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Case series of the long-term psychosocial impact of drug-resistant tuberculosis in HIV-negative medical doctors

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SUMMARY

BACKGROUND: Health care workers (HCWs) are at greater risk for tuberculosis (TB), including multidrug-resistant TB (MDR-TB), compared to the general population. The psychosocial impact of nosocomial TB on HCWs has received little attention in the literature.

METHODS: A retrospective medical record review from 1999 to 2003 found 15 HCWs who were treated for drug-resistant TB at a specialist hospital in South Africa. Five human immunodeficiency virus (HIV) negative doctors with no predisposing factors for drug resistance are included in this case series. We collectively present their clinical case histories based on medical records from 2000 to 2005, and explore the long-term psychosocial impact of TB from interviews conducted in 2009.

RESULTS: Four doctors had primary MDR-TB and one had primary resistance to multiple first-line drugs. Time from symptom onset to commencement of effective treatment ranged from 8 to 39 weeks. Time for bacteriological confirmation of drug-resistant TB ranged from 6 to 24 weeks. All were cured within 3 years of initial presentation. Content analysis of follow-up interviews revealed five main themes: 1) prolonged morbidity, 2) psychological impact, 3) poor infection control, 4) weak support structures and 5) attrition from the field.

CONCLUSION: Themes emergent from this case series encourage prioritisation of TB infection control education and practice to minimise HCW morbidity and prevent HCW attrition from high-burden resource-constrained settings.

KEY WORDS: drug-resistant tuberculosis; health care workers; South Africa; infection control; psychosocial impact

TUBERCULOSIS (TB) rates have resurged, largely from escalating human immunodeficiency virus (HIV) infection and TB drug resistance. This is paralleled by increasing rates of TB, including multidrug-resistant TB (MDR-TB), among health care workers (HCWs).[1–5] While HIV significantly contributes to the development of TB in HCWs, nosocomial transmission remains the strongest risk factor for initial exposure to TB infection.[1,3,4,6–10] Between 1960 and 2005, the median prevalence of latent TB infection (LTBI) among HCWs in lower- and middle-income countries was reviewed to be 63%, while the median annual risk for active disease that could be attributed to health work was estimated as 5.8%.[3] In high-burden countries, studies show that hospital exposures are associated with TB in HCWs even after controlling for other risk factors, suggesting that transmission occurs primarily from patients.[6,8]

In South Africa, TB incidence rates between 1999 and 2004 increased from 1024 to 1640 per 100 000 HCWs, nearly double the rate in the general population. Three per cent of affected HCWs had MDR-TB.[5] In the national drug resistance survey, the overall proportion of MDR-TB was 1.8%–2.6% in new cases (primary MDR-TB) and 6.7% in retreatment cases.[11] The psychosocial impact of developing TB as a result of occupational exposure, particularly among immunocompetent HCWs, has been poorly documented despite their integral role in the health care system. Human resource constraints warrant further examination of this issue. We present the cases of five HIV-negative doctors in South Africa who were diagnosed with primary drug-resistant TB in 2000–2003 and followed up in 2009, to explore the psychosocial impact of their illness.

METHODS

In a retrospective medical record review from 1999 to 2003, 15 HCWs were managed for drug-resistant

