



Original Research Article

The clinical study of dermatophytosis in a tertiary care hospital of konkan region, Maharashtra

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ABSTRACT

Introduction: Dermatophytes are aerobic fungi that produce proteases that digest keratin and allows colonization, invasion and infection of the stratum corneum of the skin, the hair shaft, and the nail.

Materials and Methods: This study was an attempt on the part of the author to find out the incidence and various clinico-epidemiological characteristics of Dermatophytosis in skin OPD of Tertiary care Hospital, B.K.L.W.R.M.C., Dervan.

Results: The study was carried on 2444 patients of Dermatophytosis attending the OPD, out of which 49.79% of the cases were Tinea Cruris (TC). The age group of 11-20 years showed maximum prevalence of Dermatophytosis (22.17%). 58% of the patients had diffuse lesions. Body involvement was seen in 87% of cases. Itching was the most common condition associated with Dermatophytosis. 35% of the patients reported with family history of Tinea Cruris.

Conclusion: Circumscribed variety of TC was found to be most common variant mostly observed in 2nd and 4th decade, with a male preponderance. Groin was the most common site with multiple lesions. Nail changes was most commonly associated with TC.

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1. Introduction

Dermatophytes are aerobic fungi that produce proteases that digest keratin and allows colonization, invasion and infection of the stratum corneum of the skin, the hair shaft, and the nail. Infection is generally cutaneous and restricted to the nonliving cornified layers because the fungi is not able to penetrate the deeper tissue or organ of healthy immunocompetent host. The infection is commonly designated as ring worm or “tinea”. Tinea literally refers to insect larva (cloth moth) that was felt by Romans to be the cause of infection.¹

It is more prevalent in tropical and subtropical countries like India where the heat and humidity is high for most part

of the year. There are several reports on intracontinental variability of the global incidence because of the change in climatic condition across the world. Over the past decades, non-dermatophytes, as agents of superficial fungal infection in humans, produce lesions that are clinically similar to those caused by dermatophytic infections.²

A superficial fungal infection is suspected when a lesion has central clearing, with advancing, red, scaly, elevated border, which may result in vesicles on the border of the affected area. A corporis is suspected when there is a circular plaque with demarcated border, and cruris is suspected when there is an erythematous plaque, often bilateral with pruritis. Tinea pedis is suspected when there are white macerated areas in the webs, and chronic, dry, scaly hyperkeratosis of the sole and heel. Tinea manuum is suspected when there is erythema, mild scaling when the

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dorsum is involved, and it appears in the palm as chronic, dry, scaly hyperkeratosis. A nail infection is suspected when there is distal hyperkeratosis, when chalky and dull yellow debris is found under the nail if it is separated from its bed, and the nail plate is brittle.²

This study was a novice attempt on the part of the author to find out the incidence and various clinic-epidemiological characteristics of Dermatophytosis in B.K.L.W. Medical College, Dervan, Konkan region which is a tertiary referral hospital catering to the need of about 2.8crores people with sex ratio 929 per 1000 males.

2. Materials and Methods

This study was undertaken in the department of dermatology, B.K.L.W. Medical College, Dervan for a period of two year from January 2018 to December 2019.

The study was carried on 2444 patients of Dermatophytoses after obtaining informed consent. The epidemiological data such as age, sex, family, history, associated disease was collected.

2.1. Selection criteria

Patients attending the dermatology OPD having itching over prural areas with well-marginated raised border, erythematous papulovesicles and central clearing were included.

2.2. Clinical examination

A thorough clinical evaluation was done to assess the clinical pattern, extent and severity of Dermatophytosis. Other variables such as lesion site, number, size, shape, duration, associated diseases and nail changes were also recorded.

2.3. Direct microscopic examination

All the samples were subjected to KOH preparation for direct microscopic examination. Three drops of 10% KOH plus 40% dimethyl sulfoxide (DMSO) were placed over a clean grease-free slide with skin scraping samples placed on that and covered with a coverslip. Slides were examined in light microscopy, and hyaline branching septate hyphae and arthrospores were identified.

