16 species while *Epidermophyton* have one species that is pathogenic to human, and other one is non-pathogenic. *Trichophyton* species infect all keratinized tissues viz., skin, hair and nail, while *Microsporum* infect only skin and hair but not nail, whereas the *Epidermophyton* infect only skin [2]. These infections infect almost every part of the body such as scalp, legs, arms, abdomen, arm, face, barbae, feet, groin and nails. The lesions on body parts may occur as itchy, redness, scaling, arising with irregular borders and a clear central area. This is also known as Tinea or ring worm due to its appearance not it is caused by any worm [3]. On the basis of natural habitat dermatophytes again divided into three groups: Anthropophilic, Zoophilic and Geophilic. Anthropophilic fungi are pathogenic to humans which are more prevalent in urban populations. Zoophilic are present in animals and easily transfer from pets or domestic animals to human beings. Geophilic are present in soil which are pathogenic to human and animals [4]. According WHO dermatophytes affect 20-25% of the world population. In recent years the prevalence of these infection is increases due to climate conditions like high temperature and humid weather, use of antibiotics, immunosuppressive drugs and change in lifestyle [5]. Hosthota et al. [5] henceforth reported few high risk factor for development of dermatophytes which includes poor personal hygiene, humid weather, live in overcrowded area, sharing clothes and close contact with infected person or with pets and domestic animals and farming occupation which involves

direct contact with soil [6,7]. Dermatophyte infections which present all over body surface except scalp, palm, groin and soles are called Tinea corporis and most common dermatophyte infection reported in India and overseas in many studies [8,9,10,11]. The dermatophyte spectrum causing skin infection changes with time and geographical locations. Dermatophyte commonly reoccurs due to continue exposure to the same source. Mostly in India there is poor availability of KOH or culture facilities in primary and secondary level health care facilities and most of the time treatment is provided based on clinical findings mostly the site and morphology of lesions. Therefore, it is important to understand the varied clinical presentations, the profile of organism by practitioners to provide effective empirical treatment [7]. The prevalence of dermatophyte infection enhancing day by day in India which leads complication in cure. Because the severity of infection depend on environment, host immunity, site of infection and patients working conditions. The treatment cost is burden on economic status of people. Therefore, the present investigation includes the predisposing factors and seasonal distribution of clinical types of dermatophytosis in relation to the age and sex of the patients.

Materials and Methods

Study design and patients

It was a prospective cross sectional study and carried out in the Department of Dermatology, AIMSR Hospital and Centre for interdisciplinary Biomedical Research Centre, Adesh University from January 2018 and December 2018 at Bathinda, Punjab, India. Clinically suspected cases of dermatophytosis attended the Dermatology Outpatient Clinic at Adesh University Hospital were included in the study. Detailed history of patients which included personal particulars, age, sex, occupation, duration, clinical presentation, treatment taken especially steroid locally or systemically, source of acquiring the disease (animals/soil).

Table-1 Distribution of clinical types of dermatophytosis in relation to the age and sex of patients from January to December, 2018

Dermatophytes Species	<i>T.corporis</i>		<i>T.cruis</i>		<i>Onchomycosis</i>		<i>T.pedis</i>		<i>T.faceia</i>		<i>T.capitis</i>		Total	
Age	M	F	M	F	M	F	M	F	M	F	M	F	M	F
0-10	5	2	5	3	-	-	-	1	-	-	4	-	14	6
11-20	95	18	24	17	4	1	-	1	8	1	2	-	133	38
21-30	125	81	96	44	8	7	4	3	9	3	-	-	242	138
31-40	97	86	64	60	7	9	2	2	5	1	-	-	175	158
41-50	87	79	41	33	2	8	1	1	1	-	-	-	132	121
51-60	49	36	26	19	11	6	1	1	1	-	-	-	88	62
61-70	38	21	22	12	2	6	-	-	-	-	-	-	62	39
71-80	12	1	3	2	2	4	-	-	-	-	-	-	17	7
Total	508	324	281	190	36	41	8	9	24	5	6	-	863	569

