

A Clinico- Epidemiological Study Superficial Cutaneous Fungal Infection in Elderly Patients.

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ABSTRACT

Background: The proportion of elderly population keeps on increasing. The number of dermatoses, and fungal infections, in turn continues to increase. There has been a recent upsurge of superficial cutaneous fungal infections. This observational cross sectional study aims to describe the clinico epidemiological pattern of patients presenting with the same, with some investigation as KOH mount and culture (in some cases) In total, 156 patients (103 males 53 females) of age between 60 and 84 years were evaluated, with mean duration of 10.3 months (male) and 12.9 months (female). Most patients came from farming families. The commonest coexisting disease was diabetes mellitus (type 2), followed by hypertension. The commonest site of infection was the body (tinea corporis, 56.4%), followed by onychomycosis (37.8%). This was followed respectively by tinea pedis (16.6%), tinea cruris (7.6%), tinea manuum (5%), tinea faciei (2.5%) balanoposthitis and oral candidiasis (0.6% each). It was seen that 86 patients (55.1%) had history of self/ non dermatologist prescribed medication. Most 62 (39.8%) of them had received over the counter steroid combinations (OTC, combination mixtures containing a mild to moderate potency steroid with clotrimazole/ miconazole and gentamycin/ ofloxacin). Most of the patients had extensive involvement as evident from the pattern of infection. Here, the scope of treating a patient with only topical therapy is excluded. Even then, an average patient (more than half as in the current study) attends the specialist after having received some or the other nonspecific therapy. Thus, proper referral and treatment with adequate drugs is pertinent. **Methods:** ?. **Results:** ?. **Conclusion:** ?

Keywords: Autoimmune disorders, vitiligo, Diabetes mellitus.

INTRODUCTION

The population more than the age of 60 years continues to grow each year. This may be attributed to better education, health facilities and increase in life expectancy. The percentage of elderly population (assumed to be more than 60 years) has increased from 5.3 to 5.7 percent and 6.0 to 8.0 percent respectively per decade from 1991 to 2011.^[1]

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This increase in number of susceptible rises with increase in population and shows the way to a rising prevalence of dermatoses. Fungal infections have increasingly become a problem among older adults.^[2] In fact, the prevalence of fungal infections in the elderly has been considered only second to tumors.^[3] The skin of the elderly has cumulative exposure to numerous environmental hazards as

ultraviolet light, smoking, throughout the years. This is accompanied by intrinsic degenerative and metabolic changes which make it inclined to infection. The epidermis becomes thin and shreds easily with mild friction, providing a portal of entry for microorganisms.^[4] Also, co-morbidities as diabetes, stasis dermatitis, and xerosis act as additional risk factors.

Common fungal infections of the skin can be classified into 3 broad categories based on the causative organisms:

- (1) The dermatophytes, a group of molds, cause tinea corporis, tinea pedis, tinea cruris, tinea unguium, and tinea capitis;
- (2) Candida (yeast), causative agent of oral candidiasis, angular cheilitis, intertrigo, vaginitis, balanitis
- (3) Pityrosporum, (another yeast), causing tinea versicolor, and pityrosporum folliculitis.

These pathogens cause superficial fungal infections, being normally limited to the stratum corneum, hair, and nails.

Tinea Pedis

This is caused by wearing occlusive footwear which create a hot and humid environment inside the shoe. It frequently starts in the fourth web space.^[5] Elderly patients often have poor vision, walk barefoot on contaminated surfaces and may acquire the infection easily. Also, they may not mistake it for the common dry skin related pruritus.

Tinea Corporis

It is commonly spread through contact from an infected individual. Again, heat and humidity are predisposing factors, which is common in the elderly not having regular bath or laundering facilities.^[6] Specimen collection for direct microscopy should be scraped from the advancing scaly edge.^[7] Samples obtained from the centre are unacceptable as they hardly contain fungi. Tinea corporis is caused by the dermatophytes *Trichophyton rubrum*, *T tonsurans*, *T mentagrophytes* and *M canis*. Diagnosis may be problematic especially if confused with nummular dermatitis, contact dermatitis, pityriasis rosea and granuloma annulare.^[8]

Tinea Cruris

Often spread through coexisting fungal infections on other parts of the body

Tinea Unguium

Elderly individuals are not able to take enough care of their toenails because of obesity, arthropathy, or visual problems. Distal subungual onychomycosis is the more common form and is found more frequently in toenails.

