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Prevalence of Fungal and Demodex Mite (Acari: Demodicidae) Skin Infections in A Tertiary Health Care Center in Garhwal Region of Uttarakhand.

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ABSTRACT

Background: The prevalence of cutaneous mycoses has been increasing with constantly changing pattern. The likelihood of fungal infections & demodicosis in the population of Garhwal region might be increased due to their poor personal hygiene, agriculture work and close contact with soil and animals. Aims: To find out the prevalence of various mycotic & demodex mite skin infections in Garhwal region of Uttarakhand and to compare and correlate it with site, gender and age group of residents of Garhwal region of Uttarakhand. **Methods:** The patients with suspected superficial fungal infection were studied in relation to age and sites involved. Skin scrapings were collected in a sterile black paper and KOH mount were made. The fungal infections and demodicosis were classified on the basis of morphology, colour, thickness and branching pattern of hyphae. **Results:** Out of total 2534 patients, maximum number of patients of superficial skin infection were observed in month of September 286 (11.29%).Total 1340(52.88%) patients had fungal infection, while among face infections 11(11.57%) had demodicosis. Maximum patients 817(32.24%) were in the age group of 21 – 30 years of age. Dermatophytes (69.82%) were the commonest cause of fungal infection, followed by dematatious fungi, Candida species, whereas minimum number of cases was found of Demodex mite. All the demodex mites were isolated from infections of face. **Conclusion:** Dermatophytes were most common cause of mycotic skin infection and Demodex mite was the commonest parasitic infection of face.

Keywords: Dermatophyte, Mycotic skin infection, Demodicosis, Demodex mite.

INTRODUCTION

Cutaneous mycosis is one of the most common infectious diseases worldwide and affects around 20 – 25% of world's population and the prevalence of cutaneous mycoses is still increasing with constantly changing pattern.[1-3] Infestation with Demodex is ubiquitous in humans; with more prevalence in healthy adults varying between 23-100%, whereas Demodicosis is uncommon.[4,5] Two common species of Demodex are D. folliculorum and D. brevis which are cosmopolitan.[6] The size of adult mites is mostly of 0.1 mm to 0.4 mm long, with D. brevis slightly shorter than D. folliculorum. They have a semi-transparent elongated body that consists of two fused segments. Eight short segmented legs attached to the first body segment. Females are somewhat shorter and rounder than males.[7]

Dermatophytes, yeasts and non dermatophytic molds can involve skin, hair and nails and are important microorganisms of soil. The infection is generally restricted to non – living cornified layers of skin. Various clinical manifestations are seen varying from mere pruritis to favus. In majority of cases however the infection presents as scaly lesion, spots or blisters.

Demodex is an ecto-parasite of pilo-sebaceous follicle and sebaceous gland, typically found on the face including cheeks, nose, chin, forehead, temples, eye lashes, brows, and also on the balding scalp, neck and ears.[8,9] Apart from common factors like temperature, humidity, rainfall, environmental light, climate, chemical composition and pH; other factors like human and/or animal presence in the vicinity are also of importance in amount and diversity of flora growing there.[10-14]

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In Garhwal region of Uttarakhand alpine conditions predominate with mild summers, humid monsoon and cold winters but the city of Srinagar being a valley has warm summers and humid monsoons. The major part of population is engaged in agriculture, livestock rearing and manual labour and is in close contact with soil and animals. Poor personal hygiene and inadequate environmental sanitation increases the risk of contracting fungal infection and Demodicosis.[15, 16]

Though the infections are not serious in terms of mortality but lesions are not self - curative and may harbour secondary bacterial infections. Disfigurement caused due to infection affects the self – esteem of patient and decreases the quality of life. The infected individual acts as reservoir of disease and can transfer it by direct or indirect contact.[17]

Veer Chander Singh Garhwali Government Medical Science and Research Institute (VCSGGMS&RI), Srikot, Srinagar is one of the referral centres for Garhwal region. There are seven districts under Garhwal division: Dehradun, Uttarkashi, Haridwar, Chamoli, Pauri, Tehri and Rudraprayag. VCSGGMS&RI, Srinagar is closest referral center from Chamoli, Tehri, Rudraprayag and Pauri districts so most of patients of these hilly are usually referred to this medical college. This study was undertaken to study the prevalence and pattern of fungal and demodex skin infections in Garhwal region of Uttarakhand.

