

Risk Factors and the Epidemiological Profile of Superficial Fungal Infections in Patients of Waghodia Taluka of Vadodara District, India

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Abstract:

Background: Dermatophytosis, also known as tinea ; is one of the most common superficial fungal infections present in tropical countries. Due to changes in lifestyle and risk factors, epidemiology is changing even in rural India.

Methodology: This observational study was conducted to examine risk factors, epidemiology and clinical profile of dermatophytic superficial fungal infections in patients of rural area. 100 symptomatic patients who attended teaching hospital's OPD and were from villages of Whagodia taluka which is situated at Vadodara District, Gujarat, India, were selected. This was hospital based study coupled with community visits.

Results: Of 100 patients, 69 were male and 31 were female. 12% were pediatric patients, 71% were between 19-45 years, 11% were 46-60 years and 6 were of geriatric age group (above 60 years). 46% patients had positive family history while 37% gave history of fomite sharing having statistical significant association between these two. 65% gave history of use of Over The Counter (OTC) preparations. Patients who used OTC drugs, uneducated patients, farmers as well as laborers appeared late with the disease and had longer duration of fungal infections. 84% patients had crural folds, 57% buttocks, 31% trunk, 15% had extremities while 13% had face involvement. Pediatric patients had more involvement of exposed body parts while young and middle-aged had involvement of unexposed areas of the body which was due to tight clothings. 34% patients had involvement of 1 site, 41% had involvement of 2 sites while 25% had involvement of 3 or more sites.

Conclusion: Age, gender, occupation, tight clothing, lack of education, fomite sharing, use of over the counter drugs were the risk factors responsible for dermatophytic infections. Family history and history of fomite sharing is useful markers. Prevention of indiscriminate use of OTC drugs as well as education in hygiene is a need for deterrence.

Keywords: superficial fungal infections, dermatophytosis , tinea , Over The Counter (OTC) preparations, fomite

I. Introduction

Superficial fungal infections are caused by heterogeneous group of fungi. As they involve stratum corneum, outermost layer of the skin, they are called superficial fungal infections. They can be classified as dermatophytic and non dermatophytic. Dermatophytic superficial fungal infections affect keratinized tissues and are also known as tinea. The non dermatophytic superficial fungal infections include tinea versicolor, tinea nigra, piedra and candidiasis.

There are various risk factors, host and environmental, responsible for superficial fungal infections¹⁻⁹. In different studies, various host factors delineated includes age, sex, ethnic and genetic predisposition, endocrinal as well as metabolic factors¹⁻⁹. The environmental factors include heat, humidity, overcrowding, occupation, family history and fomite sharing^{4,7}. Geographical location and whether patient is from rural or urban area is also contributing factor^{2,3,5,7}.

Due to over the counter use of topical steroids, as well as due to inadequate therapy; superficial fungal infections are becoming more and more resistant to antifungal therapy¹⁰. This study aims to identify the risk factors and epidemiological profile of superficial fungal infections which could be useful for primary prevention of the disease. Also if these factors are modified, the chances of development of drug resistance may also be prevented.

II. Methodology

With the aim to study epidemiological and clinical profile as well as risk factors of dermatophytic superficial fungal infections in rural area, this observational study was conducted. The patients attending medical college attached teaching hospital (Dhiraj General Hospital) and residing at Waghodia town and its taluka villages were included. This observational study was carried out by team of undergraduate students guided by teaching faculties of Dermatology Department attached to SBKS Medical and Research institute. It was a part of EviGenCHIP-a part of Evidence Based Education System project sponsored by Sumandeep Vidyapeeth University^{11,12}. First 100 patients who had dermatophytic superficial fungal infections and were residing in Waghodia town and/or taluka were selected. These 100 patients were detected in four months. These included months of summer and of monsoon⁷. Study was conducted after ethical approval of Institutional Human Research Review Panel. Waghodia town/taluka was selected; as it is located near our teaching hospital and number of inhabitants of this town/ taluka takes services from it. As per 2011 Indian Census, Head quarter town Waghodia has population of 16604, while Waghodia Taluka has population of about 1.5 lakh. It has 93 villages having on average population of 1,500. Waghodia town is located 28 kilometers from Vadodara and 8 kilometer from our Institute. It is situated in Vadodara district of the state of Gujarat in India. Superficial fungal infections were diagnosed clinically. Only dermatophytic superficial fungal infections were taken in this study. All symptomatic patients who sought medical help and came to the hospital were selected. The patients with positive findings for superficial fungal infections were given a prepared questionnaire which was filled up by medical UG/PG students. The various risk factors were assessed and they were analyzed. Though it was a hospital based study, home visit were done whenever was feasible.