Total patients- 1432

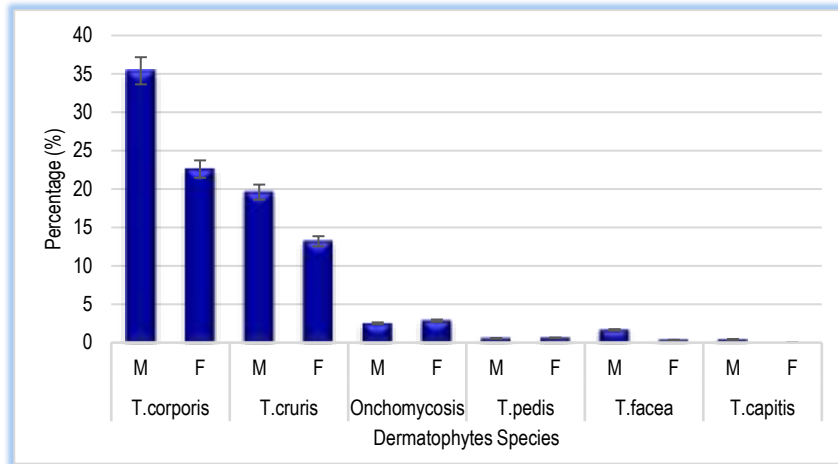


Fig-1 Percentage of distribution of clinical types of dermatophytosis

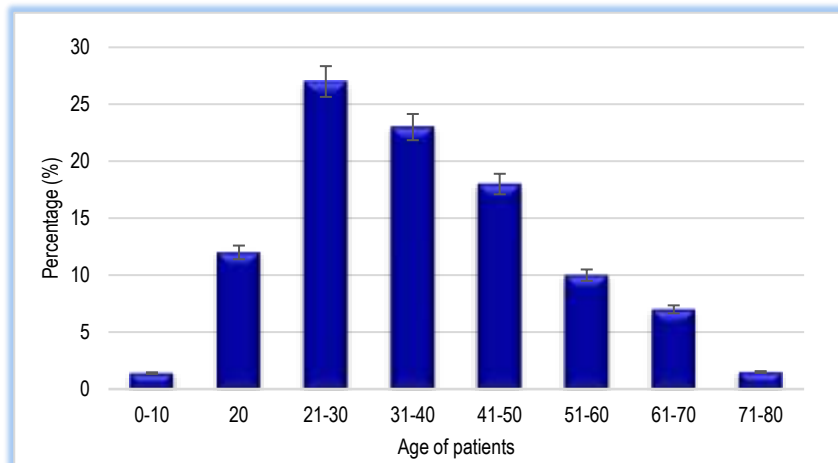


Fig-2 Age wise distribution of dermatophytes

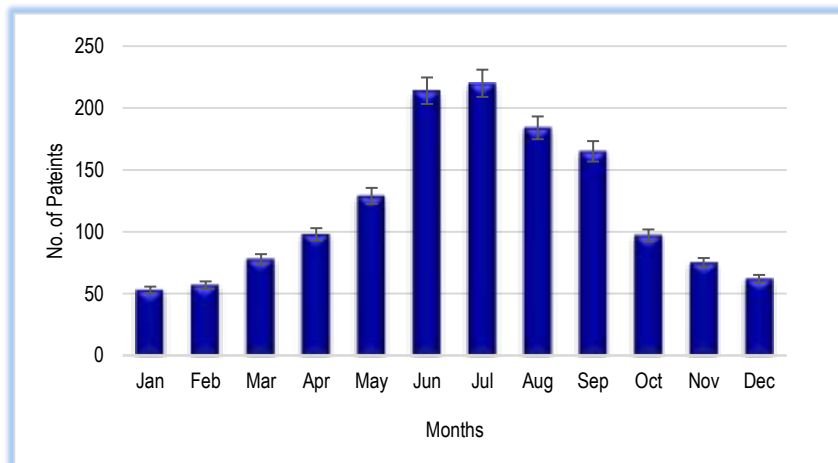


Fig-3 Seasonal distribution of dermatophytes

Family history of similar disease or presence of *Tinea* in the family, details of personal hygiene, sharing of clothing with other individuals were recorded in the questionnaire.

Diagnosis

After the thorough history, the clinician done the examination of the infected patients in presence of light and observed the type and site of the lesion, total lesions number on the body parts and existence of an inflammatory margin. After taking informed oral and written consent from the patients the samples were collected. The present research was conducted after approval by the Ethical Committee of Adesh University. The diagnosis was confirmed with the detection of segmented hyphae in skin scrapings from an affected area with a potassium hydroxide preparation under Microscope (Olympus CX21iTR) at Centre for Interdisciplinary Biomedical Research Centre [12].

Clinical symptoms of dermatophytes

Clinical Symptoms of cutaneous mycoses, including itching, desquamation, vesiculation, discoloration, fissures on skin, maceration on interdigital spaces, thickening and discoloration of the subungual area, yellowish-brown nail plates or desquamation or alopecia on scalp skin were examined by the dermatologist.

