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Dermatophytes in Skin, Nail and Hair among the Patients Attending Out Patient Department

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ABSTRACT

Background: Dermatophytosis are the most common types of cutaneous fungal infection seen in human and animals affecting skin, hair and nails caused by dermatophytes. The diagnosis of dermatophytes is based on the clinical observation and laboratory diagnosis by direct microscopic examination and fungal cultures. The present study is undertaken to isolate different type of dermatophytes causing fungal infection.

Methods: A prospective cross-sectional study design was used in a total of 90 clinically suspected cases of dermatophytic infection attending the out patient department of Kathmandu Medical College and Teaching hospital (KMCTH). Skin scraping, hair and nail samples were collected from the patients and were processed by direct microscopy and culture using standard protocol. Dermatophytes were identified based on the microscopic arrangement of microconidia and macroconidia.

Results: Dermatophytosis was more common in the age group of 21-40 years and was more predominant among male with male to female ratio of 1.7: 1. Among the total clinically suspected cases of dermatophytosis, 53 were positive in direct microscopy and only a total of 20 were positive by culture. Most common clinical type observed in our study was Tinea corporis(25%) followed by Tinea cruris. *Trichophyton rubrum*(50%) was the commonest aetiological agent in majority of clinical types followed by *Trychophyton mentagrophytes*(35%).

Conclusions: The study highlighted T. corporis followed by T. cruris and T. unguim as the most common clinical pattern of dermatophytosis with a male predominance and 21-40 years being the most affected age group. *T. rubram* was the most common aetiological agent causing dermatophytosis.

Keywords: Dermatophytes; dermatophytosis; epidermophyton; tinea; trychophyton.

INTRODUCTION

Dermatophytosis are the most common cutaneous fungal infection seen in human and animals affecting skin, hair and nails caused by dermatophytes. Dermatophytes are a group of keratinophilic fungi that can live in moist areas of skin, on environmental surface and on household items such as clothing, bedding, towels.[1] They are assuming greater significance both in developed and developing countries particularly due to the advent of immunosuppressive drugs and disease.

The diagnosis of dermatophytes is based on the clinical obeservation and laboratory diagnosis. Direct microscopic examination of potassium hydroxide (KOH) wet mounts and fungal cultures are performed for isolation of dermatophytes.[2]

Despite the availability of effective antifungal agents, dermatophytic infections continue to be one of the principal dermatological diseases throughout the world especially in tropical countries like Nepal. The present study is undertaken to isolate different type of dermatophytes causing fungal infection among the patients attending the department of Dermatology and Venereology KMCTH.

METHODS

Institutional ethical clearance was obtained from Institutional Review Committee before this study was conducted.

A prospective study was conducted between June 2017 to May 2018, attending the outpatient Department of Dermatology and Venereology of KMCTH. Samples

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were collected from 90 clinically suspected cases of dermatophytic infections. Suspected lesions were cleaned with 70% alcohol to remove the dirt and contaminating bacteria. Skin scrappings were collected from the margins of lesion with a sterilized blunt scalpel. Collection of samples from scalp, hair were epilated from the basal portion with a pair of tweezers. Nail clipping were taken from discolored, dystrophic or brittle parts of nails. Samples were collected in sterile paper, folded, labeled and transported to the laboratory with in 2 hours for microscopic and cultural analysis.[3]

Samples collected were screened for the presence of fungal elements by direct microscopy using 10% KOH for skin scrapping and 40% KOH mount for hair and nail.

A drop of 10% KOH were kept on a clean, grease free glass slide and skin scrapping was mixed and a coverslip was placed over it. The sample was placed passed through a burner flame for 5 minutes to hasten keratolysis.[4] Each tested slide was then carefully examined under low(x10) and high(x40) power objective for the presence of filamentous, septate, branched hyphae with or without arthospores.Nail and hair samples were kept on slide with 40% KOH for rapid digestion of keratin. In case of hair, arrangement of spores were noticed as ectothrix or endothrix type of infection.

Each sample was cultured onto Sabouraud Dextrose Agar (SDA).[5] A duplicte inoculation of the specimen was also cultured on SDA. The plates were incubated at 25^{0}C for 10 days to 3 weeks and examined every 2 to 3 days for fungal growth. Fungal isolates were subcultured onto plates of SDA. The isolates were examined macroscopically and microscopically for fungal colony characteristics using tease mount with Lactophenol Cotton Blue preparation and slide culture techniques.

RESULTS

The highest incidence was found in age group of 21-40 years followed by 41-60 years.Out of 53 KOH positive cases, male were commonly infected 33(62.2%) where as 20(37.73%) were only female patients. Male to female ratio in our study was 1.7: 1.

