Environmental Change, Mental Health and Wellbeing

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Abstract

In a time where environmental changes are a central issue, this chapter presents a narrative review of their impact on the mental health of the populations and main challenges. Recalling major ideas behind the relationship between mankind and the natural environment, the Anthropocene poses serious questions about the conceptualization of this debate. We start by focusing on how the physical environment changes, namely temperature, air pollution, noise pollution, green spaces and extreme events, affect mental health. We then analyse how our environmental experience has changed in our urban setting, in labor organisation, with online connections and finally with the extinction of our experience with nature. All these aspects outline that a planetary health approach is mandatory to address mental health and mutual coexistence, and structural changes in the environment must be kept in mind by clinicians and decision-makers.

Keywords: climate change, Anthropocene, mental health, migrants health, indigenous health, urban design, wellbeing, planetary health

Introduction

Environment changes influence mental health and wellbeing either through short-term phenomena or through broader long-term, enduring macroclimate patterns. The impact is complex as the category "environment" includes a stochastic element and another, *organised,* as the environment was bent by the dynamics of a society which changed it and

therefore, recursively, mobilized its related mental stress. This intertwined relation should force us to look at specific environmental and societal changes, and expect unique and new mental health problems which, together, call for a planetary health approach, "*embracing the health of human civilisation and the state of the natural systems on which it depends*" (Whitmee et al., 2015).

Man-made environmental changes should be given particular attention for their relevance in the contemporary situation. We live in what geologists call the Anthropocene - the epoch when human intervention implies changes that surpass our material and chronological scale (Crutzen, 2002; Waters et al., 2016). However, what goes around comes around, and as the *Gaia* hypothesis (Lovelock, 2000) points out, the planet has an intrinsic capacity for self-regulation through the combination of complex homeostasis mechanisms that ensure its survival. In this sequence, we're now experiencing a "kind of counterattack", an intrusion of Gaia, coming directly from the background of the existence (Stengers, 2015). Instead of a sole unilateral drive of cause and consequence, it becomes a conjunction of interchangeable forces, to which environmental changes and adaptability must be interconnected. The Institute for European Environmental Policy (IEEP) recently published a background paper where it collects a wide array of evidence about the impact of environmental degradation on mental health (Filipova T., Kopsieker L., Gerritsen E., Bodin E., Brzezinski B. and Rubio-Ramirez O, 2020). Even for policymakers, it is becoming clear that questions such as pollution or urban design go well beyond physical illness and influence our mental health, challenging our sustainability as a society.

Environmental changes

The current rise in global temperature is well documented (Hansen et al., 2010; Lenssen et al., 2019), leading to disruptions of seasonal patterns and warmer summers (Cassou & Cattiaux, 2016) as perhaps its most evident event. The impact of temperature on mental health arrives primarily from the association of hot temperatures with psychiatric hospital admissions. High daily temperature ranges (Sung et al., 2011; Zhao et al., 2016) and high temperatures (Amr & Volpe, 2012; Shiloh et al., 2005; X. Wang et al., 2014) were found to be associated with increased emergency admissions for schizophrenia and mood disorders. This may be explained by a possible vulnerability of the schizophrenic

patient to extreme temperature processes due to impaired dopaminergic transmission (Hasegawa et al., 2005) or to decreased serotonin bioavailability (Lambert et al., 2002) in the case of mood disorders, as specific neurotransmitters are involved both in thermoregulation and in psychophysiology. Besides, psychotropic drugs can alter thermoregulatory mechanisms (Martin-Latry et al., 2007). Hot weather was also found to be associated with self-injury(Kubo et al., 2021) and suicide (even surpassing unemployment) (Fountoulakis et al., 2016), besides violent crime (Tiihonen et al., 2017), intentional homicide (Xu et al., 2020) and even broader conflict (O'Loughlin et al., 2012).

However, global warming goes well beyond daily average temperatures, greatly increasing the frequency and intensity of extreme weather events. The United Nations Office for Disaster Risk Reduction estimates that in the last two decades, there was a 74% increase in the number of reported natural disasters compared to the period between 1980-1999. Floods represent nearly half of all the events, having increased by 134%. Besides, wildfires increased by 46%, heat waves by 232% and droughts by 29% (The United Nations Office for Disaster Risk Reduction, 2019). Only 3% of the affected population lives in high-income countries, underlining pre-existing inequities and structural vulnerabilities. These often-traumatic experiences carry a heavy burden on mental health, especially on post-traumatic stress disorder, depression and anxiety (Fernandez et al., 2015; Silveira et al., 2021). However, evidence is still short on the long-term effects of these events. Additionally, care workers and institutions should be aware of the involved secondary stressors, economic or health-related, but also of the victims' perceptions of the self and the world around them, as in how families or social support networks interact (Lock et al., 2012). Resilience can be surprising after these events, and understanding the "unexpected pathways" behind it (Bonanno, 2004) may be helpful when researching, dealing with or designing policies to tackle the burden of extreme events.