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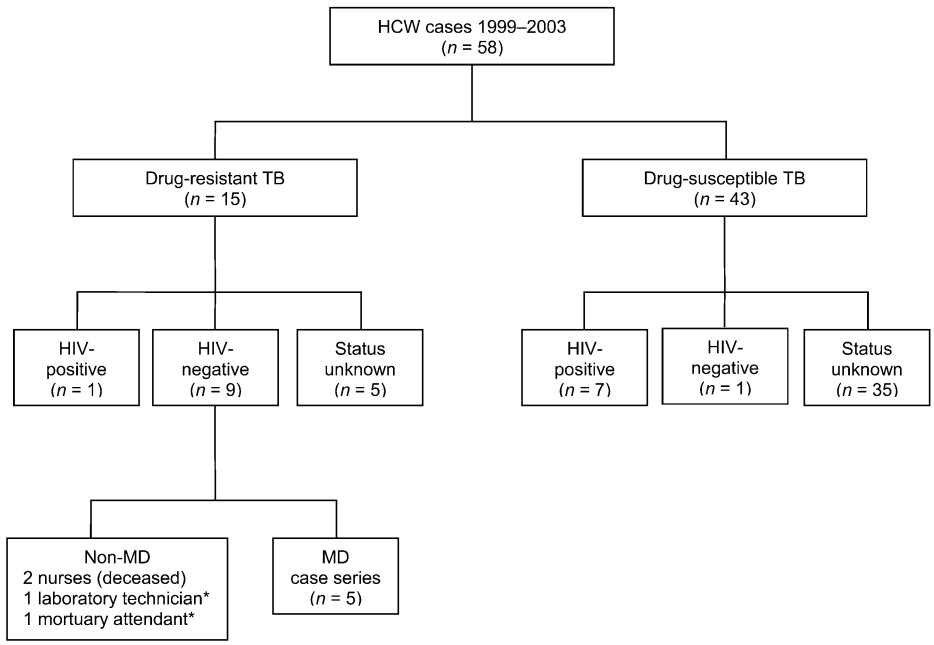

Figure Retrospective medical record review of HCW TB cases at a specialist hospital, South Africa, 1999–2003. *Minimal clinical contact with living infectious cases. HCW = health care worker; TB = tuberculosis; HIV = human immunodeficiency virus; MD = medical doctor.

TB at a specialist hospital. Five doctors who were HIV-negative with no previous history of TB are included in this case series (Figure). We initially describe their clinical case histories based on medical records from 2000 to 2005 ('disease') and thereafter explore the long-term psychosocial impact of illness based on interviews conducted in 2009 ('impact'). Findings are presented aggregately to protect participant identities.

Interviews were qualitative, semi-structured, 30–45 min long and conducted privately by a single interviewer. Interview domains focused on doctors' quality of life post-treatment, work environment and present-day expressions of their TB experience, state of health and well-being. Transcribed interviews were content-analysed with open and analytic coding by two independent researchers towards the collective development of major themes.[12,13]

All participants provided informed consent. The study was approved by the local ethics committee. (Details omitted to protect identities.)

RESULTS

Disease

One male and four female doctors were diagnosed with primary drug-resistant TB between 1999 and 2003 while meeting their professional licensing requirements in public health care facilities in South Africa. They included one medical student, one intern, two residents and one doctor completing a mandatory community service rotation. All were <30 years of age at the time of diagnosis. Four doctors met the classical case definition for MDR-TB, i.e., resistance to both isoniazid (INH) and rifampicin (RMP).[11] Their clinical case histories are summarised in the Table.

The doctors presented with a range of symptoms, including fever, malaise, night sweats, rigours, productive cough and lobar consolidation. Three doctors initiated on antibiotic treatment remained unresponsive 2–4 weeks later. Between 3 and 12 weeks after their initial case presentation, all doctors commenced empirical TB treatment while awaiting sputum, sphenoidal sinus or cerebrospinal fluid culture results. Bacteriological confirmation of drug-resistant TB took 6 to 24 weeks, by which time symptoms had severely worsened. One doctor developed headache, vomiting, neck stiffness and generalised seizure, followed by bilateral abducens nerve palsies and hydrocephalus, which mandated insertion of a ventriculoperitoneal shunt. Another doctor, who developed disturbed balance, diplopia, difficulty concentrating and was unable to stand, was eventually diagnosed with TB meningitis. Commencement of effective treatment for drug-resistant TB for the doctors ranged between 8 and 39 weeks after initial presentation. Following up with appropriate treatment was particularly problematic for one doctor who had relocated across provinces for recovery from what had been presumed to be a case of regular TB.

