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REVIEW ARTICLE

Creating equitable and sustainable opportunities for nature immersion to support restoration from stress within mental health nursing: A critical interpretive synthesis

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ABSTRACT: *In the face of global environmental changes threatening health, and despite increased calls for nurses to broker access to nature-based well-being interventions for people with mental health difficulties, there is a surprising absence of literature examining the nature–nursing relationship, inhibiting its inclusion within nursing curricula and practice. This critical interpretive synthesis supports the notion that nature immersion has the capacity to increase positive affect, reduce negative affect, provide restoration from everyday stress, promote meaning-making, enhance belonging, and foster an interest in caring for the natural world. Yet, critical examination of the literature reveals multiple social and environmental inequalities and unmasks latent anthropocentric, gendered, and colonialist thinking, which threatens the delivery of equitable and just sustainable practice. Recommendations are made for a transdisciplinary, systemic approach, which recognizes and responds to our shared humanity and vulnerability in pursuit of planetary health.*

KEY WORDS: *mental health, nature, nursing, restoration, stress, sustainability.*

INTRODUCTION

Since 2010, adverse climate events have displaced approximately 21.5 million people globally, increasing exposure to hunger, poverty, natural resource loss, and disease, whilst doubling the risk of human conflict and violence (United Nations 2021). Such tragedy inevitably puts strain on global healthcare provision, and the WHO (2022a) has estimated that an additional 9 million nurses and midwives are required by 2030 if we

are to have any chance of meeting Sustainable Development Goal 3, focussed on the attainment of global health and well-being (United Nations 2015). Yet, despite increasing climate adversity, there is a surprising paucity of literature examining our complex nature–human relationship from a nursing perspective, presenting limited opportunity for inclusion within healthcare curricula and practice (Richardson *et al.* 2017). The WHO (2022b) assert that insufficient focus has been placed on global mental health and well-being within climate change literature, outside of that focussed on natural disasters, recommending that an awareness of climate change is integrated within mental health policies and programmes. The necessity to address the climate challenge as a part of mental health care delivery indicates a need for nurses to better understand enhanced mechanisms for sustainable practice, environmental and social justice, and the informed use of nature-focussed interventions. Given

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the time pressures faced by nurses, understanding how and why climate change is relevant may increase their confidence and willingness to tackle unsustainable practice and work towards cultural change (Aronsson *et al.* 2020), whilst enhancing awareness of the mental health impacts of climate change (The WHO 2022b).

THE HEALTH BENEFITS OF NATURE IMMERSION

Immersion in nature has received increased attention as a potentially effective agent in achieving restorative well-being, with multiple studies underlining its capacity to ameliorate mental distress (Bell *et al.* 2015; Capaldi *et al.* 2014; Kaplan & Kaplan 1989; Korpela *et al.* 2017; MacMahan & Estes 2015; O'Brien *et al.* 2014; White *et al.* 2013). In the UK, the Government's 25-year environment plan (DEFRA 2018) directs healthcare workers to become more actively involved in brokering access to nature-based well-being interventions, yet it is difficult for nurses to understand the use of nature-focussed interventions and their relevance to practice if the literature does not speak to nurses, or recognize the unique pressures faced within mental health services. Given the issues outlined, we assert the need for a review of the literature exploring the nature–well-being relationship and its relevance to the global nursing community. Whilst the literature presents a largely positive picture, the use of critical interpretive synthesis (CIS) as a method has allowed for deeper interrogation of the literature, locating the missing narratives or voices within the research in order to further advance knowledge and understanding (Dixon-Woods *et al.* 2006).

Aims

Given the paucity of research examining the nature–well-being connection from a mental health nursing perspective, this critical interpretive synthesis (CIS) seeks to examine individual and collective components of the nature experience, alongside factors influencing nature engagement and connectedness, particularly in the context of the global climate crisis. Due to the limited data looking specifically at nurse experience, the question will more broadly ask 'does time in a natural setting reduce stress and improve the psychological wellbeing of adults'? This provides a basis for critical examination of the literature, offering knowledge translation for a global nursing community.

METHODS

Noblit and Hare (1988) widely used meta-ethnographic approach for qualitative literature review has been adapted and expanded by Dixon-Woods *et al.* (2006) to enable the synthesis of qualitative, quantitative, and mixed methods research where a large heterogeneous body of evidence exists. Critical interpretive synthesis uses an iterative and inductive process sensitized to, but distinct from systematic review methodology, with theory generated via a constant dialectic process (Dixon-Woods *et al.* 2006). Moving away from a traditionally constructed thematic discussion, constructs and assumptions embedded within the literature, and the relationship between them are examined to present a critical synthesis, which addresses some of the deeper or unspoken issues (Dixon-Woods *et al.* 2006). Thus, the need for an embedded reflexive process to explore the impact of researcher subjectivity is strongly indicated within the interpretive process. Skewes McFerran *et al.* (2017) have adapted the work of Dixon-Woods *et al.* (2006) to incorporate an additional reflexive stage, acknowledging embodied and emotional insights experienced by the researcher within the analysis. It is argued that emotional influences and outcomes within iterative and recursive secondary analyses are an unavoidable and potentially useful part of the process (Skewes McFerran *et al.* 2017). The process of CIS followed is argued to offer 'more insightful, formalized and generalizable ways of understanding phenomena' (Dixon-Woods *et al.* 2006, p. 42).

Search strategy

Our research question 'does time in a natural setting reduce stress and improve the psychological wellbeing of adults'? acted more like a compass than an anchor, following recommendations that the question may need to be adapted through the CIS process (Dixon-Woods *et al.* 2006). Skewes McFerran *et al.* (2017) argue that this approach reduces the potential for the question to unconsciously direct methodological choice, reinforcing dominant positivist traditions.

