Journal of Pakistan Association of Dermatologists 2010; **20**: 23-27.

Original Article

Tinea pedis: a clinical dilemma in Bangladeshi population

M. A. Wahab*, Rokeya Begum*, Biswas Shaheen Hassan*, Md. Zafrul Islam*, Ishrat Bhuiyan*, Lubna Khondker**

*Department of Dermatology & Venereology, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh.

**Department of Medical Statistics, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh.

Abstract

Background Tinea pedis is an important public health problem because of the increase in immunosuppressive states. Large scale studies in Asia are scarce, and the baseline incidence of tinea pedis is not firmly established.

Objective To find out the clinical types of tinea pedis among the Bangladeshi population.

Patients and methods 200 clinically suspected cases of tinea pedis were included in this study. In all cases, samples were collected for KOH microscopy and culture. Clinical pattern and associated relevant factors were noted according to a predetermined protocol.

Results Papulosquamous tinea pedis was the most common clinical pattern in 80 (40%) followed by intertriginous type in 70 (35%) patients. Hyperkeratotic pattern was found less commonly in 45 (22.5%) patients followed by bullous pattern in 5 (2.5%) patients.

Conclusion The incidence of papulosquamous type of tinea pedis is relatively higher among the Bangladeshi population than other countries.

Key words
Tinea pedis, Bangladesh.

Introduction

Tinea pedis (athlete's foot) is an infection of the feet caused by dermatophytic fungi. It may last for a short or long time and may recur after treatment.[1,2] Among all fungal infections, tinea pedis is the most common.[3] The exact incidence and prevalence of the disease are unknown. Tinea pedis is contagious and can be passed through direct contact or contact with items such as shoes, stocking and shower or pool surfaces.[4] Tinea pedis may be itchy, painful or asymptomatic at all.[5] The 20-50 years age group is most commonly affected and males outnumber females.[6] The disease may present in any of the four forms: a) papulosquamous type - scaly and with some papular lesions on dorsum of the foot and may also involve plantar aspect; b) interdigital type (intertriginous) - it is the most common presentation of tinea pedis and an infection of the web spaces, particularly between the 4th and 5th toes; c) hyperkeratotic type – well-demarcated erythema with minute papules on margin, fine white scaling and hyperkeratosis confined to heels, soles and lateral border of

Address for correspondence
Dr. Md. Abdul Wahab
MBBS; DDV; MCPS; FCPS; FRCP (Glasgow)
Associate Professor
Department of Dermatology & Venereology,
Bangabandhu Sheikh Mujib Medical University,
Shahbag, Dhaka-1000, Bangladesh.
Email: wahab_skinvd@yahoo.com

feet; and d) vesiculo-bullous type - tense vesicles larger than 3mm in diameter, vesiculopustules or bullae on the thin skin of the sole and periplantar areas.[7,8]

There are a few studies available regarding the incidence and prevalence of clinical types of tinea pedis. So our study was designed to see which of the clinical variants of tinea pedis is more prevalent in Bangladesh.

Patients and methods

200 clinically diagnosed patients of tinea pedis, confirmed by KOH microscopy and mycologic culture, attending Bangabandhu Sheikh Mujib Medical University, Shaheed Suhrawardy Hospital, Combined Military Hospital, Dhaka, Bangladesh during June, 2006 to May, 2009 were included in the study. The patients consisted of 122 males and 78 females aged between 20 to 60 years (mean age 40.95±14.36 years). Patients aged below 20 years and above 60 years, recently or chronically immunocompromised and having serious systemic illness were excluded from the study. A complete history including age, family history, duration and site of involvement was taken. Clinical examination was performed and types of tinea pedis were noted. Investigations included only KOH microscopy and culture. Data were edited by checking consistency and analyzed by software SPSS method.