The doctors experienced numerous adverse drug effects during their course of treatment, including nausea, depression, anxiety, labile emotions, insomnia, pruritic rash, limb weakness, bowel and bladder incontinence, and some mandating invasive or chronic medical intervention. Two doctors underwent a

Table Clinical case histories of five HIV-negative doctors with primary drug-resistant tuberculosis

Case	Time from case presentation to commencement of effective treatment, wks	Time to bacteriological confirmation of drug-resistant TB, wks	Profile of drug resistance	Radiological findings	Final treatment regimen	Outcome	Current work environment
1	28	16	INH, RMP, EMB, SM (MDR-TB)	CT (lung): cavity in posterior segment of left upper lobe	AMK, PZA, OFX, CS and ETH	Lobectomy Cured Experiences pain and loss of hearing	Specialised, private sector; minimal contact with TB patients
2	15	12	INH, RMP, EMB (MDR-TB)	CXR: lobal infiltration and hilar lymphadenopathy MRI (brain): ischemic pontine and basal nuclei lesions CT (brain): hydrocephalus	AMK, PZA, OFX, ETH, clarithromycin, sodium valproate, dexamethoasone and prednisone	Cured Experiences pain, difficulty walking, loss of hearing and bladder control	Unable to work due to disability; no contact with TB patients
3	8	6	INH, EMB, RMP, SM (MDR-TB)	CXR: right upper lobe pneumonia	AMK, PZA, OFX, CS and ETH	Cured	Specialising; public sector; minimal contact with TB patients
4	39	24	INH, RMP, EMB, SM (MDR-TB)	CXR: right lower lobe pneumonia	AMK, PZA, CFX, terivalidine and ETH	Lobectomy Cured	Works at a specialised unit; public sector; minimal contact with TB patients
5	16	7	INH, EMB, SM	MRI (brain): multiple enhancing lesions in cerebellum, pons and occipital regions	AMK, PZA, CFX, CS, ETH, RMP and prednisone	Cured Experiences pain, loss of hearing and bladder/bowel control	Specialising; public sector, overseas; no contact with TB patients

HIV = human immunodeficiency virus; TB = tuberculosis; INH = isoniazid; RMP = rifampicin; EMB = ethambutol; SM = streptomycin; MDR-TB = multidrug-resistant TB; CT = computed tomography; AMK = amikacin; PZA = pyrazinamide; OFX = ofloxacin; CS = cycloserine; ETH = ethionamide; CXR = chest radiograph; MRI = magnetic resonance imaging; CFX = ciprofloxacin.

lobectomy. One doctor's persistent limb weakness and resolving sixth nerve palsies required long-term physical rehabilitation, and another received extensive psychological counselling for medication-related depression and anxiety. Another doctor's raised intracranial pressure necessitated rehabilitation and frequent cerebrospinal fluid taps. All doctors were cured after receiving 18 and 36 months of TB treatment.

Impact

Several years after treatment completion, four of the five doctors continue to experience adverse effects, ranging from hearing impairment to bilateral deafness from otosclerosis, tinnitus, anxiety with occasional panic attacks, short-term memory impairment, weakness and pain in the shoulder and limbs, back spasms, sensory neuropathy and persistent loss of bladder and bowel control. For some, the severity of hearing loss and limb weakness or pain has not abated over time.

Doctors with hearing loss tried to make use of hearing aids, but with limited success. Doctors experiencing impaired bladder or bowel control rigorously monitor their fluid intake and wear adult diaper pads to the point of routinely catheterising and taking chronic preventive treatment against urinary infections. They avoid being outside their homes or offices for prolonged periods of time and feel uncomfortable discussing what they perceive to be an embarrassing situation outside of their immediate family members. One doctor requires the use of a wheelchair and has been in continuous rehabilitation programmes since initiating treatment. Only one of the five doctors experiences no lasting complications, and was grateful to be 'one of the lucky ones', without permanent sequelae from drug-resistant TB.

Doctors described the personal and professional stresses of carrying on work after being diagnosed with drug-resistant TB. They all returned to complete medical licensing requirements such as residencies, internships or community service rotations between 8 and 24 months after initiating treatment. Several doctors experienced difficulty and awkwardness reintegrating into a teaching environment where their illness had been publicised, especially after having to battle with stubborn policies within academic divisions to resume postings mid-semester. Intensive treatment for MDR-TB may have impaired the doctors' professional judgment, as one doctor expressed having doubts around several clinical decisions made in the first few weeks of resuming work.