As research exploring the theory and practice of nature immersion spans several fields of practice, searches were conducted across a wide range of databases hosting health, psychology, education, and earth sciences literature. Searches were conducted combining a range of keyword and search terms (Table 1), applying Boolean operators AND, OR, and NOT to construct several search strings within a comprehensive search

TABLE 1 Keywords & databases

Keywords	Role-transition Nurs* Wellbeing (well-being) Stress Blue space Green space Connection to nature Restor* Ecopsycholog* Nature therapy Ecotherapy Reflective practice Therapeutic landscapes Resilien* Garden* Horticultur*
Databases	Medline PsychInfo CINAHL AMED ERIC British Education Index Australian Education Index GreenFILE SOCIndex Environment Complete JBI EThOS Zetoc Cochrane Library

* Truncation symbol used to search for word stems within the literature.

strategy. Initial prima facie consideration of papers was followed by a two-stage process reviewing abstracts to identify papers, which met inclusion and exclusion criteria (Table 2) (Aveyard *et al.* 2016) to aid manageability and confirm relevance. All papers focussed on either the built environment or natural disasters were excluded to focus the literature. Papers were only included if they explored time outside in 'real' nature as opposed to studies examining nature in laboratory or indoor settings.

Given that qualitative literature may often fail to provide adequate keywords, it can be problematic to rely on keyword searches alone (Pope *et al.* 2007). Additional hand searching and reference chaining took place (Dixon-Woods *et al.* 2006), helping to reduce the risk of omitting potentially important literature (Dixon-Woods *et al.* 2006). Prior experience of nature-based interventions and sustainability practice helped to guide the searching process to some extent, and it is argued that reviewer expertise in a subject is valued

TABLE 2 Inclusion/exclusion criteria

Inclusion criteria	Exclusion criteria
Adults aged 18–65	Young people <18 years of age
Experiences of time outside in 'real' nature	Older adults >65 years of age
Explores psychological and/or emotional well-being	Primary focus on physical health/exercise
Considers psychological stress	Primary focus on specific diagnoses of mental illness
	Laboratory based indoor studies
	Focus on built environment/nature proximity
	Focus on natural disasters
	Papers not in the English language

within CIS (Dixon-Woods *et al.* 2006; Skewes McFerran *et al.* 2017).

Thirty-six papers were selected for deeper review and full-text reading clarified design and enabled judgements regarding relevance to the initial review question (Aveyard *et al.* 2016). The use of a reflexive diary, project supervision meetings, noting embodied and emotional responses, alongside note-taking helped to reduce the risk of an unconscious wish to 'prove' own perspective, instead, identifying methodologically diverse literature, which best represented the existing evidence base (Skewes McFerran *et al.* 2017).

Summary review forms were completed detailing initial decisions regarding the inclusion or exclusion of papers as recommended by Aveyard *et al.* (2016). These initial processes confirmed literature heterogeneity and ensured that a pragmatic number or representative papers were available to enable sufficient depth within the dialectic process (Dixon-Woods *et al.* 2006). A total of 19 papers were included in the final review (see Table 3). Data extraction of quantitative, qualitative, and mixed methods studies enabled scrutiny of the methodologies, findings, and limitations of each study. We sought to undertake a replicable search strategy, making use of varied critiquing tools (Aveyard *et al.* 2016) as part of a reflexive process. Whilst Skewes McFerran *et al.* (2017) argue such an approach is more oriented towards positivist, aggregative methods than to CIS, it increased transparency and supported critique of the diverse methodologies within the sampling frame. Only 'fatally flawed' papers were excluded, minimizing the risk of publication bias (Dixon-Woods *et al.* 2006) and literature was only included where the central research aims and themes

TABLE 3 *Selected studies*

Methodology	Critically reviewed	Included
<i>Quantitative</i>		
Meta-analysis	2	2
Randomized control trial	6	1
Longitudinal study	3	1
Observational field experiment	1	1
Survey	9	4
	21	9
<i>Qualitative</i>		
Meta-analysis	1	1
IPA	1	1
Grounded theory	2	2
Hermeneutic phenomenology	1	0
Case study	2	0
General	2	1
	9	5
<i>Mixed methods</i>		
Mixed methods	6	5
Total papers	36	19

were consistent with the research question, noting study limitations. Ultimately, pragmatic restriction of searches reflected the need for a realistic timeframe, and additionally, it is argued to aid manageability and add richness and depth to the analysis, relying on data saturation to ensure sufficient sampling (Skewes McFerran *et al.* 2017).

Analysis

The synthesis reflects an idealist epistemological positioning intended to help ‘push beyond the original data to a fresh interpretation of the phenomenon under review’ (Skewes McFerran *et al.* 2017: p. 67) by problematizing both the literature and its construction to ensure that we can ‘better hear unspoken voices in the literature’ (Ibid: p. 20). The process locates key metaphors, themes, and/or concepts, translating these into one another to determine whether dominant concepts in one study effectively capture those across the sampling frame (Dixon-Woods *et al.* 2006. Skewes McFerran *et al.* 2017). First, reading and review of selected literature resulted in the construction of a matrix table capturing how the papers met with the review question, noting synergies.

