

## PREVALENCE AND ETIOLOGY OF DERMATOMYCOSES IN RAJSHAHI, BANGLADESH

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**Abstract:** Dermatophytes are very common infections caused mainly by dermatophytes. A total of 1186 patients ranging from 1-60 years of age were surveyed for dermatomycotic infections in Rajshahi, Bangladesh. Specimens for mycological investigations were confirmed by microscopic examinations in 817 cases and the causative agents were isolated and cultured in 70 positive cases. The highest prevalence of dermatomycosis was of *Tinea corporis* (63%) followed by *T. pedis* (15%), *T. capitis* (12%) and *T. unguium* (8%). *Trichophyton* and *Microsporum* were the major etiological agents followed by *Epidermophyton*. This study also showed that there is a great variation in the severity of different types of dermatomycoses at different months of the year.

**Key words:** Dermatophytes, dermatomycoses, Tinea

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### Introduction

The dermatophytes are fungi which cause diseases of the skin of human, animals or both. They parasitize keratinized tissues, including nails, hair and stratum corneum of the skin, and cause dermatomycoses (Weitzman and Summerbell 1995). The clinical types of dermatomycoses are called tinea by the members of medical profession. Traditionally, tinea infections have been named by anatomic location of the body, such as *T. capitis* for ringworm of the scalp, *T. corporis* for ringworm of the body, and *T. pedis* for ringworm of the foot. The dermatophytic groups are typically Hyphomycetes with perfect stage in the Gymnoascaceae. These fungi have frequently been treated as special group the 'Dermatophytes' or Ringworm fungi or tinea. Dermatophytes are cosmopolitan, and occur widely in soil and other keratin containing substrate such as bird's nest and thus, the soil serves as a source of infection of tinea (Ainsworth 1971; Beneke and Rogers 1980).

Untold numbers of people world-wide suffer from these infections with high humid environment. Sex, race and occupation have little recognized differential influence upon the frequency of these infections. Children are mostly affected by dermatomycoses before and during

puberty (Elewski 1996). It is caused by a variety of zoophilic, anthropophilic and geophilic dermatophytes of the genera *Microsporum*, *Epidermophyton* and *Trichophyton* (Weitzman and Summerbell 1995).

The prevalence of dermatomycoses or tinea infections have been studied in different parts of the world (Devliotou *et al.* 2000; Metin *et al.* 2001; Akpolat *et al.* 2005). The relative occurrence of the etiologic agents of these infections varies from country to country and from one climatic region to another (De Vrocy 1985; Ayadi *et al.* 1993; Korstanje *et al.* 1995). In tropical countries, a warm and humid climate, crowded living and poor sanitary conditions all promote the spread of these infections (Abdel *et al.* 1995). Only a few research studies are available on dermatomycoses in Bangladesh (Neela and Alam 2000). The present study is aimed at detecting the prevalence of dermatomycoses infection and etiological agent in Rajshahi, Bangladesh.

### Materials and methods

**Sample selection:** A total of 1186 patients having age range of 1-60 years suspected to have dermatomycotic infections were randomly selected from outdoor patients of the Skin and Venereal Disease Section of the Rajshahi Medical College Hospital (RMCH), Bangladesh, from July

1996 to June 1997, covering all the seasons of a year. Questionnaires and physical observations were used to obtain information on duration of the lesion, clinical picture, prior therapy as well as demographic data such as age, sex, nationality and family status of the respondents. The final selected culture positive for this study consisted of 817 patients.

**Sample collection:** Samples were collected from skin, hair and nail using a sterile scalpel blade following cleaning of the affected sites with 70% alcohol. The scrapings were collected on a piece of sterile paper. The samples were divided into two portions: one for microscopic examination and the other for culture. The collected samples were transported to the laboratory within 2 hours for microscopic and cultural analysis.

**Sample processing**

*Direct microscopic examination:* Direct microscopic examination of scales and broken-off hairs placed on a microscope slide with one or two drops of 10-20% potassium hydroxide (KOH) and a cover slip was performed. The sample was warmed for 5 minutes over a flame as described by Behl (1990). Each treated slide was then carefully examined under low (×10) and high (×40) power objective for the presence of hyphae and/or conidia.

*Fungal culture:* Each scraping was cultured into Sabouraud dextrose agar (Ajello *et al.* 1996). The plates or slants were incubated at 28°C for up to 4 weeks and examined at 2 to 3 days intervals for fungal growth. Fungal isolates were sub-cultured onto plates of Sabouraud's agar. The isolates were examined visually and microscopically for morphology of the fungi using lactophenol cotton blue by slide culture technique. The dermatophytes were confirmed by dermatophyte test medium, incubated at 30°C for 14 days. Genus identification was based on the presence or absence of macro- and microconidia, their shape, and their distribution along the hyphae (Beneki and Rogers 1980).

**Results and Discussion**

Of 1186 patients, diagnosis of 817 cases was confirmed by microscopic examinations, and the causative agents were isolated in 70 cases. From the total number of isolates identified, dermatophytes were the most prevalent (Fig. 1). The highest prevalent of dermatophytic infection was *T. corporis* (63%), followed by *T. pedis* (15%), *T. capitis* (12%) and *T. unguium* (8%). Three genera identified from

the isolates were *Microsporum*, *Epidermophyton* and *Trichophyton* (Table1). *Microsporum* was isolated from skin and hair, whereas *Epidermophyton* from nail only and *Trichophyton* from skin, nail and hair.

The effect of seasonal weather conditions on the incidence of dermatophytic infections showed that the incidence during each of the months July, August, September and October was evidently higher than that found during each of the months of November, December, January and February. During the months of March, April, May and June the incidence of the infections was somewhat intermediate in position (Fig. 2).