Most doctors described being poorly informed about their risks for TB when commencing medical practicums. 'No one warns you about the risk you may be exposing yourself to', said one doctor who received little support from the medical school during and after completing treatment. Several doctors

reported feeling 'angry' that they were poorly educated about nosocomial risks and the adverse effects of the surgical and medical treatments they endured for drug-resistant TB.

Doctors were all distressed about re-infection or relapse upon resuming work in public clinics and caring for patients commonly presenting with TB and HIV. They described feeling 'paranoid' when consulting a coughing or overtly ill patient, but all assumed that alternative training options were not viable at the time. They were sometimes offered face masks, but in most cases these were not easily accessible, secured by management and inaccessible after hours. One doctor obtained a supply of face masks through a respiratory specialist acquaintance. A few quickly realised that they were the only HCWs to employ personal protection measures and consequently felt marginalised from their co-workers and patients. Some expressed fighting between the urge to prioritise personal protection with the discomfort of specifically seeking out and wearing a cumbersome face mask. One doctor was upset by the contrasting mix of opinions around infection control that was espoused by other HCWs, who rarely wore face masks themselves: 'Once, [a co-worker] at work said to me, "but you didn't wear a mask?" . . . The hospital doesn't understand that the environment itself is such that you cannot protect yourself'. To date, each doctor describes aggressively treating the mildest of flu-like symptoms: '[TB] is always in the back of my mind', said one doctor.

One of the doctors, who has severe prolonged physical disability from MDR-TB and its treatment, has not worked since being diagnosed. This doctor would like to specialise further but is advised against any patient contact. The doctor contemplates pursuing a non-clinical specialty, but persistent pain and weakness in the limbs preclude a concerted effort. 'I'm trying to get on with my life, being stuck in this hole', the doctor stated.

Another doctor had already committed to specialising at the time of diagnosis, and completed residency while on treatment. All doctors believed that their own experience with drug-resistant TB clinched their decisions to leave general medicine as soon as possible. One doctor perceived that specialisation facilitated working in 'a relatively cleaner field, with no walk-ins', and proceeded to specialise in a field that promises minimal contact with infectious disease cases. One doctor found a niche within a practice that rarely serves patients presenting with undiagnosed infections. Although wanting to formally specialise and feeling 'stagnated' at not having done so, the doctor expressed a 'lingering fear' against attending to 'sick patients'. Finally, one doctor moved overseas soon after completing treatment to a work environment and specialty with almost no TB patient contact.

Emergent themes

Five major themes emergent from qualitative content analysis of the follow-up interviews and contextualised by clinical case histories are discussed below.

Prolonged morbidity

All doctors responded favourably once appropriate treatment was commenced, but not without lingering adverse effects. Several doctors continue to experience difficulty walking—a direct result of the infection. They also experience loss of bladder control, urinary infections and hearing impairment, which are irreversible treatment effects.[14,15] Rehabilitation programmes and physical aids offer some recourse, but pain, compromised mobility and hearing dictate their places of practice and general ability to work.

Psychological impact

The doctors experienced extensive psychological sequelae from TB, including depression, anxiety, resentment and paranoia. Some lost contact with groups during extended absences from the workplace; others avoided congregate settings for fear of relapse. Prolonged physical debilitation compounded their sense of bitterness and helplessness. The physical and emotional morbidity related to TB continues to impinge on their lifestyle several years after being cured.

Poor infection control

All doctors worked in poorly ventilated facilities, with overcrowded patient waiting areas and no specific strategy to mitigate airborne contagion. Although they had some awareness of nosocomial transmission, they felt insufficiently trained to implement infection control practices and counter exposure risks. Face masks were seldom available, and they had to be proactive and inventive to acquire personal supplies. Doctors expressed feeling ashamed and blamed for acquiring TB, as they were professionals who were expected to be fully aware of risk exposure yet ill-equipped to apply this knowledge to protect themselves.