A further detailed reading of each study took place, mapping key concepts and interpretations (Pope *et al.* 2007) alongside extensive note-taking identifying findings, themes, and intervention facilitators and barriers (Dixon-Woods *et al.* 2006). Incorporation of Miles

and Huberman (1994) ‘meta-matrix’ presented ideas together in tabular form, easing comparison and categorization. The iterative review and the reflective process required the inclusion of a further column noting emotional responses and thoughts (Skewes McFerran *et al.* 2017). We endeavoured to ensure that papers were not privileged due to personal preference and met inclusion and exclusion criteria. The process of refutational synthesis provides a mechanism to examine conceptual differences and explore the dominant meta-narratives influencing research outcomes (Dixon-Woods *et al.* 2006; Pope *et al.* 2007). Given the relatively small data set (<50), it was advantageous to translate the findings of one paper to another using constant systematic comparison and mapping, adding hermeneutic discussion and scrutiny across the whole (Dixon-Woods *et al.* 2006; Pope *et al.* 2007). Heterogeneity adds an additional layer of challenge, yet it has still been possible to construct a general interpretation related to the findings of each study, extending beyond the individual studies to present a web of third-order constructs (Dixon-Woods *et al.* 2006).

Synthesis

Nature is a subjective construct, interpreted in different ways by different people (Sonntag-Öström *et al.* 2015a, 2015b) and the arising narratives explore the impact of nature immersion on health, examining emotional, psychological, and social characteristics of the experience. The relationship between studies, within groupings (e.g. affect, woodland, coastal, and spiritual), was examined and finally the relationship across the entire data set, mapping key concepts and interpretations against one another (Dixon-Woods *et al.* 2006). The arising synthesis offers a plausible interpretation of the relationship between nature and well-being, as defined by the sampling frame (Dixon-Woods *et al.* 2006), with four distinct and overlapping relational constructs emerging: (i) affect restoration (a primary construct, reflecting the research question), (ii) meaning-making, (iii) social inequalities, and (iv) natural resource.

An embedded refutational synthesis seeks to examine conceptual differences and explore the dominant meta-narratives influencing research outcomes (Dixon-Woods *et al.* 2006; Pope *et al.* 2007). Our synthesis found that although overwhelming support of the positive impact of nature upon stress existed, further interrogation identified an orientation towards white, wealthy, western human populations, with little

consideration of our impact on the natural setting itself. The construction of knowledge through the data of privileged cohorts is not representative and fails to address the transferability or generalizability of research to a global population, or recognize that nations face environmental challenges inequitably.

Findings supported the potential of green or blue space to reduce negative affect and increase positive affect, for both everyday and long-term patterns of stress. Varied theories and models were utilized to discuss the effects of nature within the sampling frame, with Antonovsky (1979) concept of salutogenesis centrally placed, which emphasizes the origins of health, rather than of disease (pathogenesis). In seeking to better understand the concept of salutogenesis, we drew upon some useful additional literature sources (Delle Fave *et al.* 2011; Sheffield & Lumber 2019). Sheffield and Lumber (2019) suggest that by considering individual resource and capacity, the assessment and understanding of one's life situation in order to find meaning and direct movement in a health-sustaining direction is enabled. This involves the development of what Antonovsky termed 'coherence' between the persons and structures of society and more recently the nature-human relationship (Sheffield & Lumber 2019).

Salutogenesis can be divided into (i) *hedonic* and subjective components of well-being oriented towards positive emotion and life satisfaction (feeling good) and (ii) *eudaimonic* or psychological well-being components concerned with self-actualization, personal growth, or 'functioning well' (Delle Fave *et al.* 2011; Sheffield & Lumber 2019). These ideas appear to be conversant with the three dominant theories, which emerged within the sampling frame: (i) biophilia, developed by Wilson (1984); (ii) stress recovery theory (SRT), developed by Ulrich *et al.* (1991); and (iii) attention restoration theory (ART) developed by Kaplan and Kaplan (1989). Biophilia (Wilson 1984) proposes that nature affiliation is a part of our human evolutionary development as a part of the natural world and asserts that modern living and mechanization have all but eradicated this natural affinity, leading to a disconnection from nature and the 'rich, natural pleasure' of spending time in the natural world. SRT (Ulrich *et al.* 1991) is a psycho-evolutionary theory positing that evolution favoured humans capable of recovering from stress in natural settings swiftly. The theory asserts that healthy, calm, and unthreatening natural environments are likely to trigger a reduction in stress and increase feelings of affect restoration, whilst time

spent in stimulating urban settings disrupts restoration (Ulrich *et al.* 1991).

Perhaps the most widely used theory in the research, ART (Kaplan & Kaplan 1989), proposes that exposure to nature can help to restore concentration following exposure to the stresses of modern living. Kaplan and Kaplan (1989) suggest the kind of stimulus and process demands required by the right frontal cortex is extremely tiring and that nature immersion provides four responses that collectively enable restoration. These are identified as (i) '*Being away*' from daily stresses, (ii) '*extent*' of expansive natural environments and contexts, (iii) '*compatibility*' of activities with personal motivations, and (iv) '*soft fascination*', or the kind of absorption in nature capable of bringing about reflection and recovery (Kaplan 1995; Kaplan & Kaplan 1989). Despite criticism suggesting that these models have had limited review since their conception in the mid to late 20th century, they are widely applied through the evidence base (MacIntyre *et al.* 2019) and the selected sampling frame.

Affect restoration

Wide support is presented for the therapeutic potential of nature immersion (Bell *et al.* 2015; Capaldi *et al.* 2014; Hipp & Ogunseitan 2011; Korpela *et al.* 2017; Korpela & Kinnunen 2011; MacMahan & Estes 2015; O'Brien *et al.* 2014; Park *et al.* 2009; van den Berg & ter Heijne 2005; Völker & Kistemann 2013; White *et al.* 2013). A U.K.-based study (n4255) identified that nature visits were motivated by a wish to reduce stress, unexpectedly finding that walking in nature was at least as effective as more exerting physical exercise, with nature itself acting as the active ingredient (White *et al.* 2013). Preference is indicated by participants for coastal, woodland, and upland environments, whilst urban playing fields and visits with children were seen as the least restorative, leading to speculation as to whether this was due to a lack of urban biodiversity alongside the potentially stressful act of childcare (White *et al.* 2013). The most significant stress reduction impacts are noted in the most stressed participants, with longer exposure resulting in increased restoration. These findings resonate with a Finnish survey (Korpela & Kinnunen 2011), which found that increased interaction with nature resulted in a reduced need for restoration from stress and that those with higher levels of work stress found time in a remote village location more beneficial than for those with lower levels of stress, the latter group preferring

to seek out more social contact. This may support the notion that the most stressed seek lower stimulus natural environments and perhaps solitude within those environments.

