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Commentary: Suggesting Shinrin-Yoku (Forest Bathing) for Treating Addiction

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Shinrin-yoku (‘森林浴’) (i.e., forest bathing), a Japanese wellbeing practice, aims to harmonise a person with a forest by bathing in the forest mindfully using our five senses (Miyazaki, 2018). Practitioners can choose whatever they like to focus on in the forest: different colours of leaves, the sounds of streams, or the warmth of sunshine beaming between leaves. Since the birth of this practice in 1982, shinrin-yoku has been widely used in the Japanese clinical fields (Hansen, Jones & Tocchini, 2017). Recently, this healing practice has received attention from healthcare practitioners and researchers worldwide (Wen, Yan, Pan, Gu & Liu, 2019). In this commentary, we will discuss limitations of the current shinrin-yoku research, and how future research can be conducted to appraise the effects of shinrin-yoku on addiction.

Needs for cost-effective and accessible treatment for addiction

Shinrin-yoku is increasingly popular for a variety of reasons. It is free to use (though there are a few forests that charge for entrance), relatively accessible, in line with today’s global emphasis on environmental preservation, and effective for diverse health outcomes. Physically, being immersed in a forest improves one’s immune system and the functions of cardiovascular and respiratory systems (Williams, 2016). Psychologically, shinrin-yoku is effective in treating mood disorders (e.g., depression and anxiety) and stress, enhancing relaxation, gratitude and selflessness (Park, Tsunetsugu, Lee, Kagawa & Miyazaki, 2012; Pritchard, Richardson, Sheffield & McEwan, 2019). The positive effects of shinrin-yoku on mental health effects are particularly noteworthy as poor mental health is one of today’s global challenges. For example, Goal 3 of the United Nations’ Sustainable Development Goals refers to good wellbeing (United Nations, 2015). About 15% of the world population (1.1 billion people) have a mental health or substance use disorder (Ritchie & Roser, 2018). Mental health problems are understood to be one of the primary causes of all diseases in the world (Vol et al., 2015), estimated to contribute to economic output losses of \$2.5-8.5 trillion

globally (Patel et al., 2018) with a forecast to increase to £6 trillion by 2030 (Marquez & Saxena, 2016). At a country-level, the costs of mental disorders are about 3% of gross domestic product (GDP) in developed countries (Hewlett, 2014), and substantially higher in developing countries (Patel, 2007).

Among mental health disorders, one of the most prevalent is substance misuse, affecting approximately 100 million people worldwide (Orford et al., 2013). Mortality rates of substance misuse are not modest: 111 (tobacco) and 33 (alcohol) deaths per 100,000, and numbers are rising (Peacock et al., 2018). Moreover, polysubstance users, who were recruited at harm-reduction facilities and shelters, were associated with a ten times higher mortality rate than the general population (Gjersing & Bretteville-Jensen, 2018). Because of the complex nature of addiction, a single cause for addiction has not yet been identified, hence the standardised effective treatment modality is unknown (Miller, 2019). As a result, in clinical practice, diverse approaches are often used (e.g., medication, counselling, and mutual-help groups), yielding extra costs. The treatment costs for addiction to the National Health Service (NHS) in the United Kingdom are estimated to exceed £500 million annually (National Drug Treatment Monitoring System, 2017), equating to 4% of the mental health costs (12 billion; NHS, 2020). A significant contributing factor for this heightened cost is the high number of relapse rates, ranging from 40% to 80% (National Institution on Drug Abuse, 2018), with 66% in the first six months, 35% after one year, and 19% during the first six years (Frimpong, 2016). A cost-effective and accessible treatment is needed, and shinrin-yoku could be one intervention to help people suffering from substance misuse and other types of addiction.

