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Community Skin Health Journal

Official Journal of the International Foundation for Dermatology

Formerly the Community Dermatology Journal

Available in French, Spanish, Simplified Chinese and Portuguese online at bit.ly/cshjournal and on the CSH App

2025; Volume 21(2)

The rise of sporotrichosis in Latin America: urgent need for a One Health response

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Conflict of interests: None.

Key words: Sporotrichosis; epidemiology; One Health; public health.

Key learning points

- **Sporotrichosis is a subcutaneous fungal infection that can be caused by various *Sporothrix* spp., with *S. brasiliensis* being the most prevalent in recent outbreaks.**
- **The disease is primarily transmitted via traumatic inoculation through activities such as gardening or through zoonotic transmission, mainly from cats.**
- **Although in most cases benign, sporotrichosis is of public health significance due to its social impact, occupational nature, potential for dissemination in vulnerable populations, and recent epidemiological changes.**
- **Multidisciplinary care is essential, particularly in immunosuppressed patients and when dissemination occurs.**
- **An integrated approach to human, animal, and environmental health is essential to prevent and control sporotrichosis.**

Abstract

Sporotrichosis is a subcutaneous fungal infection that is increasingly recognized as a public health concern, particularly in Brazil, where disease caused by *S. brasiliensis* has become more frequent. The infection is mainly transmitted through environmental trauma or zoonotic transmission, notably from cats. Sporotrichosis is predominantly a cutaneous infection, with lymphocutaneous and fixed cutaneous forms being most common. Systemic involvement can occur, especially in immunosuppressed individuals. While itraconazole is the first treatment of choice, potassium iodide and terbinafine are alternatives for specific cases. Severe cases may require more intensive therapies such as liposomal amphotericin B or adjuvant surgical treatments. Sporotrichosis remains a significant public health concern, especially in hyperendemic areas such as Rio de Janeiro, Brazil. The disease impact has increased due to changes in epidemiology, necessitating improved prevention strategies, early diagnosis, and tailored treatment plans to reduce its spread and severity.

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Fig 1. Lymphocutaneous sporotrichosis. Ulcerated lesion on the hand and erythematous nodules following a lymphatic distribution on the forearm and upper arm.

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Introduction

Sporotrichosis, caused by *Sporothrix* spp., is an endemic subcutaneous fungal infection, classified as an implantation mycosis. The infection is typically caused by traumatic inoculation of the fungus into the skin through activities such as gardening or agriculture, or via zoonotic transmission, particularly from cats.[1] The most clinically significant and frequently implicated species in human infections are *S. schenkii*, *S. brasiliensis*, *S. globosa*, *S. mexicana* and *S. luriei*.[2] Although the infection is largely non-fatal, remaining localized to the skin, sporotrichosis is of public health significance due to its social impact, occupational nature, potential for dissemination in vulnerable populations, and the epidemiological changes that have been observed since the late 1990s. Addressing these challenges requires urgent intervention that integrates human, animal, and environmental health in line with the One Health approach.

Epidemiology

Sporotrichosis is globally distributed, with a higher prevalence in tropical and subtropical regions where environmental and climate conditions favour the spread of the pathogen. The infection occurs endemically in some areas, such as Latin America and China, and outbreaks have been reported in several other countries, including the USA, South Africa, and Australia, most often related to occupational activities such as working in mines, gardening, fish handling, and agriculture. In China, outbreaks of the disease have been reported after floods. [1,3]

In recent years, the incidence of sporotrichosis has seen a notable increase, initially in Rio de Janeiro, Brazil. Since 1997, when *S. brasiliensis* was identified as the primary species implicated in the zoonotic hyperendemic situation in the state, the number of cases has been increasing across Brazil and neighbouring countries.[4,5] This upward trend has been observed in hospitalizations and deaths due to sporotrichosis throughout Brazil[6] and, as of 2023, more than 14,000 human- and 20,000 feline cases have been officially reported to the authorities in the state of Rio de Janeiro.[7]

Beyond Brazil, *S. brasiliensis* has been reported in other countries in the Americas and in Europe, where cases involved patients originating from Brazil. The species has also been found in soil samples in Argentina. However, climate change and shifts in spatial dynamics make it difficult to predict with certainty which countries, and at what point in time, conditions conducive to the emergence of new outbreaks will arise.[7]

Clinical presentation

Cutaneous sporotrichosis is the most common clinical form. Most patients (75–80%) present with the lymphocutaneous form (Figs 1 (overleaf) and 2), characterized by an initial lesion at the inoculation site, usually ulcerated, and similar lesions that follow an ascending lymphatic distribution. The less common cutaneous clinical form, the fixed cutaneous form (Fig. 3), is characterized by a single ulcerated lesion, sometimes vegetative, at the site of inoculation, typically associated with small satellite lesions.[1]

Fig 2. Lymphocutaneous sporotrichosis. Ulceration of the third finger showing nail destruction and nodules following a lymphatic distribution on the hand and forearm. The patient also presented with bone involvement by contiguous spread.

Fig 3. Fixed cutaneous sporotrichosis. The ulceration was restricted to the initial lesion site on the dorsal aspect of the arm of a 5-year-old child.

Due to the increasing number of cases caused by the highly virulent *S. brasiliensis*, atypical clinical forms and hypersensitivity reactions have been reported with greater frequency, particularly in Rio de Janeiro. Erythema nodosum, Sweet's syndrome, erythema multiforme, and reactive arthritis have been observed in association with both cutaneous and extracutaneous disease presentations.[5]

Ulcerated lesions, as well as sporotrichoid presentation, may occur in a range of differential diagnoses, including cutaneous leishmaniasis, mycobacterial infections, other mycoses, and even

neoplasms. Clinical history and epidemiological context should be considered, and appropriate laboratory tests performed.[1]

In addition to cutaneous forms, sporotrichosis may affect the skeletal system (via contiguous spread or dissemination) as well as the lungs, eyes, and central nervous system. Systemic involvement is more commonly observed in immunosuppressed patients and is frequently reported in people living with human immunodeficiency virus (HIV). Systemic involvement should be investigated in immunosuppressed or symptomatic patients, requiring a comprehensive multidisciplinary approach that includes radiography of the chest, long bones, or those contiguous with the lesion, as well as ophthalmological, otorhinolaryngological, and neurological examinations.[5,8]

The most used and reliable test for diagnosis is the culture of tissue or lesion exudate. Direct mycological examination is negative in most cases. While serology, molecular tests, and lateral flow assays are promising and available in research services, they are not widely available.[7]

