Multidrug resistant tuberculosis (MDR-TB) in emerging economies in Sub-Saharan Africa: clinicians' public health concerns

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Abstract: Despite improvement in the control of Tuberculosis globally, the disease remains a major public health problem responsible for high morbidity and mortality. In 2013 alone an estimated 9 million people acquired Tuberculosis, while mortality was at 1.5 million people that year. The emergence of multidrug resistant tuberculosis (MDR-TB) is tending to reverse earlier gains in the Tuberculosis control efforts, especially in resources limited settings in Sub Saharan Africa (SSA). The largest negative impact is expected in high-risk populations in whom the prevalence of pulmonary TB is already high. The challenges in these settings are numerous and are important for the epidemiology of MDR-TB. Alliances of negative forces and social determinants of health such as poverty, low levels of literacy, gender inequality and poorly resourced health systems may play a big role in the spread of MDR-TB. Furthermore, high cost of treatment and lack of health workers are hindrances to proper control of TB. HIV infection and male gender have been cited to be risk factors. Efforts to control this epidemic require control of HIV and more male involvement in the most affected regions. In our perspective we discuss epidemiology of MRD-TB in SSA.

Keywords: Epidemic; HIV/AIDS; multidrug resistant tuberculosis (MDR-TB); public health; Sub Saharan Africa (SSA)

Received: 25 January 2017; Accepted: 12 February 2017; Published: 13 April 2017.
doi: 10.21037/jphe.2017.03.01
View this article at: http://dx.doi.org/10.21037/jphe.2017.03.01

Introduction

Multidrug resistant tuberculosis (MDR-TB) in Sub Saharan Africa (SSA) is an emerging epidemic adding to the current long-standing pandemics of malaria, TB and HIV in the region. The epidemiology and natural history of MDR-TB have been described in specific settings and levels of HIV prevalence (1-4). However, these data may not be generalizable. The emergence of MDR-TB in SSA in the 21st century poses a new threat to health and development, and will potentially reverse some of the health gains registered on TB control. MDR-TB has disproportionately affected the poorest countries in the sub region (1-8). These same countries are already heavily burdened with malaria, tuberculosis and HIV/AIDS (9-15). A constellation of factors, including poverty, co-existent pandemics such as HIV, lack of public health infrastructure and inadequate health personnel is a lethal alliance for potential further spread of MDR-TB. Exacerbating the matter is the reality that countries in this sub region are struggling to scale up diagnosis and appropriate treatment for MDR-TB (10,14).

History of TB drug resistance

The history of TB drug resistance dates back to 1950s when resistance to streptomycin was recognized (16,17). By the 1970s the availability of safer and efficacious medications against the disease remained a re-assurance to public health. Recently, however, reported resistance to multiple anti-tuberculosis drugs especially isoniazid and rifampicin have posed a new threat amidst lack of alternative drugs for first-line treatment (18,19).

MDR-TB and poverty: cause or effect

Poor health infrastructure and systems in SSA are

illustrative of the challenges that many developing countries face (20,21). Poverty remains an ill in the sub-continent in which many countries are emerging as post conflict economies. These situations have made many of these countries inadequately prepared for epidemics. When coupled with low levels of literacy, gender inequity and high burden of TB in the region; poverty exacerbates the spread of MDR-TB. Poor infrastructure including inferior road networks, rudimentary curative clinical services and inadequate public health responses to the new epidemic are all indicative of prevalent background poverty. Inadequate diagnostic and human resource capacity in the health systems remain hindrances to initial and sustainable interventions for the control of MDR-TB.

MDR-TB and HIV link

One cannot think of an emerging disease burden in Africa without thinking of HIV/AIDS. The sub-continent currently has two thirds of the global burden of HIV/AIDS (22), a scenario which is likely to fuel the impact of a pandemic MDR-TB. Already, evidence indicates that patients with HIV are more likely to develop MDR-TB (1,3,7). A paucity of data on interactions between antivirals for HIV/AIDS and antibiotic treatment for MDR-TB among African populations remains a challenge, making the already MDR-TB vulnerable HIV/AIDS patients at risk of potential drug interactions (6,23). The efficacy of BCG vaccine for TB in SSA has recently come into question and requires urgent re-evaluation.

