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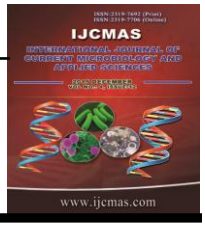

Original Research Article

Clinico-Mycological Profile of Dermatophytoses in a Tertiary Care Centre of Uttarakhand, India

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Keywords

Dermatophytosis, Uttarakhand, Tinea corporis, *Trichophyton, Microsporum*

A B S T R A C T

To study the occurrence and causative agents (fungus) of dermatophytosis in patients attending Dermatology and Venereology outpatient department of HIMS hospital, Dehradun, Uttarakhand India. A total of 124 samples were collected including infected skin, hair and nail samples for a period of 1 year. Before collecting the samples, 70% alcohol was applied to the infected area and ensured that it was totally dry. Skin samples were collected by scrapping, nail samples by clipping and hair samples collected by using sterile scalpel or forceps. Identification of the causative pathogen was done by performing slide culture, lacto-phenol cotton blue mount, hair perforation tests and urease tests Dermatophytosis was manifested clinically most common in the age group 21-30 years (24.8%) followed by 31-40 years (23.9%). Amongst the various clinical patterns, Tinea corporis was the commonest (49.2%) type followed by Pityriasis versicolor (12.1%), Tinea unguium (12.1%) and Tinea pedis (12.1%). Out of 109 clinically suspected cases of Dermatophytoses, fungi was demonstrated in 60 cases (55%) either by KOH mount and/or culture. *Trichophyton rubrum* was the commonest (37.5%) species isolated followed by *Trichophyton mentagrophytes* (20.8%). Further intensive epidemiological studies of dermatophytic fungus-induced dermatophytosis, which have public health significance, are needed.

Introduction

Fungal infections of humans have become more prevalent during the past two decades because therapeutic advances have allowed the survival of an increasing number of immunocompromised patients with lymphomas, leukemias and human immuno-deficiency virus (HIV) infections (1). Superficial mycoses are among the world's most common skin diseases affecting millions of people worldwide (2). Dermatophytes because of their widespread involvement of population at large and their prevalence all over the world are the

commonest reported cause of cutaneous fungal infections (3). The trend of living in communities, contact with animals, the use of antibiotics, corticosteroids and antineoplastic drugs are some of the factors that contribute to the increase in the risk of infection by fungi especially dermatophytes (4). These infections are especially common in tropical countries like India due to environmental factors like heat and humidity. In addition, the risk factors include socio-economic conditions like overcrowding, poverty and neglect of personal hygiene (5).

"Ring worm", "tinea" or "dermatophytosis", are common terms used for infections caused by dermatophytes. Dermatophytosis is defined as the infection of the skin, hair and nails caused by a group of closely related keratinophilic fungi called dermatophytes all of which produce enzyme keratinase (6). The classical presentation of tinea infection is a lesion with central clearing which is surrounded by an advancing red, scaly, elevated border (7). These infections generally remain limited to non-living superficial keratinized layers and rarely do they proceed into deeper layers or cause invasive infections (6). Reaction to a dermatophyte infection may range from mild to severe as a consequence of the host's reactions to the metabolic products of the fungus, the virulence of the infecting strain or species, the anatomic location of the infection, and local environmental factors (8).

Although mortality due to dermatophytosis has not been reported till date it does cause morbidity and the cosmetic importance of these infections cannot be underscored (9, 10). In India, although various authors have reported dermatophytosis from various regions, no such study has been done from this region so far. The present study was undertaken to isolate and identify the aetiological agents of dermatophytoses and to assess the prevalence of these infections in this geographical region. Our patients came from Dehradun and the surrounding areas where the monsoons are heavy and relative humidity is high for most part of the year. This climate retards sweat evaporation due to high environmental moisture content, thus facilitating fungal growth resulting in a high incidence of fungal diseases in this area.

Materials and Methods

A total of one hundred twenty four clinically diagnosed cases of skin, hair and nail infection, of all age groups and of both sexes, attending Dermatology and Venereology outpatient department of HIMS hospital were selected for the study over a period of 18 months; from August 2010 to Jan 2012.

