



Mental health and neglected tropical diseases – the neglected dimension of burden: identifying the challenges and understanding the burden

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The relationship between mental health comorbidity and neglected tropical diseases (NTDs) has been highlighted over the last decade as a major component of the ill health of those affected by these diseases. The impact of mental illness is considered to be significantly underestimated in the calculations of the overall disability-adjusted life years (DALYs), in particular the years of life lived with disability (YLDs). This commentary raises questions on the overall DALY burden, taking account of anxiety, depression and stigma associated with NTDs, recommends that the economic losses incurred as a result of mental health conditions are assessed and highlights the potential impact on caregivers and their families. It recommends that mental healthcare is incorporated into NTDs programme planning and implementation. Research areas suggested as a priority are an estimation of the overall NTD burden of depressive and anxiety disorders, the impact of neuropsychiatric conditions consequent of some NTDs (such as epilepsy and pruritus from some skin NTDs) and an evaluation of the economic costs of mental ill health derived from NTDs causation.

Keywords: DALYs, Global Burden of Disease, mental health, neglected tropical diseases.

The 2019 Global Burden of Disease (GBD) analysis¹ provides a sobering estimate of the morbidity attributed to leading mental disorders, reporting the increased burden during a period of two decades with an increased proportion of global disability-adjusted life years (DALYs) attributed to such conditions as 125.3 million DALYs from 80.8 million in 1990. These figures, of which the largest element is the years of life lived with disability (YLDs), were estimates prior to the COVID-19 pandemic, which has had a huge impact on the prevalence of mental health conditions.² However, these figures are subject to debate among mental health professionals,³ with estimates that there are 418 million DALYs (16% of the total global burden of ill health), three-fold higher than conventional estimates using newer methodologies, reinforcing earlier published conclusions.⁴ These studies also highlight the economic losses associated with the burden of mental disorders in terms of personal loss of income (which itself might further exacerbate mental ill health), while at the macro-level national economies are adversely affected by reduced output and additional costs to health services. The most common disorders among all age groups remain depression and anxiety, which are the most reported disorders recorded in neglected tropical diseases (NTDs).^{5,6} In 2012, the comorbidity of mental conditions and NTDs—previously relatively neglected—

was highlighted,⁵ and over the past decade increased attention to mental health as a significant contributing element to NTD morbidity has been recognised, with the publication of ‘Mental Health and Neglected Tropical Diseases-Towards a person centred approach’ by the WHO and an extensive review citing >200 references addressing the mental health and stigma associated with NTDs.^{6,7}

This commentary highlights the significance of the mental health dimension of NTDs in terms of the underestimated burden, as reflected in DALY estimates and, in particular, the YLDs component of the DALY estimation.^{8–10} The following critical issues are identified:

1. To what extent are NTD mental health morbidity and premature mortality (the latter a small component) included in calculations and estimates of overall Global mental health burden? A search of the literature from GBD studies on mental disorders does not appear to specifically mention NTDs. A significant proportion of the population of low- and middle-income countries (LMICs) is affected by one or more NTDs. Some NTDs with long-term sequelae with a high global incidence/prevalence, such as cutaneous leishmaniasis (CL),⁹

leprosy¹⁰ and snakebite,¹¹ and with a known association with anxiety, depression and stigma, contribute significantly to the YLDs. Conservative calculations suggest that the mental health burden of CL contributes an eightfold increase to the DALY burden based on a conservative estimate of only 30 y of life expectancy following lesion acquisition.⁹

2. Can the NTD community coordinate and find resources to estimate the total burden of mental health impact caused by NTDs for research and advocacy purposes? There is extensive comorbid depression not appropriately attributed in GBD calculations, and acute infections, while treated and/or self-cured, can result in lifetime consequences not only for individuals, but also for families and communities. There is limited funding available for research to explore the true burden of mental illness, including neuropsychiatric disorders. To date, specific studies have been undertaken to evaluate this: lymphatic filariasis, leprosy, CL, podoconiosis, Human African Trypanosomiasis and Buruli Ulcer.^{8–14} The latter three conditions, however, do not constitute a large overall contribution to the global DALY figure for NTD mental illness, because of their relatively low incidence and prevalence. The disability weight (DW) figures for major depressive disorders range from 0.145 for mild and 0.396 for moderate to 0.658 for severe illness in comparison with the smaller DWs attributed to the above diseases themselves. Given the prevalence of individuals who report mental disorders for the above NTDs, it must be concluded that the overall DALY burden for stigmatising NTDs is significantly in excess of the currently calculated burden. When discussing the NTD burden from the GBD studies, de Vlas et al.¹⁵ state: ‘In particular, the choice not to include so-called subtle morbidities, such as impaired cognitive development due to STH and schistosomiasis, or poor mental health from stigma and discrimination due to the disfigurements caused by LF and leprosy, is considered an important omission by many’.
3. Can we calculate the economic losses associated with the intersection of NTDs and mental conditions? The economic value associated with mental disorders globally has been estimated to be around US\$5 trillion, with the losses in eastern sub-Saharan Africa being equivalent to 4% of the gross domestic product.³ There is an urgent need to quantify the costs of mental illness of NTDs to individuals, families and communities. Such costs can be attributed to an inability to work, hence reduced income, costs incurred by catastrophic health expenditure (often for inappropriate treatment) with resulting long-term debt, an inability to afford children’s education and an inability of caregivers to participate in productive income-generating activities, with resultant consequences for mental well-being.
4. What is the mental health (and economic) impact on those who act in a caregiving capacity (including on children and consequential educational prospects through loss of parental income)? This aspect of the burden was discussed in a foundational paper by Litt et al.⁵ as there was no apparent recognition of this dimension of mental health impact. Those with disabling NTDs require support for their daily lives and have a dependency on family, friends or community members. This has unexplored mental health implications.
5. Can national authorities, non-governmental development organisations and communities develop plans to incorporate