Although dermatomycoses/tinea diseases have worldwide occurrence, its frequency is variable and depends on different climate condition, sex, age, occupational and economical conditions (Neela and Alam 2000). This disease appears to be prevalent in Rajshahi. Accurate assessment of the prevalence of etiologic agents is therefore useful to cure the disease and to prevent its transmission.

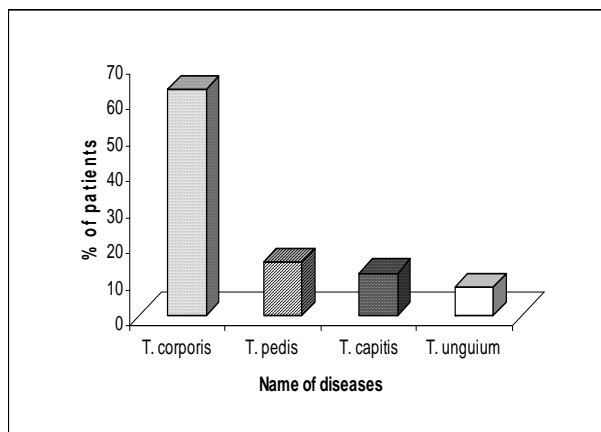
Concerning individual types of dermatophytic infection the severity was found the highest in the case of *T. corporis* followed by *T. pedis* (Fig. 1). These data suggest that the body is always covered with cloths which may help keep the body moist and favorable environment for *T. corporis* infections. In contrast, *T. capitis* is predominant in North America (Weitzman and Summerbell 1995). Mabata and Nwajagu (2007) reported that in Nigeria most common incidence of tinea disease is *T. capitis* and children suffer more than adults (Srejaard 1982). In Bangladesh, the age groups of 16-30 years suffer different types of tinea disease (Neela and Alam 2000). This may be due to the fact that younger people are more physically active and tend to sweat more. Personal hygiene plays an important role for the dissemination of *T. corporis*. Other tinea diseases are not so prevalent in Rajshahi region.

**Table 1.** Etiological agents in dermatomycoses infections

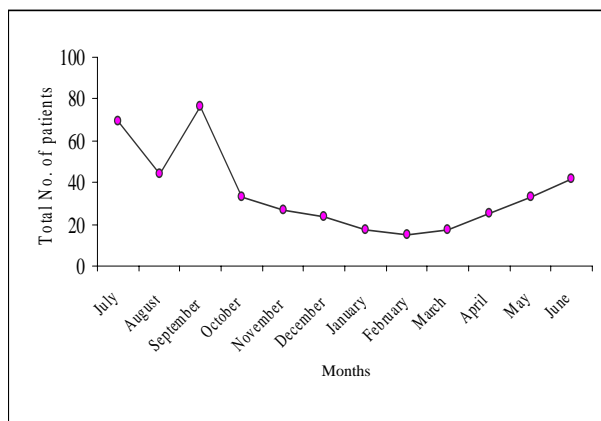
Types of specimen	Clinical name of the diseases	Etiological agents
Skin scraping	Tinea corporis	<i>Microsporum</i> <i>Trichophyton</i>
	Tinea pedis	
Nail clipping	Tinea unguium	<i>Epidermophyton</i> <i>Trichophyton</i>
Hair stubs	Tinea capitis	<i>Microsporum</i> <i>Trichophyton</i>

This study also demonstrates that a variety of dermatophytes can cause dermatomycoses. Of the isolated species *Trichophyton* is the most prevalent isolate followed by *Microsporum*. Occurrence of these organisms as the major cause of dermatomycoses in Rajshahi has been recorded (Neela and Alam 2000). Oyeka *et al.* (2003) also reported a similar phenomenon in Nigeria. In our studies *Microsporum* was isolated from *T. corporis* and *T. capitis*. These fungi can be transmitted by infected clothing, towels, bedding and combs. *Microsporum* is usually acquired from infected pet animals (Shah *et al.* 1989) that are the reservoir of zoophilic dermatophytes. *Trichophyton* was isolated from *T. pedis*, *T. unguium* and *T. capitis*. Babel *et al.* (1989) reported that *T. capitis* in children was caused by *Trichophyton* but in adults this genus was more frequently seen as an agent of *T. corporis* (Bronson *et al.* 1983). This genus has been reported to have a large number of pathogenic species. The distribution of this genus has been shown to be of similar pattern in connection with *Microsporum*. *Epidermophyton* was isolated only from *T. unguium*. It has been reported to have only two known species to date and only a single species is pathogenic that attacks skin and nails and also is distributed worldwide (Weitzman and Summerbell 1995).

Incidence of dermatomycoses in relation to seasonal weather conditions was shown in Fig. 2. These data clearly show that environmental factors play an important role in increasing and decreasing the incidence of the disease. During the period between July and October, the weather remains relatively warm and humid which would favour the infection, spread and consequently higher incidence of the disease. During the period of November and February the weather remains relatively dry and cold which would decrease the incidence of the disease. Gugnani (1982) attributed the public health problem caused by dermatophytes in Nigeria to the warm humid climate. Oyekaa and Eze (2006) reported that dermatomycoses are public health problem in many countries with high humid environment. Bangladesh, especially Rajshahi, is a warm and humid region; therefore the dermatomycoses are prevalent here.



**Fig. 1.** Prevalence of various types of tinea diseases in Rajshahi



**Fig. 2.** Incidence of dermatomycotic patients in relation to different months of the year

### Conclusion

The present investigation provides data that are valuable to the determination of dermatomycoses among the population in Rajshahi region. The etiological agents of these diseases could be specifically diagnosed, which could help the physicians to combat the disease with specific drugs. It is obvious that this sort of information is essential for the physician of our country to have correct diagnosis of various types of dermatomycoses that exist here.

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