

From The Editor's Desk

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Green psychiatry: natural environments, developmental trauma and anxiety

Green space is an important element of public health systems and appears to have a positive influence on mental health, reducing levels of depression and anxiety.^{1–3} Accessible and good-quality green space helps to tackle social and cultural inequalities with consequent benefits for health.^{4,5} Emotional vulnerability may confer a greater vulnerability to the harmful health effects of pollution.⁶ Air pollution is linked to more demand for treatment of psychiatric illnesses. The evidence of green-space benefits for well-being and physical illnesses (such as asthma and hypertension) is limited and inconsistent, and if there is an effect it is likely to be moderated by age, gender, and realistic opportunities and time to use green space.^{7–11}

The mechanisms are theorised, and seemingly involve a shift in attention, promoting curiosity and interest, access to social networks, group cooperation and physical activity.^{3,6} The Parliamentary Office of Science and Technology concludes green space is associated with better mental health and that the design and maintenance of green space is an important determinant of health, mediated by physical activity, and improved health is associated with less financial and social cost and reduced cardiovascular mortality.¹² A World Health Organization report on green space recommends better metrics of exposure and that the numerous public health benefits emerge through diverse pathways such as psychological relaxation and stress reduction, enhanced physical activity and mitigation of harmful effects of air pollution, excessive heat and noise, as well as other harms in the urban environment.¹³

Even urban green space has health benefits, especially for economically deprived communities, children, pregnant women and senior citizens. There are, however, few controlled studies, not least because of the complexity of and inconsistencies in what might be called a green environment. Stigsdotter *et al* (pp. 404–411) report on a trial of nature-based therapy and cognitive-behavioural therapy for patients with stress-related illnesses; they show greater global well-being and less burnout over a year (see the editorial by Coventry, pp. 396–397). The nature-based therapy consisted of therapeutic conversations, individual and group physical and mental awareness exercises, and meaningful tasks chosen by the individual, such as gardening activities alongside mindful awareness. Reflection, relaxation and homework tasks reinforce the other elements. Isolating which components are active or the most powerful is challenging. The effects may even be stronger for blue space, raising questions about whether a natural or a health-affording space is more powerful or needed at all in urban settings.²

Trial designs are challenging for complex interventions but also where there is marked heterogeneity in the phenotype or when faced with comorbidities and treatment-resistant illnesses. *n* = 1 trials may have a role to play in such circumstances. Marwick *et al* (pp. 398–403) systematically review the methods of *n* = 1 trials for mental illnesses and discover little consistency, quality or even standards of reporting and conduct of such trials.

War zones are antithetical to the notion of green space, reflection, mindfulness or long-term health planning. At times of war and conflict there is little attention to the types of spaces in which

people live and meet, the priority often being of securing immediate safety and avoidance of injury and death. Children in war zones are especially vulnerable to traumatic and loss events, injury, fear and anxiety about imminent dangers. Children are also targeted in some countries as recruits into militia; child soldiers carry arms and kill when their maturational resilience may not be at its optimal; childhood, adolescence and youth are critical periods of negotiating moral and ethical values and for developing life-long patterns for relating to others. Distressing or violence experiences during this critical period will inevitably have health consequences. Kizilhan & Noll-Hussong (pp. 425–429) confirm a higher prevalence of post-traumatic stress disorder, depression, anxiety and somatic complaints among male child soldiers compared with other boys living in the same war zones. Child soldiers are psychologically vulnerable, damaged by their actions and they can inflict violence and harms on their society, families and friends, perhaps mediated through mental illnesses.^{14–19} Preventing and treating mental illnesses in war zones raises numerous ethical and moral dilemmas, not to mention the challenge of reintegration of child soldiers back into society.^{15–19}

Traumatic experiences are associated with poor health generally, including anxiety, depression, post-traumatic stress and emotional dysregulation.²⁰ Emotional dysregulation may be a suitable treatment target for those experiencing early life maltreatment, and people receiving diagnoses of borderline personality and major depression (Dittrich *et al*, pp. 412–418). Archer *et al* (pp. 419–424) demonstrate that affective instability (commonly found in borderline personality, depressive illness, and following childhood maltreatment) is more than a symptom of an underlying disorder and that it predicts mortality in a 50-year follow-up. Understanding the biosocial mechanisms of trauma-induced anxiety and general anxiety disorders may provide clues about mechanisms and novel interventions. For example, inflammatory processes correlate closely with the development of post-traumatic symptoms, even in child soldiers.^{21,22}

Genetic variants that influence putamen, amygdala and thalamus volume determine obsessive-compulsive disorder risk (Hibar *et al*, pp. 430–436). The ventromedial prefrontal cortex is implicated in the development of general anxiety disorders where 'healthy' and 'pathological' worriers are unable to differentiate safe and threatening stimuli. The evidence of green space or nature-based treatment for anxiety, stress-related and even post-traumatic symptoms is promising,^{23,24} but much more in-depth and large-scale studies are needed, including biosocial and environmental measures of mechanisms.

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