In Germany, time spent in an urban blue space setting next to the river Rheine was found to result in stress reduction alongside increased feelings of happiness and relaxation (Völker & Kistemann 2013). Similarly, Bell *et al.* (2015) report increased attention restoration and feelings of renewal arising from the simplicity and cleansing act of time by the sea in the U.K. In California, Hipp and Ogunseitan (2011) reported a reduction of everyday stress, improved concentration, and elevated mood alongside perceived feelings of restoration amongst visitors to coastal beaches (n1153). The study reported that well-being effects only occurred when environmental conditions were either healthy or perceived to be healthy, identifying a number of variables, such as air quality, temporality, and water quality and tide patterns. Restoration is reported to be three times higher when air and water quality is good, factors which in combination make 'healthy days', vital for human well-being. Negative changes to the environment resulted in decreased feelings of restoration (Hipp & Ogunseitan 2011).

In Japan, Park *et al.* (2009) explored the physiological impacts of Shinrin-Yoku, translated as 'taking in the forest atmosphere or forest bathing' in order to improve psychological and physical relaxation (Park *et al.* 2009: p. 18). Male university students (n280) spent time in both forest and city environments, and in the forest setting, the physiological effects included lower levels of salivary cortisol, lower pulse, lower blood pressure, lower sympathetic nerve activity, and greater parasympathetic as compared to the city environment. The authors suggest settings with low atmospheric pressure and at high elevations reduce symptoms, whilst the relatively lower levels of light are capable of decreasing feelings of anger (Park *et al.* 2009).

Not all landscapes are life supporting or restorative for humans (Capaldi *et al.* 2014), particularly when the health of the environment is compromised (Hipp & Ogunseitan 2011) or where there is 'urban threat', such as crime and antisocial behaviour (Völker & Kistemann 2013). In the Boreal zone of northern Sweden, simply attempting to maintain body temperature diminished feelings of restoration. As such, nature can only be identified as potentially therapeutic with a number of complex factors influencing outcomes, many of which may be personal to an individual. To some, a

woodland may appear frightening (Korpela *et al.* 2017) whilst for others it may be perceived as a sanctuary (O'Brien *et al.* 2014). Some people experience 'biophobia' in response to natural beings such as spiders or snakes (van den Berg & ter Heijne 2005) and fear of outdoor dangers such as being on rivers during a thunderstorm (van den Berg & ter Heijne 2005). Whereas others may delight in the sensory experience offered by nature (Sahlin *et al.* 2014).

Human responses to natural settings are complex, and it is possible for an individual to have more than one emotional response to a perceived risk in the environment. For example, van den Berg and ter Heijne (2005) recorded a range of responses in Dutch participants asked to reflect on recent stressful nature visits, discussing the concepts of fear, fascination, and personal mastery. A Swedish nature-based therapy programme (Sonntag-Öström *et al.* 2015a) identified that participants initially expressed fear of both the forest environment, but significantly of spending time with their own thoughts. Despite early internal conflict and fear, the solitary time in nature emerged as one of the most valued aspects of the participant's nature experience, with darker environments referred to by some as 'snug', 'mysterious', and 'protective' (Sonntag-Öström *et al.* 2015a, p610).

MacMahan and Estes (2015) meta-analysis concluded that environments with healthy resources are affect enhancing, noting a moderate increase in positive affect alongside a smaller but consistent reduction in negative affect, although potential overestimation of effect sizes indicates that results must be interpreted cautiously. Similarly, a meta-analysis conducted by Capaldi *et al.* (2014) identified that the environment itself mediated the degree to which a person might experience restoration. The small but significant effect sizes supported the therapeutic potential of natural environments for well-being. Drawing on evolutionary perspective, they suggest that people identifying as connected to nature are more likely to experience positive affect, vitality, and life satisfaction. Conversely, this increased connectedness also carries the potential for 'eco anxiety' about the harmful effects of global warming and ecologically harmful human practices and can be understood as a rational response to a real threat, capable of detracting from the well-being effects of nature immersion.

Prolonged exposure may lead individuals to reflect on their life, which if confirmed through further study, could provide a rationale for employers to reward staff with breaks to undertake physical activity in natural

settings (Körpela *et al.* 2017). The only included study which considered the impact of nursing staff (Nejati *et al.* 2016) utilized content analysis of qualitative interviews to identify key words and phrases which were used to generate a survey and circulated amongst 10 000 members of the Association of Medical Nurses in the USA. The researchers found that high-quality break spaces, including outdoor nature, were valued by the majority of respondents but that breaks are often sacrificed to provide care, particularly in the face of workload problems. The authors argue for the provision of restorative break spaces for nursing staff, highlighting that some employers are beginning to introduce 'rest break programmes', including those in natural settings (Nejati *et al.* 2016).

A particular emphasis on nature-based therapy (NBT) programmes for occupational stress and burnout has emerged in Scandinavia during the past decade in response to the negative impact of increasing workplace demands. Sahlin *et al.* (2014) suggest that changes in the employment market in Sweden in the 1990s led to wide-scale organizational restructuring, job losses, increased workload, and a sizeable rise in sickness absence. NBT programmes are professionally resourced, relying on more than the nature component itself, but they could offer a useful way of supporting reintegration into the workplace following exhaustion and burnout (Sahlin *et al.* 2014; Sonntag-Öström *et al.* 2015a,b; Sahlin *et al.* 2012).

