

Editorial

Self-monitoring networks for personal and societal health: Dietary patterns, activities, blood pressure and Covid-19

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The contributors to and consequences of disordered health are increasingly complex with sociodemographic, ecological, economic and food system change. But there are opportunities for any adversity to be mitigated by advances in the understanding of human, especially nutritional, ecobiology and in its more accessible and affordable evaluation and monitoring. Viral pandemics are on the rise with climate change and loss of ecosystems. They threaten human civilisation and planetary habitability. Human security is dependent on sustainable livelihoods of which food and water systems are a vital part. We are socioecological beings and depend for our health on biodiversity and the food diversity that ensures; and on connectedness and communication, made more difficult in pandemics. Rapid and accessible point-of-care (POC) tools are now becoming available to compliment other self-monitoring network approaches, whether checklist or questionnaire, physical, chemical, or biological, for healthcare and nutritional health. They can provide information as several complimentary and interdependent health indices to facilitate personal, group and community action and management plans. This applies to indices of both communicable and non-communicable disease which problems separately and together are compromising health prospects. These indices include ones of physical and mental activities, dietary patterns, metabolites, blood pressure and now the presence and severity of viruses like Covid-19. Of imminent relevance and promise are optically-readable biosensor based strips for nasal, pharyngeal or salivary samples to check viral presence or finger prick blood for immunoglobulins and interleukins. These should allow less socially prohibitive measures to curb viral transmission and promote personal and societal wellbeing.

Key Words: POC (point-of-care), socioecological beings, food security, ecosystem health disorders (EHD), telehealth, spike protein rapid test

SELF-MONITORING HEALTH

Self-monitoring of health indices has an established, if not uniformly effective, place in public health and clinical practice. It is most familiar in the promotion of wellness,¹ measurement of body temperature, heart rate²⁻⁴ physical sensations like nasal stuffiness, pulse oximetry,⁵ the dietary and exercise prevention of eating and body compositional disorders,^{6,7} hypertension,⁸⁻¹⁰ diabetes^{11,12} and hyperlipidaemia.⁷ These initiatives have been progressively re-positioned according to effectiveness in risk factor mitigation, but less so insofar as health outcomes of morbidity and mortality. This is partly because the outcomes have most often been those of so-called chronic disease such as cardiovascular and cerebrovascular disease, cancer, or neurodegenerative disease with medium to long times to realisation. But they are enhanceable strategies, particularly through improved learning capability,^{13,14} feedback loops through support groups and with the advent of telemedicine.^{1,12,15} Problems with extraneous influences on the interpretation and application of the items monitored can be minimised by prior and continuing education, supervision, networking, complimentary meas-

urements for continuing validation and evaluation.¹⁶ That self-monitoring and technology would become mutualistic and merge not only in health policy at large, but especially in food and nutrition has been long foreshadowed.^{17,18} What has been less in mind has been the fallacious segregation of so-called non-communicable from communicable disease.¹⁹ These are inextricably linked as keenly evidenced by the differential susceptibilities to the Covid-19 pandemic according to the presence of obesity, diabetes and cardiovascular disease.²⁰⁻²³ Insofar as BP monitoring is concerned, Covid-19 accesses the cell via an angiotensin converting enzyme (ACE2), part of the renin-angiotensin system involved in the pathogenesis and pharmacotherapy of hypertension. The man-

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agement of Covid-19 requires attention to BP and this pathway.²⁴⁻²⁶ There is considerable correspondence between the nutritional management of hypertension which is likely to favour innate immunity so reducing the risk and severity of coronavirus in the most vulnerable like the aged.²⁷ Furthermore, in the absence and uncertainty of effective, safe, and lasting vaccination, the degree of innate immunity and its dependence on general health and nutrition is of considerable moment.²⁸

Whereas self-monitoring practices have generally been private or between oneself and a health advisor, the interconnectedness of health profiles encourages a more networked future for them to protect and gain the support of others. Hence 'self-monitoring networks'.

MANAGING ECOLOGICAL DYSFUNCTION

We are now faced with an uncommon and pressing degree of uncertainty and demand for synchrony between health, food, economic and ecological systems. If we are to do so rationally, scientifically, and ethically, we need shared objectives, language, values, and indicators. The urgencies that this pandemic and ones increasingly likely present may not allow sufficient reflection of how we have got to where we are.²⁹ We are nearing the tipping point of ecosystem loss and resilience, most tellingly with deforestation and loss of viral habitats and their skip from their ancient animal hosts to us.³⁰ This also represents a diminution of food security insofar as it is environmentally-dependent, a loss of the value of nature and public access to it for health and recreation, and even who we are as ecological beings.³¹⁻³³ Crowding and viral aerosol-laden air, unlike a walk in the forest, is part of the pandemic risk profile.³⁴⁻³⁶ Thus, in coming to self-monitoring, we need to be mindful of its contextual and multisystem dimensions. In doing so, we are more likely to be advantaged by the indicators we generate and what we could do about them, like personal hygiene, crowd avoidance, wearing masks and building our innate immunity through a biodiverse diet, physical and social activity as best we can, and regular sleep.²⁸ Self-monitoring networks can contribute to the risk mitigation that we must now finesse more conscientiously and with greater complexity than perhaps ever.^{29,37-39}