A structured patient proforma was prepared. Patients were evaluated according to this predetermined protocol and pertinent history was taken regarding various socio-demographic factors. Relevant medical history was also taken and any significant drug history was also recorded. After taking a detailed history of the patient, clinical examination was done in good light

The specimens for the study were skin scrapings, hair pluckings and nail clippings. All specimens were obtained from the active edge of the lesion after thorough cleaning with 70% alcohol. These were preserved in small black paper envelopes for easy visualization and absorption of moisture to reduce / eliminate bacterial load. The Specimen was then subjected to potassium-hydroxide (KOH) wet preparation of various concentrations (10%, 20% and 40%) depending on the type of clinical specimen for the presence of fungal elements.

After direct microscopic examination, irrespective of demonstration of fungal elements, the culture was performed in three media; Sabouraud dextrose agar (SDA) with chloramphenicol 50 mg/L, Sabouraud dextrose agar (SDA) with chloramphenicol 50 mg/L and Cycloheximide 500 mg/L and Dermatophyte test medium (DTM). These were incubated at room temperature for a period of 4 weeks and 10 days respectively. Pure isolates were generated by sub-culturing on SDA and Potato Dextrose Agar (PDA) media respectively for both visual and microscopic examinations of cultural (colour and growth pattern) and morphological characteristics respectively for further differentiation. Tease mount, cellphone tape mount and slide cultures were undertaken for microscopic morphology. Further characterization and differentiation was done by performing Urease test, Hair perforation test and Rice grain test using standard techniques.

Results and Discussion

A total of 124 cases of superficial mycoses out of which 109 cases were suspected of having dermatophytic infections, attending the Dermatology and Venereology outpatient department of HIMS hospital were enrolled for the study. Amongst the various clinical patterns, Tinea corporis was the commonest (49.2%) type followed by Pityriasis versicolor (12.1%), Tinea unguium (12.1%) and Tinea pedis (12.1%). The 109 clinically diagnosed cases of Dermatophytoses were distributed between the range of 8-63 years with a mean of 33.50 ± 13.29 years (mean ± Standard deviation). The most common age group to be affected was 21-30 years (24.8%) followed by 31-40 years (23.9%). Least common age group affected was >60 years (0.9%). 61 males (56%) and 48 females (44.0%) comprised the study group with a ratio of 1.38:1. T.corporis which was the most common clinical type of Dermatophytoses was more commonly seen in males (52.5%) than females (47.5%). However T.unguium (58.3%) and T.unguium with corporis (66.7%) was more common in females (Table 2). In the present study, farmers (26.6%) constituted majority of cases. Second largest group was students and housewives which constituted 23.9% and 22.9%) respectively.

Out of 109 clinically suspected cases of Dermatophytoses, fungi was demonstrated in 60 cases (55%) either by KOH mount and/or culture. 38 cases (34.9%) were positive by both KOH mount and culture whereas 12 cases (11%) were positive by KOH mount only, showing the typical dermatophytic structures as cylindrical, sparsely branching filaments sometimes with regular chains of swollen cells, arthroconidia. However in 10 cases, (9.2%) positivity was seen by culture only probably because the fungal filaments were few and were missed in the observation. 45% cases were negative both by KOH mount and culture. Using culture as 'gold standard' sensitivity and specificity of KOH mount was found to be 79% and 80% respectively (Table 3).

Trichophyton species constituted 64.6% of the 48 fungal isolates obtained by culture, followed by Microsporum species which were 14.6%. Yeast and Non dermatophytic moulds (NDM) constituted 6.3% and 14.6% of the fungal isolates respectively. *Trichophyton rubrum* was the commonest (37.5%) species isolated followed by *Trichophyton mentagrophytes* (20.8%). *Microsporum gypseum* (10.4%) was the commonest amongst Microsporum species. One isolate each of *Microsporum audouinii* and *Microsporum ferrugineum* were obtained. *Candida albicans* was seen in

6.3% cases. Isolated non dermatophytic species included *Aspergillus niger*, Gliocladium spp, Scopulariopsis spp., Geotrichum spp, Epicoccum spp. *Trichophyton rubrum* was isolated mainly from T.corporis (72%) however *Trichophyton mentagrophytes* was isolated from T.corporis (90%) and T.capitis (10%). *Trichophyton tonsurans, Microsporum gypseum, Candida albicans* and Non dermatophytic moulds were also isolated mainly from T.corporis (Table 4).

