Burden of serious fungal infections in Nigeria, Poster Nr: 1035

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Abstract

Introduction Nigeria is the most populous country in Africa with a high rate of tuberculosis and a moderate HIV infection burden. Some reports of cutaneous and mucosal fungal infections have emerged from Nigeria. We have estimated the total number of serious fungal infections in Nigeria.

Methods A full literature search was done to identify all epidemiology papers reporting fungal infection rates from Nigeria. We used specific populations at risk and fungal infection frequencies in the population to estimate national incidence or prevalence. WHO population statistics of 2009, the 2010 WHO HIV infection and ARV treatment rates; National Agency for the Control of AIDS child/adult HIV split 2011, WHO 2010 TB statistics, ISAAC estimate of asthma prevalence are some of the databases used for estimating population at risk.

Results 50% of the nearly 155M Nigerian population are children and 38M are women between the age of 15 and 50 yrs. 1.5M Nigerian women get recurrent vaginal thrush. Local estimates of tinea capitis exceed 20% of school age children, suggesting that over 15.5M children have tinea capitis. There were 78,032 cases of pulmonary TB in 2010, most in HIV negative people and based on cavity frequency and Aspergillus IgG serology, we expect 19,000 new cases of chronic pulmonary aspergillosis (CPA) with a 5 year period prevalence of 60,377 cases (Denning, 2011) [1] probably 50% of the total CPA caseload. Asthma is also common in Nigeria and a population prevalence of 15.2% has been reported. (Desalu, 2009) [2]. Therefore we expect about 3.7M adult asthmatics of which 2.5% will have ABPA (94,000 with ABPA are likely and 124,00 with SAFS). Based on the 3,459,363 cases of HIV infection reported, (55% children), 1,449,166 on ARV therapy, and 281,180 new AIDS cases, an estimated 32,000 cases of cryptococcal meningitis is estimated. 75,000 of the AIDS cases are expected to develop Pneumocystis pneumonia (40% rate in children), 253,000 oral candidiasis and 144,000 oesophageal candidiasis based on the WHO prevalence rate. Rates of candidaemia, invasive aspergillosis, mucormycosis and histoplasmosis were estimated on a population basis, without supporting data and are probably uncommon or rare.

Introduction

Invasive fungal infections have emerged worldwide as an increasingly frequent cause of opportunistic infections [3]. The incidence of nosocomial fungal infections has continued to rise over the past two decades in parallel with advances in medical and surgical procedures resulting in considerable morbidity and high mortality rate [4,5]. Bone marrow and solid organ transplant procedures, malignancies, surgery and medical intensive care have largely increased the number of profoundly immunosuppressed patients at high risk of opportunistic infection [3]. There is dearth of data from Nigeria on the burden of these life threatening disease entities, but data from a survey of the epidemiology of sepsis conducted in the USA revealed that the incidence of fungal sepsis increased threefold between 1979 and 2000 [6] and this is despite the fact that most often the diagnosis is post mortem [7]. Nigeria is the most populous black nation in the world with a population of 155million people and an average life expectancy of 55 years. The total number of HIV/AIDS is 3.3million and AIDS related deaths as of 2010 was 215,130 [8]. A full search of published literature only revealed few case reports on invasive fungal infections in Nigeria. There very few epidemiological data on serious fungal infections in Nigeria.

We therefore estimated the burden of serious fungal infections in Nigeria based on the populations at risk.

Materials and Methods

A full literature search using Google Scholar, Pubmed website, African Journals Online and grey literature was done to identify all epidemiology papers reporting fungal infection rates from Nigeria. We used specific populations at risk and fungal infection frequencies in the population to estimate national incidence or prevalence where no relevant studies were available. WHO population statistics of 2009, the 2010 WHO HIV infection and ARV treatment rates; National Agency for the Control of AIDS child/adult HIV split 2011, WHO 2010 TB statistics, recent publication of asthma prevalence and its complication allergic bronchopulmonary aspergillosis [9] are some of the databases used for estimating population at risk.

Discussion:

- Invasive fungal infections (IFDs) are frequently life-threatening infections with high morbidity and mortality rates. The groups of patients at risk are critically ill; haematological malignancies; solid organ tumour; diabetes; neonates; HIV/AIDS; bone marrow and solid organ transplant patients to name the major ones. All these groups of patients are seen and managed in our environment
- There is paucity of data on IFDs. The question therefore is "are there no IFDs in our environment?"; or just lack of awareness??; but the groups of patients at risk abound in our environment.
- Our findings revealed a number of epidemiological reports on superficial and mucocutanous fungal infections with an estimated total burden of 15,581.400 cases of tinea capitis in children [10], and about 1,500,000 women with recurrent vaginal candidiasis [11].
- We estimated 74,594 cases of Pneumocystis pneumonia from data from other African studies which were predominantly in the HIV/AIDS peadiatric age group.
- Estimated cases of immediately life threatening invasive fungal infections (candidaemia, invasive aspergillosis, cryptococceal meningitis, mucormycosis, histoplasmosis, candida peritonitis) is 11.9/100,000 of population at risk. A study on cryptococcal antigen screening amongst HIV/AIDS patients revealed a prevalence of 12.7% [12].
- Long-term respiratory (chronic pulmonary aspergillosis, ABPA, SAFS) caseload is estimated at 21/100,000 of the population at risk, although there may some duplication and overlap.
- The prevalence of blindness in Nigeria is 0.78% with corneal opacities accounting for 12% [13]; however there are no data on fungal keratitis in Nigeria (a country with a large population of rural dwellers and farmers).
- There have been no proactive searches for these life-threatening infections probably due to the fact that patients pay for every stage of their management in the hospital so most times empirical therapy is used.
- Conventional diagnostic tests such as direct microscopy, histopathology and culture are routinely used, but not galactomannan, β -D glucan, or DNA detection tests and this may have impacted on the ability to diagnose invasive fungal infections
- Epidemiological data on the burden of fungal infections in our environment will be of public health impact and influence the management protocol of the groups of patients at risk.

Conclusion

Our estimates indicate that over 11.8% of the Nigerian population is estimated to suffer from a serious fungal infection each year. If tinea capitis and recurrent vaginal thrush are excluded, over 800,000 are estimated to be affected, with substantial mortality. Epidemiological studies are urgently required to validate or modify these estimates.

Infection	Number of infections per underlying disorder per year					Total burden	Rate / 100K
	None	HIV/AIDS	Respiratory	Cancer/Tx	ICU		
Oesophageal candidiasis	-	144,195	?	?	?	144,195	9.3
Candidaemia	-	?	?	3,095	6,189	9,284	0.6
Candida peritonitis	-	-	-	-	2,321	2,321	0.2
Recurrent vaginal candidiasis (4x/year)	1,521,520	-	-	-	-	1,521,520	3800
ABPA	-	-	93,649	-	-	93,649	6
SAFS	-	-	123,617	-	-	123,617	7
Chronic pulmonary aspergillosis	-	-	120,753	-	-	120,753	8
Invasive aspergillosis	-	?	?	928	?	928	0.1
Mucormycosis	-	-	-	300	-	300	0.2
Cryptococcal meningitis	?	16,034	?	?	-	16,034	1
Pneumocystis pneumonia	-	74,594	?	?	?	74,594	5
Histoplasmosis	?	?	?	-	-	?	5
Fungal keratitis	?	-	-	-	-	-	?
Tinea capitis	15,581400	?	?	?	?	15,581,400	1000
Total burden estimated						17,941,657	

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