Challenges in Fungal Treatment: A Serious Public Health Problem

Dear Editor,

Antibiotics and drugs called antimicrobial agents have been used for the last 70 years to manage patients who have infectious diseases including antifungal drugs. Since the 1940s, these antimicrobial agents have clearly reduced illness and deaths from infectious diseases. However, these drugs have been utilized so widely and for so long that the infectious organisms for which the antibiotics are designed to kill have adapted gradually to them, thus making most drugs less effective.[1]

The problem is so extensive that it can affect anyone, from any age group, regardless of their place of origin.[2]

In comparison with antibacterial drug studies, few contributions have been reported regarding discovery of modern antifungal agents with novel mechanisms of actions.[3] The new antifungal agent will take the priority for enhancement treatment of certain fungal infections.

Some fungal infections may need a long time of about 6 months or so for cure, as in onychomycosis.[4] Long duration of treatment, drug resistance, and even cost are the most common problems associated with the usage of known antifungal agents.[3]

Production of new and novel antifungal drug targets is challenging to the researchers due to high similarities in cell structure for both human and fungi, anyway the most known antifungal agent targets include cell membrane compounds, fungal nucleic acid, and cell wall component.[3] Fungi and humans are eukaryotic cells; both of them are heterotrophic unlike plants, bacteria, and protozoa.

In general, clinical antifungal resistance is defined as persistence of infection or symptoms in spite of the administration of appropriate antimicrobial agents, consequently leading to failure to eliminate fungal infection. The major drug resistance mechanisms in fungi are efflux pump protein overexpression and biofilm formation.[3]

Antibiotic resistance has emerged as one of the major threats to the humankind and possesses all attributes to revert the progress achieved till date in the management of infectious diseases.[2]

The concern of antimicrobial resistance is a health emergency which has raised serious objections on the gains achieved in the field of medicine. There is an immense need for more investment in research and development activities for antibiotic-resistant infections, failing which we will be losing lives of millions of people to common infections, along with being a major burden on the health system.[5]

Because we have few numbers of antifungal agents available, scientists improved antifungal drug management by adopting different strategies such as traditional drug modification by altering the chemical properties and structures; developing modern formulas of antifungal agents;[6] antifungal drug combination to get synergistic action and reduce side effects and drug toxicity; besides the strategy of using topical agents combined with anti-inflammatory or oral/topical antifungal agents.[3,4]

To conclude, antifungal resistance has become a political priority, and all efforts should be activated to reduce the magnitude of the challenge by wise distribution and appropriate use of antimicrobial drugs and appropriate diagnostic tools. There are few who acknowledge regarding the mechanism of antifungal agent resistance and that there is a crucial problem in fungal infection treatment, so more searches are required to increase our information about the mechanisms of resistance in fungi.

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Conflicts of interest

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