Treatment

Itraconazole is the drug of choice for the treatment of sporotrichosis (Table 1). The dosage may range from 100 to 400 mg depending on clinical manifestations, comorbidities, and treatment response. In general, treatment lasts for a minimum of three months. However, longer treatment durations have been observed in infections caused by *S. brasiliensis*. Itraconazole is a strong inhibitor of CYP3A4 and therefore has numerous potential drug interactions. A comprehensive patient history should be obtained, and temporary discontinuation of other drugs may be considered.[1,9]

Potassium iodide, although an older and no longer widely used drug, has an immunomodulatory effect in sporotrichosis and demonstrates good efficacy. It is particularly used in children and in the treatment of hypersensitivity forms during hyperendemic situations. The recommended dosage is 2.8 to 3.5 g per day, divided into two to three doses. Gastrointestinal intolerance is the main reason for discontinuation, and thyroid function should be monitored during treatment.[9]

Increasing rates of non-wild type *S. brasiliensis* – which demonstrate reduced susceptibility to itraconazole – have been observed, which is concerning given the limited range of treatments available. In patients with contraindications to itraconazole, or in cases of therapeutic failure, terbinafine may be used at a dose of 250 to 1000 mg per day for a similar duration.[9,10]

Cryosurgery, thermotherapy, electrosurgery, or excision may be used as adjuvant therapies in cases of poor therapeutic response or when other medications are contraindicated, such as during pregnancy.[5,9]

In more severe cases involving dissemination, particularly in immunosuppressed patients, amphotericin B, ideally in liposomal formulations, should be used at a dose of 3 to 5 mg/kg/day. Treatment regimens suggested in the literature vary according to clinical situation and range from daily administration for 2 to 6 weeks to intermittent dosing a few times per week. Until symptoms improve, the patient should continue treatment with itraconazole.[9,8]

Cases of hypersensitivity secondary to sporotrichosis generally respond well to antifungal treatment; however, non-steroidal anti-inflammatory drugs (NSAIDs) or corticosteroids may be added in more symptomatic cases. Due to its immunomodulatory activity, potassium iodide may be a suitable treatment option in such cases.[5,9]

Prevention and control

Preventive measures include wearing protective clothing and gloves while handling soil, plants, or clinically affected cats, and practicing recommended wound care. Public health initiatives should focus on the One Health approach, educating the community about the risks associated with zoonotic transmission and the importance of seeking prompt medical attention for suspicious skin lesions. It has been demonstrated that *S. brasiliensis* can survive in the environment on materials such as stainless steel and wood for up to 25 days – although further investigation is needed, this finding suggests the potential for fomite transmission. Strategies to reduce transmission include the diagnosis and treatment of infected cats, public awareness campaigns promoting responsible pet ownership, the use of personal

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Table 1. Treatment of cutaneous and systemic sporotrichosis

	Cutaneous	Systemic
Itraconazole **PO** (100 mg capsule)	100–400 mg	200–400 mg
Terbinafine **PO** (250 mg tablet)	250–1000 mg	Rarely
Potassium iodide **PO** (Saturated solution - 1,42 g/mL; Concentrated solution - 1,0 g/mL)	2.8–3.5 g/kg/day	Not indicated
Amphotericin B **IV** Deoxycholate Lipid/liposomal complex	Rarely	 0.5–1.0 mg/kg/day 3.0–5.0 mg/kg/day

Abbreviations: PO, per oral; IV, intravenous

Adapted from: Orofino-Costa et al. 2022

The rise of sporotrichosis in Latin America: urgent need for a One Health response...*continued*

protective equipment when handling symptomatic animals, and the proper disposal of deceased felines to reduce environmental contamination. Sporotrichosis became a notifiable disease in Brazil in March 2025.

Conclusion

Sporotrichosis remains a significant public health issue, particularly in endemic regions. Continued surveillance, research, and public health efforts are essential in controlling the spread of this infection and reducing its impact on affected populations. Additionally, an integrated approach to human, animal, and environmental health is essential. A well-implemented One Health approach can contribute to the prevention and control of the disease, both in areas where it is already well established and in regions that may subsequently become affected.

Acknowledgements

We would like to express our thanks to the residents Maria Lúcia Paysano and Roberta Nicol D'cunha for their assistance with the selection of photographs.

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QUIZ

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A 42-year-old patient presented to the dermatology outpatient department with a four-week history of progressive itching over the face and ears. The itching was moderate to severe in intensity and interfered with daily activities and sleep. The itching started insidiously, initially over the left cheek, then gradually spread to involve most of the face and both ears. There had been no preceding trauma, insect bite, or application of any new cosmetic product. The patient's personal hygiene was poor, and he routinely shared towels, bedding, and clothing with other family members.

Fig 1.

Fig 2.

Fig 3.

On examination, multiple erythematous to hyperpigmented annular scaly plaques with clearly defined, slightly raised borders were noted, affecting the cheeks and forehead (Figures 1 and 2). An active edge was prominent with central clearing. Multiple loosely adherent whitish dry scales were noted over the left pinna (Figure 3). A KOH mount with 10% KOH, prepared from scrapings taken from the active border of the lesion, is shown in Figure 4.

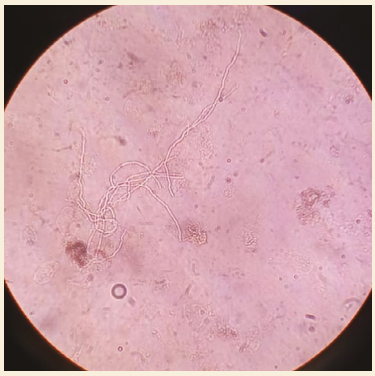

Fig 4.

Question 1 – Based on the clinical findings and KOH mount, what is the most likely diagnosis?

Question 2 – Name the classical sign seen over the pinna in Figure 3.

Answers on page 31.

French Guiana Tropical Dermatology Congress: a digest – Part I

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Conflict of interests: None.

Key words: French Guiana; tropical skin diseases; histoplasmosis; lobomycosis; chromoblastomycosis; tinea capitis.

Abstract

French Guiana is a French overseas territory in South America. It is mostly covered by deep rainforest and is inhabited by multiple populations, including Native Americans, Creoles, Maroons, and White Europeans. Due to its Amazonian location, its universal French healthcare system, and the presence of several ethnic origins and phototypes, French Guiana represents a unique setting in the field of Tropical Dermatology. The Dermatology Department of French Guiana University Hospital (formerly called Le Centre Hospitalier de Cayenne), in the capital city of Cayenne, has long experience in this specialism in the territory. In March 2025, the first French Guiana Tropical Dermatology Congress was held at the hospital, attracting participants from several countries. This article is Part I of a two-part series comprising a digest of several communications on tropical skin diseases of educational value from this congress. Part II will appear in a later issue.