Table 1. Age wise distribution of fungal infections.

Age group	<20years	21-40years	41-60years	>61	Total
	12	24	14	3	53

Table 2. Gender wise distribution of fungal infections among KOH positive.

Gender	Male(%)	Female(%)	Total
	33(62.2%)	20(37.73%)	53

Among the total clinically suspected cases of dermatophytosis, 53 were positive in direct microscopy and only a total of 20 were positive by culture. 20 were positive by both direct microscopy and culture. Similarly, 33 cases were positive by direct microscopy but negative by culture and 37 were negative both by direct microscopy and culture.

Table 3. Correlation of result between KOH and culture examination

	KOH+ve	KOH-ve	Total
Culture positive	20	0	20(22.22%)
Culture negative	33	37	70(77.7%)
Total	53(58.8%)	37	90(100%)

Out of total 90 samples, 60 were skin, 25 nail and 5 hair samples. Most common clinical type observed in our study was *T. corporis*(25%) followed by *T. cruris* and T. *ungium* (20%), *T. capitis*(15%), *T. pedis* and *T. manum* (10%).

In the present study *T. rubrum*(50%) was the commonest etiological agent in majority of clinical types followed by *T. mentagrophytes*(35%), *T. tonsurans* (5%) and *E. floccosum*(20%) .

Table 4. Distribution of superficial fungal infection by clinical type.

Clinical diseases	*T. rubrum*	*T. mentagrophytes*	*T. tonsurans*	*E. floccosum*	Total
Tinea corporis	3	2			5(25%)
Tinea cruris	2	1	1		4(20%)
Tinea pedis	2				2(10%)
Tinea capitis	1	2			3(15%)
Tinea unguium	1	2		1	4(20%)
Tinea mannum	1			1	2(10%)
Total	10(50%)	7(35%)	1(5%)	2(10%)	20(100%)

Out of 53 positive cases, 33(62.2%) were receiving antifungal drugs while sample was collected and 37.7% was not receiving antifungal drugs.

DISCUSSION

Identification of fungal agents and their species causing dermatophytoses are important for epidemiology and mostly for the therapeutic point of view when treatment is advised for longer time. The highest incidence was found in age group of 21-40 years followed by 41-60 years which is in accordance with studies done by Sen and Rasul and Mishra and Veer *et al.*[6-8] In our study, out

of 53 KOH positive cases, majority were male 33(62.2%) where as 20(37.73%) were only female patients. Male to female ratio in our study was 1.7: 1. Higher incidence in males could be due to more physical and out door activity. Similar study was done by Gahlot and Nigam which showed 70% infection among male and 30% among female.[9]

Among the total number of dermatophytosis, 53 (58.8%) were positive in direct microscopy and only a total of 20 (22.2%) were positive by culture. 20 were positive by both direct microscopy and culture. Similarly, 33 cases were positive by direct microscopy but negative by culture and 37 were negative both by direct microscopy and culture. Possible reason behind KOH positive and culture negative could be due to non-viability of fungal elements in culture medium. Low culture positivity in our care also could be that 62.2% of patients were receiving antifungal drugs.

Most common clinical type observed in our study was T. corporis(25%) followed by T. crurisand T. ungium (20%), T. capitis(15%), T. pedis and T. manum (10%). Similar finding was observed in a study done by Mathur *et al*.[10] Prevalance of Tinea capitis in our study was 15% but in a study conducted from other part of Nepal reported low (4.6%) prevalance where as prevalance of 15.1% was reported from Saudi Arabia.[11-12]

In the present study *T. rubrum*(50%) was the commonest etiological agent in majority of clinical types followed by *T. mentagrophytes*(35%), *E. floccosum*(20%) and *T. tonsurans*(5%). *T. rubrum* was the most prevalent fungal pathogen isolated from all cases of superficial fungal infection of skin hair and nail.[13] In contrast to our study, *T. verrucosum* was the most dominant species isolated by Mathur *et.al*.[10,14,15]

CONCLUSIONS

The study highlighted T. corporis followed by T. cruris and T. unguim as the most common clinical pattern of dermatophytosis with a male predominance and 21-40 being the most affected age group in central Nepal. *T. rubram* was the most common etiological agent causing dermatophytosis. One of the possible reason for dermatophytic infection could be due to poor hygienic status and bathing habits, sharing of towels. Dermatophytosis may vary from place to place due to various predisposing factors. Hence, all the clinically diagnosed fungal infections should be confirmed by laboratory diagnosis for proper management of fungal infection and also for the awareness of the prevalence rate of the particular dermatophytes in that region.

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