



Fungal Infections: A silent health crisis in Africa

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Fungal infections are a global health concern affecting millions of people worldwide. In Africa, fungal Infections have significantly contributed to the burden of diseases owing to the re-emergence and emergence of deadly fungal infections such as the invasive multi-drug resistant *Candida auris* and *Cryptococcus spp* (1). Kenya has reported similar trends and it is the second country after South Africa to have reported incidences of *Candida auris*. This burden has been tied to the high incidence of HIV infections, unavailability of effective antifungal agents, the heavy affliction of poverty that leads to inadequate access to quality healthcare, poor awareness of invasive fungal infections amongst the population, and high-level care being restricted to the limited referral hospitals due to inadequate health infrastructure (1,2). Globally, the diagnosis of fungal infections has been a difficult task owing to the non-specificity of signs and symptoms, difficulty distinguishing colonization from invasive disease, negative blood cultures, and patients' reluctance to undergo invasive diagnostic procedures. In addition, the commonly used diagnostic procedures, culture and microscopic examination, vary in sensitivity and specificity (3). The diagnostics have been further complicated in Africa by a shortage of clinical and diagnostic mycology personnel, inadequate laboratory diagnostic capacity, and poor adherence to the World Health Organization's Essential Diagnostics List about fungal infections. This has contributed to under-

diagnosis and misdiagnosis of fungal infections (2,4).

Treatment of fungal infections has been a global challenge due to the high toxicity and narrow spectrum of most of the clinically used antifungals, long treatment duration, and an increased incidence of antifungal resistance. Drug discovery of antifungal agents has been hampered by the eukaryotic nature of fungi and their human host which makes the identification of unique antifungal targets difficult (5). In Africa, the situation is worse, the inadequate diagnostic capacity and poor adherence to WHO diagnostic policies translate to a lack of definitive diagnosis of fungal infections hence contributing to much longer treatment duration as well as the emergence of resistance. High poverty levels amongst the population and inadequate health infrastructure make patients present to the referral hospitals with advanced stages of infection and likewise are incapable of sustaining the long duration of treatment as well as follow-up tests due to their unaffordability. The implementation of treatment guidelines has also been a challenge, for example in cryptococcal meningitis, flucytosine which is recommended for use in the induction phase, has not been registered in fifty African countries (1). The use of reduced-toxicity liposomal amphotericin B is limited by unaffordability and unavailability. Its alternative Amphotericin B deoxycholate requires hospitalization as well as prevention and monitoring of toxicity and side effects, which eventually translates to increased healthcare costs. The majority of the patients end up



receiving subpar fluconazole monotherapy which has been linked to the emergence of resistance strains and increased mortality rates (1).

The WHO's policy guidelines on integrated antimicrobial stewardship activities highlight the importance of rational use of antimicrobials in reducing the development of antimicrobial resistance and improving patient outcomes. However, while the guidelines acknowledge the importance of antifungal stewardship, they recommend the implementation of antibiotic stewardship programs by healthcare facilities as a core component of their antimicrobial stewardship activities such as the AwaRe classification, but there is no equivalent recommendation for antifungal stewardship programs (6). Studies have shown that there is inadequacy in the implementation of the Global Action Plan (GAP) on antimicrobial resistance in the WHO African region(7).

Despite the current crisis of fungal infection being a global concern, Africa has been adversely affected and prompt measures should be implemented to reduce the incidence of antifungal resistance, improve patient outcomes, and reduce healthcare costs. These include investing in research to better understand the epidemiology, pathogenesis, and treatment of fungal infections. This will enhance diagnosis, inform the development of new prevention and treatment strategies, as well as help identify new therapeutic targets hence the development of new antifungal drugs to confer affordability and reduced toxicity as well as combat emerging and drug-resistant fungal infections. Implementing antifungal stewardship programs is also key in curbing this crisis. These would involve establishing a national coordination mechanism for AFS, strengthening surveillance and reporting of fungal infections and use of antifungals, advocacy for rational use of antifungal agents, and promoting awareness, education, and training of healthcare professionals and patients.

Strengthening healthcare systems in developing countries can help improve access to timely diagnosis and treatment of fungal infections. Increasing fund allocation to healthcare is also necessary for improving healthcare infrastructure from the primary healthcare setting, ensuring availability of antifungal agents and facilitating training of personnel with regards to fungal infection.

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