Tinea Capitis

Though it is usually found in children but can also be found in the elderly and is often neglected. Elderly individuals often mistake the scaling and pruritus for dandruff and choose to overlook the symptoms.

Oral Candidiasis (Thrush)

Elderly are inclined to this infection as a result of the use of systemic, inhaled, or topical corticosteroids. A study by Paillaud and colleagues showed that the most significant risk factors for the development of oral candidiasis were treatment with antibiotics,^[9] poor oral hygiene, vitamin C deficiency, and denture use were the most significant independent risk factors for the development of oral candidiasis.

Candidal Vulvovaginitis and Balanitis

Elderly women may have suffered for long periods before finally presenting to the doctor because of modesty and other social issues. Uncircumcised elderly men who have sexual relations with women with vaginal candidiasis are at risk for candidal balanitis. This is diagnosed by the presence of redness over the glans and prepuce, fissuring and edema with mild burning and pruritus.

Candidal Paronychia

The elderly are prone to doing all their house hold jobs including wetwork. Also, candida paronychia is more common in diabetics.

Pityrosporum infections

Seborrheic dermatitis is a common skin disease that affects mostly men in areas rich in sebaceous glands. It is somewhat unexpected that there is an increased incidence of seborrheic dermatitis in the elderly because as people age, the activity of sebocytes decreases.^[10]

Pityrosporum Folliculitis

It can present in patients who have diabetes or those on corticosteroids or broad-spectrum antibiotics.^[11]

Tinea Versicolor

It is more common during summer and in oily rich areas of the skin. The typical distribution involves the chest, back, neck, and face. The lesions are well-defined, finely scaly hypopigmented or hyperpigmented areas with slight to absent itching. The causative yeast produces azelaic acid during lipid peroxidation, causing hypopigmented patches.^[12] Throughout the globe, the elderly tend to neglect themselves and are neglected in turn. Over and above this "normal" pattern, in the last few years, we had come to notice an alarming increase in number of elderly with superficial cutaneous infections. In addition, there is the menace of steroid induced modification and steroid provoked relapse. The present article is the result of our effort to document this state of events.

Aims and objectives

- i. to describe the epidemiological parameters of the patients (age, sex, residence, occupation, family history, treatment history)
- ii. to illustrate the clinical pattern of superficial cutaneous fungal infection (duration, site of involvement and association with systemic disorders)
- iii. investigation wise profile (Potassium hydroxide mount and culture in selected cases)

MATERIALS AND METHODS

This observational, cross sectional study was carried out between July 2016 to November 2016. All elderly patients (assumed to be at least 60 years of age) attending the Dermatology OPD of a tertiary care hospital were screened for the presence of any superficial cutaneous fungal infection. Patients who conveyed informed consent were included into the study. Patients who declined to be included into the study were excluded.

Following inclusion into the study, the patients were evaluated by detailed history, clinical examination and investigation.

The results so obtained were entered into a preformed format. At the end of the study, the results

were computed on an Excel chart (Microsoft Office windows based software, version 2007).

RESULTS

A total of 156 elderly patients with superficial cutaneous fungal infection were evaluated. The age of the patients [Table 1] ranged from 60 to 84 years, with a mean of 63.3, SD=4.19. The mean age of the male patients was 63.7 years and that of the females, 61.7years. There was no significant age difference between the two groups (P=0.01). Amongst the male patients (103, 66%), 63 came from rural areas, while 40 from urban areas. Out of the 53 females (34.0%), 35 came from rural areas and 18 from urban areas. The mean duration of suffering of the male patients was 10.3 months and that of the female patients, 12.9 months. There was no difference between the groups in this respect, (p=0.27).

Table 1: Sex- wise distribution of parameters in study population (n=156).

