



Article

Towards Key Principles for the Design and Implementation of Nature Prescription Programs

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Abstract: The health benefits of nature are well recognised. However, nature prescriptions (nature-based health interventions) are not routine in many health systems. We interviewed health stakeholders ($n = 13$) who prescribe and provide nature prescriptions, to identify enablers and barriers surrounding nature prescriptions in Australia. Participants emphasised the importance of collaboration between health disciplines, community, government and industry sectors, alongside appropriate infrastructure. Patient-centred, accessible care supporting behavioural change and social wellbeing was enabling. Participants identified a need for increased awareness, accessible local resources and responsiveness regarding climate change. The findings reveal key considerations to inform effective implementation of nature prescribing for enhanced community health.

Keywords: nature prescription; green prescription; implementation; health services



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1. Introduction

Many of the mental, physical and social health benefits of being in nature are now well established [1–3]. Nature prescriptions (also known by terms such as ‘green prescriptions’ or ‘eco prescriptions’) are given as advice to undertake activities immersed in nature to support human health, such as outdoor exercise, forest bathing or conservation work [4,5]. Effective nature prescriptions may offer durable options for narrowing health inequalities in culturally sensitive ways [6], as well as promote connection with communities by encouraging networks between people, health professionals and nature intervention providers [2]. Further, these prescriptions provide a strategy for health professionals to sustainably support physical and mental wellbeing, thus addressing the aims of the United Nations Sustainable Development Goal of ‘good health and wellbeing’ [7].

Emerging research has uncovered a number of benefits of natural environment exposure to psychological and physical wellbeing, including a reduction in stress markers and a decreased probability of cardiovascular disease, obesity, diabetes and other preventable diseases linked to premature mortality across cultures [8–10]. Interactions in nature also have been associated with enhanced self-reported health [11], improved birth outcomes, improved cognitive development and lower obesity levels in children [12]. Recent research indicates that green environments might also facilitate life-long mobility and mitigate the risk of falls in older adults [13]. Importantly, return on investment calculations undertaken in the UK indicate that for mental health benefits alone, green exercise returns an estimated financial value of GBP 7 to 8.5 (USD 7.85 to 9.50) for every GBP 1 spent [14].

According to the 2021 World Health Organization (WHO) report on ‘green and blue spaces and mental health’, various types of natural environments enhance wellbeing for a diverse range of populations. Integrating nature prescriptions into everyday health care practice by prescribers such as general practitioners and other primary health professionals is key to implementing this type of intervention [15]. While there are examples of effective implementation of nature prescribing in some countries (e.g., UK [16,17], Japan [18] and USA [19]), nature prescribing practice is still in its infancy in most jurisdictions. Differences in health care practices and natural spaces across countries and regions also question whether existing practices would be readily translated and implemented in other jurisdictions. As discussed by Van den Berg (2017) [15], it is vital that we understand how best to support health professionals in prescribing green activities specific to their context and place.

While a wealth of research has demonstrated the positive impact of natural environments on wellbeing, health and social outcomes [1,20] and has begun to shed light on patient perspectives of nature prescribing, there is a dearth of research exploring the translation of this evidence into practice [5]. Current research suggests there are major constraints to nature prescribing, including a paucity of appropriate opportunities, activities and infrastructure, socioeconomic factors, the lack of a shared definition of nature prescribing, inadequate collaboration between stakeholders and inadequate funding [21,22]. However, as the World Health Organization (2021) [3] calls for increased provision of high-quality nature exposure, there is a specific need to understand the process of prescribing and implementing interventions that utilise natural environments [5,21]. This paper addresses the knowledge gaps surrounding nature prescription implementation by asking the following research question: “What factors are affecting the implementation of nature prescribing in Australia from the perspectives of prescribers and providers”?

2. Methods

2.1. Aim and Design

The aim of this study was to identify the needs, preferences, barriers and enablers to implementing nature prescriptions in Australia, as perceived by prescribers and providers of nature prescriptions. The study employed a qualitative descriptive approach using semi-structured interviews.

2.2. Participants and Recruitment

Participants were health stakeholders (i.e., health service providers and managers), located across Australia, with an interest in either prescribing or facilitating nature prescriptions and nature-based activities. Participants were required to be fluent in English, able to provide informed consent and have access to an internet connection and a device capable of supporting Zoom video conferencing. A sample size of 12–13 participants was considered suitable in regard to the study design, research aim and the depth and range of perspectives sought [23].