Cutaneous histoplasmosis in French Guiana: a case series

Pauline Oddo, Antoine Adenis, Geoffrey Grotta, Magalie Demar, Romain Blaizot

Key learning points

- **Cutaneous histoplasmosis is endemic in South America, where it constitutes the most frequent opportunistic infection in people living with Human Immunodeficiency Virus (HIV).**
- **The infection is found in deeply immunosuppressed patients with less than 50 CD4/mm³.**
- **Cutaneous histoplasmosis can present with a wide range of mucosal or cutaneous lesions.**
- **Any suspect lesion in a patient with less than 50 CD4/mm³ in an endemic area should undergo a skin biopsy to look for *Histoplasma capsulatum*.**

Introduction

Histoplasmosis, caused by *Histoplasma capsulatum*, is a fungal infection acquired through inhalation of airborne spores. In immunosuppressed patients – particularly those with very low CD4 counts (often < 100/mm3) and/or living with HIV – the infection can develop into a severe disseminated disease form. Histoplasmosis is endemic in French Guiana, where it constitutes the most frequent Acquired Immunodeficiency Syndrome (AIDS)-defining opportunistic infection.[1]

Often misdiagnosed as tuberculosis, histoplasmosis is now recognized as a neglected tropical disease, particularly in low-resource settings where deep tissue diagnostic facilities are limited. Cutaneous involvement, though less frequent than pulmonary disease, offers an accessible and cost-effective diagnostic clue. The incidence of histoplasmosis appears to be declining, probably due to earlier HIV intervention.[2] However, cutaneous histoplasmosis may still be encountered by health workers caring for people living with HIV.

Methods

We present here a case series of cutaneous histoplasmosis seen in French Guiana between 2014 and 2024.

Results

All patients were young (less than 60 years of age) and had been living in French Guiana for at least 10 years. Five of the six patients were HIV-positive, with CD4 counts below 50. Histoplasmosis was the initial presentation in one patient, while the other five had already presented with opportunistic infections and had discontinued their HIV treatment for several years. The sixth patient was HIV-negative but had a concomitant human T-cell lymphotropic virus type 1 (HTLV-1) cutaneous lymphoma. All HIV patients presented with general health deterioration.

The extent of organ involvement varied: three patients had only cutaneous involvement, one had isolated mucosal lesions, one had both cutaneous and pulmonary disease, and one had cutaneous, lymph node, and bone marrow involvement.

Clinical manifestations were highly polymorphic. The case of isolated mucosal involvement presented with a granulomatous and ulcerated infiltration of the tongue (Figure 1). One patient presented with disseminated 'prurigo-

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like' papules, another with diffuse scaly macules resembling dermatophyte infection (Figure 2), and another with nonspecific, erythematous, scattered macules. One patient had coexisting Kaposi sarcomatous lesions that were infected with histoplasmosis, with violaceous vegetative papules on the palate and skin. The patient with HTLV-1–associated lymphoma had diffuse pseudotumoral lesions.

Skin biopsy was the initial positive diagnostic test in 5 out of 6 patients. Additional diagnostic yields included positive biopsy cultures (2/6), fungal blood cultures (2/4), urine cultures (1/2), and blood polymerase chain reaction (PCR) (1/1).

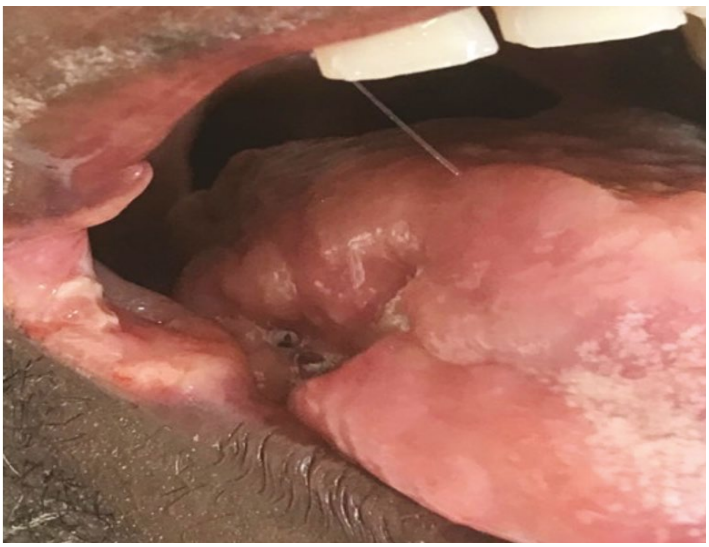

Fig 1. Mucosal histoplasmosis lesions: granulomatous infiltration of the tongue.

Fig 2. Cutaneous involvement of histoplasmosis: squamous 'dermatophyte-like' plaques on the arms and flanks.

Due to the retrospective nature of the study, the duration of cutaneous clinical response to treatment could not be precisely determined. Overall, 4 of the 6 patients died, all of whom had concurrent opportunistic infections. Among the two surviving patients, one received itraconazole (400 mg twice daily for 4 weeks) followed by 6 months of non-adherence, and secondary prophylaxis with itraconazole for 2 years. The second surviving patient was treated with amphotericin B for 7 days, followed by itraconazole (600 mg for 48 hours and then 400 mg for 8 months), with treatment discontinued thereafter. This patient developed a pulmonary relapse two years later.

Discussion

Given the wide range of clinical presentations, consistent with previously reported literature, the diagnosis of cutaneous histoplasmosis remains challenging. These findings highlight the importance of considering histoplasmosis in any dermatological presentation in HIV-positive patients from endemic regions, especially when CD4 counts are below 50.

A comparison of lobomycosis and chromoblastomycosis in French Guiana

Geoffrey Grotta, Magalie Demar, Kinan Drak Alsibai, Romain Blaizot

Key learning points

Lobomycosis

- **Lobomycosis is a benign disease, although disseminated forms can be responsible for major functional and aesthetic impairment.**
- **Healthcare professionals in South America should be aware of its diagnosis, particularly in the case of keloid-like lesions.**
- **In French Guiana, lobomycosis displays a specific epidemiological pattern, largely affecting those involved with the gold mining industry.**

Chromoblastomycosis

- **Chromoblastomycosis is a chronic and neglected infection caused by dematiaceous fungi.**
- **Clinical presentation is characterised by slow and insidious progression, with verrucous, nodular, or ulcerative lesions that predominantly affect the lower limbs.**
- **In French Guiana, the first-line treatment is high-dose itraconazole, which can be accompanied by surgery in selected cases.**

Introduction

Deep cutaneous mycoses are a neglected group of chronic fungal skin infections predominantly affecting individuals in tropical and subtropical regions. In French Guiana, lobomycosis and chromoblastomycosis represent two particularly underdiagnosed conditions, often encountered in populations with limited access to healthcare. These infections evolve slowly over years, leading to chronic lesions that are commonly mistaken for other dermatological disorders, resulting in delays in diagnosis and treatment.

