



## A Study of Clinical Profile of Dermatophytosis with a Changing Clinical Pattern at a Tertiary Care Centre

Authors

**Dr Asha S. Khade<sup>1</sup>, Dr Shreyas R. Burute<sup>2</sup>, Dr Sushma S. Deogude<sup>3</sup>,  
Dr Pradeep Jadhav<sup>4</sup>, Dr Sunita J Ramanand<sup>5</sup>**

<sup>1</sup>Associate Professor, <sup>3</sup>Junior Resident

Department of Dermatology, Venereology and Leprosy, Government Medical College, Miraj

<sup>2</sup>Assistant Professor, <sup>4</sup>Junior Resident, <sup>5</sup>Professor and Head of Department

Department of Pharmacology, Government Medical College, Miraj

Corresponding Author

**Dr Shreyas R. Burute**

Assistant Professor, Department of Pharmacology, Government Medical College, Miraj, India

### Abstract

**Introduction:** *Dermatophytosis have always been among the commonest infective dermatoses affecting nails, hairs and skin and is one of the common problem for which dermatology consultation is sought. The prevalence of dermatophytosis has been increasing since last decade because of environmental factors, irrational use of topic steroids and irregular systemic anti-fungal treatment. It is a well-known fact that most of the studies on clinical features, complications and management of dermatophytosis comes from western world. In many instances these treatment protocols are unrealistic in Indian setup and dermatologists usually treat these infections on the basis of personal experience which is proving to be more effective than guidelines as laid down in western literature. We conducted this observational study to find out demographic details, clinical features and management of patients with dermatophytosis.*

**Materials and Methods:** *This was an observational, cross sectional study done in the department of Dermatology, Venereology and Leprosy at a tertiary care center. Total 318 patients with clinical diagnosis of dermatophytosis were included in the study depending upon a predefined inclusion and exclusion criteria. Data including age, sex, chief complaints, any significant past, present and family history, drug history and cutaneous examination findings were recorded. Fungal scraping and KOH mount was done for confirmation of the diagnosis. Patients were managed according to standard protocol and outcome was studied. For statistical comparisons P value less than 0.05 was taken as significant. The data was analyzed using Minitab version 17.*

**Results:** *A total of 335 patients with superficial cutaneous fungal infections were examined out of which dermatophytosis was seen in 318 patients. Out of the patients diagnosed to be having dermatophytosis there were 176 (55.34%) males 142 (44.65 %) females with a M:F ratio of 1:0.80. Youngest patient to be having dermatophytosis was found to be 1year old infant. The most common age group affected by dermatophytosis was found to be 21-30 years (107/318). Majority of the patients (36.47%) had history of infection for 1-3 months while 30.50% patients had history since more than 3 months. Comorbidities like immunosuppression, diabetes, hypertension and atopy was found to be present in 39 (12.28%) patients. Groin (80.81%) followed by trunk (47.16%) were the common sites of involvement. T. Corporis and T.*

*Cruris were found to be most common types of dermatophytosis and were seen in 81.6% and 80.81% patients respectively. T Cruris was more common in males while T. Corporis was found to be more common in females. Majority of the patients (78.93%) had previous history of taking treatment for dermatophytosis. Most patients were young and free of apparent risk factors indicating a change in trend of dermatophytic infections. Studies to understand the cause are required.*

**Conclusion:** *Dermatophytosis is a very common infection and one of the common reasons for patients to seek dermatology opinion. It is more commonly seen in males, pregnant females and patients with diabetes mellitus and immunosuppression. It can be successfully treated by a combination of topical and oral antifungal drugs.*

**Keywords:** *Dermatophytosis, T.Corporis, T.Cruris, Anti-fungal treatment, Outcome.*

## Introduction

Several species of dermatophytes commonly invade human keratin, and these belong to the Epidermophyton, Microsporum, and Trichophyton genera<sup>1</sup>. They tend to grow outwards on skin, producing a ring-like pattern, hence the term "ringworm". They are very common and affect different parts of the body. Clinically, dermatophytosis infections, also known as tinea, are classified according to the body regions involved. The dermatophyte infection may spread from person to person (anthropophilic), animal to person (zoophilic), or soil to person (geophilic)<sup>2</sup>. The common dermatophytes infecting human being include Trichophyton rubrum, Trichophyton interdigitale and Epidermophyton floccosum. All of them have a common ability to invade hairs, nails and skin<sup>3</sup>. They usually persist in stratum corneum of the epidermis and warm and humid environment is favorable for their growth and spread. Overcrowded habitats, sharing of towels, occlusive dressings and common showers are all responsible for spread of infections between individuals. Severe dermatophyte infections, especially in active individuals, is associated with considerable discomfort and itching<sup>4</sup>. Moreover, raw areas caused by invasion of dermatophytes may predispose an individual to contract secondary bacterial infections and in severe infection cellulitis can also occur. Dermatophytosis is gaining importance of late as many cases of persistent and chronic dermatophytic infections are reported even after completing adequate antifungal therapy<sup>5</sup>.