III. Results

Out of 100 patients, 4 were below 12 years, 8 were of 13-18 years, 71 were 19-45 years, 11 were between 46-60 years and 6 were above 60 years. 69 was male and 31 were female. Age and gender profile is shown in table no 1. The highest number of cases (71%) was seen in age group 18-45, while only 6% were above 60 years. This may be attributed to active life style of the age group of 18-45 years.

In 46 out 100 patients, family history was positive in one or more family members. Of 46 patients who gave positive family history, 31 gave history of fomite sharing, also. Of the remaining 54 patients with negative family history, 6 gave history of fomite sharing. Total 37 % had history of fomite sharing of which 31 had positive and 6 had negative family history. Fomite included use of articles like towel, napkin, handkerchief, shocks, undergarments, clothes etc. Association between family history and fomite sharing was observed extremely significant in our study (P value <0.05).

There was association between the use of "Over the counter" (OTC) preparations, education and the duration of the disease at presentation (P value <0.05) (table no 2). Out of 100 patients, 65 gave history of use of OTC preparations. Out of these 65 patients, 28 patients had duration of illness more than 12 months. Also, 35 out of 100 patients who did not have history of using OTC preparations, 23 had duration of illness less than 3 months. This may be explained by the fact that OTC preparations provide temporary relief which make the patient ignore the condition.

When education was related to duration of fungal infection, out of 54 educated patients, 31 patients presented to the Out Patient Department (OPD) within 3 months of duration of the disease. While out of 46 uneducated patient, 39 presented after 3months of which 24 presented to OPD after 12 months. "Educated" here mean subjects who had studied up to secondary school and above. Out of 100 patients, 30 were farmers or laborers, 20 were homemakers, 15 were students, 15 were doing miscellaneous job and 22 were doing office job. Out of 22 patients who were having office job, 13 patients presented to the OPD within 3 months of appearance of the disease. Statistically significant difference was observed in duration of disease (less or more than three months) when two groups of patients; one doing office job and students were compared with the rest. This can be explained by the fact that office going people have more awareness regarding the disease. It was also observed that almost one third of the patients whose duration of illness was more than 12 months were farmers or laborers. This can be accounted to their work which causes increased sweating.

The most common site involved was crural folds (84), followed by buttocks (57), trunk (31), extremities (15) and face (13). Maximum number of patients had involvement of 2 sites (41). 34 patients had involvement of only 1 site while 17 had 3, 7 had 4 and 1 had 5 sites involvement. Thus 25 patients have involvement of 3 or more sites. In pediatric patients, most of the lesions were present on the extremities and face (exposed areas). In all the pediatric patients, family history and history of fomite sharing were positive.

IV. Discussion

Dermatophytosis, cutaneous fungal infections also known as tinea or ringworm found worldwide and accounts for 8 to 10 per cent of skin referrals^{4,5}. It is caused by *Tricho-phyton*, *Microsporum* and *Epidermophyton* species. They affect keratin layer and do not invade living epidermis. Superficial fungal

infection could also be due to non-dermatophytes infection like *Aspergillus*, *Candida*, *Fusarium*, *Mucor*, *Acremonium Spp.*⁴. In this hospital based epidemiological study, all patients had symptomatic dermatophytosis. Dermatophytic infection are classified according to the name of the affected part; when scalp is affected it is termed as tinea capitis, foot is affected known as tinea pedis while affection of groins and upper thighs is termed as tinea cruris. Similarly, tinea corporis (body), tinea barbae (beard and moustache area), tinea faciei (glabrous skin of the face), tinea manuum (hands) and tinea unguium (nails) are denominated. Different site predilection of dermatophytes is reported which will depend on age, occupation, gender and type of clothing^{5,130}. Tinea capitis is reported in children while Tinea pedis, manuum, corporis, barbae and cruris are reported mainly in adolescents and adults.⁴ In our study, 12 patients were from pediatric age group, of which 4 were below 12 years and, 8 were of 13-18 years. In our study pediatric patients, lesions were present on the extremities and face (exposed areas). Dermatologic fungal infections are thought to occur less frequently in children than in adults; however epidemiological change is noted which may depend on geographical regions and the mode of spread of infection^{3,4}. Spread is by contact with an animal or infected person.

