

clinical experience of use of two of the newer agents targeted against Gram negative bacteria, Ceftazidime-avibactam and Ceftolozane-tazobactam. These agents were used for the treatment of Carbapenemase Producing Enterobacteriaceae (CPE), in a post-op cardiothoracic patient with severe hospital acquired pneumonia and Multi Drug Resistant (MDR) *Pseudomonas* in a patient with severe burns airlifted to our specialist burns unit from a hospital in Pakistan.

Conclusions: Antibiotic resistance is a global problem. Resistance mechanisms are becoming increasingly complex to understand and detect, and are highly mobile via genes on plasmids spread through bacterial populations, augmented by air travel and migration. Collaboration between countries is now more essential than ever. We feel that this should include the sharing of real life clinical data and experience of the newer agents, in order to build up clinicians confidence to use them in the clinical setting, thereby increasing treatment options globally.

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Fungal diseases in Taiwan – National Insurance Data and Estimation



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Background & Purpose: Almost all the Taiwanese population of 23.6 million people are registered on the National Health Insurance Research Database (NHIRD), yet no national analysis of fungal diseases has been undertaken using the NHIRD.

Methods: Using one-in-three sampling ratio, the NHIRD was queried using ICD-9 fungal disease codes to estimate the disease burden in 2013. Documented numbers were compared with modelling as previously undertaken for total and at-risk populations.

Results: Estimates for the annual incidence of HIV-related life-threatening fungal disease include cryptococcal meningitis (243 cases, 51 in HIV), *Pneumocystis pneumonia* (1251 cases, 630 in HIV) and histoplasmosis (54 cases, 3 in HIV). We estimate 4,798 cases of invasive aspergillosis annually, whereas NHIRD had 567 and a prevalence of 7,646 chronic pulmonary aspergillosis cases, compared to NHIRD's 531. Sixty-three mucormycosis cases were documented by NHIRD (0.27/100,000). The annual burden of candidaemia and *Candida peritonitis* is recorded at 861 (3.65/100,000) and 27 cases, respectively. Fungal asthma, including allergic bronchopulmonary aspergillosis (ABPA), probably affects over 100,000 adults, yet 63 cases were captured by NHIRD. Over 20,000 oral candidiasis cases were documented by NHIRD and 1,440 oesophageal candidiasis (6.1/100,000). Over 350,000 women are estimated to be affected by recurrent vulvovaginal candidiasis each year (2,758/100,000 females). Fungal keratitis is found in 8.2% of microbial keratitis, but no total caseload recorded. A small number of tinea capitis, chromoblastomycosis and sporotrichosis cases are seen each year.

Conclusions: About 2% of the Taiwanese population have a serious fungal infection each year, and the NHIRD database documents most of these, with some notable gaps, especially invasive, chronic and allergic aspergillosis, probably a function of limited awareness and diagnosis use.

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The estimated burden of fungal diseases in South Africa



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Background & Purpose: With a population of 57.7 million, over 7 million persons living with HIV and very diverse ecology and human genetics, South Africa's serious fungal disease burden is probably substantial and diverse. We sought to estimate the burden of serious fungal disease in South Africa.

Methods: Using total and at-risk populations and national, regional, and occasionally global data, we estimated the incidence and prevalence of the majority of serious fungal diseases in South Africa.

Results: Estimates for the annual incidence of HIV-related life-threatening fungal disease include cryptococcal meningitis (23,676 cases), *Pneumocystis pneumonia* (40,587 cases), and endemic mycoses (emerging mycosis [100 cases] and histoplasmosis [60 cases]). We estimate 6,676 cases of invasive aspergillosis annually, of which 4,607 are estimated to be involved in AIDS-related mortality. The annual burden of candidaemia and *Candida peritonitis* is estimated at 8,257 and 2,972 cases, respectively. The epidemic of pulmonary tuberculosis has probably driven up the prevalence of chronic pulmonary aspergillosis to 99,351 (175.8/100,000), the highest in the world. Fungal asthma probably affects over 100,000 adults. Mucosal candidiasis is common with an annual prevalence estimated at 1,150,000 and 623,600 oral and oesophageal cases complicating HIV infection alone (estimates in other conditions not made), and over a million women are estimated to be affected by recurrent vulvovaginal candidiasis each year. Tinea capitis in children is common and conservatively estimated at >1,000,000 cases. Sporotrichosis occurs occasionally (an estimated 40 cases), but data were absent for the other inoculation mycoses, chromoblastomycosis and mycetoma. Approximately 10 cases of blastomycosis are estimated each year. Overall, over 4.1 million South Africans are estimated to have a serious fungal disease each year (7.26% of the population).

Conclusions: Significant numbers of South Africans are affected each year by serious fungal infections, emphasising the need for improving diagnosis and management of these diseases.

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The burden of serious fungal infections in Ghana



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Background and Purpose: Serious fungal infections are believed to be increasing alongside rise in the number of immunocompromised patients and yet often neglected in developing countries. In Ghana, morbidity and mortality from these infections are high due to insufficient clinical expertise and unavailability of diagnostic tools and antifungals. Estimating their burden is important for increased attention. We aim to estimate the burden of serious fungal infections in Ghana.

