

Review

Mycology in the Philippines, Revisited

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Abstract

The warm tropical climate of the Philippines and its interaction with cultural practices, occupation and immune responsiveness contribute to the increased susceptibility of Filipinos to fungal infections. An investigation to determine the prevalence of fungal infections in dermatology training institutions over a 4-year period was conducted. The results showed that fungal infections rank as the second leading cause of consultation with a prevalence of 12.98%. Pityriasis versicolor (25.34%), tinea corporis (22.63%), tinea cruris (16.7%) and tinea pedis (16.38%) were the most frequently encountered cases. Fungal culture yield is low and *Candida* sp. is the most common isolate, obtained predominantly from specimens taken from the oral mucosa and nails. Candidiasis is still the most common opportunistic infection followed by coccidioidomycosis, cryptococcosis and aspergillosis. Imidazoles are the most commonly prescribed systemic and topical treatment by Filipino dermatologists. Initial data collected would serve as reference for future research and may be used to compare with epidemiologic data obtained from other Asian countries.

Key words: mycology, Philippines, prevalence, tinea

INTRODUCTION

The Philippines has a tropical marine climate divided into a rainy and a dry season. Having an average temperature of 27-33°C and a relative humidity of 77-83% makes the weather almost always hot and humid. These environmental factors and their interplay with age, occupation, genetic susceptibilities and immune responsiveness contribute to the high prevalence of fungal infections among Filipinos. This study aimed to determine the prevalence of fungal infections in dermatology training institutions. Data which pertains to diagnosis and treatment were also collected.

METHODS

Data on the cases of superficial and deep fungal infections were retrieved from the medical record database of the Department of Health-Research Institute for Tropical Medicine (DOH-

RITM). Questionnaires were distributed in five accredited government institutions, 1 private institution and private clinics to determine incidence of superficial and deep mycoses from year 2000 to 2003 to compare with data gathered from the DOH-RITM. Most common diagnostic procedures done and modes of treatment were likewise identified. Published studies on the prevalence of skin infections in the Philippines were reviewed.

Potassium hydroxide (KOH) smear and fungal culture results were retrieved from the laboratory record database of the Microbiology section of the DOH-RITM from years 1998 to 2004.

Data collected were analyzed using indicators such as frequency distributions, rates and ratios. After assessing the data, significant interpretation was provided.

RESULTS

Fungal infections rank second as the leading cause of consultation at the DOH-RITM Section of Dermatology outpatient clinic with a prevalence of 12.98% (Table 1). Fig. 1 shows the relative distribution of cases seen where pityriasis versicolor (25.34%) is the most common, followed by tinea corporis (22.63%), tinea cruris (16.7%)

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Table 1. Ten leading causes of consultation January 2000 to December 2003

Disease classification	2000	2001	2002	2003	No. of cases seen	%
Dermatitis and eczema	6,447	6,173	7,491	8,082	28,193	29.52
Fungal infections	3,585	2,718	3,272	2,826	12,401	12.98
Disturbance of pigmentation	922	828	1,610	7,176	10,336	10.82
Papulosquamous disorders	1,314	1,298	2,480	3,633	8,725	9.14
Mycobacterial infections	1,597	1,358	2,260	2,476	7,691	8.05
Disorders of skin appendages	911	1,532	2,512	2,594	7,549	7.9
Infections of skin and subcutaneous tissue	1,312	959	1,178	1,229	4,678	4.9
Parasitic infestations/bites and stings	1,320	918	1,135	935	4,308	4.51
Viral infections	234	816	1,037	1,348	3,453	3.6
Urticaria and hypersensitivity reactions	849	561	909	956	3,275	3.43
Other diseases	66	947	1,899	7,456	4,898	5.15
Total	18,557	18,108	25,783	33,059	95,507	100

Department of Health- Research Institute for Tropical Medicine Section of Dermatology outpatient clinic (n=95,507)