MATERIALS AND METHODS

This study was carried out in department of Microbiology, VCSGGMS&RI, Srinagar, Garhwal. A total of 2534 clinically diagnosed patients of superficial fungal skin infection reported in outpatient departments for one complete year were randomly selected and enrolled for the study. History was taken in relation to name, age, and sites involved. Patients under antifungal treatment were excluded from the study group.

The affected area was cleansed with 70% ethyl alcohol and skin scraping was taken from inflamed border of active lesion using surgical blade (No. 23). Skin scrapings were collected in a sterile black paper and were used for KOH mount, 10% KOH was used for skin scrapings, 20% for scrapings from palm and sole and 40% for nail clippings. Fungi were identified on the basis of morphology, pigmentation, other microscopic characteristics and Demodex mite on the basis of their unique morphology.

RESULTS

A total of 2534 patients with clinical suspicion of fungal and demodex infection were included in the study for the period of one year i.e. from January 2015 to December 2015 and samples were collected from site of infection. Male: Female ratio of samples was 2.3:1, percentage of positive samples for males was 54.35% (962 positive out of 1770 samples) and 49.48% (378 positive out of 764 samples) for females [Figure 1]. Demodex mites were isolated in 11(11.57%) positive samples from face.

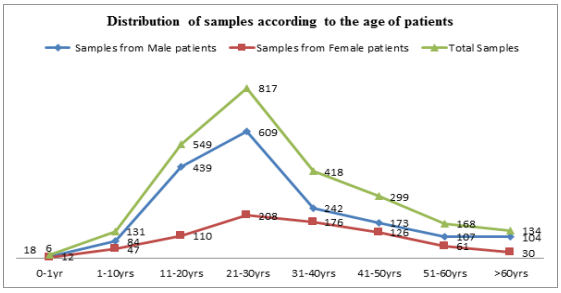

Figure 1: Distribution of samples according to the age of patients.

Out of total 2534 samples 1340 (52.88%) samples were found positive by direct microscopy for fungus [Figure 2] & 11(11.57%) cases of face infection were found positive for Demodex mite [Figure 3].

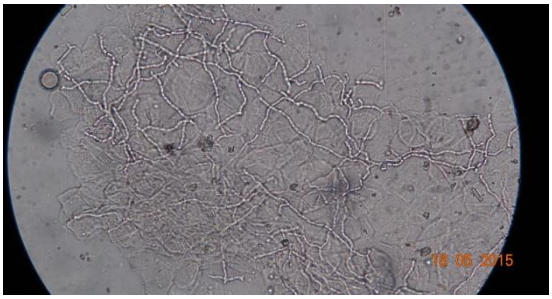

Figure 2: Hyaline, septate, branching hyphae of Dermatophytes [40x].

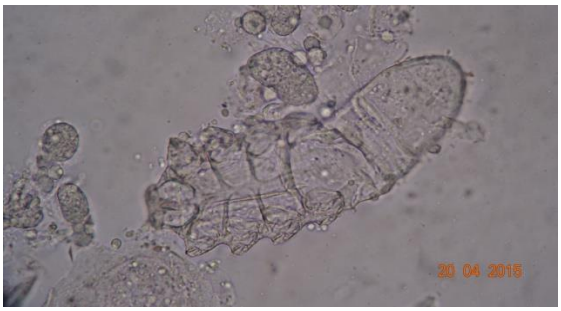

Figure 3: Demodex brevis isolated from a patient [100x].

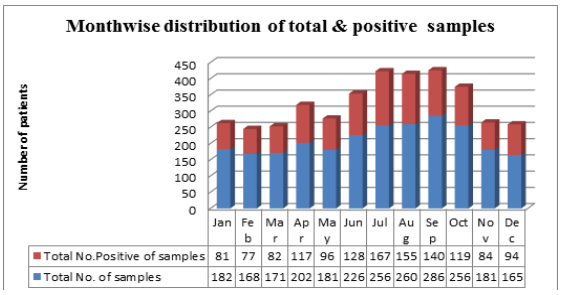

Figure 4: Monthwise distribution of total & positive samples.