Methods: Using local, regional and global data reporting fungal infection rates and population estimates for general and specific

at-risk group, we employed deterministic modelling to estimate national incidence or prevalence.

Results: Our study revealed about 4% of the estimated 28.3 million Ghanaian population suffer from serious fungal infections yearly with about 30,000 affected by life-threatening invasive fungal infections. We estimate an incidence of 6,275, 11,737 and 724 cryptococcal meningitis, *Pneumocystis jirovecii* pneumonia and disseminated histoplasmosis cases in AIDS respectively. Oral and oesophageal candidiasis was estimated to collectively affect 18,292 Ghanaians. Among adult asthmatics, 18,385 and 24,268 were estimated to have allergic bronchopulmonary aspergillosis (ABPA) and severe asthma with fungal sensitisation (SAFS) respectively. We estimated a prevalence of 10,464 cases of all stages of chronic pulmonary aspergillosis (CPA) with 50% assumed to occur post tuberculosis and an annual incidence of 277 cases of invasive aspergillosis. Candidaemia and candida peritonitis cases were estimated to be 1,446 and 217 respectively. We estimated a prevalence of 442,621 recurrent vulvovaginal candidiasis (RVVC) cases among adult women and 598,840 Tinea capitis cases among school children. Mucormycosis and fungal keratitis were estimated to annually affect 58 and 810 Ghanaians respectively. No reliable data exist on mycetoma or chromoblastomycosis.

Conclusion: There is substantial burden of serious fungal infections in Ghana. Increased awareness, clinical expertise, laboratory capacity, research and availability of antifungals are needed urgently for improved care.

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Estimated burden of serious fungal infections in Ethiopia



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Keywords: Invasive Fungal infections; Tinea capitis; Epidemiology; Ethiopia

Introduction: The morbidity and mortality associated with fungal infections in Ethiopia is not known. Therefore, we assessed the annual burden in the whole population and among populations at risk.

Methods: Data were extracted from 2011 reports of the Ethiopia World health stats, AIDS program, reports, 2015 Ethiopian Education for All 2015 National Review Report [1,2], and from a comprehensive PubMed search. We used modeling and HIV data to estimate the burdens of *Pneumocystis jirovecii* pneumonia (PCP), cryptococcal meningitis (CM) and candidiasis. Asthma, chronic obstructive pulmonary disease and tuberculosis data were used to estimate the burden of allergic bronchopulmonary aspergillosis (ABPA) and chronic pulmonary aspergillosis (CPA). Burdens of candidaemia and candida peritonitis were derived from critical care and/or cancer patients' data.

Results: In 2011, Ethiopia's population was 102 million with 593,375 people reported to be HIV-infected. Estimated burden of fungal infections was: 7,051,736 tinea capitis, 9575 cryptococcal meningitis, 13,838 *Pneumocystis pneumonia* (PCP), 1,426,988 recurrent candida vaginitis, 166,050 oral and 57,344 Oesophageal candidiasis cases respectively. There were 14,855 estimated post-tuberculosis chronic pulmonary aspergillosis cases, whereas candidaemia and *Candida peritonitis* cases were 5100 and 765 respectively. No reliable data exist on endemic mycosis or fungal keratitis.

Conclusions: Around 9% of Ethiopians suffer from fungal infections annually, mostly school children with tinea capitis. Cryptococcosis and PCP are the major causes of mycoses-related deaths. Upgrading mycosis diagnosis capacity and national surveillance of fungal infections is urgently needed.

References

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Pediatric gastrointestinal basidiobolomycosis: Case series



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Background and Purpose: Pediatric gastrointestinal basidiobolomycosis (GIB) is an emerging fungal infection caused by *basidiobolus ranarum*. The disease had a high prevalence in the pediatric population from tropical and subtropical regions in Saudi Arabia. GIB poses a challenge in the diagnosis and requires a high index of suspicion. Initially early surgical interventions with systemic antifungal therapy were recommended as the optimal management, however subsequent cases treated successfully with antifungal alone. Here, we reviewed the experience of our center and up to our knowledge this the largest series of the pediatric (GIB) cases. We aim to help understanding this emerging disease, to document the efficacy of the antifungal monotherapy, and to assess the clinical outcomes.

Methods: A retrospective electronic chart review conducted for twenty-one (21) pediatric patients with GI basidiobolomycosis who were diagnosed between February 2002 and February 2018 at King Faisal Specialist Hospital and Research Center (KFSHRC), Riyadh, Kingdom of Saudi Arabia.

Results: The majority of the patients were males from the southwestern region of Saudi Arabia. The mean age at diagnosis was four years. Most of the cases presented with abdominal mass and eosinophilia. The diagnosis proven by histopathological finding in eighteen cases, four of them had a positive culture also. Seven cases treated with the combined surgical and medical therapy and the remaining with a systemic antifungal alone. Voriconazole was the most used antifungal. Trimethoprim-sulfamethoxazole used successfully in the refractory and instances of relapse. None of our patients died. Two cases have shown a relapse of their symptoms.

Conclusion: Early diagnosis and treatment guard the favorable prognosis of pediatric GIB. The optimal management is challenging. From the finding of this series, we think that a new generation triazole (Voriconazole) monotherapy is an effective treatment and Trimethoprim-sulfamethoxazole is a promising agent in the management of refractory and relapse cases.

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