Residence	Sex		Total
	Male	Female	
Rural	63	35	98 (62.8%)
Urban	40	18	58 (37.2%)
Mean duration (months)	10.35	12.91	-
Occupation (Farming)	61	47	108 (69.2%)
Occupation (Others)	42	6	48 (30.8%)
KOH +ve	67	36	103 (66.0%)
+ve Family history	19	13	32 (20.5%)

Out of the 103 male patients, 61 were associated with farming, while the rest were engaged in other activities. Females also mostly followed farming activities, while the other 6 were engaged in different activities. In this regard, the male and female patients were different (P<0.05).

The patients were enquired about pre-existing diseases. The most co existing disease condition was diabetes mellitus type 2 (DM2). Sixty patients (38.7%) of the patients overall had DM2. The next in order was hypertension in 12 (7.7%) patients. Lichen planus hypertrophicus was present in 4 patients (2.6%). Three patients (1.9%) each had leprosy and combination of hypertension and DM2. Two patients were affected with other dermatological disease- air borne contact dermatitis (ABCD). One patient each were afflicted with conditions like bronchial asthma, heart surgery, psoriasis, thyroid disorder, urticaria and vitiligo. Combination of medical disorders like hypertension and neuropathy, diabetes mellitus with hypertension and psoriasis were found in 1 patient each.

Of the 156 patients evaluated, most 74 (47.4%) were afflicted with tinea corporis. Next in order was infection of the nails in 18 patients (11.5%). 15

patients (9.6%) were affected by combination of tinea pedis as well as nail infection. 12 patients (7.7%) had tinea cruris. 10 patients (6.4%) suffered from combined infection of the skin as well as nails. Four patients (2.6%) presented with balanoposthitis. The rest of the infection patterns were as shown in Table 2. We found total cases of tinea corporis (Fig 1-2) to be 88 (56.4%), tinea pedis to be 26 (16.6%), tinea faciei 4 cases (2.4%), tinea mannum 8 cases (5.1%), and onychomycosis: 22 cases (14.1%).

Table 2: Table showing clinical types of infection among males and females (multiple parameters included).

SN	Type	Male	Female	Total (multiple parameters included)
1	T pedis	21 (13.4%)	5 (3.2%)	26 (16.6%)
2	T corporis	58 (37.1%)	30 (19.2%)	88 (56.4%)
3	T faciei	2 (1.2%)	2 (1.2%)	4 (2.5%)
4	T cruris	8 (5.1%)	4 (2.5%)	12 (7.6%)
5	T mannum	3 (1.9%)	5 (3.2%)	8 (5%)
6	Onychomycosis	27 (17.3%)	22 (14.1%)	59 (37.8%)
7	P versicolor	1 (0.6%)	0	1(0.6%)
8	Balano posthitis	4 (2.5%)	Not applicable	4(2.5%)
9	Oral candidiasis	1 (0.6%)	0	1(0.6%)

Table 3: Table showing treatment history among males and females (n=156).

	Treatment history	Male	Female	Total
1	Fluconazole+ Topical combination steroid	5	1	6 (3.8%)
2	Terbinafine tablet+ Topical combination steroid	2	1	3 (1.9%)
3	Homeopathy	0	1	1 (0.6%)
4	Ayurvedic preparation	0	1	1 (0.6%)
5	Itraconazole+ Topical combination steroid	5	0	5 (3.2%)
6	Oral steroid	5	3	8 (5.2%)
7	Topical combination steroid	45	17	62 (39.8%)
8	No treatment	41	29	70 (44.9%)
	Total	103 (66.0%)	53 (34.0%)	156

History of past treatment [Table 3] We found that 86 patients (55.1%) had history of self/ non dermatologist prescribed medication. Most 62 (39.8%) of them had received over the counter steroid combinations (OTC, combination mixtures containing a mild to moderate potency steroid with clotrimazole/ miconazole and gentamycin/ ofloxacin). Those who visited a general practitioner had received the same, but in combination with fluconazole 6 (3.8%), terbinafine 6 (3.8%) or itraconazole 5 (3.2%). Eight patients (5.1%),

curiously, had been prescribed oral steroids for short periods by physicians. One patient each (0.6%) had received a homeopath and ayurvedic practitioner, without much relief.