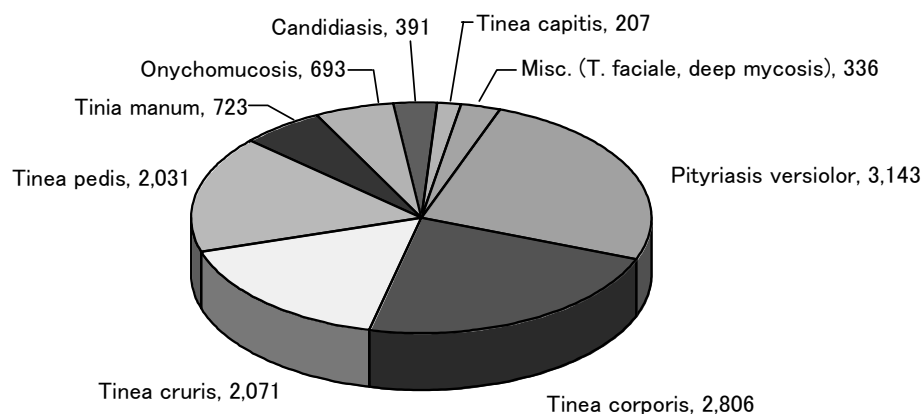


Fig. 1. Different fungal infections seen at DOH-RITM outpatient clinic (n=12,401)

Table 2. Seasonal distribution of fungal diseases in a period of 4 years (2000 to 2003)

Year	Jan-March	Apr.-Jun.	Jul.-Sept.	Oct.-Dec.	Total
2000	973	1,207	1,119	431	3,585
2001	745	738	595	640	2,718
2002	679	783	966	844	3,272
2003	1,056	466	607	697	2,826
Total	3,453	3,194	3,287	2,612	12,401

and tinea pedis (16.38%). An identical distribution is seen at the outpatient clinic of Jose R. Reyes Memorial Medical Center (JRMCC) Department of Dermatology. More cases are seen during early summer and early rainy season months (Table 2). Fungal culture is performed

in less than 25% of cases in 4 institutions and done in all KOH positive cases in 1 institution.

Nineteen percent of specimens obtained from the skin, hair, nails and mucous membranes are sent for fungal culture at the RITM laboratory which is the national referral laboratory for mycology (Fig. 2). Sources of specimen are from skin scrapings, oral mucosa, tissue biopsy and nails, in descending order. Eighteen percent yielded growth in culture whereas molds grew in 7.75% of cases. The majority of isolates were from the oral mucosa, which yielded mostly *Candida* sp. (Table 3). Similar findings were observed in a private hospital where *Candida* sp. is the most common isolate, obtained mostly from the oral mucosa

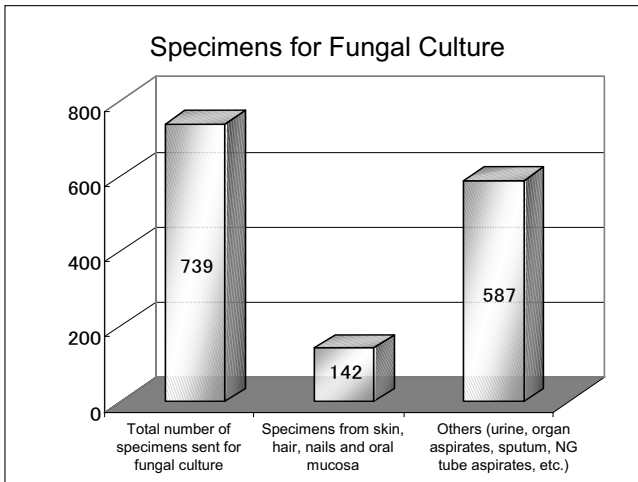


Fig. 2 Breakdown of specimens for fungal culture at the Research Institute for Tropical Medicine microbiology laboratory (1998 to 2004)

and nails (Table 4).

