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Editorial

The Changing Face of Dermatophytosis: A Call for Surveillance and Stewardship in Pakistan

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Dermatophytosis has long been considered one of the predictable infections in dermatology practice where clinical recognition followed by appropriate antifungal treatment would usually lead to clinical resolution. This paradigm is now changing. Across South Asia and even across the world, dermatologists are encountering recurrent, extensive and treatment-recalcitrant fungal infections.[1,2] The emergence and global spread of Trichophyton indotineae, particularly its reduced susceptibility or resistance to terbinafine, has changed an uncomplicated superficial fungal infection into an emerging antimicrobial-resistance concern that calls for stewardship and public health preparedness.[3,4]

The emergence of T. indotineae has changed the clinical landscape of dermatophytosis. Initially it was recognized in the Indian subcontinent but now its international spread has been documented across multiple continents.[1-3] The main problem is its reduced susceptibility to terbinafine which is associated with mutations in the squalene epoxidase (SQLE) gene, the molecular target of terbinafine.[5] It leads to increase in terbinafine minimum inhibitory concentrations (MICs) and treatment failure.[2,6] A multinational genomic study conducted in 2026 identified 90 T. indotineae isolates, out of which 63 (70%) were resistant to terbinafine. Genomic analysis showed close relation among isolates from geographically distant countries, supporting rapid international spread.[7] The international spread is further illustrated by UK surveillance data. From 2017 to 2024, 157 cases of T. indotineae were identified, predominantly among patients belonging to southern Asia, and the species accounted for 38% of dermatophyte isolates referred to the UK National Mycology Reference Laboratory.[8] These figures show how a previously unfamiliar dermatophyte can become clinically visible when systematic laboratory surveillance is in place.

For Pakistan, this is no longer only a regional warning. A recent laboratory-based study from Agha Khan University Hospital, where Shahid *et al*. found Trichophyton isolates in patients with recalcitrant dermatophytosis in Karachi from January 2023 to February 2024. Using ITS sequencing, they identified 16 of 37 isolates (43.2%) as T. indotineae. Twenty-eight isolates (75.7%) demonstrated non-wild-type MICs to terbinafine, with SQLE mutations.[5] Eight isolates (21.6%) also showed non-wild-type MICs to itraconazole but none demonstrated non-wild-type MICs to voriconazole. These findings deserve attention. As the study was laboratory-based and specifically involved recalcitrant dermatophytosis; so its proportions cannot be considered the prevalence of T. indotineae in Pakistan. However, the study provides direct evidence that T. indotineae and terbinafine-non-wild-type Trichophyton isolates do exist in Pakistan that calls for more systematic national response before it becomes an increasingly difficult clinical public-health challenge.[5] The important question is therefore no longer whether antifungal resistance exists in Pakistan. It is how widespread it is, which species and resistance patterns are involved, where they occur, and how prescribing practices may be

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contributing to its emergence and persistence.

Resistance is unlikely to arise from a single factor. Its reflects a complex interaction between organism-specific genetic changes, antifungal exposure, transmission dynamics, diagnostic limitations and prescribing practices.[2,6] In dermatology, empirical treatment of every pruritic eruption as tinea, repeated switching between antifungal medications without reassessing the diagnosis, inadequate treatment duration, premature discontinuation of treatment and unnecessary polypharmacy can all complicate the issue. The widespread use of topical corticosteroid-containing combinations is another concern as it can suppress inflammation and modify the clinical appearance leading to tinea incognito, hence delaying recognition and allowing continued transmission.[1,3,6] Importantly, antifungal stewardship should not be reduced to blaming patients. Self-medication, over-the-counter access to antifungals, inadequate dose or duration, treatment without addressing household transmission, repeated empirical switching between antifungals, emergence of resistant species, limited diagnostic facilities and inadequate public awareness are interconnected system-level issues. A successful response, therefore, requires a shared stewardship framework involving prescribers, pharmacists, laboratories, regulators and patients.