2.4. Fungal culture

All samples were cultured on Sabouraud 4% dextrose agar (SDA) with chloramphenicol and cycloheximide slant tubes, and dermatophyte test media. Incubation was done aerobically at 37°C (for isolation of *T. verrucosum*) and at 28°C for other dermatophytes.

Cultures were observed, every alternate day, to check for the appearance of any fungal growth or production of any pigment over the reverse side of the slant.

Lactophenol cotton blue staining was done of smears from culture-positive slants to detect presence of macro and microconidia. SDA slants were inspected for up to 4 weeks for growth.³

2.5. Statistical analysis

The data collected were statistically analyzed using Microsoft Excel spread sheet.

3. Results

The age group of 11-20 years showed maximum prevalence of TC (22.17%) followed by 31-40 years (17.51%). [Figure 1]

There was overall male predominance of (51.50%) and females were (48.50%) [Figure 2]. High prevalence in males have been also reported by other studies from India.⁴⁻⁶

The Etiological agents affecting the dermatophytosis were mainly humid climatic condition which constituted for about in 40% of the patients as they have history of recent shift of the residence to Konkan. Rest of the agents constitutes poor hygiene 25% due to poverty, excessive sweating 15%, Immunocompromised patients 9%, Malnutrition in 6% and Alocohol intake in 5% the patients.[Figure 4]

The probable risk factors for Dermatophytosis were mainly the family history which was about 35% as the infection can be spread in between the family members. The other associated risk factors which were taken into consideration were Diabetes Mellitus in 15%, Hypertension in 8%, Sedentary life style in 12%, Obesity in 13%, chronic steroid abuse in 6%, smoking 6% and stress in 5%. [Figure 5]

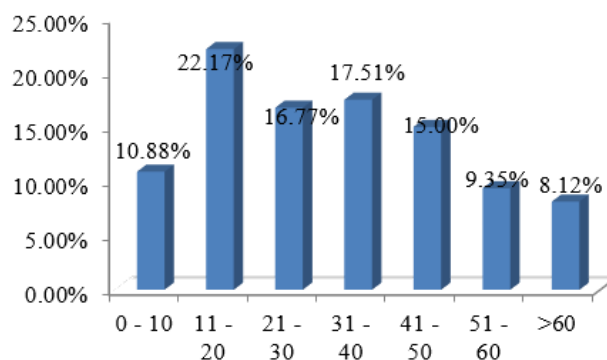


Fig. 1: Age distribution

Out of 2444 patients of Dermatophytosis, 49.79% were of Tinea Cruris, followed by 32.20% Tinea Corporis, followed by Tinea Faciei (6.30%), followed by Tinea Unguium (3.02%), followed by Tinea Pedis (2.65%), followed by Tinea Manuum (1.96%), followed by Tinea