and implement the provision of mental health support to those affected by NTDs? NTDs are endemic in a diversity of biogeographies where even the most basic health provision is limited, thus challenging the attainment of Universal Health Coverage and the concept of ‘Leave No One Behind’. Essential actions recommended by the WHO⁶ include integration of mental health into Mass Drug Administration programmes, primary care and community-based activities, the inclusion of mental health care to improve health of individuals with chronic NTDs, ensure practicable culturally sensitive assessment methods for evaluation of the problem, develop capacity building to reduce discrimination and stigma, thereby changing behaviours and attitudes through peer group support by those living with NTDs and their mental health consequences. Mental health provision should be a core element in the thinking of those involved in all NTD programmes.⁶

Future issues for priority investigation

There are several priority topics that need to be addressed urgently. However, some specific research areas to address the burden of mental health should be progressed.

- The true burden of the mortality, but in particular the morbidity of snakebite envenoming, needs to be refined. There are between 421 000 and 1 841 000 envenoming events every year.¹¹ Snakebites cause serious disfigurement and disability due to tissue loss, amputations, blindness, contractures (tightening or shortening of a muscle or joint), arthrodeses (fusion of a joint), chronic infections and malignant ulcers. Typically, victims of snakebite can face social stigmatisation, with mental health issues as a result of these disabilities, which can be lifelong. Although limited literature regarding the mental health burden is available, snakebite sequelae are not dissimilar to other NTDs, and data suggest that levels of mental illness are similar.
- Neurocysticercosis (NCC) has been estimated as responsible for 30% of epilepsy in endemic countries and 13 million DALYs annually are attributed to epilepsy. Approaching 46 million people have epilepsy and annual mortality is estimated at 125 000, with 80% of these deaths in LMICs. Both the mortality and morbidity attributed to epilepsy-associated NCC need to be defined.¹⁶
- Onchocerciasis is traditionally associated with eye disease and the consequent visual impairments, often leading to irreversible blindness, while severe itching, epilepsy and nodding syndrome have recently been highlighted as a result of *Onchocerca* infection. The burden of these latter symptoms needs quantifying, together with the mental health consequences of visual impairment for this condition, for which, in severe cases, caregiver support is essential.¹⁷
- Pruritus (severe itching) has been underestimated as a cause of depression and is a common feature of scabies and onchocerciasis. The global prevalence of scabies is estimated to be >200 million and the debilitating consequences of this prevalent skin condition, as well as other pruritus-causing NTDs, needs quantification.¹⁸
- While not classified as an NTD infection, *Toxoplasma*, a zoonotic parasitic protozoan infection with a global distribution—30% of the global population is estimated to

be infected—has been identified as having significant effects on the rate of several mental health disorders, including psychoses.¹⁹

Conclusions

Over the last decade it has become apparent that many of those afflicted by NTDs have significant additional comorbidities as a consequence of the stigma and disabilities, which present in depressive illness, anxiety and an overall reduction in the quality of life. Given the prevalence of NTDs globally, with >1 billion people estimated to be infected, and the irreversible disability of many conditions, many individuals experience co-morbid mental illness. Several studies have shown a high prevalence of major depressive disorder in NTDs, which cause this additional disability, with patients enduring many years of life with mental illness. Studies on several NTDs show that the overall burden of diseases, as measured by the DALYs (particularly the YLDs), frequently exceeds the earlier estimated of NTD DALYs for individual diseases. In addition, mental illness also affects the family, increasing the burden on already impoverished families and communities because of the need for long-term care of those with NTD conditions. The role of and impact on caregivers are often ignored, given the consequences for reduced agricultural productivity and children's education, with consequent further economic impact among the poorest driving a cycle of depression and anxiety beyond the individual with an NTD. Mental health and well-being must be a major consideration as we move towards a world free from these diseases, which characterise the poverty cycle, if the aspirations of the Sustainable Development Goals for Universal Health Coverage and the WHO NTD RoadMap to 2030 are to be achieved.

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