One might reasonably argue that whether such extensive surveillance is justified for a superficial fungal infection that is not life-threatening. Moreover, antifungal susceptibility testing for dermatophytes is challenging as molecular identification is not routinely available in many laboratories in Pakistan, and standardized clinical breakpoints remain another challenge.[2,6] These practical points make a conventional nationwide surveillance programme difficult to be implemented. The WHO Fungal Priority Pathogens List mainly emphasizes fungi associated with invasive disease; dermatophytes are not included among its priority pathogens.[8,9] However, this does not ignore the need to address emerging resistance in dermatophytes at a national level in Pakistan. Instead, it highlights the need for a proportionate and context-specific approach. Pakistan does not necessarily need an immediate nationwide testing programme. A more pragmatic approach would be to establish sentinel surveillance through selected dermatology and mycology centres, using standardized laboratory protocols for species identification, susceptibility testing and clinical reporting. Data from these centres could then be fed into a coordinated national report, allowing trends and emerging resistance signals to be identified, and surveillance to expand subsequently as evidence gathers.

What should we do in Pakistan? First, recognize recalcitrant dermatophytosis as a surveillance signal. Extensive, recurrent or repeatedly treatment-failing diseases should go for diagnostic reconsideration and, where feasible, mycological investigation rather than repeated empirical therapy should be done. Second, strengthen laboratory capacity. Conventional laboratory methods may not reliably differentiate T. indotineae from closely related members of the T. mentagrophytes/ interdigitale complex. Molecular identification and standardized antifungal susceptibility testing should, therefore, be developed with regional reference laboratories.[2,6] Third, establish sentinel national surveillance. Selected centres could collect standardized information on species distribution (which dermatophyte species predominate), terbinafine susceptibility, SQLE mutations, geographic distribution, previous antifungal exposure, past use of steroid combination creams and clinical outcomes. This would allow Pakistan to move from isolated reports towards a longitudinal epidemiological data. Fourth, promote antifungal stewardship in routine dermatology practice. Establish diagnosis whenever possible, avoid injudicious use of steroid-antifungal combinations, select antifungal therapy rationally, mention previous treatment exposure, reassess current treatment failure and investigate suspected resistant diseases rather than repeatedly switching therapy empirically.[10-12] Finally, develop Pakistan-specific clinical guidance. Recommendations derived from other regions may not fully reflect local species distribution, resistance patterns (to both terbinafine and azoles), medicine availability or laboratory

capacity. National guidance should therefore be developed collaboratively and updated as local surveillance gives better evidence.

As the national journal of the Pakistan Association of Dermatologists, the Journal of Pakistan Association of Dermatologists (JPAD) can play a central role in this emerging challenge. It can serve as a platform for multicentre Pakistani data, and provide a forum for developing and publishing national consensus recommendations. JPAD can also facilitate continuing education on antifungal stewardship and help create a multidisciplinary forum that connects dermatologists, microbiologists, mycologists and policymakers. Such collaboration is important because antifungal resistance cannot be addressed through prescribing practices alone; it requires integration of clinical diagnosis, laboratory expertise, epidemiological surveillance and appropriate policies. In this context, JPAD can serve as a platform for bringing the relevant disciplines together to translate that evidence into action.

Dermatophytosis is changing, and Pakistan should respond to it before the evidence becomes overwhelming. What Pakistan needs is a proportionate, evidence-based response focused on accurate diagnosis, rational antifungal use, laboratory preparedness, coordinated surveillance and multidisciplinary collaboration. Over the years, dermatophytosis was treated mainly at an individual level but now it requires us to think one step ahead from treatment to stewardship, from isolated cases to surveillance, and from empirical treatment to informed national strategy. Pakistan still has an opportunity to define the problem before the problem defines our practice. JPAD can help provide a platform through which that evidence is generated, shared and translated into action.

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