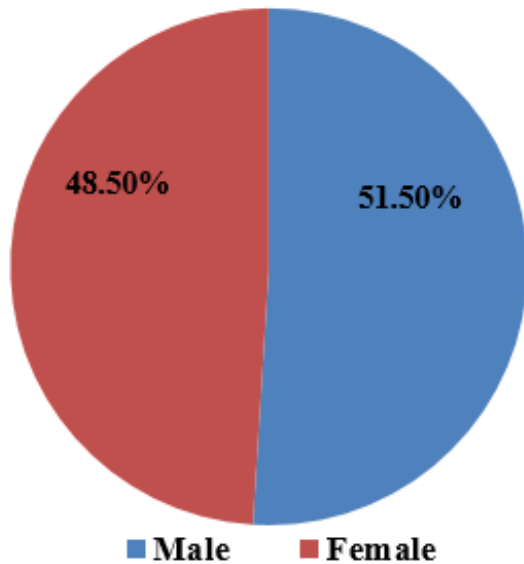


Fig. 2: Sex distribution

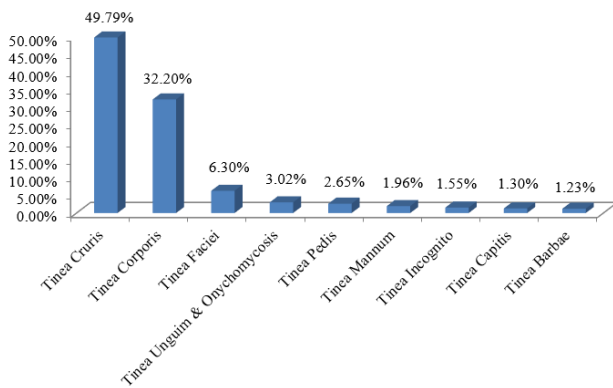


Fig. 3: Percentage of disease distribution

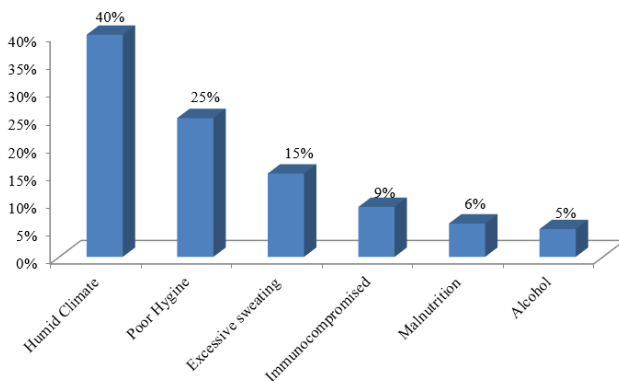


Fig. 4: Etiological agents

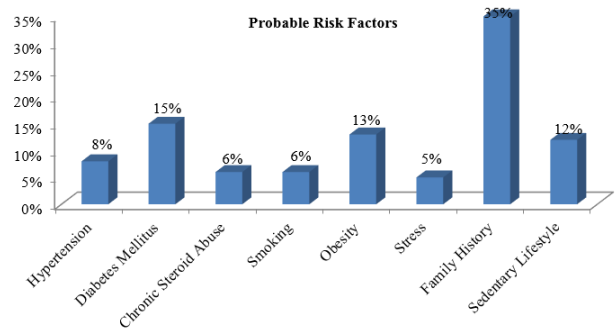


Fig. 5: Probable risk factors

Incognito(1.55%), followed by Tinea Capitis (1.30%) and Tinea Barbae(1.23%). The age group of 11-20 years showed maximum prevalence of TC (22.17%) followed by 31-40years (17.51%). There was a overall male preponderance of (51.50%).

49.79% of the patients showed lesions over the prural area, out of which 62% showed multiple lesions with a male dominance of 51.50%. It was followed by lesions all over the body (22%) where single lesion comprised of 16%.

Considering the shape of the lesions, most of the patients had circular lesions (82%) followed by (12%) circular and (6%) reticular lesions.

Out of 2444 patients, only 74 patients (3.02%) had nail involvement (Figure 3). Yellowish discoloration of nails being the commonest pattern.

As regards to duration of disease, 63% of the patient reported within 1-2 months, 28% had their disease within 6 months to 1year while 9% presented with disease for more than one year.

T.rubrum was the most common condition associated with TC, seen in 86.3% cases followed by T.Mentagrophytes in 8.2% and E.floccosum in 5.5% of cases (Table 1).