Maximum number of sample 286(11.28%) were collected in the month of September and minimum number of sample 165 (6.51%) were collected in December. Maximum percentage of positive cases 73.90% (167 out of 256 samples) and minimum 44.50% (81 out of 182 samples) were seen in month of July and January respectively [Figure 4].

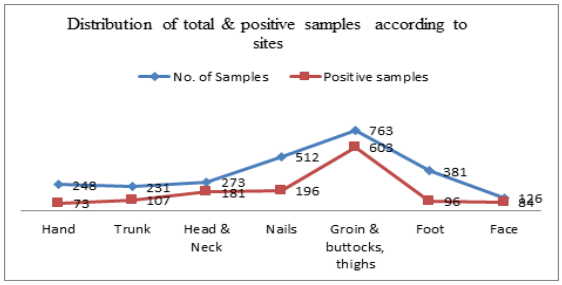

Figure 5: Distribution of total & positive samples according to sites.

Maximum number of samples (763, 30.11%) were collected from groin, thigh and buttock region, followed by nails, (512, 20.21%) and minimum samples were collected from face (126, 4.97%). Maximum percentage of positive samples 79.03% (603 out of 763 samples) was from groin, thighs & buttock and minimum 25.20% (96 positive in total 381 samples) from foot and sole [Figure 5].

Figure 6: Fungal lesion on nail.

Figure 7: Fungal lesion on neck.

Figure 8: Demodex mite infection on cheek.

On microscopy examination, maximum fungal isolates 1098(82%) were hyaline septate branching hyphae, suggestive of Dermatophytes, followed by yeasts 123(9%) and Dematiaceous fungi, 119 (9%).

Table 1: Distribution of different isolates in relation to sites.

Site	Total Samples (%)	Positive samples (%)	Dermatophytes: hyaline, septate hyphae (%)	Yeasts (%)	Dematiaceous fungi (%)
Hand	248(9.79%)	73(29.44%)	64(87.67%)	3(4.11%)	6(8.22%)
Trunk	231(9.11%)	107(46.32%)	92(85.98%)	2(1.87%)	13(12.15%)
Head & Neck	273(10.77%)	181(66.3%)	163(90.01%)	11(6.01%)	7(3.87%)
Nails	512(20.21%)	196(38.28%)	79(40.31%)	70(35.71%)	47(23.98%)
Groin, thighs, & buttock	763(30.11%)	603(79.03%)	591(98.01%)	12(1.99%)	00(0%)
Foot & sole	381(15.03%)	96(25.20%)	38(39.58%)	12(17.39%)	46(47.92%)
Face	126(4.97%)	84(66.67%)	71(84.52%)	13(15.48%)	00(0%)
Total	2534(100)	1340(52.88%)	1098(43.33%)	123(4.85%)	119(4.70%)

Table 2: Agewise distribution of isolates from face.

Age/ Samples	samples from males	Positive Dermetophytes+ (yeasts/Malassezia) + [demodex mite]	Samples from Female patients	Positive Dermetophytes+ (yeasts/Malassezia) + [demodex mite]	Total Samples
0-1yr	3	1+(1) +[0]	2	0+(0)+[0]	5
1-10yrs	8	2+(3) +[0]	9	2+(4)+[0]	17
11-20yrs	16	10+(1)+[2]	19	12+(2)+[1]	35
21-30yrs	16	12+(0)+[3]	21	13+(0)+[3]	37
31-40yrs	8	6+(0)+[0]	7	6+(0)+[1]	15
41-50yrs	3	2+(0)+[0]	4	3+(0)+[1]	7
51-60yrs	4	2+(0)+[0]	3	2+(0)+[0]	7
>60yrs	1	0+(0)+[0]	2	1+(0)+[0]	3
	59	35+(4)+[5]	67	39+(6)+[6]	126

Maximum percentage of Dermatophytes (98.01% (591 out of total 603 isolates) were isolated from groin, thigh & buttock region, followed by Head & neck 90.01% (163 out of total181 isolates) and

minimum percentage 39.58%(38 out of total 96 isolates) were from foot & sole.