Weak support structures

Doctors in training received varying support from their academic bases during recovery, despite having been assigned to high-risk settings by these same institutions over which the doctors had little choice. Some believed their medical backgrounds should have earned them greater support and compensation from the employer, in each case the State. They were disenchanted by the bureaucratic difficulties faced with resuming work after having become patients themselves.

Attrition from the field

Several doctors returned to care for TB patients, but such work was short-lived, and they opted to leave general medicine upon fulfilling their professional

obligations. All of these doctors currently practise in specialised fields, except for one who is unable to work. They each expressed concern about working with 'sick' or 'coughing' patients. They believe their personal experience with drug-resistant TB influenced their career trajectories in that they eventually selected a specialty or work environment (or lack thereof) that they perceived would afford minimal exposure to infectious diseases.

DISCUSSION

This case series explores how primary drug-resistant TB may have impacted the lives of five doctors in the early stages of their careers. The doctors had no predisposing factors for drug resistance. In the absence of DNA fingerprinting confirmation, nosocomial infection appears to be the most likely mechanism of transmission. MDR-TB drug toxicities and long-term morbidity have been documented in non-HIV-infected patients despite successful treatment completion.[16–18] The psychosocial aftermath of TB, particularly HCWs' emotional burden of illness, subsequent quality of life and return-to-work decisions, adds a critical perspective to the overall impact of the disease. Psychological support and professional counselling should be a routine part of conventional medical care for doctors with TB in high-risk settings.

Poor infection control within health care facilities may seriously compromise TB control strategies, particularly in high HIV prevalence settings. In this case series, bacteriological confirmation of drug-resistant TB took 6–24 weeks, and commencement of effective treatment from case presentation ranged from 8 to 39 weeks. During this time the doctors themselves may have contributed to an infectious pool of TB, further aggravating nosocomial transmission. Negative-pressure rooms, air filtering systems, isolation of TB suspects and confirmed cases are routinely applied in high-income countries.[19] However, they are generally unfeasible within resource-limited settings.[7,20] Where funds for sustainable engineering solutions are inaccessible, the onus to reduce transmission falls upon HCWs themselves, via improved personal protection measures or efficient TB case finding.[7,21,22] Commensurate administrative efforts such as staff education, disbursement of protective masks/respirators, rapid laboratory diagnoses and sustained drug supplies should be applied in cohesion to significantly reduce transmission.[7,20–25] Adherence to legislation for occupational safety is further mandated.

The risk for nosocomial TB is highest among young HCWs in high-burden countries, those in training or those most recently added to the workforce, as they tend to spend greater time with patients and are less aware of exposure risks compared to senior colleagues.[8,10,26–28] Even when aware of nosocomial risks, implementation of personal protection measures among HCWs is generally low.[1,29,30] Within middle- and low-income countries, TB transmission is also highest in general medicine wards.[1] In the light of the human resource constraints in these countries,[31] neglect of occupational safety among HCWs, followed by their disinclination to continue general clinical work in the public sector, is a critical loss to the state of the health workforce.

Study characteristics

Semi-structured interviews allowed for an in-depth understanding of participants' illness and return-to-work experiences. The long follow-up period highlighted how TB among HCWs may facilitate attrition from the field and deter a concerted effort to control the epidemic. Emergent themes may help enhance infection control education in medical curricula and practice, towards mitigating occupational risks. Larger studies are needed to quantify the psychosocial impact of disease and HCW retention rates.

CONCLUSION

Health care workers are not only at greater risk for acquiring TB, they also serve as potent vectors for TB transmission due to their greater contact with immunocompromised patients. This issue is stronger yet in the cases of MDR-TB and extensively drug-resistant TB and in high HIV prevalence areas. The public sector is already battling against the better salaries and work conditions offered to HCWs in better-resourced countries and the private sector.[31] There is a clinical and social imperative to prioritise infection control among HCWs, not only to reduce the risk of nosocomial transmission and prolonged morbidity, but also reduce the risk of the 'brain drain' in the health workforce.