Results

Two hundred patients of tinea pedis were enrolled in the study. The mean age of patients was 40.95±14.36 years, with age range 20-60 years. Gender distribution in different age groups is shown in **Table 1**. Males were more affected than females (p<0.05). Duration of disease is also shown in **Table 1**. However, there was no significant difference between various groups (p>0.05). **Table 2** shows statistically significant difference between different age groups and level of positive family

Table 1 Age and sex distribution and duration of illness (N=200)

	Male (n=122) N (%)	*Female (n=78) N (%)*
Age (years)		
20-30	15 (7.5)	18 (9)
30-40	37 (18.5)	23 (11.5)
40-50	40 (20)	22 (11)
50-60	30 (15)	15 (7.5)
Duration (months)		
< 3 months	50 (25)	25 (12.5)
3-6 months	42 (21)	28 (14)
> 6 months	30 (15)	25 (12.5)

Table 2 Distribution of the patients by positive family history (N=200)

Age group (years)	*N (%)*
20-30	3 (1.5)
30-40	5 (2.5)
40-50	8 (4)
50-60	4 (2)
Total	20 (10)

Table 3 Comparative study of direct microscopy and culture (N=200)

	KOH +ve N (%)	*KOH –ve N (%)*	*Total N (%)*
Culture +ve	120 (60)	32 (16)	152 (76)
Culture – ve	20 (10)	28 (14)	48 (24)
Total	140 (70)	60 (30)	200 (100)

Table 4 Clinical pattern of tinea pedis (N=200)

Clinical pattern	*N (%)*
Papulosquamous	80 (40)
Intertriginous	70 (35)
Hyperkeratotic	45 (22.5)
Vesico-bullous	05 (2.5)

Table 5 Distribution of the patients by clinical pattern of tinea pedis and family history (N=200)

Clinical pattern	*Positive family history*	*Negative family history*
Papulosquamous	7 (3.5%)	73 (36.5%)
Intertriginous	5 (2.5%)	65 (32.5%)
Hyperkeratotic	8 (04%)	37(18.5%)
Vesico-bullous	0 (0%)	05 (2.5%)

Figure 1 Tinea pedis: papulosquamous type.

Figure 2 Tinea pedis: interdigital type (intertriginous).

history, although positive family history was present in 3 (1.5%) patients in 20-30 years age group, 5 (2.5%) patients in 30-40 years age group, 8 (4%) patients in 40-50 years age group and 4 (2%) in 50-60 years age group.

Table 3 shows the frequency of positive KOH microscopy and fungal culture in Saboraud's dextrose agar media. Fungal culture were positive in 152 (76%) cases and among them 120 (60%) were also positive in KOH microscopy. KOH microscopy was positive in 140 (70%) cases and among them, 120 (60%) were culture positive. The chi-square test was done and the difference was found statistically significant ($p< 0.05$).

Figure 3 Tinea pedis: hyperkeratotic type.

Figure 4 Tinea pedis: vesico-bullous type.

The distribution of clinical pattern of tinea pedis is shown in **Table 4**. It was observed that papulosquamous type was the most common type (**Figure 1**) seen in 80 (40%) patients followed by intertriginous type (**Figure 2**) in 70 (35%) and hyperkeratotic type (**Figure 3**) in 45 (22.5%) patients. The least common was vesico-bullous type (**Figure 4**) present in 5 (2.5%) patients.

Table 5 shows the relationship between clinical pattern of tinea pedis and family history of disease. Family history was infrequent in all types of tinea pedis ($p< 0.05$).

Discussion

Tinea pedis is a dermatophytosis of the feet. Of all fungal infections, it is the most common type. The risk of tinea pedis increases by wearing closed shoes, especially if they are plastic lined, wetting of feet for prolonged time, hyperhidrosis and minor skin or nail injury. Disease severity ranges from mild to severe and it may last for a short or long time. It may persist or recur, but generally responds well to treatment. Long term medication and preventive measures may be needed.[9-13]

In the present study, 200 patients with tinea pedis were enrolled. The mean age of the patients was 40.95±14.36 years. The age of the study population was 20-60 years. Among 20-30 years males were 15 (7.5%) and female were 18 (9%), among 30-40 years male were 37 (18.5%) and female were 23 (11.5%), among 40-50 years male were 40 (20%) and female were 22 (11%), and among 50-60 years male were 30 (15%) and female were 15 (7.5%). These findings are consistent with those of Daniel *et al*.[14] and Foster *et al*.[15] Regarding duration of the disease in our study, maximum patients were of less than 3 months duration 75 (37.5%) followed by 3-6 months 70 (35%), these findings were consistent with the previous data.[1,11,15,16] 1.5% in 20-30 years age group, 2.5% in 30-40 years age group, 4% in 40-50 years and 2% in 50-60 years age group gave positive family history which was different from those by Allens *et al*.[16], Attye *et al*.[17] and Pickup *et al*.[18] where they found more percentage of family history.