Air pollution, one of the main causes of environmental degradation, can also impact mental health. Emerging evidence has been pointing out that high levels of NO_2 and PM 2.5 in the air are positively associated with an increased risk for anxiety (Braithwaite et al., 2019) and bipolar disorder (Khan et al., 2019). A large longitudinal study in London also registered an increased risk of depression at age 18 in youngsters previously exposed to higher levels of these pollutants, possibly mediated by immunological stimuli (Roberts et al., 2019). Besides psychiatric outcomes, low air quality has also been associated with poorer

mental well-being (Ahad et al., 2022), lower cognitive throughput, increased inattentiveness and self-perceived stress (Gignac et al., 2022). The 2022 update on the World Health Organization (WHO) ambient air quality database outlined that only the population of 10% of the assessed settlements around the world was exposed to annual mean levels of PM10 or PM2.5 that complied with air quality guidelines, and 23% to NO_2 (WHO Air Quality Database, 2022). Broader research is needed to assess the effect of pollution on mental health and its psychophysiology pathways, besides a clear policy focus on the diminishing of inequities in air quality exposures among countries, neighbourhoods and vulnerable populations. Water quality and exposure to chemicals and metals and their potential impact on mental health should also be kept in mind.

Another important aspect to focus on is noise pollution, which in Europe affects 100 million people (around 20% of the population) and is estimated to contribute annually to 12.000 premature deaths (European Environment Agency, 2020). Long-term noise exposure was found to be a specific risk factor for dementia (Meng et al., 2022). Aeroplane noise is significantly associated with a higher risk of insomnia and mental health emergencies (S. S. Wang et al., 2022), and road-traffic noise is particularly associated with a higher risk of poor mental health outcomes, with these outcomes recovering when noise exposure is reduced (Li et al., 2022). During the first COVID-19 lockdown, individuals exposed to noise annoyance also had a significantly higher risk of developing severe symptoms of anxiety and depression (Goldberg et al., 2022).

As an urban feature that prevents heat islands, diminishes air and noise pollution and promotes physical activity and social cohesion (I et al., 2017), green spaces have been recently highlighted for their role in mental health. Cross-sectional studies have substantiated that urban green spaces are positively associated with better mental health (de Vries et al., 2003; White et al., 2013), that moving to greener areas shifts baseline mental health (Alcock et al., 2014) and that populations exposed to the greenest environments also have the lowest levels of health inequality related to income deprivation (Mitchell & Popham, 2008). However, how one connects with those spaces is also important. In order to comprehend its impact on our health and well-being, one should take first into account its natural features, such as size, tree density and distribution, and even biodiversity, that have recently been associated with positive mental health outcomes (Marselle et al., 2019). Then, one should look at the level of exposure in terms of proximity

and time spent in contact with nature, and finally at the experience, in a parallel to pharmacology, where characterisation of the dose and interaction with nature plays an important role (Bratman et al., n.d.).

Experience changes

The United Nations estimates that in 2020 approximately 56.2% of the global population lived in cities (United Nations, 2019). As the now dominant human habitat, it is valuable to understand how they condition our mental health and well-being. Indeed, only after the 20th century did the city as a setting become so overwhelming, being imbued with spatiality and temporality that humans are still ill-adapted to (Morton, 2013). With the rise of mega-cities with millions of inhabitants they are becoming older, poorer and flattered (meaning decreased access to public services and increased dependence on cars) (Gatzweiler et al., 2017). These urban determinants of mental health, besides the ones purely related to the built environment, need to be integrated into urban health policies and strategies for promoting mental health for these populations.