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RÉSUMÉ

CONTEXTE : Le risque de tuberculose (TB), y compris celui de tuberculose à germes multirésistants (TB-MDR), est plus élevé chez les travailleurs des soins de santé (HCW) que dans la population générale. L'impact psychosocial de la TB nosocomiale sur les HCW n'a guère retenu l'attention dans la littérature.

MÉTHODES : Une revue rétrospective des dossiers médicaux entre 1999 et 2003 a trouvé que 15 HCW avaient été traités pour une TB résistante aux médicaments dans un hôpital spécialisé d'Afrique du Sud. Cette série de cas comporte cinq médecins séronégatifs pour le virus de l'immunodéficience humaine n'ayant pas de facteurs prédisposant à la résistance aux médicaments. Nous présentons de manière collective leur histoire clinique en nous référant aux dossiers médicaux de 2000 à 2005 et nous explorons l'impact psychosocial à long terme de la TB à partir d'interviews menées en 2009.

OBSERVATIONS : Chez quatre médecins, il s'agissait d'une TB-MDR primaire, tandis que chez un cette résistance primaire concernait de multiples médicaments de première ligne. La période séparant le début des symptômes et le début d'un traitement efficace a été de 8 à 39 semaines. La durée avant confirmation bactériologique d'une TB résistante aux médicaments a varié de 6 à 24 semaines. Tous ont été guéris dans les 3 ans après leur consultation initiale. L'analyse du contenu des interviews de suivi a révélé cinq thèmes : 1) prolongation de la morbidité, 2) impact psychosocial, 3) médiocre lutte

contre l'infection, 4) faiblesse des structures de soutien et 5) perte pour le terrain.
CONCLUSION : Les thèmes émergeant de cette série de cas plaident pour une priorité à donner à la lutte contre l'infection TB, à l'éducation et à la pratique pour minimiser la morbidité du personnel de santé et prévenir la perte de ce personnel dans des contextes à fardeau élevé et à ressources limitées.

RESUMEN

MARCO DE REFERENCIA: Los profesionales de la salud (HCW) presentan mayor riesgo de contraer la tuberculosis (TB) que la población general, incluida la tuberculosis multidrogorresistente (TB-MDR). En las publicaciones científicas, se ha prestado poca atención a la repercusión psicosocial de la TB nosocomial de los HCW.
MÉTODO: En un examen retrospectivo de los expedientes clínicos de 1999 al 2003 se encontraron 15 HCW tratados por TB farmacorresistente en un hospital de especialistas en Sudáfrica. En esta serie de casos, hubo cinco médicos con examen serológico negativo para el virus de la inmunodeficiencia humana y sin factores predisponentes a la resistencia a los medicamentos. En el presente artículo se presentan sus historias clínicas, a partir de los expedientes médicos del 2000 al 2005 y se analizan las repercusiones psicosociales de la TB a largo plazo, con base en entrevistas realizadas en el 2009.
RESULTADOS: Cuatro médicos presentaron TB-MDR primaria y uno presentó resistencia primaria a múltiples medicamentos antituberculosos de primera línea. El lapso entre la aparición de los síntomas y el comienzo del tratamiento eficaz fluctuó entre 8 y 39 semanas. El tiempo necesario para la confirmación bacteriológica de la TB farmacorresistente osciló entre 6 y 24 semanas. Todos los casos alcanzaron la curación en los 3 años que siguieron a la presentación inicial. El análisis del contenido de las entrevistas de seguimiento puso en evidencia cinco aspectos principales: 1) la morbilidad prolongada; 2) la repercusión psicológica; 3) la insuficiencia del control de las infecciones; 4) la deficiencia de las estructuras de apoyo; y 5) el abandono del trabajo en el terreno.
CONCLUSIÓN: Los temas que surgen a partir de esta serie de casos inducen a dar prioridad a la educación y las prácticas dirigidas al control de la infección tuberculosa, a fin de reducir al mínimo la morbilidad de los HCW y evitar la disminución del personal sanitario en los entornos con alta carga de morbilidad y recursos limitados.