

Fungal infection knowledge gap in Ethiopia

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Abstract

Fungal infections are associated with morbidity and mortality especially in patients with underlying medical conditions. With the increasing number of immune-compromised patients, the burden of invasive fungal infections became widespread.

In any country, data on fungal infection is important to design appropriate programs as well as to plan and implement further studies. A review of literature on fungal infections in Ethiopia shows that there is paucity of evidences on this problem and existing ones focused mainly on superficial and mucosal fungal infections while there is almost none on an invasive or systemic infection [*Ethiop. J. Health Dev.* 2017;31(2):124-126].

Key words: fungal infections, Ethiopia.

Introduction

Fungi are eukaryotic organisms that cause a range of clinical infections including skin, hair, nail, mucosal, subcutaneous, and invasive infections. Majority of fungi cause opportunistic infections in patients with other underlying immune-suppression such as HIV infection, chemotherapy induced neutropenia in cancer patients, solid organ transplant patients receiving immunosuppressive therapy, and patients with chronic obstructive lung disease (1). Fungi also play a role in allergic fungal disease such as allergic bronchopulmonary Aspergillosis (ABPA) and chronic or deep tissue infections. The laboratory diagnosis of fungal infection starts with a simple potassium hydroxide (KOH) wet mount for superficial infections to more difficult and complex methods for systemic infection including clinical vigilance for signs, imaging procedures, culture, serology, molecular techniques (2). The number of patients with the risk of invasive fungal infections is increasing in Ethiopia. This brief communication intends to shade light on the gaps of research based evidence in the area of serious and life threatening fungal infections in Ethiopia.

Methods

Review of existing literature on fungal infections in Ethiopia was done using the following key terms: “fungal infection and Ethiopia”, “candidiasis and Ethiopia”, “candidaemia and Ethiopia”, “invasive fungal infections and Ethiopia”, “Aspergillosis and Ethiopia”, “dermatophytosis and Ethiopia”, “Cryptococcus and Ethiopia”, “opportunistic infections and Ethiopia”, “Pneumocystis Pneumonia and Ethiopia”, “Mycetoma and Ethiopia”, and “Histoplasmosis and Ethiopia”. Publications starting from 1996 and only those publications in English related to human fungal infections were included for the purpose of this brief communication.

Results

The existing literature on any fungi in Ethiopia over a span of two decades revealed only 91 publications, out

of which only 45 original articles were on human fungal infections. Out of the 45 publications, 17 were on superficial infections mainly on dermatophyte infections, 14 on mucosal candidiasis and candiduria, 9 on Cryptococcal meningitis, 4 on Pneumocystis pneumonia, and one on fungal keratitis (Table 1). According to these reports, superficial infections caused by dermatophytes was high ranging from 17% to 73% (3,4). After the first case report of Cryptococcal infection in a young woman with AIDS in 1992 (5), there have been several studies that addressed the prevalence of cryptococcal meningitis mainly in patients from Addis Ababa (6,7,8). Other invasive infections such pneumonia caused by *Pneumocystis jirovecii* have been investigated in some studies, showing its importance in the differential diagnosis of smear negative HIV positive patients presenting with atypical chest x-ray (9,10). Four studies done between 2011 and 2016 addressed the rising resistance of *Candida* species to commonly used antifungal drugs. One report shows azole resistant *Candida* isolates from Oropharyngeal Candidiasis (OPC) with 11% resistance to fluconazole, and another with 32% resistance to one or more antifungal agents tested such as fluconazole, ketoconazole and itraconazole (11, 12). On the other hand, there was no study on invasive fungal infections such as blood stream infections with *Candida* or chronic pulmonary Aspergillosis. PubMed search on invasive Aspergillosis and Ethiopia returned only one case report from 1996 of a bilateral pulmonary aspergilloma colonizing an old tuberculous cavity (13). Preliminary data in a study on blood stream infection (BSI) among febrile cancer patients in Tikur Anbessa Specialized Hospital has shown the importance of routine surveillance for invasive fungal infections in these groups of patients (Personal communication, unpublished report). Similarly, there are several individual case reports on other unusual systemic infections such as coccidiomycosis and rhinocerebral mucormycosis.

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Table1: Original articles published on fungal infections in Ethiopia from 1996 to 2016

Category of fungal infections	Year (Number of articles)			Total
	1996-2002	2003-2009	2010-2016	
Superficial and cutaneous infections	4	2	11	17
Candidiasis				14
Cryptococcal meningitis	2	-	7	9
Fungal keratitis				1
Pneumocystis pneumonia	-	3	1	4
Total				45

Discussion

Fungal infections are common worldwide with over 300 million people of all ages suffering from serious fungal infection every year with rates varying widely from one country to another (14). This brief communication is based on existing literature and personal observation that fungal infections have been neglected and understudied in Ethiopia. The available publications mostly focus on superficial and cutaneous infections. In contrast, there is no data on life threatening invasive fungal infections (1) which commonly occur in patients with underlying medical conditions and are mostly caused by *Candida*, other yeasts and *Aspergillus* species.

