

# Depression: a silent driver of the global tuberculosis epidemic

Depression is a common comorbid condition for patients with tuberculosis (TB) (1-3), and is associated with higher morbidity and mortality (4,5), antibiotic drug resistance (1,3,6), and community transmission. Depressed individuals with TB are less likely to seek care promptly, if at all, and once in treatment are significantly less likely to take medications consistently and/or completely (2,4,7). These treatment irregularities can lead to drug resistance, morbidity and mortality. Therefore, depression may be an unrecognized driver of the TB and multidrug resistant TB (MDR-TB) epidemics.

MDR-TB treatment is significantly more expensive, takes approximately four times as long to complete, and produces acute physical and psychiatric side effects, which makes treatment adherence and completion a considerable challenge. Since few low-income settings have the resources or capacity to deliver the specialized care that is required, ensuring prompt and complete TB management in all settings is critical to curb the global TB and emerging MDR-TB epidemics.

Using a two-stage snowball approach to reviewing the literature, first searching MEDLINE (1946-2013), PubMed (1966-2013), and PsycINFO (1806-2013) databases with key relevant search terms, then reviewing the references of those articles, we identified 31 studies from 11 countries that assessed depression prevalence among individuals with active TB. These included one low-income (Kenya), three lower-middle income (India, Nigeria, Pakistan), five upper-middle income (South Africa, Peru, Romania, Russia, Turkey), and two high-income countries (Greece, United States). The studies were of mixed methodological quality. A majority of them relied on brief screening instruments to identify probable cases of depression, seven used clinical diagnostic interviews, and two did not specify the method of assessment. Only two studies included a healthy comparison group. Sample sizes ranged from 30 to 691 (mean 158, median 100). Two-thirds were conducted among outpatient populations and the remaining among inpatients in hospitals.

The current prevalence of depression among individuals receiving treatment for TB ranged from 11.3% to 80.2%, with a mean weighted prevalence of 48.9% (95% CI 48.3%-49.6%). In the two studies that compared the prevalence of depression among TB outpatients to healthy controls, that prevalence was three to six times higher among the former. Though we expected to find consistent rates within or between countries of similar income levels, a great deal of variability was observed. The widest variation occurred within countries (India, Nigeria, Pakistan, Peru and Russia). However, in these cases, the weighted mean prevalence within countries revealed relatively nar-

row confidence intervals with a strong central tendency. There was little difference in rates between studies using structured diagnostic interviews versus brief screening instruments, and no single screening instrument produced higher or lower rates than any other used. The most commonly used brief screening tool, adopted in eight studies, was the Beck Depression Inventory.

Though available evidence is of mixed methodological quality, it suggests that the prevalence of depression among individuals with active TB may be equally high or higher than in people with other chronic medical conditions. However, more research is sorely needed to estimate the true community prevalence of depression among individuals with TB.

Treating comorbid depression has been associated with better TB outcomes, including medication adherence, treatment completion, and cure. A prospective controlled study in India found that TB patients who received individual psychotherapy during treatment were significantly more likely to adhere to and complete treatment and, thus, be cured of their disease (8). In rural Ethiopia, the organization of peer-led "TB clubs" increased clinic attendance and adherence, case detection, and community awareness about TB (9). In Peru, a psychosocial support group intervention was developed for MDR-TB patients which improved treatment adherence and completion, as well as social rehabilitation after treatment (1). Finally, antidepressants, in isolation or in conjunction with other therapies, have also been effectively used to treat depression among patients with TB (10).

Though TB disproportionately affects individuals in low-resource settings with few mental health specialists, a growing body of evidence suggests that non-specialist health workers can be trained to deliver basic mental health care, including case detection, symptom management and triage, and such strategies may be very useful and relevant in the context of TB.

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