Possible efficacy of shinrin-yoku on addiction to be researched

A recent systematic review and meta-analysis for the effects of shinrin-yoku on mental health outcomes revealed that shinrin-yoku was effective for reducing depression,

anxiety, anger and stress, and the effects on anxiety were the largest (Kotera, Richardson & Sheffield, 2020). This suggests that shinrin-yoku could be an effective treatment for addiction, because many types of addiction are associated with mental distress such as anxiety, stress and depression. These include sex addiction (Kotera & Rhodes, 2019), substance misuse (Smith & Book, 2008), gambling (Medeiros, Sampaio, Leppink, Chamberlain & Grant, 2016; Rizeanu, 2013), internet addiction (Li, Hou, Yang, Jian & Wang, 2019), social media addiction (Fabris, Marengo, Longobardi & Settanni, 2020), exercise addiction (Lodovico, Poultais & Gorwood, 2019), and eating disorders such as compulsive overeating (Davis & Claridge, 1998). By alleviating mental distress including anxiety, shinrin-yoku could improve recovery rates from addiction. In our analysis, only one study (of twenty included studies) targeted substance misuse (alcohol) (Shin, Shin & Yeoun, 2012): a nine-day shinrin-yoku programme reduced alcoholics' depression (medium-large effect), while depression in the passive control group did not. Future studies should evaluate whether shorter interventions would yield beneficial effects on addiction.

Additionally, the mechanism of how shinrin-yoku might work for addiction needs to be appraised. There are several theories defining the mechanism of shinrin-yoku on wellbeing. Attention Restoration Theory posits that spending time in nature recovers our concentration by effortlessly paying attention to nature (Kaplan & Kaplan, 1989). Stress Reduction Theory claims that being in nature reduces stress and improves physiological functions such as heart rate and blood pressure (Ulrich et al., 1991). Biophilia Hypothesis poses that humans have inherent need to be affiliated with nature (Kellert & Wilson, 1995). Spending time in nature provides preventive health effects by reducing stress and strengthening our immune system (Song, Ikei & Miyazaki, 2016). Affect regulation, a key factor for wellbeing (Gross, 2013), is another possible mechanism of how nature heals our mental health (Richardson, McEwan, Maratos & Sheffield, 2016).

Likewise, there are various theories attempting to capture the complex nature of addiction to explain its aetiology and to provide treatment modalities. The Brain-Hijack Theory (Volkow & Li, 2005) regards addiction as a dysfunction of the brain's reward system. The emphasis on biology rather than morality reduces the stigma associated with addiction and increases access to treatment (Hyman, 2007). The Excessive Appetites Model of Addiction (Orford, 1985) challenges the Disease Model (believing the origin of addiction to be neurological, genetic and environmental), and focuses on psychological aspects to appraise how people become addicted to appetitive behaviours, such as sex, in the same way they become addicted to substances. The Biopsychosocial Model (Marlatt & VandenBos, 1997) defines addiction as a complex behaviour pattern impacted by biological, sociological, psychological and behavioural components. In this model, addictive behaviour is distinguished from other problem behaviours by the individual's overwhelming, pathological lack of control. More recently, research at the intersection of neuroscience and psychology suggests that addicted individuals have substantial impairments in cognitive control of behaviour, but further evidence is still needed to support this mechanism (Morgenstern, Naqvi, Debellis & Breiter, 2013). While these theories shed some light on the mechanism of addiction, how these addiction theories would be related to the effects of shinrin-yoku has not yet been explored.

Suggestions for future research

Considering these advantages of shinrin-yoku that meet today's global needs, addiction research can benefit from evaluating the effects of shinrin-yoku. However, new studies need to overcome limitations of the existing shinrin-yoku research. For example, many studies did not evaluate the effects of shinrin-yoku in the long-run, and only compared with the urban settings, which would worsen mental health by itself in the first place. Additionally, the only one shinrin-yoku study targeted alcoholics evaluated the effects of a

nine-day programme on depression only (Shin, Shin & Yeoun, 2012); the degree of alcohol misuse was not assessed, and shorter interventions should be evaluated to be practiced at wider settings. Therefore, future addiction research needs to i) assess the effects of brief shinrin-yoku practice on addiction in the long-run by establishing a rigorous follow-up assessment, ii) compare with other addiction interventions, and iii) discuss theories and/or mechanism of how shinrin-yoku might work for addiction.

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