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Pattern of dermatophyte at Shaheed Ziaur Rahman Medical College Hospital, Bogra, Bangladesh

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ABSTRACT

Introduction: The dermatophytes are a group of fungi that invade and grow in the dead keratin of skin, hair and nails. Dermatophytes are by far, the most prevalent of the 3 major classes of superficial infections.Our aim was to determine the prevalence of superficial cutaneous fungal infections especially dermatophytosis at ShahidZiaur Rahman Medical College Hospital, Bogra, Bangladesh. ***Methods:*** A total of 270 specimens were collected from clinically suspected tinea corporis, tinea cruris, tinea capitis, tinea faciei, tinea pedis, tinea manuum, finger and toe onychomycosis and examined by microscopy using 20% KOH and culture on Sabouraud dextrose agar medium. ***Results:*** Direct microscopy revealed fungal infections in 150 (55.55%) cases whereas 128 (47.45%) were positive in culture. Commonest age groups were between 21-30 years 93 (34.07%). Incidence amongst male were 152 (56.3%) which is higher than female 118 (43.7%) and male to female ratio being (1:1.29). Majority cases were from low socioeconomic status. ***Conclusion:*** This study identifies the epidemiologic trends and the predominant organisms causing dermatophytosis in Bogra, Bangladesh. These data can be used to ascertain the past and present trends in incidence predict the adequacy of our current pharmacologic repertoire and provide insight into future development

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INTRODUCTION

Dermatophytosis, also known as ringworm, is a fungal infection of the skin.[1] Typically it results in a red, itchy, scaly, circular rash.[2] Hair loss may occur in the area affected.[3] Symptoms begin four to fourteen days after exposure.[1] Multiple areas can be affected at a given time.[4] Dermatophytes are by far the most significant fungi because of their

widespread involvement of population at large and their prevalence all over the world.[5] The dermatophytes are a group of closely related fungi that have the capacity to invade the keratinized tissue (skin, hair and nails) of humans and other animals to produce an infection, dermatophytosis, commonly referred to as ringworm.[2] Infections are generally restricted to the skin and they do not penetrate the deeper tissue or organs of immunocompetent hosts.[6] Although the fungi are worldwide today over 200,000 fungal species have been described. Approximately 100 of which are able to cause human mycoses and out of them 41 are dermatophytes.[7] Dermatophytosis is an infection of most commonly the Trichophyton genus and less commonly of the Microsporum or Epidermophyton genera.[2] Tinea capitis, tinea pedis, and onychomycosis are common dermatologic diseases that may result from such an infection.[8] Surveillance for fungal infections is important to define their burden and trends, to provide the infrastructure needed to perform various epidemiological and laboratory studies, and to evaluate interventions. Surveillance systems require the following basic elements: a clear case definition, a defined population, mechanisms for reporting, analyzing and disseminating the data and incentives to conduct surveillance. For fungal diseases, each one of these elements presents distinct challenges.[9] Accurate diagnosis of fungal infection is based on clinical findings, microscopic examination and mycological culture.

Present study was undertaken to find out the clinical pattern of dermatophytosis and isolation of the most common dermatophyte species and to compare the clinical diagnosis with KOH smear positivity and culture positivity in this part of our country.

METHODS

This is a retrospective study over a period of 1 year from January 2016- December 2016, attending in the outpatient department of Shahid Ziaur Rahman Medical College Hospital, Bogra, Bangladesh. The collections of infected materials were done from a total 270 suspected cases of dermatophytosis patient, age between 1-70 years. Data regarding age and sex duration, types of lesion, socio-economic status of the patient were examined and grouped in different clinical types depending upon the site of involvement.

Collection and processing of the sample: Samples were collected from affected lesions. Whenever the patients presented with lesions at clinically different sites, samples were collected from all those sites and each of these were processed and examined individually.