Professional associations, health care clinics and individual providers known to have an interest in nature prescribing were identified as potential participants through public websites, news articles, and contacts known to the research team. These associations, services and providers were emailed information about the study and invited to contact the research team if they (or their members) were interested in participating. Semi-purposive sampling [24] was applied to generate a sample of participants from a range of health service settings, including at least three participants (25%) from each of the following contexts: clinical (e.g., physicians), non-clinical (e.g., forest therapy guides) and management (e.g., service directors). The sampling process also selected participants from both urban and non-urban locations across multiple Australian states and territories, and it sought to represent perspectives from both prescribers (health care professionals who prescribe nature prescriptions) and providers (professionals who provide nature-based interventions and activities).

2.3. Data Collection

Data were collected between 27 April and 26 May 2022, using a semi-structured interview guide. The guide explored participants' experiences with nature prescribing, including perceived barriers and enablers to such prescribing. After reading an information sheet, participants consented to the interview and to the interviews being audio-recorded. The 30 min interviews were conducted online using the Zoom video conferencing platform. Interviews were scheduled according to participant convenience and researcher availability. Interviews were recorded as audio files with a transcript generated using the Zoom auto-transcribe function (i.e., no video was recorded). Transcripts were then anonymised and reviewed for accuracy against the recordings before being saved as de-identified files. Data were collected by one interviewer (HF) for consistency. The interviewer held a PhD in public health, had training and experience in conducting qualitative research and had no relationships with participants prior to recruitment. A copy of the interview guide is provided in Supplementary File S1.

2.4. Data Analysis

Transcripts were imported to NVivo 12 Plus (QSR International Pty Ltd., Melbourne, Australia, 2020) qualitative analysis software for coding. Data underwent inductive thematic analysis, using the method of Braun and Clarke [25]. Generation of initial codes, themes and domains was undertaken by one researcher (HF) and checked by two others (EB and ML). Themes and domains were reviewed and defined by three researchers, collaboratively (HF, EB and ML).

2.5. Ethics

Ethical approval was granted by the Southern Cross University Human Research Ethics Committee (approval number 2022/035).

3. Findings

3.1. Sample

Expressions of interest to participate in the study were received from seventeen potential participants. Thirteen individuals provided consent to participate and were interviewed. The final sample comprised individuals from both urban and non-urban locations, across five of eight Australian states and territories, including New South Wales, Victoria, Queensland, Tasmania and the Northern Territory. In order to preserve anonymity and ensure participants were not identifiable, no other demographic data were collected. Five participants primarily had experience in prescribing nature prescriptions, five participants primarily had experience in facilitating nature prescribing interventions, and three participants had substantial experience in both roles. The professional roles of participants are outlined in Table 1.

Table 1. Professional profile of participants.

Professional Role	No. of Participants
General practitioner	2
Forest therapy guide	2
Primary care director	1
Primary care community nurse	1
Sport and exercise physician	1
Horticulture industry professional	1
CEO, patient advocacy not-for-profit	1
Occupational therapist	1
Allied health manager	1
Exercise physiologist	1
Psychiatric nurse	1

Thematic analysis identified thirteen themes, which were inductively grouped into five domains: (1) Community: consultation and customisation; (2) Systems: building partnerships and networks; (3) Prescribers: cultivating awareness and capacity; (4) Prescriptions: recognising the foundations; (5) External setting: interfacing social and natural environments. These domains and themes are explained in the proceeding sections and summarised in Table 2.

Table 2. Summary of domains and themes.

Domain 1	Community: Consultation and Customisation
Themes	Tailoring to the specific and unmet needs of the population Adapting for accessibility in nature prescription activities Engagement and trust-building with community
Domain 2	Systems: Building Partnerships and Networks
Themes	Establishing connections and building pathways Creating resources tailored to the local area and models of patient care Integrating infrastructure with purpose
Domain 3	Prescribers: Cultivating Awareness and Capacity to Implement
Themes	Prescriber awareness of and familiarity with nature prescribing and its benefits Alignment with the primary care consultation and medical model
Domain 4	Prescriptions: Recognising the Foundations
Themes	Person-centred delivery Supporting behavioural change for uptake and sustainability Social engagement as an enabler and an outcome
Domain 5	External Setting: Interfacing Social and Natural Environments
Themes	Adaptive response to environmental challenges and changes Raising the profile of nature prescribing

3.2. Community: Consultation and Customisation

This domain describes the role of connection and engagement between the nature prescription prescriber/provider and the community or population within which the prescribing takes place. A community-oriented approach was applied to customise nature prescriptions to the specific needs of the community or population, which is presented in three themes: (1) tailoring to the specific and unmet sociological needs of the population, (2) adapting for accessibility in nature prescription activities, and (3) engagement and trust-building with community.