Various epidemiological studies have found that tinea pedis is common in adults while tinea capitis

is more common in children. Tinea corporis is present in all ages and is more frequent in males because of presence of moisture in crural folds<sup>6</sup>. The patients usually present with erythematous, scaly skin lesions with intense itching. The area involved depends upon the type of dermatophytosis. Most commonly affected parts of the body include scalp (Tinea Capitis), Groin (Tinea cruris), exposed skin of trunk and extremities (Tinea corporis), toe webs and plantar surface (Tinea Pedis), palms and finger webs (Tinea Manuum) and beard and neck area (Tinea barbae)<sup>7</sup>. These infections need to be differentiated from other common skin conditions including seborrheic dermatitis, impetigo, mycosis fungoides, eczema and psoriasis. Clinical examination followed by KOH preparation may confirm the diagnosis. Hyphae can be seen in skin and nails. Spores around the hair shaft can be also be detected. Other workup may include Wood light (UV light) examination and fungal cultures<sup>8</sup>. Biopsy usually is not required but may be needed in resistant and atypical cases. Once the diagnosis is confirmed the management usually consist of topical and systemic therapy<sup>9</sup>. For systemic therapy Tazoles and the allylamines are commonly used. In resistant cases broad spectrum anti fungal like fluconazole can be used. Griseofulvin which was very popular in past is hardly used now a days because of availability of newer antifungals with better safety profile. They act by inhibiting ergosterol production. For topical therapy clotrimazole, ketoconazole, econazole and miconazole are frequently used. Antibiotics may be administered in cases where there is secondary bacterial infection or cellulitis. Associated

comorbidities like diabetes and immunosuppression must be appropriately managed for successful treatment of dermatophytosis<sup>10</sup>.

We conducted this prospective observational study to find out demographic details, clinical features and management of the patients with dermatophytosis.

### Materials and Methods

This was a prospective cohort study conducted in the department of dermatology, Venereology and Leprosy of a government medical institute situated in an urban area. The institutional ethical committee duly approved the study. All patients attending the outpatient department of dermatology were included in this study depending upon the inclusion and exclusion criteria. A total of 335 patients were included in this study after obtaining informed consent from them. All cases were studied in detail. Complete history and clinical examination was recorded as per a predefined proforma. In history, the presenting symptoms, duration of skin lesions were noted. Details regarding occupation, environment of workplace, presence of conditions like diabetes mellitus or any other systemic illness were enquired and noted. In clinical examination, area involved, type of lesions, size, shape and presence of any nail changes were recorded.



**Figure 1:** Steroid modified T faciei. The active lower border can be appreciated



**Figure 2:** Steroid modified T corporis with pustules and crusting in centre and incomplete concentric rings



**Figure 3:** Extensive dermatophytosis with multiple large patches on thigh

Presence of alopecia was also noted down. General and systemic examination was done routinely. Haemogram, urine analysis, liver and renal function tests and blood sugar were carried out wherever indicated. KOH smear and Biopsy was done only in selected cases. After diagnosis was confirmed patients were treated accordingly. Specific topical and if needed symptomatic antifungal treatment was instituted. Patients receiving the treatment were followed up to observe any improvement in skin lesions following the treatment. The results were studied using appropriate statistical methods. Data analysis was carried out using SPSS16.0 version software. Microsoft word and excel were used for generating charts and graphs.

