Can an ecosystem approach to health promotion succeed where reductionism fails?

The current reductionist approach to the Western biomedical health model fails to address the complex multi-factorial environmental, socio-cultural and lifestyle behavioural determinants of non-communicable diseases (NCDs). Here, Wayne Lawrence, Beemnet Neway, Gifty Addae, Jeremy Lanford, Olivia Orta, Michelle Williams and Lee Stoner, from the Multidisciplinary International Research Training Program, Department of Epidemiology, Harvard School of Public Health, Boston, Massachusetts; Wellington Regional Hospital, Wellington, New Zealand; and the School of Sport and Exercise, Massey University, Wellington, New Zealand, argue that application of an ecosystem approach to health care will aid in shifting the focus from treatment to the prevention of chronic diseases and thus reverse the rising global incidence of NCDs.

INTRODUCTION

Reductionism pervades the current Western biomedical health model, whereby complex biological or medical phenomena are deconstructed into many parts in an attempt to focus on a singular dominant factor or root cause of disease.1,2 While this approach has enabled greater understanding of some diseases, it fails to take into account the multi-factorial determinants of complex chronic disorders and co-morbid conditions. For example, it is now well-understood that chronic non-communicable diseases (NCDs) result from a complex interplay of environmental, socio-cultural and lifestyle behavioural factors. However, the current Western biomedical health model pays limited attention to tackling the multi-factorial root causes of NCDs and instead focuses finite resources on treating the symptoms. For example, within the United States, the cost of ‘treating’ NCDs is outpacing the growth of gross domestic product next four decades.3,4 The status quo is not sustainable; something has to change.

Arguably, to tackle complex NCDs, the focus needs to shift from the individual disease to the whole system (i.e. the individual). For this to occur, a ‘common currency’ would have to be determined, whereby a mutual goal encapsulates all individual parts. Such an approach has been advocated in the environmental sciences, whereby it has been argued that an ecosystem is best managed by recognising the interconnectivity and balance between ecosystem services to produce a net benefit for the entire ecosystem.4 Using NCDs as an exemplar, this commentary will discuss the limitations of the reductionist approach as it is applied to public health, and we will discuss the potential benefits of an alternative approach – the ecosystems approach.

LIMITATIONS TO REDUCTIONISM

Reductionism is essentially a divide-and-conquer approach, whereby a given medical specialist reduces ‘poor health’ to a single root cause, resulting in the treatment of symptoms for a given disease, not the complete health and wellbeing of the individual.2 An example is seen in the treatment of breast cancer, in which oncologists treat the disease in accordance with the dictates of their specialty, sometimes at the risk of ignoring other co-morbid conditions or secondary complications resulting from therapy. For example, chemotherapy treatment may lead to secondary complications such as kidney disease and cardiovascular diseases (CVD).5,6 In fact, among breast cancer survivors, mortality due to CVD is now more common than breast cancer-related death.7 Currently, while cardiovascular function is monitored in those undergoing trastuzumab (Herceptin) treatment or at high risk of CVD while on anthracycline therapies, it is generally not routine practice for the oncologist to communicate with the cardiologist when determining treatment.7 Likewise, it is not routine practice for the oncologist to communicate with primary care physicians or other parties involved in the general health and wellbeing of the patient. As a result, ‘treatment’ of one condition may exacerbate a secondary complication and ultimately diminish the overall health and wellbeing of the patient.

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health and medicine. Physicians tend to measure what they can medicate and medicate what they can measure. This system of measurements and tests leads to the physician and patient believing that the disease has been ‘cured’ or managed, although the root cause(s) may remain. A prime example is in the ‘treatment’ of atherosclerosis: hypertension is treated using angiotensin-converting-enzyme (ACE) inhibitors or beta blockers, and the outcome is determined using blood pressures; hyperlipidaemia is assessed by measuring blood lipids and treated using statins; and diabetes is assessed using blood glucose levels and treated with oral hypoglycaemics or insulin. However, there is clear evidence that the root cause of atherosclerosis is lifestyle deficiency of beta blockers or statins in the body. Reducing the disease to components that can be treated with medications leads to minimal or non-existent discussion about the importance of lifestyle changes, leaving the patient at continued risk for future health-related events.

**ECOSYSTEM APPROACH**

Biomedical and public health scientists and practitioners can garner important lessons from studying natural ecosystems, which function optimally when all parts of the system are healthy. Extending this to a management model, it has been argued that preservation of biodiversity should be a key indicator of success for natural ecosystems. Biodiversity is dependent on the interconnectivity and balance between services within an ecosystem and may be used as a common currency to unite the various managers, stakeholders and policy-makers. Extending this model to biomedicine, the key indicator, or common currency, would be health and wellbeing. Using health and wellbeing as a common currency will encourage the various health services to work towards a mutual goal, ultimately to benefit the whole system, that is, individual person(s) rather than individual disease(s).

**EXAMPLES OF AN ECOSYSTEM APPROACH TO HEALTH**

There are contemporary examples of indigenous communities employing a form of health care which could be considered an ecosystem approach – this is perhaps unsurprising when considering that these cultures place special significance between people and the natural world. Indigenous-led examples include the Gurriny Yealamucka Health Service and the Apunipima Cape York Health Council, both situated in Queensland, Australia. These community-led health services incorporate the indigenous health model, which comprised physical, environmental, family and spiritual components. For these communities, providing primary health care is only one component of their model; in addition, they take several measures to support the wellbeing of their community members by ensuring that connection to land and ancestry, as well as the bonds within family and community, is protected. The implementation of community-centred health care has been crucial to improving the health gap which exists between indigenous Australians and non-indigenous Australians. For instance, the implementation of the Apunipima Cape York Health Council has led to increased access to healthcare services, including maternal and child health care, and the serviced communities are outperforming the national key performance indicators. For example, 73% of mothers in the Apunipima communities attend their first prenatal visit before 13 weeks, while only 38% of mothers do nationally. While these communities are still burdened by poor health outcomes, the focus on health and wellbeing as a common currency has thus far proved effective.

There are non-indigenous examples which hold promise. For example, Healthy Together Victoria, in Australia, and Healthy Families New Zealand are variants of an ecosystem approach, utilising a ‘complex system’ model to tailor health services towards focusing on the overall health of the community. These initiatives are meeting the health needs of their communities by adopting a common currency unique to their culture, lifestyle and disease burden. Across Victoria, Healthy Together communities are implementing custom programs designed to promote healthy living in early childhood services, schools and workplaces. Modelled after Healthy Together Victoria, Healthy Families New Zealand promises to target underserved populations, particularly Maori and Pacific Islanders who are disproportionately burdened by NCDs. The community health approach resonates with Maori culture, which structures health around spiritual, mental, family and physical wellbeing.

**CONCLUSION**

The current reductionist approach is limited in addressing diseases, particularly NCDs, which are influenced and possibly caused by an interplay of socio-cultural, environmental and lifestyle behaviour factors. An ecosystem approach will aid in shifting the focus from treatment to prevention of chronic diseases and may assist in reducing the rising global incidence of NCDs by centring health and wellbeing as the common currency.

**References**

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