Sahlin *et al.* (2012) conducted an interpretive phenomenological analysis, identifying that NBT allowed people to slow down and take things at their own pace. Nature is viewed as an instructive, vitalizing life force within the programme, with participants using metaphor and reflection to explore the potential for new growth and recovery. Similarly, a programme conducted on the edge of a Swedish nature reserve (Sahlin *et al.* 2014) identified participants increased capacity to store peaceful or joyful images, which could be drawn upon at times of high stress. Reduction in symptoms could be influenced by social group membership, alongside the skills and therapeutic presence of facilitators. The inclusion of relaxation techniques within the programme may explain to some extent the feelings of relaxation reported.

Sonntag-Öström *et al.* (2015a) highlight that long-term stress exposure results in neural and regulatory system imbalances, indicating a need for increased restoration. NBT is posited as a useful complementary addition to both medical responses and psychological therapies for aiding recovery from severe

stress. A forest rehabilitation programme for participants on sick leave with exhaustion disorder in Sweden (or burnout) qualitatively established the value of solitary time in nature for 'peace of mind' and increased reflection on their life situation, enabling the identification of positive, health supporting life changes (Sonntag-Öström *et al.* 2015a). The companion randomized control trial (Sonntag-Öström *et al.* 2015b) failed to reach power, thus is statistically inconclusive, and it was not possible to confirm the hypothesis that nature visits could increase preparedness for Cognitive behavioural therapy. Decreased positive values were observed towards the autumn, potentially due to adverse weather; however, solitary visits in nature were helpful despite the need for regular practice to maintain results (Sonntag-Öström *et al.* 2015b). A randomized control trial undertaken by Corazon *et al.* (2018) found that the positive impacts of an NBT programme in Copenhagen's University therapy garden were sustained for a year postparticipation, but that whilst GP visits and sick leave were decreased, these still remained higher than that for the general population. They argue that a focus on NBT as a preventative measure for severe or long-term stress would be a helpful next step, recognizing that there are differences between the NBT programmes on offer, which need further examination (Corazon *et al.* 2018).

Meaning-making

Spiritual and emotional connection to place within the studies reviewed highlight how people make meaning in a natural setting, drawing on personal reflection, and making use of metaphor and symbolism (Bell *et al.* 2015; Cosgriff *et al.* 2010; O'Brien *et al.* 2014; Sahlin *et al.* 2012; van den Berg & ter Heijne 2005; Völker & Kistemann 2011, 2013). Study participants articulate a sense of place, in which landscapes have their own essence, capable of stirring meaningful reflections and powerful individual responses. Diminutive experiences or 'feelings of insignificance' in relation to the wider world or universe can provide comfort, helping to put human struggles into perspective (Bell *et al.* 2015; O'Brien *et al.* 2014; Sahlin *et al.* 2012) whilst at the same time enabling individuals to feel 'part of everything' (O'Brien *et al.* 2014). Natural spaces may mirror back one's own subjective position within the world, offering a liminal and symbolically healing environment (Bell *et al.* 2015). Nature itself is described as a therapeutic presence, capable of stirring

personal reflection on own capacity for growth, recovery, and change (Sahlin *et al.* 2012).

Cosgriff *et al.* (2010) conducted a study in New Zealand, which highlighted the Indigenous Māori perspective that the natural world is sacred and that it is not possible to separate the self from nature. Individuals often form a deep attachment to place, yet those who did not establish a connection with nature in childhood may not experience the same sense of attachment to place. Individual differences and traits may determine the extent to which a person feels connected or attached to nature (Capaldi *et al.* 2014; Cosgriff *et al.* 2010) and O'Brien *et al.* (2014) discuss Irwin's ideas of co-construction whereby we become where we are. Within such a model, the potential for less anthropocentric, healthier responses to human interaction with nature becomes possible. Such a view recognizes and respects nature as a teacher, capable of mirroring aspects of self, through which we are better able to see others (Sahlin *et al.* 2012) and respond to wider global needs.

Social inequalities

Whilst studies outline the positive social interactions which can happen in nature-based interventions (O'Brien *et al.* 2014), Capaldi *et al.* (2014) and O'Brien *et al.* (2014) identify the dominance of white western voices within the literature, and a call is made for greater awareness of the experiences and impact of exclusion (Bell *et al.* 2015). There is a need to draw on data from outside of a largely white, western, and wealthy context, particularly if we are to understand the relationship between health and nature in developing countries. The detail provided within studies seems to suggest a lack of ethnic diversity within the data (Capaldi *et al.* 2014; Cosgriff *et al.* 2010; Hipp & Ogunseitan 2011; MacMahan & Estes 2015; O'Brien *et al.* 2014). The sampling frame includes experiences of Japanese (n280), Maori (n1), Hispanic/Spanish origin (196) and Caucasian (numerous, unknown) people, with no indication of black participants at all or those defined as 'other', a highly problematic social category for those marginalized and unseen within it. Whilst it is possible that not all studies collected information on ethnicity, it is apparent that there is an absence of black voices within the literature and from within the field of research itself (Redwood & Gill 2013).

The sampling frame includes a higher percentage of women, which may or may not be representative of the settings within which studies were undertaken. When

looking at NBT, Sahlin *et al.* (2014) suggest that this is representative of the Swedish labour force. Yet, the disproportionate number of women in samples requires further consideration, examining the assertion that women are more prone to work-related stress, burnout, and exhaustion disorder (Sahlin *et al.* 2014), something which is beyond the scope of the present review. The included studies suggest that being a woman does not moderate the increased positive affect and decreased negative affect associated with nature engagement (Capaldi *et al.* 2014; MacMahan & Estes 2015; White *et al.* 2013). Some variation was evident in that women who were either younger or older and wealthier reported better mood (White *et al.* 2013) and women in middle age were more likely to express concerns about the environment (Capaldi *et al.* 2014). It might appear that middle classed women benefit most; however, larger data sets reveal no difference as a function of gender or socioeconomic status (Capaldi *et al.* 2014; White *et al.* 2013).