### Inclusion Criteria

1. Patient attending dermatology OPD for superficial fungal infections.

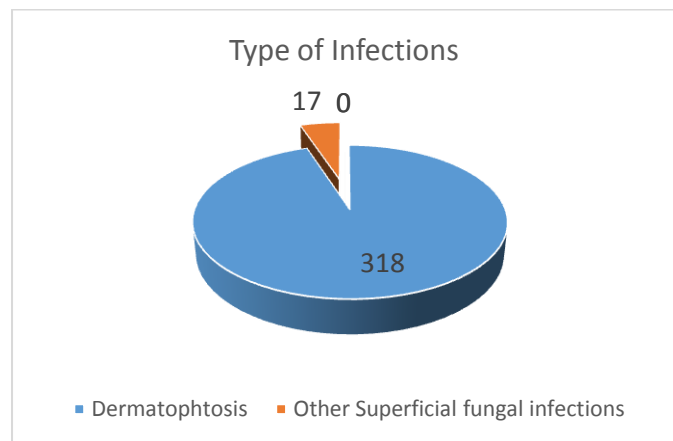
2. Patients attending dermatology OPD for other reasons but found to have dermatophytosis.
3. Those patients who gave informed consent for being part of this study.

**Exclusion Criteria**

1. The patient who refused consent.
2. Patients with severe secondary bacterial infections.

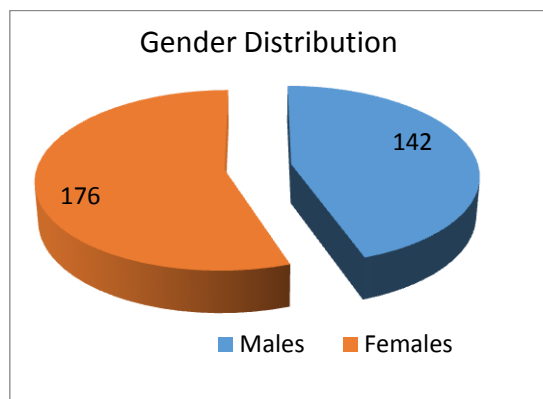
**Results**

This was a prospective study of 335 patients having superficial fungal infections. Out of these 335 patients 318 patients were diagnosed to be having dermatophytosis while remaining 17 patients were having candidiasis and other fungal infections.



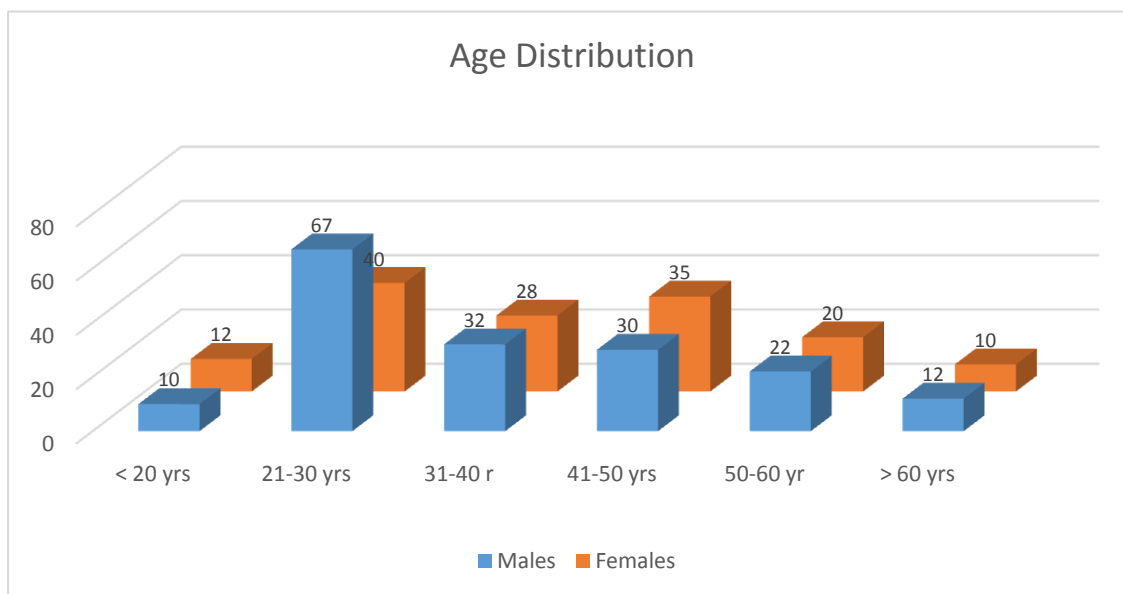
**Figure 4:** Type of superficial fungal infection in studied cases.

Out of 318 patients confirmed to be having dermatophytosis on the clinical examination and further investigations it was found that there were 176 (55.34%) males 142 (44.65 %) females with a M:F ratio of 1:0.80.