Out of 48 fungal isolates 28.9% of isolates were identified by LCB mounts prepared from primary isolation on SDA and 73.7% isolates were identified by the slide culture (with SDA) technique. Identification on the basis of culture characteristics and microscopy on PDA by subculture was possible in 92.1% isolates. This difference in identification by subculturing on PDA and by slide culture technique (with SDA) was found to be statistically significant (P value=0.03) (Table 5). Out of 109 cases studied, 65.1% gave history of having domestic animals at their homes like dogs, cattle and pigs whereas 34.9% did not give a similar history. Commonest clinical presentation seen in the group having pets was T.corporis (57.8%) followed by T.pedis (14%). Contact with infected family members was seen in 5.5% of the cases. *Trichophyton rubrum* was the commonest isolate in patients giving history of contacts. The difference in the rates of isolation of fungi from cases with and without history of contact with domesticated animals was found to be statistically significant (P value <0.006) (Tables 6a, 6b). In the present study 11 cases (10.0%) out of 109 were found to be suffering from diabetes. Of these diabetic cases, fungal isolates were isolated from 63.7 % cases and the only fungal pathogens isolated were Dermatophytes (54.5%). The association was found to be statistically significant.

Fungal infections are extremely common in the tropical region and can produce diverse human infections ranging from superficial skin infections to internal organ invasion (systemic disease) (11). The epidemiology of superficial mycoses has changed significantly in the last century and reflects changes in socioeconomic conditions, lifestyle, and migration. It is difficult to ascertain reliably the overall incidence and prevalence of the various superficial mycoses in different parts of the world because studies of one region of the country may not be a true representation of the overall disease pattern of that country; furthermore, incidence and prevalence figures may only be representative of the population sampled, which may have associated risk factors for infection (12). Thus it is important to generate epidemiological data for different communities so as to enable strategic plan and control. This survey on the prevalence and distribution of dermatophytes isolated from clinical materials in Dermatology Outpatients Clinic of Himalayan Institute of Medical Sciences, Swami Ram Nagar, Dehradun shows that the most common dermatomycoses are *T.corporis* followed by *P. versicolor, T. unguim and T. pedis. T. corporis* has been reported to be the commonest type of clinical presentation in almost all Indian studies conducted on superficial mycoses (11, 13, 14). However certain studies conducted in North East India, West Orissa, Singapore and USA are in variance, indicating that many factors like selection of study groups, life style, levels of personal hygiene, climatic conditions affect the patterns and types of superficial fungal skin infections (15, 16, 17).

The commonest age group to be involved was 21-30 years and 31-40 years. This age predilection between 21 years to 41 years has been suggested to be caused by

excessive sweating due to more physical activity in addition to the existing tropical climate in India (18). Males were more prone to developing Dermatophytoses than females. This may be explained by the fact that most of the males were farmers, which makes them prone to increased contact with plants, soil and damp conditions. Also the higher incidence in males could be due to greater physical activity and increased sweating during outdoor activities (5). The lower incidence in females could be due to non reporting in hospitals due to the prevailing social stigma in rural population and poor health seeking behavior of females (13, 14, 19). Incidence of T. mannum and T. unguium in females may be attributed to repeated prolonged exposures to water and different types of detergents (especially in kitchen) while performing daily domestic chores. The same has been highlighted in a study conducted on onychomycosis where cases of females outnumbered males (20). Higher prevalence of dermatophytic infection was seen in lower socioeconomic group. The reason behind this may be the poor living conditions, large family size and close contact, either directly or by sharing facilities, including combs and towels between family members in low socioeconomic group.

In the present study most of the cases were farmers (26.6%) followed by students (23.9%) and housewives (22.9%). This may be due to increased physical activity and increased opportunity for exposure to plants, animals and soil in agricultural workers. The same observation has also been reported by Balakumar et al in their study from Tiruchirapalli (13). In case of students higher freedom of movement, carelessness, common sharing of articles by fellow students and perhaps lack of guidance regarding personal hygiene could be the factors in exposing students to increased dermatophytic infections (21). In our study maximum cases of superficial mycoses were found in the months of July to September coinciding with the prolonged monsoon season in Uttarakhand in 2011.

Positivity by KOH mount alone was 11%, 9.2% by culture alone and 34.9% by both KOH mount and culture. These variations between microscopy and culture have been noted by various authors in India and abroad (20, 22, 23). Sensitivity and Specificity of KOH mount in comparison to culture as ‘gold standard’ was found to be 79% and 80% respectively. KOH mount is simple, rapid, inexpensive and more sensitive but sufficient experience is required to interpret it and possibility of false negative results do exist (24). However, because information concerning the accurate identification of the specific pathogen is not available through KOH alone, mycological culture continues to remain the undisputed 'gold standard' of mycological diagnostics (20, 25). A ‘drying procedure’ of Milne has been recommended to increase the yield of fungal culture (15, 26).

