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Prevalence of Dermatophytoses in Rural Population of Garhwal Himalayan Region, Uttarakhand, India

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Abstract

To assess the prevalence and factors contributing in developing dermatophytoses in rural population of Garhwal Himalayan Region, a cross sectional study of 12 villages was done family to family from 1-Jan-2013 to 28-Aug-2013 and a total of 106 samples were taken into study from subjects who didn't attend OPD and were not receiving any anti fungal treatment. Samples were tested by potassium hydroxide [KOH] examination. Macroscopic and Microscopic examination of direct sample and corresponding culture was done to identify the etiologic agent. All of 106 samples were found KOH positive whereas 74 [69.81 %] samples were culture positive. Amongst culture positive samples, clinical type Tinea capitis was found predominant with 43.24% prevalence followed by Tinea corporis and Tinea pedis 28.38% and 18.92% respectively. Tinea cruris was found least with 9.46 % occurrence. Males [64.86%] were more prone to dermatophytoses than females [35.14%]. A pretested questionnaire, to assess prevalence was designed and data was collected and analyzed.

Keywords: Close contacts with livestock, overcrowding in family and low personal hygiene, bare foot farming were primary reasons for the development of dermatophytoses. Improving awareness of peoples about the dermatophytoses can minimize the prevalence of this disease.

Introduction

Dermatophytoses, a major public health problem throughout the world is caused by a group of microorganisms called Dermatophytes, lesions of which are characterized by circular disposition, desquamation, alopecia and erythema of the edges[1]. There are three genera of dermatophyte, Trichophyton, Microsporum and Epidermophyton[2].

As the transmittance of the dermatophytoses merely require contact and low personal hygiene, its occurrence in a community may become persistent. Keeping in view the fact that dermatophytoses and other fungal infections are readily caught by immunocompromised individuals which are increasing critically at sharp rate[3]. Frequent incidences of dermatophytoses have become a serious problem to counter and manage. Climatic and ambient environmental conditions do favors the growth of certain dermatophytes[4]. India is a large subcontinent with remarkably varied topography. Its climate is conductive to the acquisition and persistence of dermatophytic infection.

The present study aims to report the prevalence and distribution of 4 predominant clinical types of Dermatophytoses and to find out the parametres contributing in its prevalence in rural population of Garhwal Himalyan region that don't have access to the health care facilities due to adverse geographical locations.

Methodology

Physiography of the area: The present study was conducted in the 12 Villages of Joshimath district of Uttarakhand, Garhwal Himalayan Region namely; Saundari, Badagaon, Dhaak, Tugaasi, Karchhi, Raigari, Karchhaun, Bhangyul, Ringgi, Subhhain, Reni, and Merugh, that lies between Latitude 30°34'0" N and Longitude 79°34'0" E and at 3124 msl height.

Collection of Samples: After receiving an informed consent from each individual included in this study, a total of 106 samples were collected and investigated from those individuals who were found clinically suspected for dermatophytoses and were not receiving any antifungal treatment from beginning of the infection and subjected to mycological examination. To remove the dirt or other ointments if any, after wiping the infected areas or lesions with 70% alcohol, Samples from scalp, nails, foot webs and skin scrapings were collected in pre sterilized black paper sachet [13x12cm]. Pieces of discolored, broken nails and scrapings were taken from the advancing borders and edges of infection with the help of blunt sterile scalpels were taken.

Isolation and culturing of Dermatophytes: Prior to 10% KOH examination, Samples were made free of any small hairs aseptically using sterile forcep. All 106 samples collected were subjected to direct microscopic observation. After confirmation of fungal elements, samples were streaked on to modified Sabouraud Dextrose Agar [SDA] plates and slants enriched with cyclohexamide [0.5 mg/ml], chloramphenicol [0.05 mg/ml] [Hi-

media] and incubated for 5 weeks[5]. Cultures without any apparent fungal growth after 5 weeks were treated as Culture negative and discarded.

All mycological Identifications were done by macroscopic and microscopic observation of culture isolates by examining the surface morphology, texture, and pigmentation on the reverse side of colony[6]. Lactophenol cotton Blue staining was done for each culture positive sample to observe mycelial type, conidial arrangement [macro and micro conidia] to differentiate between species and genera.

Survey methodology and statistical analysis: In order to assess the prevalence of dermatophytoses on the basis of age, sex, education and profession of rural population its management, a pretested and structured questionnaire was designed to asses the living standards and other. All individuals participated in the study were informed and consent was taken verbally and in written. A value of $P < 0.05$ was taken as significant.

Results and Discussion

Amongst 106 samples taken, only 74 (69.81%) were culture positive and subjected for further investigation. Microscopical and macroscopical observation suggested the high prevalence of clinical type 'Tinea capitis with 43.24% (table 1) followed by Tinea corporis and Tinea pedis 28.38% and 18.92% respectively. Tinea cruris was found least with 9.46% occurrence. We observed that close contacts, over crowding in family and low personal hygiene were primary regions for the development of the dermatophytoses.