Cosgriff *et al.* (2010) identify that the language associated with the outdoors is often masculinized in line with dominant paradigms, reflecting long-established control of women and their distancing from nature. Interestingly, van den Berg and ter Heijne (2005) state that women are more likely to respond fearfully to natural threats; however, this assertion is based on one small qualitative study (Frederikson & Anderson 1999), which also cited the range of positive emotion expressed by the women including the sense of personal achievement gained from being in a natural setting. O'Brien *et al.* (2014) identify that women who were scared of being alone would only visit woodland sites if accompanied by others, whilst Cosgriff *et al.* (2010) point out that often women are not scared of nature itself, but of 'unpredictable human' encounters. The world remains a dangerous place for many women, with assault and violation a tragic potentiality; thus, women may justifiably feel frightened about spending time alone in nature (O'Brien *et al.* 2014).

Natural resource

It is suggested that concepts of place are constructed via the engagement of human actors, with our use and enjoyment defining the meanings attributed to natural settings (Völker & Kistemann 2013). If true, this suggests the potential to reconstruct our understanding of place in a way that honours the healing potential of nature or therapeutic landscapes and recognizes the potential complexity in achieving restoration from

stress. Of the 19 included studies, only a few actively highlight the reciprocity required for this relationship to remain in healthy balance (Hipp & Ogunseitan 2011; O'Brien *et al.* 2014). MacMahan and Estes (2015) highlight that only natural settings with life-sustaining 'resources' (presumably food, water, and shelter), rather than barren ones are considered therapeutic, whilst calls are made for appropriate planning that enriches the 'human' habitat (Hipp & Ogunseitan 2011). The consideration of biodiversity (White *et al.* 2013) and habitat protection alongside pollution and climate change in future research is necessary (Hipp & Ogunseitan 2011; Völker & Kistemann 2011, 2013).

It may cause us discomfort or pain to engage with the reality that our natural world is itself in failing health (Capaldi *et al.* 2014), yet continued orientation towards the consumption of nature, without consideration of habitat protection and restoration (DEFRA 2018) will continue to create problems for life on earth and a re-examination of this relationship is necessary (The Crex-Crex Collective 2018). Capaldi *et al.* (2014) moot the idea that pro-environmental behaviour has creative consequences for hedonic well-being (positive emotion and life satisfaction), whilst also providing positive benefits for eudaimonic well-being (self-actualization, personal growth, or functioning well). Research that identifies nature as more than a setting for human recreation is required exploring the importance of the human–nature relationship, ensuring that the well-being of the natural world itself is present within the literature, supporting the UN Sustainable Development Goals (SDG's) (United Nations 2015) and addressing the reality of climate change. As White *et al.* (2013) assert, it is nature itself that is the active ingredient in restoration from stress.

DISCUSSION

Within our analysis, an overarching concept of shared vulnerability (Fig. 1) emerged, providing a means to explore interconnected global health and well-being challenges for both people and planet. Synthesis of the literature revealed that health can be identified as a 'multidimensional, dynamic construct' (Völker & Kistemann 2011, p. 450) influenced by multifarious systemic interactions between people and place. Increasingly demanding environments at work and in our communities influence the development and maintenance of stress (Kaplan & Kaplan 1989). In collaborating with nature, consideration is given to personal preference, social characteristics, and the factors that combine to

make a landscape therapeutic and restorative. Our experiencing of nature may differ across cultures and is mediated by our lived experience, a factor not adequately addressed within the research. Differences in opportunity based on wealth, ethnicity, and gender are indicated, but cannot be confirmed due to a lack of relevant data. Dixon-Woods *et al.* (2006) highlight an interest in the influence of social patterning of individuals, settings, and environment, noting the pressure arising from time, availability, and parity of access for disadvantaged people. Part of the process of examining the literature has resulted in the need to question how the research may be borne out of a culture steeped in privilege, power, and status (Skewes McFerran *et al.* 2017). Keaulana *et al.* (2021) consider nature connectedness research within indigenous populations, concluding that the measures used to capture data may be problematic, asking questions which lack relevance to the target population and lack understanding of the impacts of social, cultural and spiritual identity. They go further in asserting that Indigenous people across the world continue to suffer from the harmful effects of continued 'colonial environmental mismanagement' alongside associated health and well-being impacts of the trauma associated with land displacement (Keaulana *et al.* 2021; p. 18). Recent reports of racist abuse faced by individuals and the powerful assertion that 'environmental racism has ripped black people away from nature' (Anifowoshe 2020) need to be urgently addressed, examining the dominant cultures, which prevent people of colour from feeling safe and welcome in natural settings. It seems that not everyone is free to benefit from the healing potential of time in nature, and it is a sad reality that for many people across the world, it increases rather than reduces stress.