3.2.1. Tailoring to the Specific and Unmet Sociological Needs of the Population

Participants discussed the importance of tailoring nature prescriptions to the specific needs of the target population to promote uptake and sustained engagement. This included the initial identification of people with unmet needs that could be addressed through nature prescribing, such as marginalised groups with unmet psychosocial needs or patient populations with health conditions that have lifestyle-based risk factors. As well as addressing the health needs of the patient or population, participants spoke of tailoring nature prescriptions with consideration of social, economic and cultural factors, and they believed this could enhance the safety and effectiveness of interventions. Conversely, failure to consider such factors was perceived as a missed opportunity and a barrier to successful implementation.

“You’ve got to find a way to be inclusive and work with community—their communities—and understand what they want, what they need, and how to approach a green prescription seeing from their cultural perspective, because if you go in thinking you know what’s going to work, you’re destined to fail”. Participant 1, Primary care director. Adapting for accessibility in nature prescription activities.

3.2.2. Adapting for Accessibility in Nature Prescription Activities

The outdoor-based nature of nature prescribing was understood to present barriers for some populations due to limitations on physical mobility or access to green spaces. Participants spoke of overcoming these barriers through patient-led selection or co-designed adaptation of activities to various accessibility needs. Participants indicated accessible en-

vironments could be better identified (e.g., wheelchair-accessible forest trails) or developed (e.g., building gardens within in-patient settings), while the use of online technology and introduction of natural elements to indoor environments could be used for cases with very low mobility. User-generated content developed for sharing within the target population was discussed as an enabling resource as it provided empirical knowledge about what worked for the population in a practical context.

“We disseminate patient- and participant- driven stories of how nature facilitated their wellbeing and their own experiences of nature, and how they accessed it despite disability or mobility impairments. The participants discovered these resources themselves”. Participant 7, Allied health manager and researcher.

Developing content and resources in multiple formats and through a variety of media (e.g., hardcopy and online, visual and audio) was another approach to enhancing accessibility by attending to different learning styles, neurodivergence and neurological conditions.

“I find a lot of people I talk to these days, they’ve actually got learning disabilities and autism, and differences in how they want to consume information. And I find as well that people that are living with persistent pain get a lot of brain fog. So, resources like word heavy material are not going to be suitable for them, whereas a short phone call or something that is available, even on a website that they can look at, at a time that suits them”. Participant 5, CEO at a chronic pain not-for-profit. Engagement and trust-building with community

3.2.3. Engagement and Trust-Building with Community

Some prescribers and providers discussed the enabling impact of being engaged with the local community and having trusted relationships with community members. Such engagement could be deliberately developed or arise organically from being part of the community themselves. Participants described community engagement as a foundation that facilitates other aspects of nature prescription implementation, such as the development of networks and identification of local opportunities for nature prescribing. Trust-building was considered important when working with vulnerable and marginalised populations in order to address socioeconomic and cultural barriers to implementation.

“I think it’s that you do have to be out in the community to establish that type of trust and that’s the challenge. So yeah, there needs to be that community support and context and ongoing, you know . . . if you’re not consistent, people will forget you very quickly and you won’t build that trust” Participant 4, Therapeutic horticulture professional.

3.3. Systems: Building Partnerships and Networks

This domain recognises the necessity of inter-connected, locally relevant networks between people, services and infrastructure to facilitate the process of nature prescribing. Participants acknowledged that fragmented systems present a barrier to the implementation of nature prescribing and described various strategies for integrating networks through three themes: (1) establishing connections and building pathways, (2) creating resources tailored to the local area and models of patient care, and (3) integrating infrastructure with purpose.

3.3.1. Establishing Connections and Building Pathways

Prescribers and providers both frequently discussed the value of inter-disciplinary networks between health care providers, nature-based activity providers and other relevant service providers. A wide range of different stakeholders were identified as potential partners in the implementation of nature prescribing (see Box 1). These networks were discussed as knowledge-sharing opportunities and pathways to more efficient application of nature prescribing. The absence of such networks was perceived as a barrier to connecting patients with a suitable intervention. By contrast, having a range of new and existing inter-disciplinary relationships was considered useful in supporting prescribers to offer

appropriate nature prescriptions and enabling providers to reach patients who could benefit from facilitated activities. Some participants also described how community partnerships served as support networks by providing practical and financial resources to develop nature prescribing initiatives.