Table 1: Associated species

Species	Number	Percentage
T.rubrum	2111	86.3%
T.Mentagrophytes	201	8.2%
E.floccosum	132	5.5%

4. Discussion

Our study pointed that out of 2444 patients, 49.79% were of Tinea Cruris. It differs from a study done in Chennai, South India where Tinea corporis is the more common variety. Tinea corporis was present in 63.27% of cases in the study done in chennai, South India.⁷

The age of presentation of Dermatophytosis varied from 0 to >60 years in our study and the age group of 11-

Table 2: KOH - positive and culture - positive cases of different types of Dermatophytosis from respective total cases

Clinical types	Total no. of samples	KOH +ve	% of KOH +ve	Culture +ve	% of Culture +ve
Tinea cruris	1217	1190	97%	786	64%
Tinea corporis	787	698	88%	488	62%
Tinea faciei	154	122	79%	96	62%
Tinea Unguium	74	56	75%	38	51%
Tinea pedis	65	55	84%	29	44%
Tinea Manuum	48	28	58%	19	39%
Tinea incognito	38	19	50%	11	28%
Tinea capitis	32	22	68%	8	25%
Tinea Barbae	26	10	38%	4	15%
Total	2444	2200	90%	1479	60%

20 years showed maximum prevalence of Dermatophytosis (22.17%) followed by 31-40 years (17.51%). There was overall male predominance of 51.50% with male to female ratio being 1.06:1 which was similar to the study done at other parts of India where males outnumbered females.⁴⁻⁶ The main reason for higher prevalence in this group may be because the individuals in this group are often most active and involved in outdoor activities such as studies and jobs. In this study, various dermatological conditions were diagnosed by the dermatologist based on the clinical presentation.⁶

Hot and humid climate in tropical and subtropical countries like India makes dermatophytoses or ringworms a very common superficial fungal skin infection. Factors like socioeconomic conditions, lifestyle and migration also play further significant role in the prevalence of dermatophytosis in population.

Dermatophytosis is one of the most common communicable disease. It infect humans and animals as well globally although some of the infections are present with higher prevalence in tropical countries.^{8,9} Many factors are responsible for their higher prevalence such as humid and cold environment in and around Konkan region of Maharashtra. Poor hygiene and illiteracy also responsible for higher incidence of dermatophytosis.

The diagnosis of different clinical types of dermatophytosis in Konkan was presented in Table 2. The results indicated that dermatophytosis was a common skin infection in Konkan. Out of 2444 cases of various types of dermatophytosis, 1217 cases of Tinea cruris were reported and 1190(97%) were positive for KOH test and 786(64%) were confirmed in SDA culture (Table 2). The predominant clinical manifestation type of dermatophytosis was Tinea cruris and Tinea corporis was the second most common dermatophytic infection among all the clinical types of dermatophytosis out of 787 cases, 698(88%) were KOH-positive and 488(62%) patients were observed positive in culture. The present study is coincides with earlier research.^{10,11}

Age group 11-20years appeared to be prone for Tinea cruris. Low amount of fungistatic fatty acids, sharing of

towels, low hygienic levels at this age are responsible factors for this.¹² After Tinea cruris, Tinea faciei was the third in the prevalence of dermatophytic infections as shown in Table 2 for KOH-positive and culture-positive percentage. Tinea Unguium was the fourth most common type of clinical fungal infection among all dermatophytic infections. For Tinea pedis, 40% culture-positive cases were reported. Most of the patients were from economically low background as they have to work bare hand and footed. At different places the incidence of occurrence of Tinea pedis varies.^{13,14} Other types of dermatophytosis such as Tinea capitis, Tinea incognito, Tinea Manuum & Tinea Barbae were found less frequent (Table 2)

Dermatophytosis is one of the most common communicable disease. It infect humans and animals as well globally although some of the infections are present with higher prevalence in tropical countries.^{8,15} Many factors are responsible for their higher prevalence such as humid and cold environment in and around Konkan. Poor hygiene and illiteracy also responsible for higher incidence of dermatophytosis.

5. Conclusion

Circumscribed variety of TC was found to be most common variant mostly observed in 2nd and 4th decade, with a male preponderance. Groin was the most common site with multiple lesions. Nail changes was most commonly associated with TC. The limitation of the study was the low sample size and large scale prospective study is needed to have a holistic approach to the problem.