Results

This study intended to find out the spectrum of dermatophytes causing *Tinea* infections and to assess possible risk factors for getting dermatophytosis specifically among patients from rural areas around Bathinda. Among the 1432 patients, the men (60.26%) were more susceptible to fungal infection as compared to females (39.73%). Most common is *Tinea corporis* (58.1%) followed by *Tinea cruris* (32.89%), *Onychomycosis* (5.4%), *Tinea pedis* (1.2%), *Tinea faciei* (2.0%) and *Tinea capitis* (0.42%) (Table 1, Fig.1). Age group 21-30 was more susceptible to *Tinea corporis* and *Tinea cruris* in males while in females age group 31-40 were more susceptible (Fig. 2). In the age group 21-40 both sexes are physically more active in indoor and outdoor activities which acquired the infection through direct contact with infected person, soil and animals. On the contrary, *Onychomycosis* was most common in the age group of 51-60 years, as aging is the promising risk factor for *Onychomycosis* that might be due to insufficient peripheral circulation, prolonged exposure to pathogenic fungi, repeated nail damage, minimum immune function, and reduced nail growth. Similarly, *Onychomycosis* in the younger population may also occur due to their exposure to occupation-related damage to nails as well as use of occlusive footwear. *Tinea pedis* was more frequent in the female patients while the *Tinea faciei* was found mostly in males patients which may be *Tinea barbae* because in some cases dermatophyte infection spread up to the bearded areas. Although 20 children both male and female between 7-10 years were also infected with *Tinea corporis*, *Tinea cruris* while *Tinea capitis* was more common in the male children only. Whereas in age group 71 to 80 approximately 24 patients reported, in which 17 was males and only 7 was females which had severe dermatophytes infection because medical conditions more common in the elderly that further enhanced the risk of combined *Tinea*.

Symptoms

The main symptoms of dermatophytosis are the itching that depends on the site of infection on human body. *Tinea corporis* reveals a little severe itching in the location of infection, while the itch becomes very intense in the case of *Tinea cruris* and can be painful, if sweating accumulates further macerating of the skin. The severity of itching in *Tinea cruris* make it called jock itch due to the continuous stimulated of disease to scratch the skin. Different types of *Tinea* or dermatophytosis show various levels of itching. In case of *Tinea pedis* odour is another symptom that can be release very distinct smell from the location. The symptoms resulted from the macerated skin cells that embedded in high level of moisture between the figures and specifically in toes. In nail infection or *Onychomycosis*, it can be noted a change in the appearance of nail from normal, shiny to that of being dull, opaque and yellowing. After infection nails becomes thickened, brittle and disintegrate.

Predisposing factors contributing to dermatophytes infections

The climate of Bathinda district are tropical steppee, semi arid and hot which is mainly dry and humid but during rainy months humidity increased, that plays significant role in the *Tinea* prevalence. In the present investigation more than 50% patients reported from July to October (Fig. 3). These climates perform to gain superficial mycoses in human which is major health issue. Secondly, the tertiary care hospital in the present study located in the rural area and mostly patients visited have agriculture background. Therefore, unhygienic conditions, ignorance, poverty, less medical facility and high cost of medicine, people do not get timely and appropriate treatment. Henceforth, high temperature, humid weather, sharing clothes and close contact with infected persons and with pets, domestic animals and obesity were other potential risk factors. Several factors related to host and environment promotes recurrence or persistence of infection. Since last few years, there has been a lot of change in the climate, lifestyle, and attitude toward health in general population. The hot and humid climate and working conditions and tight-fitting clothes such as jeans, leggings, and synthetic undergarments provide moist and occlusive milieu where dermatophytes thrive. The attitudinal changes such as reluctance to seek expert opinion, noncompliance, unrealistic demand of quick relief, and self-medication further augment the existing problem. As long as these factors persist in an individual, the chances of recurrent or persistent infection enhanced. Similarly during the diagnosis about 2% patients acquired infection by using unclean blade for shaven underarms and river water usage. The sportsman and Army personnel acquired infection for more physical activities and contact with soil [12]. In addition, 5% patients reported *Tinea* infection after cholecystectomy whereas female patients acquired the infections after delivery. Furthermore, use of mustard oil, Dettol and savlon products also accelerated the infection in the present investigation. Fairness creams containing topical steroids again playing important role for the dermatophytes infection, while hair dyes usage by male for coloring of beard enhanced the *Tinea* infection in the face areas. The role of fomites seems to be highlighted in the case of family members because sharing of beds, linen, and clothing is all too common in them. All household clothes were washed together in the majority of patients. Due to deficient and irrational treatment methods the dermatophytes have acquired the status of superbugs and can give rise to antifungal drug resistance.

