Tuberculosis and Healthcare Workers in Underresourced Settings

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In October 2015, the World Health Organization (WHO) reported that tuberculosis now ranks alongside human immunodeficiency virus (HIV) as the leading cause of death worldwide, with >1.5 million deaths and 9.6 million new active cases in 2014. The majority of these tuberculosis cases occur in the 22 high-burden countries, where the healthcare systems are often fragile and underresourced. It comes as no surprise that healthcare workers (HCWs) are disproportionately affected by contagious conditions such as Ebola virus disease, influenza virus, and tuberculosis. The emergence of multidrug-resistant (MDR) tuberculosis, which now accounts for 3.3% of new tuberculosis cases and 20% of repeat tuberculosis cases, and extremely drug-resistant tuberculosis, which accounts for 10% of MDR tuberculosis, also increases the risk to HCWs, especially in areas of high HIV seroprevalence. In this supplement, many of the risks, issues, and possible solutions to the ongoing problem of transmission of tuberculosis to the healthcare workforce are addressed.

Verkuijl et al [1] discuss the main pillars of the approach to tuberculosis infection control: managerial and administrative, environmental, and utilization of personal protective equipment (PPE). They present data that in underresourced settings, the initial step of a managerial plan, including policy setting, facility assessment, and annual planning, is only rarely implemented [2]. Likewise, administrative work practices such as triage, redeployment of HIV-infected staff to lower-risk settings, and practice guidelines for diagnoses, are equally rarely followed [3]. In surveys in sub-Saharan Africa, environmental controls that extend beyond using open ventilation, such as the implementation of ultraviolet germicidal irradiation, are generally not even acknowledged or known, much less practiced. Verkuijl et al further contend that there is an overemphasis on the role of PPE, despite the fact that it is intermittently used, not appropriately fit-tested, and frequently too expensive to be readily available. Encouragingly, they describe a test case program in Eastern Cape Province, South Africa, where all the pillars are implemented with little monetary infusion, but to a greater extent due to the will of management and staff.

Van Cutsem et al [4] point out the inadequacy of the worldwide DOTS (directly observed treatment, short-course) program to address the issue of MDR tuberculosis, with <20% of the 450 000 annual cases receiving treatment [5]. They highlight the fallacy that in high-burden countries, tuberculosis is contained and only occurs in tuberculosis clinics and wards. They point out studies in which HCWs in other areas are as vulnerable to tuberculosis risk as those who are confined to work in tuberculosis areas [6, 7]. The potential broadened use of a specific tool for infection control, the FAST approach (Find cases Actively, Separate safely, and Treat effectively) is emphasized, although difficult when <10% of the Mycobacterium tuberculosis isolates from hospitalized patients undergo drug sensitivity testing. The rapid rise in MDR tuberculosis [8], and the fact that MDR and XDR tuberculosis are rarely identified and thus appropriately treated, only compound the problem. One solution is decentralized care with universal precautions, rather than targeted ones, in high-incidence settings. They point out that the cost of MDR tuberculosis, at US$8300 per case in South Africa, or single case of XDR tuberculosis, which in the United States approaches US$500 000 per person [9], and which is massively impacting multiple countries’ healthcare budgets, justifies the cost of implementing such measures. As with the findings of other authors in this series, an overemphasis on PPE has led to complacency in addressing the issue more systematically.

One issue with many of the needed policies and procedures is the stigma associated with either tuberculosis, HIV, or both in the healthcare setting. Most everyone may agree on the need to address the issue, but woefully little work has been done to develop appropriate tools to measure stigma in order to study the impact of any given intervention. Wouters and colleagues begin to address this gap by examining stigma in the hospital setting that is both internalized and externalized [10]. The 7 quantitative
scales they develop address the relationship between internal and external stigma, and will be a useful starting point to examine the new tools and interventions that would decrease the risk of nosocomial transmission of tuberculosis to the HCW.

Tudor et al examine the risk factors for tuberculosis disease in HCWs over a 5-year period in KwaZulu-Natal, South Africa [11]. They point out that 11%–16% of the HCWs in South Africa are infected with HIV, and that HIV is the single greatest risk factor for tuberculosis in HCWs in this region. Contact in the tuberculosis ward in their setting is also a risk, and they emphasize the need to identify, help, and not stigmatize those who are living with HIV.

The WHO has acknowledged that the elimination of tuberculosis in general, and the associated risk to HCWs, cannot be achieved without the effective deployment of interventions that work as well as development of new tools, such as novel diagnostics and vaccines. In addition, a better understanding of latent infection is also urgently needed. Hatherill et al review the history of tuberculosis and vaccines in HCWs, and point out that most HCW infections are not acquired in the community [12]. They call attention to the data supporting the use of BCG vaccine in those who are BCG naive, not latent infected, and entering a high-risk setting, and note that many countries have adopted such a policy for their HCWs who provide care in high-risk environments [13]. The issue and potential role of re-vaccination in certain populations is also explored [14, 15]. The authors cover some of the issues concerning enrolling HCWs into clinical trials, and emphasize the extraordinarily high rates of new infection in naive HCWs such as residents or newly graduated nurses just entering the workforce.

These public health challenges also raise bioethical and legal issues. A timely article by Boulanger et al [16] provides an overview of some of the most important ethical considerations related to tuberculosis prevention from the perspective of HCWs: fairness in ensuring equal pay for community workers or family members who provide care in a nonprofessional setting; the concept of duty to serve and administer healthcare when one puts one’s life at risk; and the use of HCWs as subjects in clinical trials.

Last, von Delft et al [17] remind us that the issue of tuberculosis in HCWs is not about numbers, controls, policies, and finances, but about human beings who are our friends and coworkers. Individuals entering the field of healthcare are young, and often carry a sense of invincibility and an indifference to the threat of their surroundings. They work in a setting where there is a scarcity of trained HCWs, and where there is no financial compensation to students (vs employees) for occupational health and safety. The authors discuss the sense of stigma—even shame—and the inability to cope with the demands of treatment while continuing to work or train.

The world responded to the Ebola epidemic, which in the entire 2014–2015 outbreak killed as many people as die in 3 days from tuberculosis, with an infusion of funds estimated at US$4 billion. The United States responded to the crisis of MDR tuberculosis in New York City in the early 1990s with a similarly massive influx of funding, estimated to be nearly US$1 billion. A person dies every 21 seconds from tuberculosis, some of whom are frontline caregivers, DOTS supporters, and healthcare professionals. The end of the tuberculosis epidemic, as called for by the WHO, will require a proactive and urgent mobilization of resources, political will, and innovation, which must start with active protection of our health workforce.

Notes

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References