Lobomycosis or Jorge Lobo's disease, caused by *Paracoccidioides lobogeorgii* – previously known as *Lacazia loboi* – remains uncultivable and requires histological or mycological examination, typically through identification of chains of yeast-like cells in cutaneous biopsy.[3] Surgical excision alone is rarely curative, with recurrence approaching 100%. Emerging evidence supports the use of multidrug therapy (MDT) with agents such as rifampicin, clofazimine, and dapsone, alongside surgical excision for better outcomes.[4] Standard antifungal therapies are generally ineffective in lobomycosis, but new systemic treatments with posaconazole seem to be showing promising results in a few case series.[5]

In chromoblastomycosis, caused by pigmented fungi of the *Cladophialophora* and *Fonsecaea* genera, antifungal therapy with itraconazole or terbinafine should be combined with surgery and/or cryotherapy[6,7] for patients who can afford these drugs. However, the cost of itraconazole remains an important barrier to treatment adherence.

Despite their similarities in chronic evolution and areas of endemicity, differences can be observed between these two mycoses.

Our objectives were to examine all cases of lobomycosis and chromoblastomycosis diagnosed in French Guiana since the creation of the Dermatology Department of French Guiana University Hospital (fomerly called Le Centre Hospitalier de Cayenne) in the 1950s until 2023 and to determine their epidemiological and therapeutic features.

Methods

All patients diagnosed with lobomycosis and chromoblastomycosis in French Guiana between 1955 and 2023 were included in this single-centre study.

Results

In total, 31 cases of lobomycosis were recorded between 1959 and 2022. A notable epidemiological shift occurred after 2000, with 81% of cases emerging among Brazilian migrant gold miners (the affected population showed a marked male predominance of 84%). Clinical presentations included chronic, slow-progressing, keloid-like cutaneous lesions (Figure 3), found mostly on the lower limbs (55% of cases); multifocal involvement (several lesions involving at least two different body parts) occurred in 35% of cases. All patients with major disease forms (multifocal involvement or high fungal density) showed therapeutic failure or recurrence.

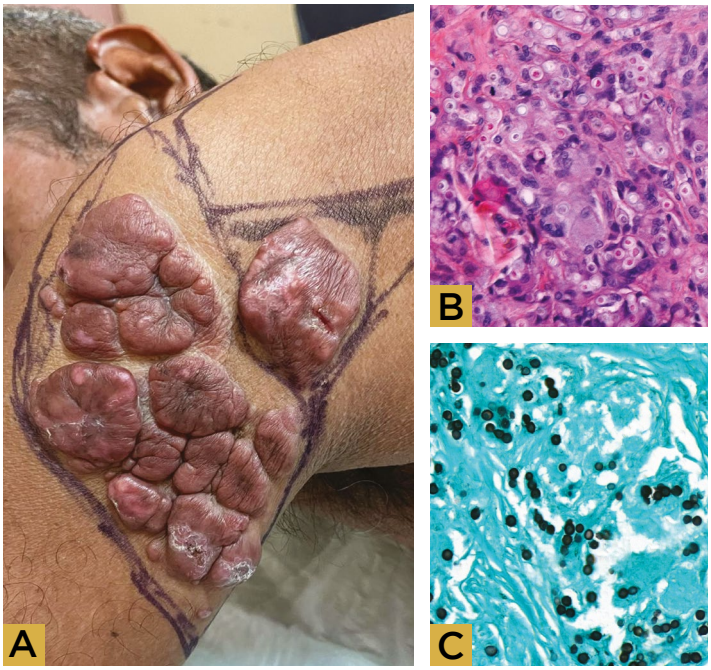

Fig 3. (a) Typical presentation of keloid-like nodular lobomycosis of the left shoulder; **(b)** Histological examination shows a dense granulomatous dermal inflammatory infiltrate composed of numerous multinucleated giant cells and histiocytes, with the presence of numerous round yeasts bodies measuring 8 to 15 Qm (H&E; 40x); **(c)** Examination after Grocott-Gomori staining confirms the fungal nature of the yeasts, isolated or arranged in chains (60x).

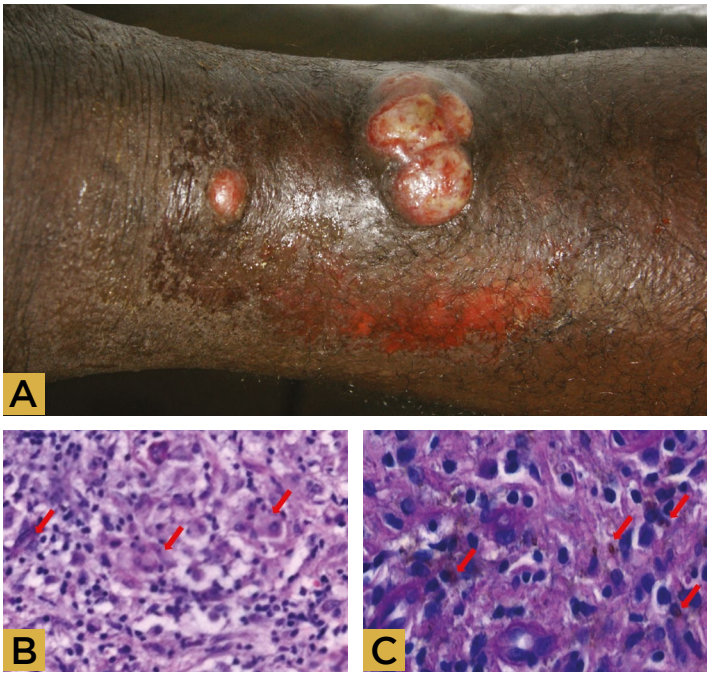

Fig 4. (a) Nodular and ulcerated presentation of chromoblastomycosis. **(b)** Histological examination shows an inflammatory infiltrate of the dermis consisting of epithelioid and histiocytic granulomas associated with some multinucleated giant cells (red arrows, H&E-stain; 40x). **(c)** Presence of intrahistiocytic brownish, small, isolated and round chromoblastomycosis yeasts (red arrows, PAS-stain; 60x).

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Meanwhile, chromoblastomycosis was observed in 23 patients between 1955 and 2023, primarily among local agricultural workers (48%). Twelve patients (52.2%) had a single lesion. The lower limbs were mainly involved (78.3%), followed by the upper limbs (21.7%). Clinical presentations included verrucous, cicatricial, or nodular lesions (Figure 4) in most cases, occasionally associated with pruritus or mild pain (26% and 17% of cases, respectively). Many therapeutic regimens have been used since the 1950s. Antifungal agents alone showed an efficacy rate of 33% compared with 66% when combined with surgery or cryotherapy.