The scientific revolution fuelled by Cartesian notions of the dualistic separation between mind and body signalled a departure between humans and nature. Subsequently, the enlightenment made clear the human imperative to dominate and conquer, gaining control over people (largely women and people of colour) and nature via colonialist practices. The resultant persecution of folk customs and oral traditions has influenced the way that science has responded to diverse communities and women, being a part of the mechanism, which has driven disconnection and enabled a culture of dominance and destruction to thrive in the capitalist west. Alongside human bodies, so-called insentient nature has been reduced to controllable pieces and the Anthropocene born (Jickling *et al.* 2018). Despite our

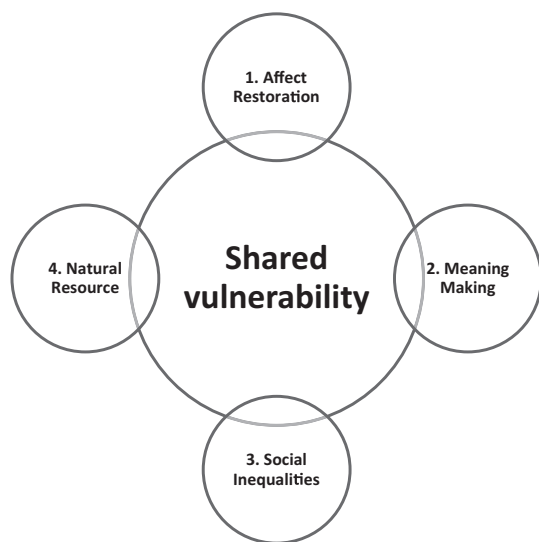


FIG. 1 Synthetic constructs. 1. Affect regulation. 2. Meaning-making. 3. Social Inequalities. 4. Natural resource.

five million year exposure to the natural world, mechanization and the advancement of technology has further distanced us within the space of a few 100 years (Park *et al.* 2009). Uncomfortable questions need to be asked about who precisely benefits from such a system and the factors within practice, education, and research which maintain it. Western conceptions of the value and function of nature within culture dominate, and other ways of knowing are diminished, for example, Keaulana *et al.* (2021) remind us that Indigenous people identify an interconnected, relationship of kinship with the natural world, viewing the land as an ancestor. Within this context, land is an active component in reflecting health within communities, stimulating a reciprocal caring relationship, especially in relation to climate change, simultaneously capable of enhancing our own well-being. The developing field of ecopsychology (Roszak 1992) studies and places value in this reciprocal relationship, and rather than being ‘anti-science’ (Fox 1995), incorporation of an ecophilosophy directs attention towards healthy relationship with nature, supporting an orientation towards radical, just and sustainable change, recognizing the impact of poor environmental choices by those in the wealthiest countries on those in developing countries or at the most risk of harm.

The subjugation of *mythos* by *logos* through the age of the enlightenment has often seen spiritual meaning-making dismissed as the enemy of science, favouring a version of ‘truth’ that at best diminishes and at worst

mocks the validity of lived experience (Skewes McFerran *et al.* 2017). It may be difficult to articulate and translate the intensity of meaningful nature experience into words (Cosgriff *et al.* 2010), yet nature connection is held up as an indicator of pro-environmental behaviour (Capaldi *et al.* 2014) and identified as essential if we are to endure in a ‘culturally rich way’ (Cosgriff *et al.* 2010). Acknowledgment of the vulnerability of our own health and that of the natural world is painful. Yet, consideration of the well-being journey may bring narratives of hope capable of stirring responses that are useful for self, others, and the world (Bell *et al.* 2015; Korpela *et al.* 2017; Sahlin *et al.* 2012; Sheffield & Lumber 2019). This may involve development of a commitment to socially shared goals (Delle Fave *et al.* 2011), and whilst this may inevitably differ across different cultures and contexts, our intent and drive to connect with others, derive meaning, and pursue goals is a part of what makes us human (Delle Fave *et al.* 2011).

Consideration of nature within the literature is oriented towards human health, examining what we can get or take away from our nature encounters. Nature is presented as an endless provider and resource generator, with areas that are vital for wildlife identified primarily as ‘cultural landscapes for human recreation’ (Tree 2018). An increased focus on ‘natural capital’ in the UK for instance, initially set up to support nature, now requires the categorization of nature to be costed as units in order to determine their presumed worth to society (Monbiot 2018). It is a sad indictment of an impoverished culture when we are required to identify the monetary cost of a bee to establish its value to humanity (Monbiot 2018; Tree 2018). Similarly, the reduction of animals to ‘objects’ (van den Berg & ter Heijne 2005) in order to fit within a biological theoretical positioning is problematic. Yet, Tree (2018) argues that when nature is economically invisible, it is disregarded. This begs the question, how do we cost something which is priceless (Tree 2018).

It would be naive to assume that there are no costs involved in providing nature-based well-being experiences alongside habitat protection. Increased corporate interest and the commodification of nature fail to ask adequate questions about how we scale up support for human health alongside the protection of habitat. Increasingly, average people are priced out of the everyday healing potential of nature, for example through the rising costs of housing near green and blue spaces and visitor parking (Völker & Kistemann 2013). There is a moral responsibility (DEFRA 2018) to

ensure that planning provides more than a mechanism for income generation at the expense of human citizens and the natural world. To that end, research could be an ally in the change process, influencing future planning considerations. Recently, in a talk given to UCL Institute for Sustainable Resources (2020), Sir James Bevan, Chief Executive of the Environment Agency in the U.K., has suggested that in the U.K. alone, ensuring that everyone has access to good quality green space could result in a saving of £2.1 billion per annum in healthcare costs and that those who live in poor environments and in the worst health would potentially see significant elevations in health. A global nursing agenda which pushes for social and environmental justice as a health promotion strategy is necessary and welcomed.

