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Web of causation and its implications for epidemiological research

Antonio Ventriglio[1,2], Antonello Bellomo[2,3] and Dinesh Bhugra[4,5]

Modern medicine and psychiatry deal with the aetiological factors and determinants of illness including mental illness. Unlike physical illness where infections, traumas and other agents play a major role in causing illness, factors producing mental distress or illness may often be multiple and complex. Theoretically, biopsychosocial models are employed to understand aetiological factors in mental illness and also the same domains are used to deliver interventions.

A major step in understanding causative factors may be using a large number of cases to identify and determine commonalities and differences so that key influences can be identified. A major method of doing this is by large-scale epidemiological studies. For decades, epidemiological studies have been used to collect both longitudinal and cross-sectional data. Longitudinal studies are better equipped to allow researchers to study the causative factors and impact, whereas cross-sectional studies can only inform associations. Epidemiological studies enable researchers and clinicians to understand causative factors as well as longitudinal outcomes.

Social epidemiology: The field of epidemiology, which is the informational (but also potentially transformational) engine of public health programmes as well as clinical medicine, aims to identify causes, distributions and effective interventions to study outcomes and impairments of individuals (Venkatapuram, 2011, p. 32). The impact of epidemiological studies is massive in creating our understanding of illness at a number of levels. Epidemiological studies can enable us to identify trends and links between cause and effect. The causative factors are interlinked and multiple as well as complex. The social epidemiology or social determinants approach questions the fundamental assumptions of medical models, which examine only discrete, proximate exposures and short causal chains which often are not clear (Good, 1994). Social epidemiology is attempting to break the constraints of individual model based on biomedical approaches (Venkatapuram, 2011, p. 80). Links between medical science and social science and health inequalities are critical in our understanding of the whole system health.

Web of causation: MacMahon, Pugh, and Ipsen (1960) and Susser (1973) argued that a linear causal chain of multiple factors does not take into account complex precursors to each component of the chain, and these may well overlap and may have further complex interactions (Venkatapuram, 2011, p. 82). Venkatapuram goes on to remind us that these authors exchanged the old notions of single agent or social chain of events causing disease for a more metaphorical 'Web of Causation'. This web of causation explores multiple causative factors, giving each an equal prominence in identifying determinants and relevant interventions. It has been suggested that in this web, perhaps the most significant determinant may well be the most proximate one (Krieger, 1994; MacMahon et al., 1960). The web of causation offers a useful way forward in understanding aetiology and linking social determinants and social factors and biomedical aetiological factors.

The web of causation emphasises proximate determinants of disease amenable to intervention through individual level health care but taking into account larger social networks (see Venkatapuram, 2011, pp. 80–85). Individual interventions can be employed at individual technical levels, whereas supra-individual factors can be at higher or second level intervening at population level health. The general exclusion of social factors from the scope of epidemiology reflected a political reality in certain parts of the world, such as the United States, where individuals were seen and held as being responsible for their own health and ill-health. In other countries, such as the United Kingdom, the role of social inequalities in development and maintenance of ill health was seen as critical and worth further study. Social inequalities influence the genesis and perpetuation of certain disorders, and social determinants do affect genetic endowments, which in turn will influence other determinants, thus setting up a vicious or virtuous cycle, depending upon the outcome. The recent development of syndemics in epidemiology reflects cultural variations in our understanding of the causative factors (Singer & Clair, 2003).

[1]Department of Mental Health, Regione Marche, ASUR, Jesi (AN), Italy
[2]Department of Clinical and Experimental Medicine, University of Foggia, Foggia, Italy
[3]Department of Mental Health, ASL Foggia, Foggia, Italy
[4]Institute of Psychiatry, Psychology & Neuroscience, King's College London, London, UK
[5]World Psychiatric Association, Geneva, Switzerland

Corresponding author:
Antonio Ventriglio, Department of Clinical and Experimental Medicine, University of Foggia, via G. Marconi, 3 – 71041 Carapelle, Foggia, Italy.
Email: a.ventriglio@libero.it

Future impact: Although neurosciences have been rapidly increasing the amount of knowledge regarding the biological mechanisms, genetics, neurophysiology and epigenetics of major psychiatric disorders, social research will greatly contribute to combine clinical, biological, aetiological and phenomenological data available in a complex model for mental illness. In addition, social psychiatry and human sciences will deal with inequities among the psychiatric population, as human rights violations, and newer trained psychiatrists will add a social justice approach to all their activities. Also, the combination of neurobiological and social research will promote a new concept of recovery including resilience, social inclusion and will diminish stigma among mentally ill patients. Multiple pathologies be they caused by biological or social vulnerabilities can be studied using the concepts called syndemics, which is a major advance in our understanding of the bio-cultural or bio-social models. Syndemics has been defined as the presence and interaction of two or more epidemics interacting synergistically (Baer et al., 2003; Singer & Clair, 2003) as a new term in understanding public health. This synergistic contribution can lead to an increased burden of disease within a given population (Frumkin, 2002; Homer & Milstein, 2002, cited in Singer & Clair, 2003). Co-affliction of two or more conditions will cause biological interactions and consequences and social factors similarly will produce co-existing afflictions.

Singer (1998, 1999, 2001) has created a critical biocultural approach to identify and understand the determinant interconnections among health problems. These can be applied to individuals, community or society as a whole in understanding the concepts of both disease and illness in the context of political, social and economic factors. Singer and Clair (2003) argue that the relationship between social conditions and diseases can produce excess morbidity. Thus, it becomes important that the web of causation should be studied as it may also allow us to explore interactions between more than one psychiatric condition as well as between physical and mental health.

Conclusion

Epidemiological methods leading to better understanding of aetiological factors and subsequent interventions have come a long way in the past few decades. However, the impact on social justice and health justice still needs to be addressed and explored. The potential for exploring such multi-faceted complex factors is enormous in our understanding of causation of mental distress and mental illness. These approaches will also provide a way forward for exploring and implementing suitable preventive as well as health promotional strategies. Clinicians and researchers need to work together to explore these complex factors.

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