Discussion

Barriers to diagnosis and treatment in French Guiana include a lack of awareness, limited access to laboratory services in remote areas, patient mobility, and the absence of standardized treatment protocols. The mean duration before diagnosis was 4 years for both mycoses. Losses during follow-up were significant in both case series. Surgery remains the best therapeutic strategy for minor forms of disease.[8] A combination of surgery and systemic antifungal therapy should be used for major or disseminated disease forms.

Experience of tinea capitis in French Guiana

Juliette Lebret, Geoffrey Grotta, Magalie Demar, Clémentine Dehlin, Romain Chanlin, Romain Blaizot

Key learning points

- **The first-line treatment for *Trichophyton* infection should be terbinafine, while itraconazole should be preferred for the treatment of *Microsporum* infection.**
- **Clinical presentation can be ill-suited for clinical diagnosis, given that up to 40% of *Trichophyton* cases can present with large patches usually associated with *Microsporum* infection.**
- **In French Guiana, as with the wider Caribbean, *Trichophyton tonsurans* is by far the most frequent pathogen responsible for tinea capitis.**

Introduction

The epidemiology of tinea capitis is prone to variations over time and according to local ecology.[9] French Guiana is an Amazonian overseas territory characterized by a high exposure to fungal and parasitic diseases. Although there is no published clinical data from this area, mycological data from 2009 suggest a specific epidemiology with most infections being caused by *Trichophyton tonsurans*.[10] We sought to establish a clinical and biological description of tinea capitis epidemiology in French Guiana.

Methods

We collected all requests for mycological examination of scalp scales between 1 January 2017 and 31 December 2022 at the French Guiana University Hospital, the only referral centre for dermatology in French Guiana. Patients with a positive mycological examination were included in the study; identification was based on morphological criteria or Matrix-Assisted Laser Desorption/Ionization Time-of-Flight Mass Spectrometry (MALDI TOF).

Results

A total of 322 requests for mycological examination of scalp scales were received. The test was positive in 150 cases (46.6%); patients were predominantly male (64.7%) and had an average age of 9 years. Most cases were caused by *Trichophyton* spp. (141/150, 94%); only 6% (9/150) arose from *Microsporum* spp.

Among the *Trichophyton* spp., the most common was *T. tonsurans* (102/141, 72.3%), followed by *T. soudanense* (22.7%), *T. violaceum* (2.8%), *T. rubrum* (1.4%), and *T. interdigitale* (0.7%). According to the available data, 79.2% (80/101) of these patients had multiple lesions; 70.8% (68/96) had alopecia; 59.4% (38/64) had small patches (Figure 5); 20.8% (21/101) had involvement of hairless skin; 9.2% (9/98) presented with clinical kerion.

Among *Microsporum* infections, the most frequent spp. was *M. canis* (6/9, 66.7%), followed by *M. gypseum* (2/9, 22.2%) and *M. racemosum* (1/9, 11.1%). Among these patients, multiple lesions were found in 71.4% (5/7) of cases; alopecia in 87.5% (7/8); large patches in 83.3% (5/6) (Figure 5); involvement of hairless skin, and kerion occurred in 37.5% (3/8) of patients.

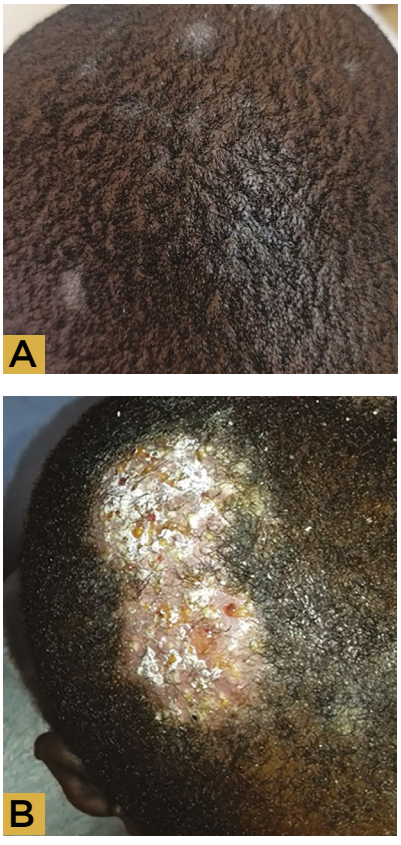

Fig. 5 (a) *Trichophyton* tinea capitis with small scaly patches **(b)** *Microsporum* tinea capitis with large inflammatory patches.

Discussion

The epidemiology of tinea capitis in French Guiana is different from that observed in Europe, with a predominance of *T. tonsurans* infection being seen. While *Microsporum* infection represents 30% of cases in mainland France, the wider epidemiological landscape is changing, with a predominance of *T. tonsurans* now being seen in the United Kingdom[11] and *T. violaceum* emerging in the rest of Europe.[12] Current post-griseofulvin recommendations in mainland France include the use of terbinafine as an empirical treatment, although itraconazole should be preferred in *Microsporum* infection.

In our study, the importance of parasitic identification was confirmed; more than 40% of *Trichophyton* cases presented with large plaques, suggesting an atypical presentation ill-suited to clinically-based diagnosis and treatment. Hair microscopy could help differentiate between pathogens, with an endothrix pattern (involvement of the hair shaft) in *T. tonsurans* and an ectothrix pattern (confined to the hair surface) with *M. canis*. The Wood lamp examination would be another means to distinguish *M. canis* (yellow-green fluorescence) from *T. tonsurans* (no fluorescence). This study presents the first data concerning tinea capitis in French Guiana, showing a 'French American overseas' epidemiology similar to previous studies in Martinique and Guadeloupe. This study also shows the persistence of severe presentations with kerion among French Guiana children.

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ILDS World Skin Summit

The International League of Dermatological Societies (ILDS) convened the World Skin Summit in Cape Town, South Africa, on 24th – 25th October 2025. Over two days, experts examined how the field of dermatology can drive greater health equity by addressing persistent global disparities in access to care, medicines and diagnostics. Participants highlighted the growing momentum generated by the World Health Assembly Resolution on Skin Diseases adopted in May 2025, which formally recognised skin conditions as a global health priority. They also welcomed the recent addition of key dermatological treatments to the WHO Essential Medicines List, while emphasising that substantial progress is still required.

Delegates proposed a range of innovative approaches, including expanding teledermatology and AI-enabled triage, strengthening local manufacturing, advancing fair pricing negotiations, deploying mobile clinics and developing standardised migrant-health toolkits. Enhanced data collection through ILDS member societies, together with deeper engagement from industry partners, was also encouraged to support affordability and sustainable access.

Overall, discussions underscored the urgent need for coordinated global action to embed skin health as an integral component of universal health coverage. Participants called for evidence-based policy, equitable pricing strategies and resilient health systems to ensure that people everywhere can obtain safe, affordable and effective treatment for skin diseases.