Priorities for future research to improve the outcome of dermatophytosis management:

1. Improved diagnostic tests, with high accuracy, rapid turnaround time, and prognostic value like BSA that can guide antifungal therapy in real time.
2. Direct detection of species causing infection and antifungal resistance from clinical specimen
3. Better risk prediction models, including genetic risk factors to target surveillance and prophylaxis

4. Mechanisms to ensure the attainment of maximal antifungal effect as quickly as possible (e.g. combination therapy, therapeutic drug monitoring).

6. Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

7. Source of Funding

None.

References

- Surendran K, Bhat MR, Bolor R, Nandakishore, Sukumar D. A Clinical and Mycological Study of Dermatophytic Infections. Father Muller Medical College hospital Mangalore. *Indian J Dermatol*. 2014;59(3):262–7.
- Lakshmanan A, Ganeshkumar P, Mohan SR, Hemamalini M, Madhavan R, Indian J Med Microbiol. Epidemiological and clinical pattern of dermatomycoses in rural India. Employee State Insurance Corporation Medical College and Post-graduate Institute of. *Indian J Med Microbiol*;33(5):134–6. doi:10.4103/0255-0857.150922.
- Das S, De A, Saha R, Sharma N, Khemka M, Singh S, et al. The current Indian epidemic of dermatophytosis: A study on causative agents and sensitivity patterns. *Indian J Dermatol*;65(2):118–22. doi:10.4103/ij.d.IJD_203_19.
- Bhatia VK, Sharma PC. Epidemiological studies on dermatophytosis in human patients in Himachal Pradesh India. *SpringerPlus*. 2014;3:134. doi:10.1186/2193-1801-3-134.
- Mahajan S, Tilak R, Kaushal SK, Mishra RN, Pandey SS. Clinico-mycological study of dermatophytic infections and their sensitivity to antifungal drugs in a tertiary care center. *Indian J Dermatol Venereol Leprol*. 2017;83(4):436–40. doi:10.4103/ijdv.IJDVL_519_16.
- Kalita JM, Sharma A, Bhardwaj A, Nag VL. Dermatophytoses and spectrum of dermatophytes in patients attending a teaching hospital in Western Rajasthan, India. *J Family Med Prim Care*. 2019;8(4):1418–21. doi:10.4103/jfmpc.jfmpc_159_19.
- Ramaraj V, Vijayaraman RS, Rangarajan S, Kindo AJ. Incidence and prevalence of dermatophytosis in and around Chennai, Tamilnadu, India. *Int J Res Med Sci*. 2016;4(3):695–700. doi:10.18203/2320-6012.ijrms20160483.
- Cohen J, Powderly WG, Day J. Infectious diseases, 2nd Edn., In: Infectious diseases. London, New York: Mosby Edinburgh; 2004.
- Murray P, Rosenthal K, Pfaller M. Medical microbiology, 5th Edn. Mosby Elsevier; 2009.
- Balakumar S, Rajan S, Thirunalasundari T, Jeeva S. Epidemiology of dermatophytosis in and around Tiruchirapalli Tamilnadu, India. *Asian Pac J Trop Dis*. 2012;2(4):286–9.
- Rassai S, Feily A, Sina N, Derakhshanmehr F. Some epidemiological aspects of dermatophyte infections in Southwest Iran. *Acta Dermatovenerol Croat*. 2011;19(1):13–5.
- Ansarin H, Ghafarpour GH, Alahati M. Prevalence and etiologic agents of tinea among school children in City of Varamin. *J Iran Univ Med Sci*. 2001;24:128–35.
- Shah HS, Amin AG, Kanvinde MS. An analysis of 2000 cases of dermatomycoses. *Indian J Pathol Bacteriol*. 1975;18(1):32–7.
- Anand LC, Singh UK, Rathore BS. Fungal flora in the armed forces: Clinical and mycological studies. *Indian J Med Res*. 1980;71:365–71.
- Murray P, Rosenthal K, Pfaller M. Medical microbiology, 5th Edn. Mosby Elsevier; 2009.

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