**Figure 5:** Gender Distribution of the studied cases.

The analysis of the ag groups of the affected patients showed that Patients of all age group were affected by dermatophytosis. The youngest was 1-year old male child and the eldest was 88 yrs old male patient. Maximum number of cases were seen in the age group of 21 to 30(33.64%) followed by 41-50 years (20.44%) and 31-40 years (18.86%).



**Figure 6:** Age distribution of the studied cases



The analysis of duration of the dermatophytosis showed that majority of the patients had infection since less than 1 months (33.01%) while infection was present since more than 1 month, 3 months and 6 months in 36.47%, 14.77% and 15.72% patients respectively.

**Table 1:** Duration of the infection

Duration	No. of patients	Percentage (%)
< 1 month	105	33.01 %
1-3 months	116	36.47 %
3-6 months	47	14.77 %
>6 months	50	15.72%
<b>Total</b>	<b>318</b>	<b>100 %</b>

The associated co-morbidities in the studied cases were present in 39 (12.26%) patients. Out of these 39 cases the most common comorbidities were found to be hypertension (4.08%), diabetes mellitus (2.20%) and psychiatric illnesses (2.83%).

**Table 2:** Associated co-morbidities in studied cases

Co-morbidity	n (%)
Hypertension	13(4.08%)
Diabetes Mellitus	7(2.20%)
Psychiatric illness	9(2.83%)
Retroviral disease	5(1.57%)
Atopy	2(0.62%)
Vitiligo	1(0.31%)
Hypothyroidism	1(0.31%)
Psoriasis	1(0.31%)
<b>Total</b>	<b>39(12.26%)</b>

The analysis of the patients on the basis of site of the body affected by dermatophytic infection showed that Groin was most commonly affected (80.80%) followed by trunk (47.16%) and buttocks (16.16%). Most of the patients had multiple sites involvement.

**Table 3:** Site Involvement (Topographical Distribution of the lesions)

Site	Number of patients	% of patients
Face	45	14.15 %
Trunk	150	47.16 %
Upper extremity	65	20.44 %
Lower extremity	31	9.74 %
Buttock	53	16.16 %
Hands	34	10.69 %
Feet	33	10.37 %
Groin	257	80.80 %
Infra-mammary fold	23	7.23%

Clinical Classification of the infections on the basis of involved site showed that the common types of dermatophytosis were Corporis (81.76%), T. cruris (80.81%), and mixed type (73.58%) of dermatophytosis. Total number of patients exceeds 318 as mixed pattern was observed in 73.58% of patients

**Table 4:** Clinical Classification of the dermatophytosis depending upon the sites involved.

Dermatophytosis	No of patients	% of patients
T. cruris	257	80.81
T.corporis	260	81.76
T. Faciei	45	14.15
T mannum	5	1.57
T.unguium	3	0.94
T.pedis	33	10.37
T barbae	4	1.27
<b>Mixed</b>	<b>234</b>	<b>73.58</b>

The analysis of different age groups of the patients and type of dermatophytic infections showed that in males T. cruris (83.5%) was the commonest type seen (Table 4) in all age groups up to 60 years (Table5a). On the other hand, in females corporis (86.61%) was the commonest presentation observed (Table 4) in all age groups (Table 5b). Third most common dermatophytosis (Table 4) observed was T.Faciei in males [37/176(21.02%)] and T Pedis [14/142(9.85)] in females. Females in the age group of 20 to 30 and 30 -40 yrs (Table 5b) appear to be more commonly affected with dermatophytosis unlike males who were affected most in 20 -30 age group (Table 5a). T. faciei was more common in males (21.02%) as compared to females (5.63 %). Interestingly the proportion of patients showing mixed clinical pattern in both sexes (Table 5a and 5b) was nearly similar (74.43% in males and 72.53% in females).

**Table 5:** Sex wise distribution of dermatophytosis

Dermatophytosis	Male(total-176)		Female(total-142)	
	Number	percentage	Number	percentage
T.cruris	147	83.50	110	77.46
T corporis	137	77.84	123	86.61
T. manuum	2	1.13	3	2.11
T. Pedis	19	10.79	14	9.85
T Faciei	37	21.02	8	5.63
T. unguium	2	1.13	1	0.70
T. barbae	4	2.27	--	-