From rash to diagnosis: first insights on the impact of formal and informal learning on competency strengthening in primary health workers in Tanzanian skin camps

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Conflict of interests: None.

Funding: PEP4LEP is part of the EDCTP2 programme supported by the European Union (grant number RIA2017NIM-1839-PEP4LEP); the project also received funding from the Leprosy Research Initiative (LRI; www.leprosyresearch.org). PEP4LEP 2.0 is supported by the Global Health EDCTP3 Joint Undertaking and its members, co-funded by the European Union (grant number 101145677-PEP4LEP 2.0). The funders had no role in study design, data collection/analysis or publication. The content and findings reported are the responsibility of the researchers and do not necessarily reflect the official position and sentiments of the funders.

Key words: competency strengthening; dermatology training; primary health workers; skin NTDs; leprosy; Tanzania; mHealth

Abstract

This qualitative study presents preliminary findings from the Post-Exposure Prophylaxis for Leprosy (PEP4LEP) and PEP4LEP 2.0 studies in Tanzania, exploring how health workers learn to diagnose and manage skin diseases, including neglected tropical diseases such as leprosy. Interviews with ten primary health workers revealed that hands-on experience, mentoring, and use of the NLR SkinApp enhanced both formal and informal learning. The results of the study underscore the value of integrating structured training with real-world clinical practice and opportunities for continuing professional development.

Key Learning Points

- **Given the shortage of dermatologists in many African countries, primary health workers – many of whom have limited dermatological expertise – are often the main point of contact for patients with common skin diseases, as well as skin NTDs.**
- **Preliminary findings from the PEP4LEP 2.0 studies demonstrate the importance of integrating formal education in dermatology for primary health workers with ongoing, informal, context-based learning opportunities.**
- **A hybrid approach to competency building – combining classroom teaching, on-the-job learning, peer and digital support – can sustainably improve skin healthcare in rural areas with limited access to dermatological services.**

Introduction

Skin conditions are especially highly prevalent in resource-poor countries, with rates exceeding 50% in rural areas and reaching up to 80% in some regions.[1] While often not life-threatening, skin diseases such as leprosy cause stigma and disability, which can lead to a reduced quality of life.[2,3] In such circumstances, diagnosis is usually clinical, which depends on well-trained healthcare staff. Yet, most African countries have fewer than one dermatologist per million people, creating a significant gap in service provision.[4]

In rural areas, primary health workers, who often lack dermatological and leprosy training, commonly label various dermatoses as 'rash' and manage them empirically using combinations of topical antibacterial, antimycotic, and corticosteroid agents.[5] Besides specialist shortages, referral is frequently impractical due to geographical and financial barriers. Against these difficulties, evidence suggests that short formal dermatological training can significantly improve health workers' ability to identify and manage skin diseases.[2]

Beyond formal training, informal and incidental learning through real-world experience, peer interaction, and mentoring play a key role in adult learning.[6] Such opportunities, which are increasingly enhanced by technology, support practical, learner-centred development – especially when formal education is limited.

The recently adopted World Health Assembly (WHA) resolution *Skin Diseases as a Global Public Health Priority* (May 2025) emphasizes that with appropriate training, essential

medicines, and support, local health teams can effectively manage common skin conditions, thereby contributing to stronger primary care service provision and progress toward universal health coverage.[2] The resolution also highlights the importance of addressing skin-related neglected tropical diseases (NTDs), such as leprosy, as part of integrated service delivery. To support these goals, the World Health Organization (WHO) promotes an integrated approach to expanding access to quality dermatological care.

The Post-Exposure Prophylaxis for Leprosy (PEP4LEP) and PEP4LEP 2.0 studies in Ethiopia, Mozambique, and Tanzania screen for both skin-NTDs and common dermatoses.[7] In community screening events ('skin camps'), approximately 100 community contacts of leprosy index cases (i.e. the 20 closest households) are invited for integrated skin screening (Figures 1 and 2). Following the screening, they are offered, if needed, dermatological treatment free of charge and prescriptions or medical referral, as well as leprosy chemoprophylaxis for those who are eligible. Participating health workers receive a three-day project training with occasional refresher sessions, mentorship and on-the-job training from a dermatologist or senior clinician, and practical support via the NLR SkinApp (now also integrated in the WHO Skin NTDs App).[8] This mobile health (mHealth) application (app), which also functions offline, supports health workers to identify skin diseases and to access treatment information.

Fig. 1 A community skin screening station at a Tanzanian skin camp.

Fig. 2 Dermatologist Dr. Mwageni (left) and Medical Officer Dr. Shigela (right) collaborate during an integrated skin screening session for a family at a community skin camp in Tanzania.

During the skin camps, we identified the relevant experiences and perceptions of learning by participating health workers. This article presents our preliminary findings.

Methods

A qualitative study was conducted in Lindi Rural, Mvomero District, and Morogoro Rural District, three Tanzanian districts involved in the PEP4LEP and PEP4LEP 2.0 projects, to explore primary health workers' learning experiences, training needs, and use of the NLR SkinApp. Ten participants were purposively sampled to ensure diversity in district, sex, and professional role. Eligible consenting participants resided in the project areas, had attended at least one formal training session, and participated in a skin camp.

Key informant interviews (lasting approximately 30 minutes) were conducted by phone using a semi-structured guide translated into Swahili. Interviews were audio-recorded, supported by notes, transcribed verbatim and, if in Swahili, translated to English. Data were analysed thematically using Braun and Clarke's Six-Phase Framework.[9]

Ethical approval was granted by the CUHAS/BMC Research and Ethics Committee (CREC/364/2019) and NIMR (NIMR/HQ/R.8c/Vol.1/1530). Participation was voluntary, with written informed consent. All data were anonymised for analysis.

Results

The study participants comprised ten healthcare professionals, evenly divided by gender (five men and five women), with ages ranging from 31 to 60 years. Participants were evenly distributed across the three districts; roles included three medical officers, two nurses, and five clinical officers. Participants had undergone professional training spanning 1 to 9 years, with overall work experience ranging from 7 to 38 years.

Health workers could enrol at different stages in the projects. Five health workers completed the PEP4LEP or PEP4LEP 2.0 project training and two refresher sessions; four completed the project training and one refresher session, while one only completed the primary project training. Participation frequency in skin camps ranged from 4 to 70 sessions, with medically trained senior staff (doctors) attending more frequently than primary health workers.

Analysis of the ten interviews revealed six key themes: 1. Understanding of skin conditions; 2. Perceptions of formal training; 3. Knowledge development through practice; 4. Mentorship and peer-learning; 5. Use of technology; and 6. Ongoing learning needs.

1. Understanding of skin conditions

Most participants reported limited dermatological knowledge before the project training and attendance at skin camp,

Continued overleaf...