Transmission

The majority of current infections are primary MDR-TB. There is potential that some cases are secondary MDR-TB. Case definitions of primary and secondary MDR-TB are difficult to make, but are required so as to improve identification of contact, at risk, probable and confirmed case categories. In addition, proper case definitions will enable appropriate case management and prevention efforts. Mapping of the epidemic across the region remains a public health challenge. Case recognition and confirmation are inadequate, and no accurate estimates of resources needed to tackle the problem have been made. The most socially and economically vulnerable populations especially children, women, elderly and inmates in prisons, remain at greater risk. However, the relative risk for MDR-TB among different populations, age strata, health status and geographical locations remains poorly described (2,5). The risk of transmission of MDR-TB infections may be similar to risk models described for other airborne infectious diseases. Evidence from some data on MDR-TB indicates that the risk of transmission of MDR-TB is dependent on poorly diagnosed and/or incorrectly treated TB in a patient (5), poor anti-TB drug adherence and inadequate dosing (1), background prevalence and the type of resistance (primary or possible secondarily acquired resistance) (5). Other risk facts include underlying HIV status of either the primary TB case or the exposed contact (1). It is also plausible that the frequency of contact with infectious aerosol is a risk factor. The early picture of MDR-TB in the SSA region is that of marked heterogeneity. This may be due to poor diagnostics, low index of suspicion by clinicians or background distribution of other predisposing factors. Like many previous epidemics, there is a potential of MDR-TB to diffuse widely in the community over a period of time. The duration and the lifespan of the epidemic will be dependent on availability of effective interventions and control measures.

Approaches to management of MDR-TB

There are few models of effective treatment of MDR-TB in areas with a high prevalence of HIV (3,7). The high costs for treatment of MDR-TB are prohibitive for poorer countries (24). Moreover, the region is also faced with a lack of research into effective and culturally acceptable strategies for prevention and treatment of this condition. Resources for such research have also not been adequately channeled into this culturally diverse region (25). Furthermore, the region has lost a large portion of its trained health personnel to wealthier countries, who have recruited them to manage their own shortfalls (26-31). These healthcare workers will be desperately needed as the MDR-TB epidemic diffuses through the subcontinent's vulnerable population already burdened with the four poverty related ills of malaria, tuberculosis, malnutrition and HIV/AIDS.

The recommended quinolone based therapy for MDR-TB includes antibiotics already widely used for other conditions. The long duration of MDR-TB regimen (32) may compromise patient compliance, which may be a risk for extensively drug-resistant TB (1). There are no effective national or regional guidelines in most parts of SSA restricting the available antibiotics for MDR-TB for exclusive use for this condition only (33). Lessons from HIV/AIDS treatment programmes may offer some insight

to potential management approaches, but first they need to be proven. The shortage of trained health workers for HIV treatment programmes was circumvented by allowing lower cadre health workers to diagnose HIV and prescribe antiretroviral therapy (34). These packages may not be easily replicated in treatment of MDR-TB because of the current complex diagnostic and treatment protocols involved. At the moment, specialized treatment centres with adequate capacity are recommended to handle MDR-TB. Another contrast is that in HIV/AIDS treatment, outpatient and home care have cut down on long in-hospital stays (35).

The front line clinicians in SSA have a huge challenge recognizing, diagnosing and successfully treating MDR-TB, resulting in delays in patient care.

Summary

Multidrug resistant TB has posed a public health problem with potential to reverse some of the health gains in the control of TB in the SSA. Joint national, regional and continental efforts are required to control this epidemic. Whereas the history of TB drug resistance has been on for about 5 decades that of MDR-TB is only in the recent times. However, this may be a precursor of an era of XDR-TB. Efforts to control this epidemic require control of HIV and more male involvement in the most affected regions.

Acknowledgments

We acknowledge Mbale Regional Referral Hospital and Busitema University.
Funding: None.

Footnote

Provenance and Peer Review: This article was a standard submission to the editorial office, *Journal of Public Health and Emergency*. The article did not undergo external peer review.

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at http://dx.doi.org/10.21037/jphe.2017.03.01). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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doi: 10.21037/jphe.2017.03.01
Cite this article as: Olupot-Olupot P, Namuyodi D, Obbo JS, Meadway J. Multidrug resistant tuberculosis (MDR-TB) in emerging economies in Sub-Saharan Africa: clinicians' public health concerns. J Public Health Emerg 2017;1:43.

