



The burden of serious fungal diseases in Sudan

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Objective

Sudan is a large north-African country with a population of about 40 million. Apart from mycetoma which is a substantial problem, the burden of fungal infections in Sudan is not well documented. Serious fungal infections are increasing with more immunocompromised patients, longer lives and a high frequency of respiratory diseases. The aim of this study was to estimate the burden of serious fungal infections in Sudan.

Methods

Epidemiological data reporting fungal infection rates in Sudan and nearby countries together with population estimates for general and specific at-risk patient groups were acquired. We used previously described deterministic modelling to estimate national incidence or prevalence.

Results

HIV rates are low in Sudan and we estimated 231, 1,378 and 3,568 cases with cryptococcal meningitis, *Pneumocystis* pneumonia and oesophageal candidiasis, respectively. Asthma affects an estimated 480,000 adults, and 11,400 and 15,048 people were estimated to have allergic bronchopulmonary aspergillosis (ABPA) and severe asthma with fungal sensitisation (SAFS) respectively, probably with some overlap between them. We estimated 1,085 cases of all forms chronic pulmonary aspergillosis (CPA) with 50% assumed to occur post tuberculosis or are mis-diagnosed as TB. We estimated 354 cases of invasive aspergillosis complicating leukaemia, HIV and lung cancer. There are no COPD prevalence data. In the absence of local data, we have estimated candidaemia at 5/100,000 or 2,000 cases. We estimated ~530,000 women to be affected by recurrent vulvovaginal candidiasis (RVVC). As many as 3.6 million school-age children suffer from tinea capitis, based on a 21% rate. Mycetoma is a particular problem in Sudan and a minimum of 1.81/100,000 inhabitants or about 700 estimated cases are found there, predominantly eumycetoma. No reliable data exist on fungal keratitis, histoplasmosis or mucormycosis.

Serious Fungal Infection	Rate/100,000	Totals
Cryptococcal meningitis	0.58	231
Pneumocystis pneumonia	3.44	1,378
Invasive aspergillosis	0.89	354
Chronic pulmonary aspergillosis post TB *	0.43	172
Chronic pulmonary aspergillosis post TB **	1.36	543
Chronic pulmonary aspergillosis – all	12	1,085
Allergic bronchopulmonary aspergillosis (ABPA)	29	11,400
Severe asthma with fungal sensitisation (SAFS)	38	15,048
Allergic fungal rhinosinusitis	0.0	-
Chronic Aspergillus granulomatous sinusitis	0.0	-
Candidaemia	5.00	2,000
Candida peritonitis	0.75	300
Oral candidiasis	35.8	14,334
Oesophageal candidiasis	8.9	3,568
Recurrent Candida vaginitis (>4x/year)	2651	530,237
Mucormycosis	0.02	8
Mycetoma	1.81	699
Fungal keratitis	0.00	-
Tinea capitis	9030.00	3,612,000
Total serious fungal infection burden		4,192,642

Conclusions

Our study revealed about 4.1 million (10.5%) of the Sudanese population suffer from serious fungal infections yearly with about 15,633 affected by life-threatening invasive fungal infections. Improvements in fungal disease diagnosis and management is required in Sudan.

* Perkhofer S, The Nationwide Austrian Aspergillus Registry: a prospective data collection on epidemiology, therapy and outcome of invasive mould infections in immunocompromised and/or immunosuppressed patients. Int J Antimicrob Agents. 2010 Dec;36(6):531-6..

** From Denning et al, Bull WHO 2011