Maximum percentage of dematiaceous fungi (47.92% ,46 out of total 196 isolates) were isolated from foot & sole region, followed by nails 23.98% (47 out of total196 isolates) and there were no cases from groin, thigh & buttock region and face .

Maximum percentage of yeast (35.71%, 70 out of total 196 isolates) were from nails, followed by foot & sole 15.48% (13 out of total 84 isolates) and minimum percentage from trunk 1.87% (2 out of total 107 isolates) [Figure 6,7,8] [Table 1].

Dermatophytes 74 (77.89%) were the most common isolates from face, followed Demodex mites 11(11.56%) and Malassezia yeast 10 (11.53%). [Table 2].

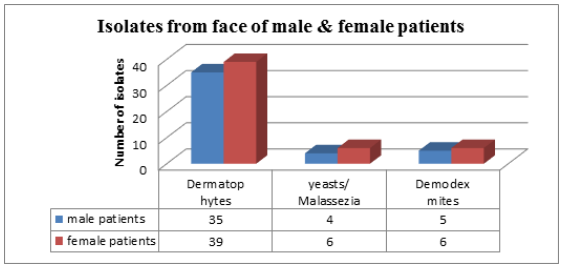

Figure 9: Isolates from face of male & female patients.

Dermatophyte (25, 33.78% of total Dermatophyte isolates from face) were most commonly isolated from 21- 30 year age-group, followed by 22 (29.72%) from 11- 20 year age-group. Malassezia yeast 7(70%) were commonly isolated from 01-10 year age-group. Six (54.54%) demodex mites were isolated from 21- 30 year age-group, which was maximum for any age-group. [Table 2 & Figure 9]

DISCUSSION

In this study 2534 clinically suspected cases of fungal skin infection attending Dermatology and Venereal disease outpatient department of VCSG Government Medical Science and Research Institute, Srikot, Srinagar were studied.

Male predominance has been observed in the study but Male: Female ratio of 2.32:1[Figure 1] is greater than most other studies,[15,17-23] but is comparable to other studies carried out in Shimla, Central India and Rajasthan.[24-28] This high Male: Female ratio may be because females in rural area avoid visiting health facilities until their condition begins affecting their work and home made remedies have failed to provide relief.

Age range of patients varied from 3 months to 81 years. Maximum number of patients was in the age group of 21 – 30 years, followed by 11-20 years & 31-40years [Figure 1] which has also been observed in most of the researches.[23,24,26,27] The reason of high prevalence in this group may be their more active life style and involvement in outdoor activities.

The surrounding area near groin, thigh and buttocks area were most common affected sites [Table 1] followed by nails, head & neck. Less frequent changing of undergarments and poor personal hygiene along with involvement in physically strenuous work leading to heavy sweating may be responsible for more frequent involvement of groin and surrounding area.

Dermatophytes were most common isolates followed by Dematiaceous fungi and yeasts [Table 2].

Yeast C. albicans was next most isolated in all samples, while Malassezia spp. was most commonly isolated from face in the age-group of 1-10years.

Demodex mites were also isolated from patients (11, 11.57%) suffering from superficial cutaneous mycosis of face, mainly from the 21-30 years age-group as seen in other studies. Demodicosis was more common in females (Female :Male::1.2:1) as seen in other studies,[29,30] but reverse female: male ratio was noted by Roihu in Finland.[31] As Females have more sebaceous glands therefore more chances of Demodicosis infection in females.[32]

CONCLUSION

Superficial mycotic infections are very common in Garhwal region of Uttarakhand whereas Demodicosis are less common in face infections despite the relatively cold climate conditions. This may be due to warm and humid days despite cold nights due to proximity with river. Poor hygiene, occlusive clothing and involvement in agriculture and related activities increase the risk of fungal infection. Dermatophytes are most common cause of fungal infection but yeasts like C. albicans are also quite common. Dematiaceous fungi are common cause of superficial mycosis foot & sole and nails.

Further research on pattern of fungi found in soil at different regions, therapeutic efficacy of different drugs, presence of fungal infection in farmers and patients not reporting to OPD will help make the results more applicable to general population. Research on hygiene habits of different age groups and occupation in relation to fungal infection will help better direct awareness programmes.

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