The incidence of subcutaneous mycoses is rare in the Philippines with only 1 case of sporotrichosis, 1 case of chromoblastomycosis and 3 cases of mycetoma reported in a 4-year period (2000-2003). Candidiasis is still the most common opportunistic infection followed by coccidioidomycoses, cryptococcosis and aspergillosis.

The imidazoles are still the most commonly prescribed topical treatment for dermatophyte infections followed by terbinafine, and sulfur-salicylic acid creams. The use of ciclopirox shampoo is preferred. Most commonly prescribed systemic therapy includes itraconazole, ketoconazole, terbinafine, griseofulvin, and fluconazole in descending order of frequency.

DISCUSSION

Our finding that dermatophytosis ranks second among the most common causes for consultations in dermatology clinics is supported by a 5-year study of common dermatoses seen at the University of the Philippines-Philippine General Hospital dermatology clinic from 1982-1986 where dermatophytosis ranked in the top 4 common dermatologic conditions¹⁾. The high prevalence of fungal infections among Filipinos can be attributed to both cultural and environmental factors. A high relative humidity coupled with the Filipino penchant for the Caucasian style of dressing promotes sweating and increased incidence of pityriasis versicolor during hot summer months. The increased incidence of tinea pedis from July to September is most probably due to persistent soaking of feet during floods. Other predisposing factors may include age and occupation.

Table 3. Most commonly isolated species in fungal culture at the DOH-RITM Microbiology laboratory (1998 to 2003)

Species isolated	No. of specimens with growth
<i>Candida albicans</i>	11
<i>Candida tropicalis</i>	3
<i>Cryptococcus neoformans</i>	2
<i>Candida parapsilosis</i>	5
<i>Candida guilliermondii</i>	2
<i>Candida non-albicans</i>	1
<i>Candida fomatata</i>	1
<i>Trichosporon beigelli</i>	1
Total	26

Table 4. Most commonly isolated species in fungal culture at a private hospital microbiology laboratory (2003)

Fungal culture isolates from all specimens collected (including non-skin specimens) N=61	No. of specimens with growth
<i>Candida</i> spp. (non- <i>albicans</i>)	29
<i>Aspergillus</i> spp.	16
<i>Candida albicans</i>	14
<i>Cryptococcus terreus</i>	1
<i>Microsporum</i> spp.	1

A 4-year retrospective study from 1996 to 1999 in a tertiary hospital dermatology clinic in Davao City shows that dermatophytoses, the most common of which are tinea pedis and cruris ranked fourth among the most frequently seen dermatoses in the elderly 65 years old and above, occurring in 8.98%²⁾. This type of dermatophytosis is commonplace because of the warm and humid environment that favors its growth³⁾. In a survey conducted by Tianco, Teodosio and Alberto among 100 patients 60 years and above, dermatophytosis also ranked in the top 4 common dermatologic conditions⁴⁾.

A three-year retrospective study from 1996 to 1998 done at the Davao Medical Center Department of Dermatology showed that fungal infections rank 7th among the most common dermatoses affecting the pediatric age group. Tinea corporis followed by tinea pedis were the most frequently seen dermatophytosis and were more pervasive in the pubertal age group (10-14 years)⁵⁾.

The higher prevalence of tinea pedis in a country with a tropical climate has been mentioned in retrospective studies done in Asian countries like Taiwan⁶⁾ and Thailand⁷⁾.

In the Philippines, a higher prevalence of tinea pedis is observed among military personnel. A study conducted at Camp Catitipan, Davao

City in 1999 revealed that the prevalence of tinea pedis is higher among combatant (42%) than non-combatant (21%) soldiers. The most common type of involvement is the chronic intertriginous type (63%), followed by papulosquamous (26%), vesicular (10%) and acute ulcerative (1%) type⁸). In Hong Kong, the prevalence rate of fungal diseases and tinea pedis is 26.9% and 20.4%, respectively. Vascular diseases, diabetes mellitus and obesity were the three most important predisposing factors in foot disease, fungal disease and fungal nail disease. *Trichophyton rubrum* was shown to be the most common pathogen in both skin and nail infections⁹).