The labor environment has also been changing. Fordism's rigidity gave way to post-Fordist flexibility, paving the way to unemployment cycles, the fusion between work and private life and the deregulation of labor (Marazzi, Christian, 2011). In the last decades, cybernetic systems of work pushed this logic further with the so-called platform economy (e.g., *uberisation*) (Abilio & Abilio, 2019). Job insecurity is associated with worse mental health, particularly when it implies the threat of closure, downsizing of activities or changing working environments (Siegrist, Johannes et al., 2016). In such settings, the experience of time is no longer linear but broken into punctiform and often chaotic divisions. Healthcare workers and researchers should be aware of the possible impact of these labor realities on workers and their families, as well as on absenteeism, presenteeism (Heitor dos Santos et al., 2021) and productivity.

Beyond reality, the online lives of today's existences have provided new worlds with particular rules. Nowadays, one can migrate while keeping the lived space in the original position, as studied in the case of the online influence on Filipino migrants' networks of care (McKay, 2016) or in the case of workers in Chinese factories, far from their rural origin, to whom the online world provides a new sense of home (X. Wang, 2016). Beyond that, there's

the possibility of digital existence, where life online can ensue leaving beyond the limitations of reality. Humphrey's study on Russian chat rooms, for example, unfolds new ways of projecting a 'naked self' through avatar creation, implying new ways of dialogue and trust (Humphrey, 2009). The online platform Second Life® even offers its own virtual mental health clinic (Secondlife, n.d.). Along, one must consider the increase in stimuli and social stressors associated with digital life, social media use and screen time. Evidence is now surging on their impact on hyperactivity and attention deficit problems (Tamana et al., 2019), child development problems (Madigan et al., 2019), depression (Yoon et al., 2019) and phenomena like phantom vibration (Rothberg et al., 2010).

As stated before, the way we experience the environment around us is not stable and influences the way we adapt to it. Together with climate change and the so-called sixth mass extinction, we are facing what some authors call the extinction of the experience (Pyle, 1992), driven by a loss of opportunity to contact with nature and a loss of positive orientation toward engaging with nature, especially during childhood and in urban settlements (Soga & Gaston, 2016). This phenomenon not only may carry health-related consequences but also tends to diminish engagement with conservation efforts, promoting a vicious cycle of environmental degradation. At the same time, "psychoterratic" syndromes (Albrecht, 2011) are surging, such as solastalgia (distress caused by perceived (Albrecht et al., 2007) or anticipated (Moratis, 2021) environmental destruction), ecological grief (Comtesse et al., 2021) and eco-anxiety (Usher et al., 2019), posing new challenges for future mental health practice.

Conclusion

The advances of the last centuries helped to diminish poverty on a global level, implement social support and, in general, provide more equitable healthcare systems. Yet, the backlash of industrial growth seems to threaten their continuity. It is also impossible to ignore that many of those advances are subsidiaries of extractive practices and the destruction of communities such as in indigenous settings. Any approach should consider these challenges as more than small technical fixes, and search for planetary solutions that encompass the multiplicity of biomes, species, societal systems and knowledges.

Focus on environments at the global level should include awareness of the multifaceted specificities of the urban, labor and virtual environments of today's world. Their settings and accelerating ever-changing status have determined new psychosocial dynamics and therefore several mental health challenges. It is essential to research their impacts (Ferrão & Pinto Paixão, 2018) and to create new initiatives or support the existing contemporary resistance practices. Keeping health, and in this case, mental and planetary health, in all policies, may bear a transformative drive that will ultimately allow mutual coexistence.

Table 1. Summary of key advices to address each of the problems discussed across the chapter

Environment		Experience	
Temperature	➔ prevent emergency admissions ➔ prevent violence and conflict ➔ mitigate inpatients' decompensation	Urban space	➔ understand the city as a changeable environment ➔ research implications of rural exodus ➔ have present geographical inequities inside the cities
Extreme events	➔ support victims ➔ understand secondary social stressors ➔ address resilience pathways ➔ research long-term effects	Labor organisation	➔ be updated about labor organisation ➔ understand job insecurity impacts on mental health ➔ take part on occupational and preventive workers' health
Air pollution	➔ research psychopathological pathways ➔ comprehend confounders ➔ address implied inequities	Online existence	➔ attend new ways of interacting through online media ➔ research its impact on mental health ➔ be aware of mental health services provided by informal online services
Noise pollution	➔ avoid road traffic noise in healthcare services ➔ advise reduction strategies to patients	Psychoterratic syndromes	➔ visibilize and explore these emotions in clinical practice ➔ research their long-term impact on mental health ➔ understand how it
Green spaces	➔ enforce research on quality, exposure and experience ➔ apply it near healthcare		

	services ➔ inform about social and nature prescription		influences human's relationship with nature ➔ promote social and nature prescription

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