Detection rate was 45.9% using KOH mount and 44% by culture. The culture isolation rate in India ranged from only 20.2% to as high as 78.9%. Our findings were more similar to those of Kamothi from Rajkot and Bindu from Calicut (27, 28). Detection rate by KOH mount as reported in Indian studies ranged from 62.1% to 85%, in comparison the KOH positivity rate in our study was lower but similar to that reported by Madhavi from Hyderabad (43%) (29). Our hospital is a Tertiary care center in Uttarakhand where patients are referred for management after having received prior antifungals and this might affect the positivity rates of KOH and culture. Detection rates by KOH/Culture were highest in T. corporis whereas lowest

detection rates were seen in T.faciei, T. imbricata and T. unguium. If neither KOH mount nor culture yields an aetiological diagnosis histological analysis has been recommended -using Periodic acid Schiff stain, Methenamine silver stain and Calcofluor white stain (30).

Dermatophytes were the most commonly obtained fungal isolates from the study group (34.9%). Among the dermatophytes, Trichophyton species (28.4%) were the commonest out of which *Trichophyton rubrum* (58%) was the most frequent followed by *Trichophyton mentagrophytes* (32.2%). This is in conformity with other reports from India and abroad (31). *Trichophyton rubrum* was isolated mainly from T.corporis (13/18), the same has been endorsed by other workers (14, 32). Asymptomatic infection, chronic nature of the infection and adaptation of the fungi to human skin causes a higher incidence of *Trichophyton rubrum* infections (10,33). *Microsporum gypseum* was isolated in 5 cases, and it is a common keratinophilic fungus found in soil. Most of our cases were males and farmers from rural background and thus more exposed to this conducive environment. Single isolates of each *Microsporum audouinii* and *Microsporum ferrugineum* were obtained. *Microsporum ferrugineum* is an anthropophilic fungi endemic in Africa and Oriental Asia, sporadic cases have been reported from other countries including India from the North East(Grover) and Lucknow (15, 34, 35). Among the Non Dermatophytes, Candida was one of the commonest isolate (2.8%) obtained. Because of difficulty in assessing true pathogens from contamination we followed the simple criteria used by Veer and Raja that if a non dermatophytic mould (NDM) or yeast was cultured it was significant only if direct microscopy was also positive (30, 36, 37). In the present study all 3 isolates of *Candida albicans*, isolate each of *Aspergillus niger*, Scopulariopsis, Geotrichum were considered to be significant. All these 3 NDMs were isolated in pure forms and their profile is in accordance to other studies carried out by Veer et al (13.6%) and Prasad et al (11.5%) (36, 38).

The comparative evaluation of the isolation of dermatophytes on SDA and DTM has been done by other workers. Singh S, Beena P.M et al found SDA to be 96.6% and DTM to be 98.3% effective in isolation of dermatophytes (39). A recent study conducted by Madhavi in 2011 shows that 93.5% of isolates on SDA were obtained from DTM (29). The same was noted by us also (94.4% on DTM). DTM was found to be as efficient as SDA in primary isolation of dermatophytes, hence isolation of dermatophytes was comparable in both the media. Further more isolation of Dermatophytes took $\geq$ 1 week on SDA and $\leq$ 1 week on DTM. Hence DTM can be used not only as an identification media but for rapid isolation also. As compared to SDA we also found PDA to be an excellent medium for identification of dermatophytes. Scotch tape preparation from PDA yielded better results than Slide culture technique with SDA (P value< 0.03). Study by Dynowska et al also recommends the use of PDA as a routine diagnostic media for fungi isolated from skin lesions (40).

In our study majority of the cases (79.1%) comprised of people who had domestic animals like cattle, dogs, pigs and poultry. The difference in the rates of isolation of fungi from cases with and without history of contact with domesticated animals was found to be statistically significant (P value <0.006). In a study by Madhavi 15% of cases gave history of contact with animals (29).