Fig. 3 Scabies in a Tanzanian skin camp.

often classifying conditions simply as 'rashes' and overlooking possible early signs of leprosy. After participation, health workers reported greater confidence in diagnosing skin diseases.

Fig. 4 Tinea faciei on a patient in a Tanzanian skin camp.

When asked which skin conditions the health workers encountered in the skin camps, the following diseases were listed: atopic dermatitis, scabies (Figure 3), fungal infections (Figure 4), keratosis pilaris, leprosy (Figure 5), pityriasis versicolor, seborrhoeic dermatitis and ulcers.

Fig. 5 Leprosy in a patient in a Tanzanian skin camp.

2. Perceptions of formal training
Formal training was widely valued, particularly given its practical orientation and co-facilitation by a dermatologist. Participants appreciated learning to differentiate between skin conditions.

3. Knowledge development through practice
Informal learning through hands-on experience during skin camp complemented formal training by reinforcing theoretical knowledge. Participants highlighted the value of real-time observation and immediate application of skills in community settings. Skin camp also offered care providers the opportunity to observe and engage with the spectrum of common skin diseases and NTDs – often within a single session – enhancing their appreciation of disease progression and variation in clinical presentation.

> *"What I liked the most ... you know, there are different types of teaching methods, like you are told this is a patch, then you see the actual patch which you are shown right there."*
> **Clinician**

Skin camps also allowed healthcare providers to develop holistic clinical awareness, including attention to patient dignity, proper lighting, and infection prevention.

4. Mentorship and peer learning
Mentorship from senior clinicians and dermatologists was central to learning. One participant stated, *'I learned through them'*, while another stated, *'I learned through observation'*. Participants also formed peer groups to discuss challenges and reinforce learning beyond the formal training setting.

> *"During the skin camps, I was able to ask anything that I was not clear with ... I was instructed and reminded ... the (mobile phone messenger) group we created helped us to discuss the challenges regarding the skin conditions we encounter."*
> **Nurse Officer**

5. Use of Technology
The NLR SkinApp is a practical decision-support tool designed to assist health workers in diagnosing and treating skin diseases – especially in regions with limited access to dermatology specialists. Participants reported using the NLR SkinApp in the skin camps and other healthcare settings; most health workers accessed the application via smartphone (not via a tablet).

6. Ongoing Learning Needs
Participants expressed a strong interest in continued learning through extended training, both in terms of time allocation and practical experience.

> *"(Classroom) training days should be increased so that people can learn more ... because some people understand slowly".*
> **Clinician**

"In my experience, when we go to the skin camps, we continue gaining knowledge ... we learn more and we understand more."
Assistant Health Officer

It was also reported that an official nurses' speciality programme in dermatology would be appreciated:

"Apart from learning through skin camps and reading books, I wish there were a college to train nurses specifically regarding skin disease ... Nurses are now (specialised) in different units."
Nurse Officer

While open to individual future learning opportunities, such as online courses, many interviewees emphasised the need for hands-on practice in dermatology.

"Online courses, I give them fifty-fifty ... if it is a good platform, but I think in skin disease we need to have live patients to feel... to touch the skin."
Medical Doctor

Discussion

This study highlights the value of combining formal and informal learning opportunities for primary health workers involved in integrated community skin screening programmes in Tanzania.

Although formal training provided foundational knowledge, on-the-job experience, mentorship, and peer interaction were often regarded as being more effective for developing practical skills. Health staff also gained insight into the social, environmental, and collaborative dimensions of care.

Our findings support informal learning theory, where knowledge is gained through real-world engagement and reflection.[6] Skin camps enabled 'learning by doing', accelerating competence through direct observation, discussion, and immediate application. These insights also align with both Social Learning Theory and Situated Learning Theory.[10,11] Health workers learned by observing and modelling experienced colleagues,[10] and through active participation in a real-world community of clinical practice, gradually transitioning from novice to confident practitioner.[11]

Technology also played an important role. The NLR SkinApp (or WHO Skin NTDs App, which contains the latter) provided point-of-care decision support and additional learning opportunities.

Participants expressed a clear need for ongoing professional development, including more in-depth theoretical and hands-on training. These findings suggest the value of hybrid learning approaches that blend brief formal training courses with long-term mentoring and digital tools.

A strength of this study is its focus on frontline worker perspectives. Limitations include a small sample of interviewees from three districts. These preliminary findings, however, offer transferable lessons for similar programmes across the PEP4LEP and PEP4LEP 2.0 countries and beyond. They can help strengthen primary health worker learning processes and inform other medical training programmes and community-based health initiatives.

Conclusion

Informal learning – through mentorship, observation, and practical experience – is vital for strengthening dermatological skills among primary health workers in rural, low-resource settings, such as the Tanzanian districts included in this study. Recognising and integrating these learning opportunities, alongside formal training and the use of digital tools, can enhance diagnostic confidence and service delivery in skin health and leprosy control programmes.

Recommendations

To sustainably strengthen dermatological competency among primary health workers in rural settings with limited access to specialised care, and in line with the recent WHA resolution,[2] we recommend:

1. Integrating on-the-job coaching, structured mentorship frameworks, peer-learning (digital and face-to-face), and digital tools (e.g., tele-dermatology, WHO Skin NTDs App, e-learning) alongside formal training;
2. Engaging key stakeholders – such as the Ministry of Health and medical training institutions – to support the integration of skin health objectives into national policies and training guidelines; and
3. Expanding this research to include a more diverse group of health workers from wider settings to improve the evidence base.

Acknowledgements

We would like to thank all study participants, partners, and funders.

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A transformative teaching experience in Cambodia – sharing knowledge and building connections

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Dear Editor

We are two senior dermatology residents from the Université de Montréal in Canada who would like to share our rewarding experience of teaching dermatology to medical students and residents in Cambodia during the summer of 2024. This initiative, organized in collaboration with Health Volunteers Overseas (HVO), allowed us to contribute to medical education in a resource-limited setting while gaining invaluable insights into dermatological care in Cambodia.

Support from Health Volunteers Overseas

We highlight the exceptional support we received from HVO (hvousa.org/volunteer), a nonprofit organization focusing on improving healthcare accessibility and quality in resource-limited countries through education, training, and professional development. The HVO programmes, grounded in values of sustainability, equity, and innovation, strongly resonated with us. Furthermore, from the moment we expressed interest in volunteering through to the completion of our teaching sessions, the group ensured we were well-prepared and guided us every step of the way. Their dedication to facilitating meaningful volunteer work in global healthcare settings is truly remarkable, and we are grateful for their commitment.