Collection of samples from skin: The affected area was swabbed with 70% ethyl alcohol and the active edge of lesion scrape sterilized blunt scalpel. The scrapings were collected from active margin of lesion without injuring the skin surfaces and collected in black paper packet to prevent contamination.

Skin Scraping: It was taken by applying a water proof vinyl adhesive tape to affected skin lesion and then this was carried to laboratory by adhering to glass slide in black paper packets.

From the nails: The affected nails were swabbed with 70% ethyl alcohol after which the nails were scraped deeply enough to obtain recently affected nail tissue. Nail clippings were also collected in addition to nail scrapings from the lesions whenever it is feasible.

From the scalp (hair): The same procedure as mentioned for skin scrapings was followed, in addition few affected hairs were also epilated and collected with the help of scissors, collect the basal portion of hair (hair stub) as the fungus was usually found in this area. The nail clippings and hair samples were cut into small fragments of

1mm in size. Out of the material collected, part of it was used for direct KOH examination and remaining part was used to inoculate onto Sabouraud dextrose agar media with chloramphenicol and cycloheximide, Dermatophyte test medium (DTM) with supplement to isolate the causative dermatophytes. These three culture media used in our mycology laboratory were obtained as dehydrated media (manufacturer HiMedia Laboratories, Mumbai) and prepared in-house following stringent quality control measures. DTM is a selective medium recommended for the isolation and cultivation of pathogenic dermatophytic fungi. It is a modification of a commercial formulation made by Taplin et al.[10, 11]

KOH examination

Skin and hair specimens were treated with 20% KOH solution. The preparation was kept at room temperature for 30 mins. Subsequently examination was done under high power objective (40x) of the microscope for branching and septate hyphae.

Culture

Skin, hair and nail samples were inoculated after reducing the size of the samples to approximately to 1-2 mm as it was mentioned earlier. Inoculations were done at four sites at well spaced interval onto Sabouraud dextrose agar slants with chloramphenicol (0.05mg/ml) and cyclohexamide (0.5mg/ml).[10,12] Inoculations of specimens were also done on Dermatophyte test medium (DTM) slopes for isolating dermatophytes where mixed pathogens were suspected. The tubes were incubated in incubator at 25^0c and also at room temperature to achieve good growth of some dermatophytes, which prefer a little higher temperature. The tubes were examined at regular intervals for evidence of fungal growth and were discarded after four weeks of incubation. Any visible growth on SDA was examined for colony morphology, texture, urea production pigmentation on surface. Microscopic examination of colony was done by doing a lactophenol cotton blue mount to examine the hyphal structure, different vegetative structures formed by hyphae, microconidia, macroconidia and chlamydoconidia.[13]

RESULTS

During 1 year period of study, a total of 270 populations were included irrespective of age and sex. Figure 1 shows male preponderance, which was 152/270 (56.3%). Table I shows the most commonly involved age group in years was 21-30, followed by 31-50 years which were 93 (34.07%) and 56 (20.74%) respectively. Table II shows most common age group for Tinea corporis was 21-30 (60) years and next common age group for Tinea unguium 31-40 (24) years. Table III shows 150 (55.56%) dermatophytes were positive by microscopy. Table IV shows most common isolated dermatophytes was *Trichophyton rubram* 92 (71.9%).

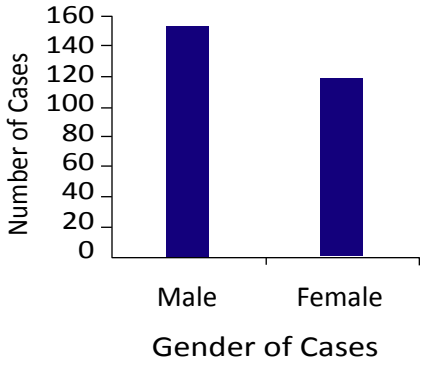

Figure 1: Gender distribution of cases

Table I: Age distribution of dermatophyte infection in the study group

Completed age in years	Number of cases (%)
1-10	20 (7.4)
11-20	50 (18.5)
21-30	93 (34.07)
31-40	56 (20.74)
41-50	31 (11.48)
51-60	14 (5.19)
>60 years	06 (2.22)
Total	**270 (100)**