Table.1 Agewise Distribution of Clinical Types of Dermatophytoses (n= 109)

Types	**1-10 (yrs)**	**11-20 (yrs)**	**21-30 (yrs)**	**31-40 (yrs)**	**41-50 (yrs)**	**51-60 (yrs)**	**>60 (yrs)**	**Total**	**Percentage**
T.corporis	1 (1.7%)	11 (18.6%)	17 (28.8%)	12 (20.3%)	12 (20.3%)	5 (8.5%)	1 (1.7%)	59	54.1%
T.cruris	0 (0%)	1 (14.3%)	2 (28.6%)	2 (28.6%)	1 (14.3%)	1 (14.3%)	0 (0%)	7	6.4%
T.unguium	0 (0%)	3 (25%)	3 (25%)	3 (25%)	1 (8.3%)	2 (16.7%)	0 (0%0	12	11.1%
T.capitis	1 (33.3%)	1 (33.3%)	1 (33.3%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	3	2.8%
T.pedis	0 (0%)	4 (26.7%)	1 (6.7%)	6 (40%)	3 (20%)	1 (6.7%)	0 (0%)	15	13.8%
T.faciei	0 (0%)	1 (20%)	1 (20%)	2 (40%)	0 (0%)	1 (20%)	0 (0%)	5	4.5%
T.manuum	0 (0%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1	0.9%
T.corporis with T. cruris	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (50%)	1 (50%)	0 (0%)	2	1.8%
T.unguium with T.corporis	0 (0%)	1 (33.3%)	1 (33.3%)	0 (0%)	0 (0%)	1 (33.3%)	0 (0%)	3	2.8%
T.imbricata	0 (0%)	1 (50%)	0 (0%)	1 (50%)	0 (0%)	0 (0%)	0 (0%)	2	1.8%
TOTAL	**2 (1.8)%**	**23 (21.1%)**	**27 (24.8%)**	**26 (23.9%)**	**18 (16.5%)**	**12 (11.0)%**	**1 (0.9)%**	**109**	

Table.2 Sexwise Distribution of Clinical Types of Dermatophytoses (n=109)

Types	**Male**	**Percentage**	**Female**	**Percentage**	**Total**	**P value**
T.corporis	31	52.5%	28	47.5%	**59**	*0.43*
T.cruris	6	85.7%	1	14.3%	**7**	*0.10*
T.unguium	5	41.7%	7	58.3%	**12**	*0.29*
T.capitis	2	66.7%	1	33.3%	**3**	*0.7*
T.pedis	9	60.0%	6	40.0%	**15**	*0.7*
T.faciei	3	60.0%	2	40.0%	**5**	*0.8*
T.manuum	0	00.0%	1	100.0%	**1**	*0.25*
T.corporis with T.cruris	2	100.0%	0	00.0%	**2**	*0.20*
T.unguium with T.corporis	1	33.3%	2	66.7%	**3**	*0.42*
T.imbricata	2	100.0%	0	00.0%	**2**	*0.20*
TOTAL	**61**	**56.0%**	**48**	**44.0%**	**109**	

Table.3 Comparison of KOH Mount with Culture Findings (n=109)

KOH mount	Culture		Total (%)
	Positive	Negative	
Positive	38	12	**50 (45.9%)**
Negative	10	49	**59 (54.1%)**
Total	**48 (44.0%)**	**61 (56.0%)**	**109**

Table.4 Clinico Mycological Comparison (n=48)

	T. rubrum	***T. mentagrophytes***	***T. tonsurans***	***M. audouinii***	***M. ferrugineum***	***M. gypseum***	***C. albicans***	**NDM**	**Total**
T.corporis	13 (72%)	9 (90%)	3 (100%)	0	1 (100%)	4 (80%)	2 (66.6%)	4 (57.1%)	**36**
T.cruris	0	1 (10%)	0	0	0	1 (20%)	0	0	**2**
T.unguium	2 (62%)	0	0	0	0	0	0	0	**2**
T.capitis	0	0	0	0	0	0	0	1 (14.3%)	**1**
T.pedis	1 (6%)	0	0	1 (100%)	0	0	1 (33.3%)	1 (14.3%)	**4**
T.faciei	0	0	0	0	0	0	0	0	0
T.manuum	1 (6%)	0	0	0	0	0	0	0	0
T.corporis with cruris	1 (6%)	0	0	0	0	0	0	1 (14.3%)	**2**
T.unguium with corporis	0	0	0	0	0	0	0	0	0
T. imbricata	0	0	0	0	0	0	0	0	0
TOTAL	**18**	**10**	**3**	**1**	**1**	**5**	**3**	**7**	**48**

Table.5 Comparison of PDA, Slide Culture Technique and SDA for Identification (n=38)