THE COMMONS, LIVELIHOODS, FOOD SECURITY AND INFECTION CONTROL

Human security depends on personal safety, mutual respect, healthful and sustainable environments, livelihoods, and dependable social networks. We are socioecological beings. Elinor Ostrom in her Nobel prize winning work showed that we live most successfully when we *agree on the things that we must hold in common*, principally to do with nature and livelihood requisites.⁴⁰ *Livelihoods* comprise principally shelter, clothing, food and water, energy for heating and cooking, education, healthcare, forms of communication and transport, and sanctions if any of these are compromised. Employment and unemployment need not feature if means to achieve a livelihood are in place. In times of pandemic or other forms of disaster, sustainable livelihood maintenance in support of overall security remains *the community benchmark*. Wahlqvist has recommended that we formulate and measure our welfare by a system of Livelihood Units (LU)

rather than monetise it.^{32,41} There can be little prospect of long-term health favourable outcome personally or socially unless we approach such a benchmark.

PANDEMIC COVID-19 SELF-MONITORING NETWORKS

How then do we maintain sustainable livelihoods in the face of a pandemic when each of their elements is threatened? It first requires us to be clear about what we need rather than what we want and to understand *what we need to have in common*. The economist Robert Skidelsky and his philosopher son Edward Skidelsky provide guidelines for making these decisions rationally and ethically in their treatise 'How much is enough?'⁴² It then requires us to be *sufficiently socially and physically active* enough to maintain our networks, especially with family and community, to generate livelihoods, and to be in mental and physical health. At present, much of the world is dysfunctional because we are rightly putting physical health first, but eroding other livelihood domains.

Whether we practice the basics of scrupulous hygiene, physically distance and wear masks is documentable³⁵ and complimented by measures of temperature, pulse and oximetry as required³⁵ Promise for greater mobility comes if we can personally and collectively know when we are infected, whether our carers are safe, and whether we can avoid transmission to one another without us all needing to be isolated from each other.^{16,43-47} That means *being able to monitor ourselves for covid-19* positivity and know that those we visit, play, study or work with are also not positive. That is now technically possible with several developments which allow *point-of-care (POC) assessment* rapidly and in real time. Not only that, Drs Yung-Chih Wang, Chao-Min Cheng and colleagues in Taiwan have developed *2 rapid test strips*, one which detects the virus itself (spike protein) in body secretions (nasal, throat, saliva) and a second for the combination of antibodies (IgM and IgG) and inflammatory activity (IL-6, interleukin 6), readable in a convenient optical analyser.⁴⁸ The information is communicable by hand phone to any person who needs to know. The second strip would only be needed if the first were positive and could be used to alert the person's healthcare provider to consider whether and where medical attention is required. Present indications are that this system will be affordable and available in healthcare systems, particularly where there is universal health care as exists in Taiwan and elsewhere. This development encourages plans and prospects to add to personal security and re-enable societal wellbeing. Other POC platforms in development have the capacity to be adapted quickly for a range of possible viral pandemics which are becoming more likely.⁴⁹

CONCLUSIONS

Viral pandemics are on the rise with climate change and loss of ecosystems. They threaten human civilisation and planetary habitability. Human security is dependent on sustainable livelihoods of which food and water systems are a vital part. We are socioecological beings and depend for our health on biodiversity and the food diversity which that ensures; and on connectedness and communication, made more difficult in pandemics. Rapid and ac-

cessible POC (point-of-care) tools are now becoming available to compliment other self-monitoring network approaches to healthcare. These should allow less socially prohibitive measures to curb viral transmission and promote personal and societal wellbeing. The global shift in health patterns and the need to rapidly assess and manage multisystem disorder of pandemic scale will benefit from the integration of self-monitored questionnaire (eg cognition, mood, diet), physical (eg temperature, pulse oximetry, anthropometry), chemical (analytes like glucose, HbA_{1c}, lipids) and biological (eg immune function, microbiomes such as the virome). Self-monitoring will be most effective if it is networked between relevant users and family, community, and service providers (eg by sector, health care, educational venue, workplace, travel itinerary). The advent of the coronavirus pandemic underscores this imperative and will enable such monitoring to be health and socioeconomically transformative.

AUTHOR DISCLOSURES

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