Table II: Age distribution of different clinical types of dermatophytes

Clinical types	Distribution of patients in different age group in years						
	1-10	11-20	21-30	31-40	41-50	51-60	>60
Tinea corporis	14	29	60	14	20	8	2
Tinea cruris	-	7	13	9	4	3	-
Tinea unguium	-	8	12	24	5	3	3
Tinea capitis	4	3	-	-	-	-	-
Tinea pedis	-	3	5	5	-	-	1
Tinea facci	-	-	3	3	2	2	-
Tinea manum	2	-	1	1	-	-	-
Total	**20**	**50**	**93**	**56**	**31**	**14**	**6**

Table III: Comparisons between microscopy and culture positive for dermatophyte

Test Name	Microscopy	Culture
Positive	150(55.56%)	128(47.4%)
Negative	120 (44.44%)	142(52.59%)
Total	**270 (100%)**	**270 (100%)**

Table IV: Isolated species of dermatophytes by culture

Species of Dermatophytes	Number (n-128) %
Trichophyton rubram	92 (71.9)
Trichophyton mentagrophytes	24 (18.8)
Microsporum gypseum	02 (1.6)
Epidermophyton floccosum	10 (7.8)
Total	**128 (100)**

DISCUSSION

Dermatophytosis is an infection of keratinized tissue (skin, hair and claws) by one of the three genera of fungi collectively called dermatophytes-*Epidermophyton*, *Microsporum* and *Trichophyton*. Most superficial fungal infections are easily diagnosed and readily amenable to treatment.[14] The prevalence of dermatophytosis among male 56.3% was higher than the female 48.7% (Figure 1) and male female ratio was 1.29:1, which was similar to Rumana et al.[15] Males are more likely to be infected compared to females. The probable factors may be increased sweating in outdoor physical activities but our study shows the ratio of male and female was slightly lower than previous study.[16] It may be due to involvement of the outdoor activities of the females. All age groups were suspected for dermatophytes but in this study more involvement were found among 21-30 years which was 37.7%, followed by 31-40 years 20.74%. Tinea corporis 54.44% was commonest clinical type encountered in age group of 21-30 years, which was more common in male. Tinea unguium was the second most common clinical type mainly age group 31-40 years and was most common in female as they were engaged mostly with household activities like washing, cleaning, cooking etc. Tinea capitis was more in 1-10 years which was more than other studies.[9] It may be due to less secretion of sebum that has antifungal activity. Tinea pedis was seen in 5.19% cases both in of 21-30 years and 31-40 years age group but in other studies the incidence was 7.5%.[17] Direct microscopic examination of hairs or skin scrapings may enhance clinical suspicion by demonstrating characteristic hyphae or arthrospores in the specimen.[9] In this study, 150 (55.6%) cases were positive by microscopy, which is higher than another studies,[18] where it ranged from 32.8%-37.5% but lower than some studies where it ranged from 76-85%.[18] Culture positivity rate was 47.4% which compared to the rate varying from 30.3%-53.05% in other studies.[9,19] An ELISA for the sero diagnosis of canine dermatophytosis had been researched. The sensitivity and specificity is high and similar to that of fungal culture with DTM, but positive results can be seen after elimination of the dermatophyte infection.[20] These different reports may be due to difference of climate, personal hygiene, food habit and standard of living.

CONCLUSION

Further investigation over the course of several years will be needed to determine whether these changes reflect a continuing trend.

Limitation: In this study, sample size is relatively small size and period of time may be extended to get the actual picture of dermatophytosis.

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Conflicts of Interest There is no conflict of interest.

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