Clinical experience in Cambodia

During our one-month stay in Phnom Penh, we had the privilege of working with enthusiastic medical students and residents. We participated in clinical dermatology sessions at Preah Kossamak Hospital, gaining hands-on experience with a variety of tropical dermatological diseases and exchanging valuable perspectives with the local dermatology team. We encountered numerous fascinating cases, including systemic sclerosis, severe eczema, paederus dermatitis, and jellyfish-induced contact dermatitis. Despite resource limitations, including the $10 consultation fee being a barrier for many patients, we were impressed by the dedication and resourcefulness of the Cambodian medical team, which went above and beyond to provide care to those in need. Some patients were fortunate to receive free consultations due to the generosity of local staff.

Teaching dermatology and fostering cultural exchange

We taught foundational dermatology concepts to medical students and residents through interactive lectures, quizzes, and case-based discussions. To evaluate our teaching sessions, we used the Student Evaluation of Educational Quality Questionnaire (SEEQ), completed by over 50 participants. The feedback was incredibly positive, with many students requesting additional educational sessions, highlighting the value of such initiatives in regions with limited access to specialized dermatology education.

One of the most popular sessions involved an interactive exercise during which students were divided into small teams, with one team being asked to describe clinical images of dermatological lesions while the others faced away. The medical students who had not seen the images then used the verbal description to make differential diagnoses. This engaging activity fostered critical thinking, teamwork, and diagnostic skills. The SEEQ responses confirmed that students favoured interactive teaching formats, such as quizzes and clinical image discussions, which were central to their learning experience.

Building connections and lasting impact

The volunteering experience was not one-sided. While teaching, we also learnt immensely from the students' knowledge and enthusiasm – their passion for the specialism and eagerness to improve their skills were truly inspiring. We met remarkable individuals who, despite limited resources, were deeply committed to advancing dermatology and patient care in their country. Their dedication motivated us to reflect on our practices.

Cultural exchange was another highlight. On our final day, we organized a Canadian meal featuring maple syrup to celebrate our diverse backgrounds. This shared meal fostered deeper connections with the students and encouraged meaningful conversations about our respective cultures and medical perspectives.

Our experience was profoundly personal because we formed lasting relationships with the students and local healthcare providers. One of the most memorable moments was a sunset boat ride along the Mekong River with some of the students we had taught – an opportunity to bond outside the hospital setting. We also learnt a great deal from the resilience of the Cambodian medical community, whose commitment to patient care inspired us. These experiences have deeply influenced our professional perspectives and motivated us to continue engaging in similar global health initiatives in the future.

Conclusion

In conclusion, our time in Cambodia was transformative, enhancing our teaching skills, broadening our clinical expertise, and deepening our understanding of dermatology in the global context. We strongly encourage other medical professionals to undertake such international teaching experiences, given the invaluable opportunities for personal and professional growth and advancement of medical education in underserved regions.

We are grateful for the collaboration with HVO, the Cambodian medical teams, and the students who made the volunteering experience so enriching. This initiative reinforced our commitment to improving access to dermatology care in underserved communities, both globally and in our own country. We hope our story inspires others to engage in similar initiatives and join the global effort to advance medical education in resource-limited settings.

Acknowledgements

We would like to express our heartfelt thanks to Dr. Beverly Roland, Project Director for HVO Cambodia; Dr. Sithach Mey, Head and Senior Consultant Dermatologist at the Department of Dermatology, Preah Kossamak Hospital, and Drs. Amb Bori and Siri Thida, Department Leads in Cambodia, for their invaluable guidance, expertise, and warm hospitality. Their support made our time in Cambodia unforgettable.

The psychosocial effect of tinea infection in patients

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Dear Editor

As dermatologists in Southeast Asia, we frequently encounter patients suffering from tinea infection, often complicated by steroid modification or extensive presentation. We observe a significant lack of patient awareness regarding fungal infections, leading to the prolonged and indiscriminate use of over-the-counter topical preparations that combine steroids and antifungal agents. This practice, extending for a duration of two to three months or more, frequently results in adverse effects typical of topical steroid misuse, such as skin atrophy, hypertrichosis, and telangiectasia. Furthermore, any chronic dermatological condition invariably exerts profound psychosocial effects on the affected individual.[1]

Patients with extensive tinea corporis often exhibit a significantly diminished dermatological quality of life (QoL), consistent with findings by Henry D *et al.*, which indicated that QoL is affected in patients with tinea infections.[2] The application of steroids alters the typical clinical presentation of the disease, leading to diagnostic challenges.[3] Such patients frequently experience considerable emotional distress, including depression, low self-esteem, social discrimination, and frustration due to their condition. Chronic extensive tinea infections can significantly disrupt daily routines, with symptoms such as itching in the workplace causing particular embarrassment, especially for female patients. The financial burden of treatment poses a substantial problem for economically disadvantaged patients and for households when multiple individuals are affected.

Therefore, comprehensive patient counselling on tinea infection is crucial, alongside the provision of treatment options tailored to the patient's financial capacity, given the frequently prolonged treatment duration. Educating patients about the 'dos and don'ts' of tinea management is essential. Successfully treating a case of tinea not only brings relief to patients but also immense satisfaction to the treating dermatologist.

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DIAGNOSIS ANSWERS

1. *Tinea faciei.* The KOH mount shows fungal hyphae.

2. *'Ear sign' of tinea faciei.*

The 'ear sign' of tinea faciei consists of diffuse erythema and whiteish dry scales over the pinna. Unlike other forms of tinea, *T. faciei* does not always present with the classic annular erythematous plaques with superficial scales; instead, it can present with diffuse erythema, scaling, and papules. Because of its potential overlap with other skin disorders, the diagnosis of tinea faciei requires expertise. To assist with diagnosis, the term 'ear sign' of tinea faciei was coined, whereby erythema and scaling over the auricular pinna are deemed suggestive of diagnosis. An earlier term, 'ear sign' of tinea capitis, referred to lesions over the helix, antihelix, and the retroauricular region, with sparing of the retroauricular fold. This distribution pattern was useful in differentiating tinea capitis from seborrheic dermatitis, which typically involves the retroauricular fold.

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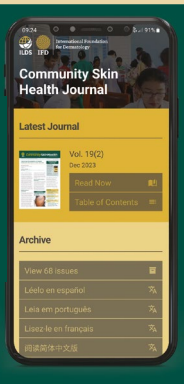

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ILDS

Officially founded in 1935, the International League of Dermatological Societies (ILDS) has been promoting skin health around the world for over 80 years. Its forerunner began in 1889 at the first of many World Congresses of Dermatology. Today, the ILDS represents dermatology at the highest level with over 170 members from more than 80 countries; we represent over 200,000 dermatologists.

The International Foundation for Dermatology (IFD) was created in 1987 to carry out the global health dermatology activities of the ILDS. Today, the IFD supports projects in Africa, AsiaPacific and South America. CSH is the official journal of the IFD.

IFD

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