**Table 6:** Clinical Pattern of dermatophytosis in males – Age wise distribution

Age	T.cruris	T. corporis	T manuum	T pedis	T.faciei	T unguium	T barbae	Mixed
1-	-	01(0.56)	-	-	01(0.56)			01(0.56)
10-	30(17.04)	24(13.63)	-	01(0.56)	11(6.25)			27(15.34)
20-	53(30.11)	48(27.27)	01(0.56)	07(3.97)	13(7.38)			46(26.13)
30-	24(13.63)	19(10.79)	-	02(1.13)	01(0.56)	1(0.56)	1(0.56)	18(10.22)
40-	23(13.06)	25(14.20)	01(0.56)	04(2.27)	08(4.54)		2(1.13)	24(13.63)
50-	13(7.38)	12(6.81)	-	03(1.70)	02(1.13)		1(0.56)	11(6.25)
60-	04(2.27)	07(3.97)	-	1(0.56)	01(0.56)	1(0.56)		04(2.27)
70-	-	01(0.56)	-	-	--			-
Total*	147(83.52)	137(77.84)	02(1.13)	18(10.22)	37(21.02)	02(1.13)	04(2.27)	131(74.43)

**Table 7:** Clinical Pattern of dermatophytosis in females – Age wise distribution

Age	T.cruris n(%)	T. corporis n(%)	T manuum n(%)	T pedis n(%)	T. Faciei n(%)	T unguium n(%)	Multiple types(mixed pattern) n (%)
1-	-	2(1.40)	-	-	-		00
10-	09(6.33)	9(6.33)	-	-	2(1.40)		08(5.63)
20-	38(26.76)	40(28.16)	2(1.40)	2(1.40)	2(1.40)		34(23.94)
30-	33(23.23)	35(24.64)	1(0.70)	7(4.92)	1(1.40)	1(1.40)	30(21.12)
40-	19(13.38)	23(16.19)	-	3(2.11)	2(1.40)		19(13.38)
50-	06(4.22)	9(6.33)	-	1(1.40)	1(1.40)		07(4.92)
60-	05(3.52)	5(3.52)	-	1(1.40)	-		05(3.52)
70-	-	-	-	-	-		-
Total	110(77.46)	123(86.61)	3(2.11)	14(9.85)	8(5.63)	1(1.40)	103(72.53)

Mixed dermatophytosis was seen in 234 patients. Out of these 234 patients, two types of clinical pattern were found in 204 patients. Three clinical patterns were seen in 29 patients and four or more clinical types were seen in 1 patient. T.cruris with T.corporis [79.91%]] was the most common mixed clinical pattern observed.

**Table 8:** Pattern of mixed dermatophytosis in studied cases

Mixed Dermatophytosis	Number	percentage
T. cruris + T corporis	187	79.91
T corporis +T Faciei	9	3.84
T cruris + T faciei	5	2.13
T. pedis +T. manuum	2	0.85
T. Pedis+T.unguium	1	0.23
T. cruris+ T corporis +T pedis	25	10.68
T.cruris+T.pedis+T.faciei	2	0.85
T.cruris+T.mannum+T.faciei	2	0.85
T.cruris+T.corporis+T.faciei+T. Unguium	1	0.23

Previous history of treatment was observed in 251 (78.93%) patients. Out of these, 146 (58.16%) patients had taken self-medication with some topical cream (probably steroid mixed antifungal preparation) but they could not provide the details.76 (30.43) patients had taken antifungal therapy and 29 (11.55%) patients had taken treatment from PHC or private practitioner. Remaining 67 (21.06%) patients were newly diagnosed and had not taken any medicine.

**Discussion**

Dermatophyte infections are predominant in many parts of India because of hot and humid climate which is favorable for the acquisition and spread of this infection. In present study which was conducted in western Maharashtra, dermatophytosis was the most common cutaneous superficial fungal infection which was found in found in

94.92 % patients amongst those suffering from superficial fungal infections of skin.

#### **Sex-**

In present study there were 176 (55.34%) males 142 (44.65 %) females with a M:F ratio of 1:0.80. Similar male preponderance was reported by many authors. Janardhan B et al reported M:F ratio of 1.86:1<sup>11</sup>. Other studies done across the country also reported male preponderance. This may be due to the fact that males do more physical outdoor activity than females. Underreporting in females due to shyness may be another reason because of which decreased numbers of female patients sought medical treatment<sup>12,13,14</sup>.