Out of 200 patients having tinea pedis, the most common variant was papulosquamous type 80 (40%) followed by intertriginous pattern 70 (35%) which was not consistent with the findings of El-Segini *et al*.[19] and Nishimoto[20] where they found intertriginous pattern was most common.

Conclusion

In the present study, the incidence of papulosquamous type of tinea pedis was relatively higher among the Bangladeshi population.

References

1. Sobera JO, Elewski BE. Fungal Diseases. In: Bolognia JL, Jorizzo JL, Rapini RP, eds. *Dermatology, Volume 1*. New York: Mosby; 2003. P. 1171-98.
2. Habif TP, ed. *Clinical Dermatology, 3rd edn.* St. Louis: Mosby; 1996. P. 366-369.
3. Verma S, Heffernan, MP. Superficial fungal infection: dermatophytosis, onychomycosis, tinea nigra, piedra. In: Wolff K, Goldsmith LA, Katz SI *et al.*, eds. *Fitzpatrick's Dermatology in General Medicine, 7th edn, Volume 2*. New York: McGraw Hill Medical; 2008. P. 1807-21.
4. Elewski BE, Hazen PG. The superficial mycoses and the dermatophytes. *J Am Acad Dermatol* 1989; **21**: 655-73.
5. Singh KA, Srivastava KS. A clinico-cytological study on tinea pedis at Ranchi. *Studies* 1994; **60**: 68-71.
6. Elewski BE, Elgart ML, Jacobs PH *et al*. Guidelines of care for superficial mycotic infections of the skin: Tinea corporis, tinea cruris, tinea faciei, tinea manuum, and tinea pedis. *J Am Acad Dermatol* 1996; **34**: 282-6.
7. Szepietowski JC, Reich A, Garlowska E *et al*. Factors influencing coexistence of toenail onychomycosis with tinea pedis and other dermatomycoses. *Arch Dermatol* 2006; **142**: 1279-84.
8. Hapcioglu B, Yegenoglu Y, Disci R *et al*. Epidemiology of superficial mycosis (tinea pedis, onychomycosis) in elementary school children in Istanbul, Turkey. *Coll Antropol* 2006; **30**: 119-24.

9. Kenna ME, Elewski BE. A U.S. epidemiologic survey of superficial fungal diseases. *J Am Acad Dermatol* 1996; **35**: 539-42.
10. Krejci-Manwaring J, Schulz MR, Feldman SR *et al.* Skin disease among Latino farm workers in North Carolina. *J Agricultural Safety and Health* 2006; **12**: 155-63.
11. Hay RJ, Moore MK. Mycology: tinea pedis. In Burn T, Breathnach S, Cox N, Griffiths C, editors. *Rook's Textbook of Dermatology, 5th edn*. London: Blackwell Science; 2004. p. 31.32-5.
12. Sharma NL, Gupta ML, Sharma RC *et al*. Superficial mycoses in Simla. *Ind J Dermatol Venereol Leprol* 1983; **49**: 266-9.
13. Tsuboi R. Human beta-defensin-2, an antimicrobial peptide, is elevated in scales collected from tinea pedis patients. *Int J Dermatol* 2006; **45**: 1389-90.
14. Daniel CR, Jellinek NJ. The pedal fungus reservoir. *Arch Dermatol* 2006; **142**:1344-6.
15. Foster KW, Gahannoum MA, Elewski BE. Epidemiologic surveillance of cutaneous fungal infection in the United States from 1999-2002. *J Am Acad Dermatol* 2004; **50**: 748-52.
16. Allen S, Christmas TI, McKinney W *et al*. The Auckland skin clinic tinea pedis and erythrasma study. *NZ Med J* 1990; **103**: 391-3.
17. Attye A, Auger P, Joly J. Incidence of occult athlete's foot in swimmers. *Eur J Epidemiol* 1990; **6**: 244-7.
18. Pickup TL, Adams BB. Prevalence of tinea pedis in professional and college soccer players versus non-athletes. *Clin J Sport Med* 2007; **17**: 52-4.
19. El-Segini Y, Schill WB, Weyers W. Bullous tinea pedis in an elderly man. *Mycoses* 2002; **45**: 428-30.
20. Nishimoto K. An epidemiological survey of dermatomycoses in Japan, 2002. *Japanese J Med Mycology* 2006; **47**: 103-11.