The existing report in the country on the rising resistance of yeasts to commonly used antifungal agents (11, 12), is a strong indication for more comprehensive research on antifungal resistance in the country. Reports on the rise of antifungal resistance in *Candida* and *Aspergillus* species are becoming more common, and one such emerging yeast is *Candida auris*, a multi-drug resistant yeast which is increasingly identified in different countries worldwide (15). *C. auris* shares the same risk factors as other *Candida* species although it poses challenges not only to treatment but also to identification of the species since correct identification relies on molecular sequencing (15). Currently almost all clinical microbiology laboratories in Ethiopia use basic microscopy for fungal identification and do not perform fungal culture and identification.

In situations where predisposition to opportunistic infections is increasing in Ethiopia, commensurate increase in fungal infections is anticipated. Lack or limited evidence in Ethiopia on the current state of fungal infections particularly of the invasive and life threatening infections pose serious challenges to service. From personal observation, there is an indication that there is low index of suspicion in clinical practice, lack of laboratory capacity, and scarcity of research focused on these infections. Rapid diagnosis of fungi causing invasive infections is important to clinically manage patients who are at high risk of acquiring these life threatening infections. The clinical outcome and high mortality associated with systemic fungal infections in patients, especially those who are immune-suppressed, should motivate the need to raise awareness by renewed effort for improved laboratory diagnostic capacity combined with evidence

based data that will improve knowledge and skill of health care professionals.

It is recommended that more research needs to address these neglected infections especially focused on opportunistic and invasive fungal infections, which will contribute to initiation of better and timely approaches to appropriate management of patients.

References

- Richardson M, Lass-Flor L. Changing epidemiology of systemic fungal infections. Clin Microbiol Infect 2008;14(Suppl.4):5-24
- Badiee P, Alborzi A. Invasive fungal infections in renal transplant recipients. Experimental and Clinical Transplantation 2011;6:355-362
- Leiva-Salinas M, Marin-Cabanas I, Betlloch I, Tesfasariam A, Reyes F, Belinchon I, et al. Tinea capitis in school children in a rural area in southern Ethiopia. Int J Dermatol. 2015;54(7):800-5.
- Woldeamanuel Y, Mengistu Y, Chryssanthou E, Petrini B. Dermatophytosis in Tulugudu Island, Ethiopia. Med Mycol. 2005;43(1):79-82.
- Gebremedhin A. Cryptococcal meningitis in a young Ethiopian woman with AIDS. Ethiop Med J. 1992;30(3):169-73.
- Mihret W, Zenebe G, Bekele A, Abebe M, Wassie L, Yamuha LK, et al. Chronic meningitis in immune-compromised adult Ethiopians visiting Tikur Anbessa Teaching Hospital and Ye'huleshet clinic from 2003 to 2004. Ethiop Med J. 2014 (suppl1); 43-8.
- Beyene T, Woldeamanuel Y, Asrat D, Ayana G, Boulware DR. Comparison of cryptococcal antigenemia between antiretroviral naïve and antiretroviral experienced HIV positive patients at two hospitals in Ethiopia. PLoS One. 2013; 8(10):e75585.
- Alemu AS, Kempker RR, Tenna A, Smitson C, Berhe N, Fekade D, et al. High prevalence of Cryptococcal antigenemia among HIV-infected patients receiving antiretroviral therapy in Ethiopia. PLoS One. 2013;8(3):e58377.
- Aderaye G, Bruchfeld J, Aseffa G, Nigussie Y, Melaku K, Woldeamanuel Y, et al. *Pneumocystis jirovecii* pneumonia and other pulmonary infections in TB smear-negative HIV-positive patients with atypical chest X-ray in Ethiopia. Scand J Infect Dis. 2007;39(11-12):1045-53.

10. Aderaye G, Woldeamanuel Y, Asrat D, Lebbad M, Beser J, Worku A, *et al.* Evaluation of Toluidine Blue O staining for the diagnosis of *Pneumocystis jiroveci* in expectorated sputum sample and bronchoalveolar lavage from HIV-infected patients in a tertiary care referral center in Ethiopia. *Infection*. 2008; 36(3):237-43.
11. Wabe TN, Hussein J, Suleman S, Abdella K. In vitro antifungal susceptibility of *Candida albicans* isolates from oral cavities of patients infected with human immunodeficiency virus in Ethiopia. *J Exp Integr Med* 2011; 1:265-271
12. Mulu A, Kassu A, Anagaw B, Moges B, Gelaw A, Alemayehu M, *et al.* Frequent detection of 'azole' resistant *Candida* species among late presenting AIDS patients in northwest Ethiopia. *BMC Infect Dis*. 2013;13:82.
13. Aderaye G, Jalaw A. Bilateral pulmonary aspergilloma: case report. *East Afr Med J*; 1996 73(7):487-8.
14. The Fungal Infection Trust. How common are fungal diseases? Fungal Research Trust 20th Anniversary meeting. London June 18th 2011, updated September 2016.
15. Chowdhary A, Voss A, Meis JF. Multidrug resistant *Candida auris*: 'new kid on the block' in hospital associated infections? *Journal of Hospital infection*. 2016; 94: 209-212.