There is increasing awareness of resource use, depletion, and vulnerability amongst nurses (Richardson *et al.* 2017). The need to work more sustainably is directed by the International Council of Nurses (2019), the European Nurses Climate Challenge (Healthcare Without Harm, 2022) and through the NurSus project, which offers free, downloadable teaching resources in six languages for use in student nursing programmes (Richardson *et al.* 2017). The potential well-being effects of nature engagement for supporting both patient recovery and nurse well-being are increasingly promoted (Nejati *et al.* 2016), whilst conservation efforts are nurtured through projects such as the NHS Forest in the U.K. and the Irish Nurse a Tree programme, which plants a tree for every nurse in Ireland. With nursing recognized as a high-stress profession, it is suggested that nature-based well-being strategies may be of value (Nejati *et al.* 2016), particularly in the face of global retention issues (WHO 2022a). Further exploration of nature-based intervention for the management of occupational stress and burnout (Corazon *et al.* 2018; Sahlin *et al.* 2012, 2014; Sonntag-Öström *et al.* 2015a,b) is indicated. The use of micro-restorative breaks and activities in nature may offer a useful health promotion strategy within the workforce (Korpela *et al.* 2017; Kaplan & Kaplan 1989; Nejati *et al.* 2016) and within nurse education, providing opportunity to explore the impacts of the natural world first hand. Additionally, clinical guidelines must be adopted, which address climate change and make clear for practitioners their potential in supporting a greener, healthier future for people and planet.

The studies highlight the value of nature in supporting emotional restoration (White *et al.* 2013) with several notable factors impacting on a person's experience

of nature, including social threat, access opportunity, and the health of the environment itself (Bell *et al.* 2015; O'Brien *et al.* 2014; Völker & Kistemann 2013; White *et al.* 2013). The studies highlight manifold social and individual experiences of nature encounters for participants, which may require additional interpretation within a mental health nursing context. Whilst solo time can be powerful in supporting individuals to access and explore the self and emotion (Sahlin *et al.* 2014), it is important to consider the personal history, degree of mental distress, and cognitive function of each individual alongside the identification of perceived or actual threat within their internal and/or external landscape. The provision of opportunity for facilitated space, offering therapeutically safe social engagement and individualized support, is suggested within healthcare, and this is likely to indicate an educational skill development need for mental health nurses who utilize nature within their practice. An enhanced understanding of ecopsychology (Roszak 1992) may be of benefit to practitioners wishing to engage with natural spaces, however great or small, within their work.

RECOMMENDATIONS AND LIMITATIONS

The literature makes recommendations for further investigation of the social factors affecting nature engagement and to explore nature immersion as a preventative strategy for managing everyday and long-term stress (Bell *et al.* 2015; Capaldi *et al.* 2014). A combination of longitudinal, experimental, and qualitative designs are proposed to gain a fuller picture of the complex inter-relational dynamics (Korpela & Kinunen; Corazon *et al.* 2018; Sahlin *et al.* 2014; MacMahon & Estes 2015; White *et al.* 2013) and Völker and Kistemann (2013) recommend further consideration of space construction to enable further provision of environmental justice. Furthermore, examination of the use of nature-based interventions within a mental health nursing context is required. Future exploration of the under-representation of male voices may also help to understand perceptions around masculinity and well-being in natural settings.

Dixon-Woods *et al.* (2006) suggest that full transparency is not possible when using the creative, interpretive methods employed within CIS, and this limitation is acknowledged. Reflexive practice via a reflective diary, field notes, and the supervisory process has helped, enabling examination of own thoughts and emotions (Skewes McFerran *et al.* 2017). Whilst

extensive care and attention is given to limit the dominance of researcher voice (Skewes McFerran *et al.* 2017), this is to some extent unavoidable and strong reactions were noted, particularly in relation to the objectification (van den Berg & ter Heijne 2005), consumption, and commodification (Völker & Kistemann 2013) of nature. Given that healthcare is a large consumer of natural resources, contributing significantly to global pollution (Richardson *et al.* 2017), we feel that this concern is justified and that further exploration is warranted.

The studies located during the literature search were published between 2005 and 2018, and further contemporary research is indicated. Every attempt has been made to provide a representative sampling frame via a comprehensive search strategy, but inevitably, some literature may have been missed. Although we sought to include literature from a range of global settings, studies were only included if published in the English language and this is a noted limitation. Different authors using the same body of knowledge and tools may offer differing interpretations (Pope *et al.* 2007) and the sociocultural-political context may change through the course of a study.

RELEVANCE FOR CLINICAL PRACTICE

The United Nations (2015) propose 17 SDG's to 'transform our world', directing partnership working for the equitable attainment of good health and well-being. A systemic transdisciplinary approach for shared learning and research is suggested (MacIntyre *et al.* 2019; Hipp & Ogunseitan 2011). Addressing inequalities in therapeutic nature contact based on ethnicity, income, or sensory impairment (Bell *et al.* 2015) will support health promotion strategies, enabling wider participation, with the discipline of ecopsychology (Fox 1995; Roszak 1992) enriching discussion and understanding.

CONCLUSION

This review explores how time in a natural setting might reduce stress and improve the well-being of adults, drawing attention to our shared vulnerability. The literature supports the therapeutic potential of nature, recognizing its capacity to increase positive affect, decrease negative affect and stress, providing a sense of belonging, promoting meaning-making and fostering an interest in caring for the nature world. Yet, a picture of exclusion from nature has emerged and inequalities of access need to be further examined,

developing increased insights into the complex social factors and potential solutions for marginalized communities. Additionally, examination of our relationship with nature as a 'resource' is posited as a taken-for-granted assumption within the literature and within healthcare. Revisiting our understandings of this relationship within a nursing context may provide a useful opportunity to review and amend practice. Activities within biodiverse, aesthetically pleasing landscapes with healthy ecosystems provide the greatest potential for enhanced mental health; thus, an increased focus on reciprocity within the human-nature relationship is essential within future healthcare delivery, policy, research, and in securing protective legislations. We argue that there is an urgent need for a transdisciplinary, systemic approach that understands the shared vulnerability of the human-nature relationship as a function of our interconnected humanity.

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ETHICAL APPROVAL

This study received ethics approval from the Faculty of Health Ethics and Integrity Committee at the University of Plymouth.

DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

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