Skin scraping [Figure 3] was done from all patients [Table 1]. Out of the total 103 patients (66%) who were positive, 67 were males and the rest 36 were females. Few samples were subjected to culture. Family history [Table 1] was positive in 32 patients (20.5%) -19 were males and 13 were females.



Figure 1: Extensive tinea corporis involving the upper arm and trunk of an elderly male.



Figure 2: Large plaques of tinea corporis involving the back of an elderly lady.

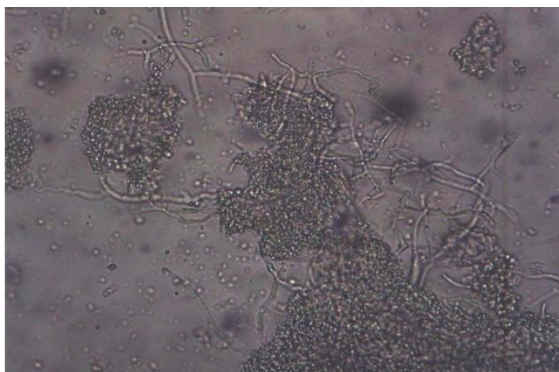


Figure 3: Nail clippings on KOH mount (original magnification X 400): branching fungal hyphae in dermatophyte infection.

DISCUSSION

As the population starts to age, it becomes more imperative to recognize and treat common skin

conditions that can be more widespread in this age group. It becomes more important to recognize that the drugs that the patient is already on, the possible interactions and of late, the drugs that may not be used because of resistance to the same.

The prevalence of tinea corporis was found to be 37.2 (males) and 19.2% (females). This difference between the sexes may have been due to higher propensity of males in acquiring the infection during outdoor activities, as well as their medical attention seeking behaviour. Females, on the other hand, seem to avoid hospital attendance due to their shyness.

The prevalence of onychomycosis increases with age and becomes nearly 20% in patients over 60 years.^[13] In the current study, we calculated the incidence in males to be 17.3% and 14.1% respectively. This apparently lower prevalence of the infection may be attributed to the relatively low level of awareness amongst our population. Predisposing factors include trauma, peripheral vascular diseases, immunosuppressive conditions including diabetes.^[13] In a study involving elderly diabetics,^[14] the prevalence of tinea pedis was found to be 23%. However, our study revealed a prevalence of 13.4% (males) and 3.2% (females). This apparent difference only serves to highlight how diabetes predisposes to tinea pedis.

Tinea faciei was found to be prevalent equally in males and females (1.2%, each). This may be attributed to the lesser number of female patients but perhaps a higher level of cosmetic awareness.

The prevalence of tinea cruris in males and females was 5.1% and 2.5%. This higher incidence in males¹⁵ could be to the anatomy of the external male genitalia which predisposes to warmth and moisture. Also, 2 (1.2%) patients with tinea cruris were found to have onychomycosis. This might have happened by contamination of clothing when putting on undergarments. Thus, this chance of autoinoculation must be kept in mind and the nails and hands examined when cases of tinea cruris is come across.^[16]

Balanoposthitis was found in 2.5% of patients in the present study. Though infectivity, when transmitted from sexual partner is stated to be about 10% only,^[17] we found positive family history in all patients (100%). This difference may be factitious, as most women in this age group state to have white discharge.

CONCLUSION

Over the past few years, there has been a worrisome rise in cases of superficial cutaneous fungal infection amongst the elderly. This may have been due to emergence of antifungal resistance.^[18,19] This in turn, may have been caused by irrational use of antifungal agents, especially when combined with steroids. Use of the latter results in alleviation of

erythema and pruritus. This gives a false sense of wellness leading to discontinuation of medicines.

In a country where the elderly mostly tend to neglect themselves, what has been stated above becomes important. Added to this, is the perpetual tendency of family physicians and general practitioners to label most skin lesions as 'fungal infections' and prescribe a mixed preparation in the hope that it will resolve whatever disease is present.