#### **Age-**

All age group patients were found to be affected from 1 to 88yrs. Maximum number of patients were found in the age group 20 to 30 (33.64%) patients. This is in contrast to the study done by Gupta CM in which dermatophytosis was found predominantly in males after 60 yrs followed by the age group of 31-45yrs. Agarwal et al, Hanumanthappa et al and Sunil Kumar Gupta et al also reported the maximum cases in age group of 21-30years which is similar to present study (33.64%). This can be explained by the fact that 20 -30 yrs is probably the physically most active group doing more physical outdoor activity like agricultural work and manual laborer in hot and humid climate<sup>15</sup>. The dressing pattern with tight fitting and synthetic clothing could also contribute to increase in the number of patients in this age group. The fact that the most common site of involvement is groin corroborates the above view<sup>16</sup>.

#### **Associated co-morbidities**

Associated co-morbidities like Diabetes mellitus, retroviral disease and atopy are known risk factors for fungal infections. Mahalaxmi et al reported 30.50 % patients with diabetes and all of them had 100% history of chronic dermatophytosis. In contrast to this in the present study very few (12.26%) patients with dermatophytosis had history of these conditions. This explains that

maximum patients affected by dermatophytosis were apparently healthy people without any underlying risk factor thus indicating a changing clinical trend with involvement of more healthy individuals in tinea infections<sup>17</sup>.

#### **Common Pattern in males and females with regard to age-**

T corporis and T cruris were most common presentation in this study and was seen in 81.76% and 80.81% of patients respectively. In contrast other authors like V. Bindu and K.Pavithran reported prevalence of T.Corporis and T.Cruris to be 54.6% and 38.6% respectively which is less as compared to present study<sup>18</sup>. The same study reported that axilla was the commonest site affected in females and T.faciei, T.barbae were most common in males. These observations deviate from observations of present study wherein T. corporis was the commonest presentation observed in females in all age groups, and T. cruris was the commonest pattern in males up to 60 years. Surendran K et al observed dermatophytosis more commonly in males below 30 and in females above thirty years of age. He has also observed T corporis as most common clinical pattern in females (44%) and T cruris as most common pattern in males (68%) as seen in our study. A study by US Agarwal also observed T.corporis to be most common pattern but they have not compared the male pattern with female pattern of dermatophytosis. Unlike T.cruis which involved only groin, the present study T.corporis showed the trunk to be most involved site. Dressing style causing occlusion in these sites is the possible explanation for involvement of these areas. No case of T capitis in this study indicates its low incidence. Similar observation has been reported by Surendran K et al<sup>19</sup>.

#### **Mixed pattern**

In the present study the proportion of mixed pattern of dermatophytosis (73.58%) was much higher as compared to other studies. Other authors like US Agarwal et.al reported a proportion of 14.7%, Lavanya M et al reported only 8.77% while Janardhan B et al Siddappa et al reported mixed

infections in 2%, and 0.77% patients respectively. In a similar study done by KAK et al in 2014 mixed pattern was seen in 47% and most common pattern observed was T.corporis with T. Cruris (73.91%). This was similar to our study. This could be explained by the fact that the patients came to this tertiary care center when treatment elsewhere was found unsatisfactory. Shyam V and R Madhu in their article have discussed the menace of over the counter use of topical steroids resulting in extensive lesions of superficial dermatophytosis. In the present study 58.16% patients had self-medicated with some form of topical treatment. The site of involvement i.e. T.cruis may be responsible for inhibition in seeking timely medical help since majority of the patients with mixed infections had T.cruis as one of the infections<sup>20</sup>.

#### Duration-

In present study 221 patients (69.48%) had infection of less than 3 months duration and 97 patients (30.50 %) had infection of > 3 months duration in contrast to this Agarwal et al reported 62.5 % cases having lesions > 3 months. This suggests that in present study there were more patients who were newly infected in addition to chronic cases of infection. Also in the present study, 50 patients (15.72%) had chronic and persistent dermatophytosis of more than 6 months duration. Mahalakshmi R et al reported similar observations. Prolonged therapy associated with the high cost of antifungal medicines, self-medication and application of steroid mixed antifungal creams which results in partial improvement with persistence of infection is the possible explanation. Reinfection from family contacts or fomites may be another contributory factor.

#### Conclusion

Dermatophytosis is a common infection and one of the common reasons for patients to seek dermatology opinion. Corporis et cruris with widespread skin involvement was the most common presentation seen in our study. Healthy adults without associated risk factors were

predisposed to get infected with dermatophytosis. Diabetes mellitus, immunosuppression and use of over the counter topical steroid creams was found to be associated with chronic dermatophytosis.

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