	No. of isolates	**SDA**		**Slide Culture**		**PDA**	
		I	**NI**	**I**	**NI**	**I**	**NI**
T. rubrum	18	5	13	15	3	16	2
T.mentagrophytes	10	6	4	9	1	10	0
T. tonsurans	3	0	3	0	3	3	0
M. gypseum	5	0	5	4	1	5	0
M.audouinii	1	0	1	0	1	0	1
M.ferrugineum	1	0	1	0	1	1	0
Total	38	11	27	28	10	35	3
Percentage		**28.9%**	**71.1 %**	**73.7%**	**26.3%**	**92.1%**	**7.9%**

x^2=4.54 P value=0.03

Table.6a Distribution of Cases According to History of Contacts (n=109)

	T. corporis	T. cruris	T. unguium	T. capitis	T. pedis	T .faciei	T. manuum	T.corporis with T. cruris	T.unguium with T. corporis	T. imbricata	Total	Percentage
H/O Domesticated animals	**41**	**6**	**6**	**2**	**10**	**2**	**0**	**2**	**2**	**0**	**71**	**65.1%**
No H/O Domesticated animals	18	**1**	**6**	**1**	**5**	**3**	**1**	**0**	**1**	**2**	**38**	**34.9%**
Contact with infected Family members	3	**1**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**6**	**5.5%**
No H/O Contact with infected Family members	56	**6**	**11**	**3**	**14**	**5**	**1**	**2**	**3**	**2**	**103**	**94.5%**

Table.6b Profile of Fungi Isolated from Patients Giving History of Contacts (n=109)

	T. rubrum	*T. mentagrophy*	*T. tonsurans*	*M. audouinii*	*M. gypseum*	*M. ·*	*C. albicans*	ND M	Total		Percentage
									FI	NFI	
***H/O domesticated animals**	15	9	2	1	4	1	1	5	38	33	79.1%
NO H/O domesticated animals	3	1	1	0	1	0	2	2	10	28	20.9%
#Contact with infected family members	2	1	0	0	0	0	0	0	3	3	6.2%
No H/O Contact with infected family members	16	9	3	1	5	1	3	7	45	58	93.8%

FI-Fungi isolated ***** **x^2= 4.55** **P value= 0.006 (significant)**

N FI-No Fungi isolated **#** **x^2= 0.09** **P value=0.7(Not significant)**

A study carried out by Nooruddin and Singh in Ludhiana found *Trichophyton mentagrophytes, Trichophyton verrucosum, Microsporum gypseum, Trichophyton rubrum, Epidermophyton floccosum, Trichophyton violoaceum* to be the most common fungi isolated from cattle and the farm workers (41). In concurrence to our study Bindu et al and Kamothi et al also gave history of contact with infected family members in 3.09% and 16.6% cases respectively (27, 28). Out of 109 cases associated clinical conditions like diabetes, psoriasis and atopy was found in 12%, 6.4% and 1.8% of the cases respectively. Bindu et al also reported Diabetes in 10.6% of the cases and atopy was seen in 10% of cases (27). Another study by Prasad et al has also reported diabetes in 17.3% of the cases whereas atopy was seen in 13.3% of the cases (38). Difference in isolation rates of dermatophytes in patients with and without diabetes was found to be statistically significant (P value= 0.03).

In conclusion, the results of the present study indicated that Superficial fungal infections caused by Dermatophytes is prevalent in our setting and T*richophyton rubrum* and *Trichophyton mentagrophytes* were the commonest dermatophytes causing dermatophytosis. Both direct microscopy and culture are important in making a diagnosis of Dermatophytoses and culture should not be taken as a gold standard. DTM is useful as a general screening medium and also as an identification medium and the isolation of dermatophytes is more rapid when compared to SDA. Potato dextrose agar should be included as a routine diagnostic media for identification of dermatophytes. Associated factors like close association with animals, infected people, soil, diabetes, etc. are important contributory factors for acquiring dermatophytoses. Clinical significance of isolating non dermatophytic fungi should be studied further and Antifungal susceptibility pattern of locally prevalent species should be assessed as per latest CLSI guidelines. Thus, there is an urgent need for public education campaigns and socio-economic interventions at the community level, to overcome the risk factors like overcrowding and lack of personal hygiene. A larger study over a prolonged period of time should be conducted to further evaluate the epidemiology of these infections in this hilly state of Uttarakhand.

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