Sharing of article used by infected person (fomite) is also important for spreading of infection. In all of our pediatric age group patients, family history and history of fomite sharing were positive. Children in rural areas are more exposed to infectious pathogens due to the larger number of animals and farms¹⁴. Our study was also of rural area but in our study it was "fomite" which was responsible for infection in pediatric patients rather than exposure to animal. 84% of our study patients had involvement crural folds. This was because majority of our patients were adults. (71% were of 19-45 years). Second common site was buttocks (57%) and trunk (30%). Involvement of extremities (15%) and face (13%) was common in pediatric age group. As discussed earlier, pediatric dermatophytic infections are different than adult. In pediatric patients, most of the lesions were present on the extremities and face (exposed areas).

In this study, we specifically asked about sharing articles of daily use like towel, handkerchief, napkin, comb, brushes, clothes, undergarments, shoes and socks which can transmit infection. Another aspect was of family history. In 46% patients, family history was positive, 37% had history of fomite sharing and 31% had both positive family history and fomite sharing. One important fact which we would we wish to highlight is significant association between family history and fomite sharing. 31% patients had family history and fomite sharing meaning by that it was secondary infection due to sharing of the infected daily use articles and it was present in all pediatric age group. This may suggest lack of health education, poor personal hygiene and affordability for individualized items like towel, napkins and others. Study observation revealed use of tight garments by both male and female patients especially wearing of Jeans trousers, custom percolated in rural Indians also. This was also responsible for crural fold involvement. Previously Indian women had tinea infection due to wearing of Sari and peticot⁵, now rural women wears tight leggings and Indian men tight trousers and Jeans.

Another fact was involvement of two or more sites by the coetaneous fungal infections which was present in 66% patients. 25% had involvement of three sites or more. 5 patients were diabetic of which 3 had multisite (>3) involvement. Apart from Diabetes no other immunocompromised states was found clinically or by investigations¹³. Apart from fomite sharing, inadequate earlier therapy and use of OTC preparation was responsible for multisite involvement.

65% patients gave history of use of "Over the counter" (OTC) preparations. They presented late and there duration of the disease was more. This may be explained by the fact that OTC preparations provide temporary relief which make the patient ignore the condition. Use of over the counter medications, particularly topical corticosteroid, produce reduction in the local cell mediated immunity leading to proliferation of superficial fungal infections. Also due to temporary reduction in pruritus, the patient continues to use medication for longer time. An immune mediated phenomenon called "tinea pseudoimbricata" is a particular type of tinea incognito. Patient may have atypical manifestation of superficial skin fungal infection or is exacerbated by application of topical steroids^{10,15}.

Duration of the disease had relation with education status of the patient. Educated patients and patients who were doing office job presented earlier while uneducated patients and farmers or laborers presented late. This can be explained by the fact that educated people have more awareness regarding the disease. In this study, almost one third of the patients whose duration of illness was more than 12 months were farmers or laborers (10 out of 32). This can be accounted to their work which causes increased sweating. Very similar findings are reported from study conducted by Narasimhalu CRV *et al*¹⁶

V. Conclusion

In our study, significant association was found between family history and fomite sharing which suggests that infection is spread among family members by fomite sharing. Another fact was a significant association between the use of OTC medication and duration of the disease, suggesting that the use of OTC medications resulted in delayed presentation of the disease and increased duration between appearance of

disease and initiation of proper and early treatment. Awareness in relation to personal hygiene, education status and occupation do play a part in genesis of superficial fungal infection of skin.

AGE DISTRIBUTION			
Age group	Male	Female	Total
< 12 years	2	2	4
13-18 years	5	3	8
19-45 years	50	21	71
46-60 years	7	4	11
>60 years	5	1	6
Total	69	31	100

Table. 1 showing age and gender distribution.

A.Duration In Relation To OTC Medication							
	<3 Months (A)	4-6 Months (B)	7-12 Months (C)	>12 Months (D)	>3 Months (B+C+D)	Total (A+B+C+D)	
OTC Not Used	23	4	4	4	12	35	
OTC Used	15	11	11	28	50	65	
Total	38	15	15	32	62	100	
B.Duration In Relation To Education							
Educated Patient	31	8	7	8	23	54	
Un Educated Patient	7	7	8	24	39	46	
Total	38	15	15	32	62	100	
C.Duartion In Relation To Occupation							
Occupation	Farmer/ Labourer	9	5	6	10	11	30
	Housewife	6	4	4	6	14	20
	Job Office	13	5	1	3	9	22
	Others	5	1	0	7	8	13
	Student	5	0	4	6	10	15
	Total	38	15	15	32	62	100

OTC*= Over The Counter,

Table. 2 showing relation of duration to Over the counter medication ,education and occupation

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