Table-1
Etiology of Dermatophytoses. (P<0.05)

Etiological Agent	Isolates		Males		Females	
	No.	%	No.	%	No.	%
Trichophyton rubrum	32	43.24	23	71.87	09	28.15
Trichophyton mentagrophytes	21	28.38	12	57.14	09	42.85
Epidermophyton floccosum	14	18.92	08	57.14	06	42.85
Trichophyton Verrucosum	*07*	*9.46*	*05*	*71.42*	*02*	*28.57*
Total	74	100	48	64.8	26	35.2

People with habit of bare feet farming, poor hygienic status and having close contacts with livestock were found to comprise the major infected group in all (table 2).

Susceptibility by age and gender: Of the 74 culture positive samples, the dermatophytoses infection was found prominent in the age group of 20-40 [31.08%] and 40< [28.37%] years [table 2a]. Males were found to be more susceptible to the dermatophytoses as studied by earlier investigators[7-9]. Taking occasional bath and wearing of tight cloths in winter season that lasts till march in Himalayan region is a major reason for having such infections. Education however was found as negligible factor as all educational groups viz. primary and secondary were infected with nearly equal percent of occurrence.

Table-2
Prevalence of dermatophytoses as per Age

S. No.	Age	No. of patient(s)	Males (%)		Females (%)	
1	1-10	13	8	61.53	5	38.46
2	10-20	17	11	64.70	6	35.29
3	20-40	23	15	65.21	8	34.78
4	>40	21	14	66.66	7	33.33
Total		74	48	64.86	26	35.13

Prevalence of dermatophytoses as per Occupation

Occupation	No. of patient (s)	Males	(%)	Females	(%)
Farmer	11	11	100	-	-
Laborers	9	9	100	-	-
House Makers	13	-	-	13	100
Students	41	24	58.53	17	41.46
Total	74	44	59.45	30	40.54

Prevalence of dermatophytoses as per Educational Qualification

Educational Qualification	No. of Patient(s)	Males (%)		Females (%)	
<5	21	9	42.85	12	57.14
5-10	29	16	55.17	13	44.82
>10	24	15	62.5	9	37.5
Total	74	40	54.05	34	45.94

Discussion: There are reports of emergence of high occurrence of dermatophytoses from different parts of the world[7]. Though on receiving prompt treatment most of the infections are checked but dwellers of geographically distinct areas those who are not availing primary facilities like primary health care centers are always at high risk of persistent infection. Dermatophytoses if not treated, may sometime go latent and transmits to the healthy population by all possible ways of transmission i.e. through sharing of things and close contacts which in turn leads to the prevalence in symptomatic carriers[10-11]. Interior rural population of high altitude regions of Garhwal Himalayas, thus constitute a privileged site for epidemiological study of dermatophytoses along with ascertaining the factors contributing in emergence and developing of the infection. Occurrence of dermatophytoses with respect to particular gender has been studied earlier with different views, which does not come to a significant conclusion that either of gender is more susceptible to the infection. Some studies have shown that males are at the higher risk of acquisition of infection[12-15]. However, others have reported females of being more prone[4,10,16]. Of the 106 samples taken

69.81% i.e. 74 were culture positive. High prevalence of *Trichophyton rubrum* and *Trichophyton mentagrophytes* followed by *Epidermophyton floccosum* and *Trichophyton verrucosum* was found with males [64.86%] being more prone to the dermatophytoses. Our study reports that species of Trichophyton genus was responsible of majority of the infection [71.31%] which is also supported by reports of other investigators[17-19]. In this study our findings provide further evidence for the existence of the strong correlation between occurrence of dermatophytoses and living standards. Our results are in good agreement with the earlier studies[8,9,20.] We observed that the lack of knowledge about dermatophytoses, carelessness towards treatment [as it was a general notion that dermatophytoses doesn't cause serious problems], remoteness from health care units and low personal hygiene were the apparent factors for the continuous existence of dermatophytoses in the community. A value for *P* to be greater than 0.05 makes the study statistically significant.

Figure-1
Clinical photographs showing grey scaling with roughness in hands by *T. rubrum*

Figure-2
papulosquamous appearance and fissuring in Tinea pedis

Figure-3
Photograph showing broken and weakened hairs in Tinea capitis

Figure-4
Advancing border of infection of ringworm pattern in Tinea corporis

Conclusion

The present study indicates the widespread occurrence and dissemination of dermatophytoses in Garhwal Himalayan region and suggests for the establishment of healthcare units and upgrading the beliefs of rural population about dermatophytoses infection and its consequences. Our study supports the belief that age group 20-30 years is considered as highly active group and there are greater chances of interaction between them leading to dissemination of fungal infections (dermatophytoses) more rapidly in the community. It was well observed during the study that level of knowledge about dermatophytoses or other fungal infections was below average in the local dwellers and hence further worsened the situation in this part of India. Hence, an abrupt intervention is needed in the form of upgrading their knowledge, precautions and need for urgency of treatment.

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