In an unpublished study done by Ojeda and Go on the prevalence of skin diseases among mentally retarded patients at Elsie Gaches Village, tinea cruris was the most common dermatophytosis followed by tinea capitis. Aside from the tropical climate, institutionalized patients suffer higher rates of infection because most are bedridden with inadequate knowledge of hygiene.

The finding that candidiasis is the most common opportunistic fungal infection can be related to many predisposing factors. Some of those described in the literature are tuberculosis, cancer, and tooth extraction, surgery of any type, diabetes, drug addiction, pregnancy, indwelling catheters, long-term antibiotics and steroid

therapy, AIDS and depressed immunologic responses¹⁰).

Cryptococcosis is also common in the Orient and is ranked as the second most common cause of death in AIDS patients. In most instances, the etiologic agent belongs to *C. neoformans* var. *gattii* comprising 75-90% of diagnosed cases. Its natural habitat has not been found but contrary to belief, is not considered to be pigeon droppings¹⁰). Fig. 3 illustrates an unusual case of cutaneous cryptococcosis in AIDS patients which responded well to treatment¹¹).

The response to opportunistic infections appears to depend largely on both humoral and cell-mediated immunity. Antibodies have been shown to function as opsonins, and antibody mediated extracellular killing of *C. neoformans* by natural killer cells has been demonstrated. It has also been suggested that antibodies may influence invasive candidosis by neutralizing secreted proteinase or blocking attachment of *C. albicans* to epithelial cells by interacting with cell wall adhesions. The common occurrence of candidal infections in patients with cell-mediated immunodeficiency and AIDS patients relates to T-cell deficiency¹²).

Although KOH findings correlate well with clinical manifestations, a very low fungal culture yield is one of our major concerns. Recognition of the identity of a fungus isolated from a