In our study we found that most infections were extensive as far as area was concerned. The scope of managing a patient with only topical preparation is thus, nonexistent. Even more, topical antifungal creams come in tubes of 10-15 grams which are 5-7 times costlier than OTC formulations of mixed preparations. This is another important factor to be kept in mind while practicing in developing nations. It is thus time, that given the limited choice of drugs, we must treat, especially the elderly with proper drugs in the appropriate dosages so that our limited armamentarium does not lose relevance.

REFERENCES

1. Situation analysis of the elderly in India.: Central Statistics Office Ministry of Statistics & Programme Implementation Government of India. c2011- [cited 2017 Mar 20] Available from: http://www.censusindia.gov.in/vital_statistics/srs_report/9chap%202%20-%202011.pdf
2. Kauffman CA. Fungal infections, Clin Geriatr Med , 1992, vol. 8 (pg. 777-91)
3. Johnson MT. Aging of the United States population: the dermatologic implications. Clin Geriatr Med 1989; 5:41-51.
4. Wey SJ, Chen DY. Common cutaneous disorders in the elderly. Journal of Gerontology and Geriatrics 2010;1:36-41.
5. Dawber R, Bristow I, Turner W. Skin disorders. In: Dunitz M, editor. Text atlas of podiatric dermatology. Malden (MA): Blackwell Science; 2001. p. 31-76.
6. Martin AG, Kobayashi GS. Superficial fungal infection: dermatophytosis, tinea nigra, piedra. In: Feedberg IM, Eisen AZ, Wolff K, et al, editors. Fitzpatrick's dermatology in general medicine. 5th edition. New York: McGraw-Hill; 1999. p. 2337-57.
7. Daniel III CR, Elewski BE. The diagnosis of nail fungus infection revisited. Arch Dermatol 2000;136: 1162-4.
8. Schieke SM, Garg A. Superficial fungal infection. In: Fitzpatrick's dermatology in internal medicine. 8th edition. New York: McGraw-Hill; 2012. p. 1807-21.
9. Paillaud E, Isabelle M, Catherine D, et al. Oral candidiasis and nutritional deficiencies in elderly hospitalised patients. Br J Nutr 2004;92:861.
10. Mastrodonardo M, Diaferio A, Vendemiale G, et al. Seborrheic dermatitis in the elderly: inferences on the possible role of disability and loss of self-sufficiency. Acta Derm Venereol 2004;84:285-7.
11. Gupta AK, Batra R, Bluhm R, et al. Skin diseases associated with Malassezia species. J Am Acad Dermatol 2004;51:785-98.
12. Nazarro-Porro M, Passi S. Identification of tyrosinase inhibitors in cultures of Pityrosporum. J Invest Dermatol 1978;71:205-8.
13. Loo DS. Cutaneous fungal infections in the elderly. Dermatol Clin 2004;22:33-50.
14. Asokan N, Binesh VG. Cutaneous problems in elderly diabetics: A population-based comparative cross-sectional survey. Indian J Dermatol Venereol Leprol 2017;83:205-11.
15. Sobera JO, Elewski BE. Fungal diseases. In: Bologna JL, Jorizzo JL, Rapini RP, editors. Dermatology. 2nd edition. St Louis: Elsevier; 2008. p. 1135-63.
16. Gupta AK, Chaudhry M, Elewski B. Tinea corporis, tinea cruris, tinea nigra, and piedra. Dermatol Clin 2003;21:395-400.
17. English JC 3rd, Laws RA, Keough GC, et al. Dermatoses of the glans penis and prepuce. J Am Acad Dermatol 1997;37:1-24.
18. Mukherjee PK, Leidich SD, Isham N, Leitner I, Ryder NS, Ghannoum MA. Clinical Trichophyton rubrum strain exhibiting primary resistance to terbinafine. Antimicrob Agents Chemother 2003;47:82-6.
19. Azambuja CV, Pimmel LA, Klafke GB, Xavier MO. Onychomycosis: Clinical, mycological and in vitro susceptibility testing of isolates of Trichophyton rubrum. An Bras Dermatol 2014;89:581-6.

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