Discussion

The current study was conducted in the outpatient setting of a tertiary care hospital in Bathinda. The most common age group affected in the study was 21-30 years which constituted 27.1% of the total followed by 23.8% of 31-40 age groups (Fig. 2). This indicated that more productive age group were more prone to infection because more involvement of outdoor activities according to occupation and also exposure for transmission. Similarly, in other studies also reported that 21-30 age group were mostly affected [13,14]. Further, Janagond *et al.* [6] reported that men were more commonly affected than women while nearly 48% of the patients were students and 26% of the patients were involved in agriculture related activities. In the present study male predominance are more because rural male's occupation are farming, and regularly exposed to the livestock and soil which are potential sources of dermatophyte infections. Our study also agreement with Sumathi *et al.* [15] investigation that suggested higher incidence of dermatophytosis was observed higher in males as compared to females. Previously, Kannan *et al.* [16] reported that prevalence of fungal infection worldwide is 20-25% especially in tropical countries. In the present investigation *Tinea corporis* was most common fungal infection observed in patients followed by *Tinea cruris*. Divya and Thomas, [17] also reported that *Tinea corporis/Tinea cruris* being the commonest combination reported in patients with multiple site involvement (39%) followed closely by *Tinea corporis* (33%). Same study conducted in Gulbarga district where males with age group 21-30 are highly prone to have dermatophytes infection and commonest infection was *Tinea corporis* followed by *Tinea cruris* [18]. In many parts of India dermatophyte infections are predominant because of hot and humid climatic conditions which are conducive for the acquisition and spread of the dermatophytes. Khade *et al.* [14]

Conducted research in western Maharashtra and reported dermatophytosis was the most common cutaneous superficial fungal infection which was found in 94.92% patients. In addition poor hygiene also play major role in fungal infection in rural population. Further, in the present study it is also observed that direct contact with infected person and their clothes and fomites easily transfer the fungal infection from one person to another.

Similarly, Moto *et al.* [19] in Kenya also observed same that high population and contact with infected individuals are the reason of high prevalence of fungal infection in which males were more commonly infected. In the present investigation the fungal infection was also high in women with age group 31-40. Similarly, Verma and Madhu, [20] also reported fungal infection in females with age group 31-40 due to modern life style, wearing laggings, jaggings and tight fitting jeans in urban area whereas in the present study females were from rural area which were highly prone to fungal infection because they involve in farming activities and also direct contact with domestic and pet animals. They live and work in hot and humid weather and most important their personal hygiene which are very poor due to socioeconomic level in rural area. The analysis of the study indicated that both males and females were involved in the agriculture activities and therefore infected with fungal infection. Even the housewives also at risk because they work in humid weather and their hands and feet immersed in water for long hours which cause *Onchomycosis* and *Tinea pedis*. The study showed that fungal infection effected by occupation and economical, productive age group with more prevalent in males as compare to females and mostly farmers. High level of exposure to humidity, dust, high temperature involving immersion of body parts in water are prone to fungal infection. The present research reported the predominance of *Tinea corporis* occurring concomitantly and followed closely by *Tinea cruris* with a predilection for the male population with the age group 21-30. Dermatophytes infections are very common in the present study area, where the hot and humid climate in association with poor hygienic conditions play an important role in the growth of these fungi. Thus, good hygiene and limited sharing things of other infected person is the gold key to control and prevent the infection with dermatophytes. Moreover, decrease contacts with animals are also important to get high level of protection.

Application of research: The present study includes the risk factors for the dermatophytes infection, if patients and clinicians are aware of different risk factors, the severe dermatophytes infection maybe be controlled. In addition proper medication and timely treatment should be provided to the dermatophytes infected patients to decrease the prevalence.

Research Category: *Tenia* infection

Acknowledgement / Funding: Authors are thankful to Centre for Interdisciplinary Biomedical Research, Adesh University, Bathinda, 151101, Punjab, India.

***Research Guide or Chairperson of research:** Dr Prabhjot Kaur Gill

University: Adesh University, Bathinda, 151101, Punjab, India

Research project name or number: PhD Thesis, Clinical case study

Author Contributions: All author equally contributed

Author statement: All authors read, reviewed, agreed and approved the final manuscript. All authors agreed that- Written informed consent was obtained from all participants prior to publish / enrolment.

Study area / Sample Collection: Department of Dermatology, AIMSR Hospital

Conflict of Interest: None declared

Ethical approval: Ethical approval taken from Adesh University, Bathinda, 151101, Punjab, India.

Ethical Committee Approval Number: AU/EC/FM/38/2018.

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