Big data and meaning: methodological innovations

Commentary on: Charlson *et al*. (2015). Excess mortality from mental, neurological and substance use disorders in the Global Burden of Disease Study 2010. *Epidemiology and Psychiatric Sciences*, doi:10.1017/S2045796014000687

The Global Burden of Disease (GBD) project is visionary and ambitious. It has great potential to consider mental health care in the context of local realities in diverse regions of the world (Horton, 2012; GBD2010CountryCollaboration, 2013). In the poorest regions of the world, the quality of routine information systems and variation of case-recording, and changes in GBD weighting procedures make cross-national comparisons less credible (Whiteford & Baxter, 2013). Furthermore, concern is often expressed that we need to manage Big Data analyses with care, as these are always methodological and contextual issues that might be overlooked when attacking the global burden of any disease or adversity (Watts & Cairncross, 2012). One issue which has united the clinical, policy and research community is the need to prevent premature mortality of people with severe mental illness (Thornicroft, 2013). The stark and consistent findings of excessive 'years of life lost' due to mental illnesses are borne out by the experience of clinicians who, while working closely with their communities, are all too aware of local environments. Premature mortality in people with severe mental illness is, in part, explained by age, gender, ethnicity, health risk behaviours and poverty (Ribe *et al*., 2014). However, the absence of effective action to reduce this premature mortality is also a concern and seems to reflect lesser priority being given to the value of life among people with mental illness (Mitchell *et al*., 2009).

The findings from the GBD project are remarkable testament to the human endeavour to understand disease, tackle inequalities, and to find ways of finding intelligent solutions to complex health problems. Although welcomed, the early GBD 2010 data on mental illness seem to challenge the evidence of a higher mortality among people with mental illness (Whiteford *et al*., 2013). More recent analyses exercise some caution and better elaboration of the methodological limitations. Both are essential if Big Data are to be a useful tool in disease prevention and treatment, and policy development and commissioning (Whiteford *et al*., 2013). One of the key concerns is that coding to a single cause of death is neglectful of a substantial body of evidence that shows that the mind is not separate from the body, and co-morbidities are the norm rather than the exception. For examples, studies of 'fundamental causes' of mental illnesses (Cerda *et al*., 2014) and 'syndemics' (Weaver & Mendenhall, 2014) argue that vulnerable populations are victim of social, cultural and environmental risk factors that interact with individual dispositions leading to new onset illnesses, and that dealing with one might lead to the emergence of another, and that co-morbidities are actually usual; furthermore these studies show that physical and mental illnesses show much reverse causality (Osborn *et al*., 2007).

In this context, Charlson *et al*.'s paper (this issue) is exceptional in its commitment to deepen the collective knowledge about premature mortality in severe mental illness. The authors provide original analyses and methods that bring out the weaknesses of taking a 'single cause of mortality' model. The findings are startling. The general point about contrasting single-cause mortality and all-cause mortality is well made with different estimates of years of life lost from the two approaches, respectively: schizophrenia 20 000 *v*. 700 000; bipolar disorder 0 *v*. 1.3 million; depression 0 *v*. 2.2 million; intellectual disabilities 0 *v*. 900 000; alcohol use 110 000 *v*. 900 000; drug use 44 000 *v*. 700 000; dementia 500 000 *v*. 2.1 million. The differences appear less dramatic and worrisome for neurological disorders including epilepsy. For some disorders (bipolar disorders, major depression, autism and intellectual disabilities) there are no cause specific mortality data, but 4.5 million excess deaths due to all

Address for correspondence: K. Bhui, Professor of Cultural Psychiatry & Epidemiology, Queen Mary University of London; Hon. Consultant Psychiatrist, East London Foundation Trust, London, UK.

(Email: k.s.bhui@qmul.ac.uk)

causes! If cause-specific mortality is recognised as the only method to drive policy, commissioning and practice, it will seriously underestimate and mislead. The data also show specific excess deaths due to suicide among those with mental disorders, and due to ischaemic heart disease among those with major depression. And there are instructive lessons for those working in global mental health initiatives: dementia and opioid use are a key risk factor in high-income countries; epilepsy and alcohol use are especially important in Africa, and central Europea, central Asia and Latin America, respectively. Men's excess mortality exceeds that of women generally, but markedly so in Central/East Europe, Central Asian and Latin America.

So the question arises whether these geographical regions with contrasting risks have political, social and health care economies that are addressing this excess mortality or whether these economies are in fact driving the trends. Clearly interventions will need to be culturally adapted and implementation will require proportionate local systems of care, commissioning and policy. The priority we need to give to premature mortality among those with mental illness is not in doubt, but the methods to reduce mortality are often disputed. Smoking cessation and managing alcohol use are clearly important (Ferrari *et al.*, 2014; Ruther *et al.*, 2014), and preventive approaches in the population have a substantial evidence base (Campion *et al.*, 2012). Charlson *et al.*'s new analysis redress the shortfalls of GBD methods using single cause of death models, but they also reveal the substantial problems of excess life lost among people with some mental disorders, which had not previously been the subject of any global prioritisation.

K. S. Bhui

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