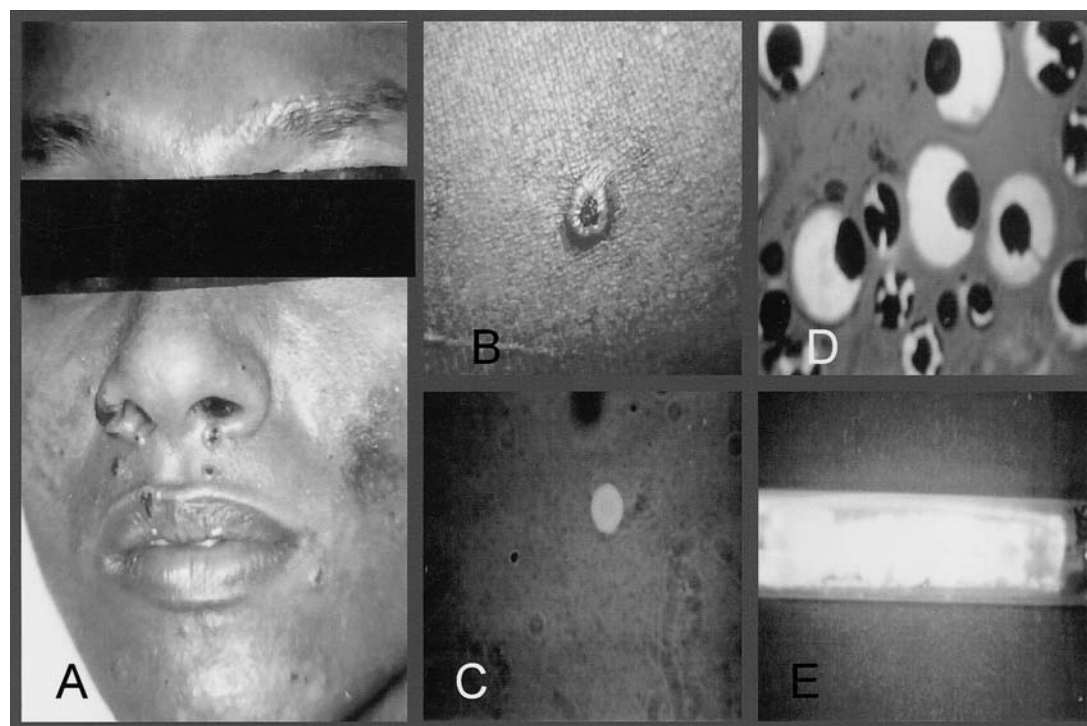


Fig. 3. A-B: Multiple dome-shaped umbilicated skin-colored papules with central hemorrhagic crusts. C: Encapsulated yeast cell on India Ink. D: Gomori Methenamine Silver stain showing fungal yeast cells. E: Fungal culture grew *Cryptococcus neoformans*.

clinical specimen is a matter of mycological expertise¹³⁾. Although our low culture positivity rate might relate to diagnostic skill and sample collection difficulties, another possible factor is inability to obtain sufficiently large scrapings as many patients had recently applied self-prescribed medications. At the Institute of Dermatology in Bangkok, Thailand, treatment is usually guided by culture results. Most commonly isolated non-dermatophyte molds causing tinea pedis and onychomycosis are *Scytalidium dimidiatum* while *T. rubrum* and *T. mentagrophytes* were the predominant dermatophytes isolated⁷⁾. In our study, the finding that *Candida* sp. is the most commonly isolated organism may not by itself be of diagnostic significance since the majority of the clinical samples were taken from the oral mucosa. Isolation is often uninterpretable when a specimen is taken from a site likely to be colonized such as the mouth, throat or skin, but is possibly significant when taken from biopsy, especially in immunocompromised and neutropenic patients¹³⁾.

The respective values of microscopy, culture and serology in the diagnosis of fungal disease vary according to the type of infection. Results correlate well when the possible identity of the pathogen is suspected and named on the request form accompanying the specimen. In other countries, an increasing number of fungal diseases isolated from clinical materials and previously dismissed as commensals and transient colonizers now have to be included as possible opportunistic pathogens¹³⁾.

Newer diagnostic procedures based on molecular methods such as PCR and DNA probes have recently been developed but have not yet had significant impact in clinical mycology.

It is the desire of the authors that these newer diagnostic modalities be adopted in the Philippines to address problems relating to the necessity for rapid diagnosis of fungal infections.

CONCLUSIONS AND RECOMMENDATIONS

Fungal infections are one of the most common complaints for consultation both in government-sponsored and private government clinics and Filipino dermatologists have developed good clinical skills in their diagnosis and treatment. Because of financial constraints, clinicians would rather write a prescription for treatment than request a laboratory investigation. Cases requiring confirmation on the diagnosis of deep mycoses and opportunistic infections need a proper laboratory investigation. Poor culture yield

relates to technical skills and the problems should be addressed by stakeholders to further enhance good clinical practice. More mycology courses and workshops for both dermatologists and laboratory technicians should be offered to further improve skills and generate more meaningful epidemiologic data.

Acknowledgements

Dr. Jeanne Salanga, Dr. Jesusa Barcelona-Tan, Dr. Vesna Castillo, Dr. Monina A. Macam, Dr. Sharon Ann Tepeng, Dr. Lalaine Visitacion, Dr. Jennifer Sese, Dr. Jose Benjamin Untalan, Dr. Leilani L. Ramirez, Dr. Filomena L. Montinola, Dr. Julie Wong-Pabico for the clinical data. Dr. Rosario Capeding and Ms. Lydia T. Sombrero for the laboratory data.

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This article was presented as a special lecture in the 48th Annual Meeting of the Japanese Society for Medical Mycology's International Forum "Mycoses in Asia".