“You can’t connect with people in those marginalised situations if you’re not connecting with the destinations in the communities that they are interacting with. (...) There are some people who are incredibly socially isolated—but for most people, they’re having some sort of connection with community..”. Participant 1, Primary care director

Box 1. Potential stakeholder groups and partners identified by participants.

- Allied health providers
- Associations, peak bodies and patient advocacy organisations
- Community groups and other grassroots organisations
- Education providers
- General practice and other primary care providers
- Government agencies (e.g., parks) and councils
- Hospitals and other public health facilities
- Local businesses
- Mental health care providers and services
- Providers of nature-based activities
- Volunteers

3.3.2. Creating Resources Tailored to the Local Area and Models of Patient Care

When discussing the types of resources that enable implementation of nature prescribing, prescribers discussed using, or having a need for, resources that were: specific to their local area; easy to access and share; and able to be efficiently embedded within routine processes of clinical practice. Participants indicated these resources should include a range of locally available options for nature-based activities that could be routinely shared with patients through online or hardcopy materials, sometimes with the inclusion of information to educate patients about the benefits of nature-based activities. Some providers expressed a desire to connect with prescribers through similar resources as a referral pathway.

“You could say ‘I prescribe’ and up the top have all of the different options that would help me as a clinician. ‘I prescribe physical activity in nature, a walk or bike ride’, ‘I prescribe sitting in nature’, ‘I prescribe meditation’, and then down the bottom, you might have a few different links that people could look up the benefits of nature therapy or green therapy. It also reduces the burden on the doctor to explain everything then. You’ve got to have a way of making it easy for people to adopt as part of their practice when they’ve already got 50,000 things”. Participant 3, Sport and exercise physician

3.3.3. Integrating Infrastructure with Purpose

Participants indicated that nature prescribing was enabled when green spaces and other relevant infrastructure were connected in some way with systems of health service provision. This involved strategies such as co-location of health services with either green spaces or providers of nature-based interventions, the inclusion of green spaces when designing and building new health service facilities (e.g., healing gardens [26]), and recognition of existing green spaces such as parks and state forests as potential public health infrastructure. Policy-based and economic infrastructure, such as subsidised public health initiatives and private health insurance, were discussed as desirable points of potential integration between nature-based interventions and health system infrastructure. Participants also expressed that in order for green infrastructure to be utilised in a sustained manner, its design had to be suited to the specific needs of the target population or local community.

“Our hospital is being rebuilt as we speak, (...) so, based on all of the benefits we’re seeing of nature prescribing we’ve been pushing all the way along with the redevelopment to have

a lot of garden space. So that we can prescribe more nature-based things". Participant 7, Allied health manager and researcher

"National parks and state forests, sure they recognize those places for recreation, but they're not recognized really as a public health resource, which they are because it goes beyond recreation, (. . .) it is actually having those health benefits". Participant 11, Forest and nature therapy guide

3.4. Prescribers: Cultivating Awareness and Capacity

This domain acknowledges the need for prescribers to have relevant knowledge and appropriate clinical care processes to facilitate nature prescriptions, particularly in primary care where patients typically receive referrals. Participants discussed this capacity for nature prescribing in two themes: (1) prescriber awareness of and familiarity with nature prescribing and its benefits and (2) alignment with the primary care consultation and medical model.

3.4.1. Prescriber Awareness of and Familiarity with Nature Prescribing and Its Benefits

A perceived lack of awareness of nature prescribing amongst health care providers in Australia was described by participants as a barrier to implementation, as was a perceived lack of credibility of nature prescribing as a health intervention. Participants discussed a need for greater awareness and education around nature prescribing, particularly for general practitioners due to their trusted role in primary care provision, which was seen as a central opportunity for nature prescription dissemination. Research was viewed as a valuable resource to promote awareness, perceptions of credibility, and the benefits of nature prescribing amongst evidence-based professions, as noted by one participant:

"We're all evidence-based practitioners, so we're looking to draw on evidence". Participant 9, Exercise physiologist

Prescriber familiarity and personal experience with nature-based activities was discussed as an enabler as it was seen to facilitate patient-provider conversations on the topic, lend confidence to the prescriber in their recommendations and encourage patients by setting an example or "walking the talk", as one participant described:

"They can see I'm not a hypocrite, I practice what I preach. Also doing it and being involved, you're more familiar with what's available and can readily talk about it in a more meaningful way, a more personal way". Participant 12, General practitioner.

3.4.2. Alignment with the Primary Care Consultation and Medical Model

Prescribers in primary care settings (such as general practice) discussed the challenges presented by these settings in regard to introducing patients to nature prescribing and facilitating the uptake of nature-based interventions. Limitations related to the short consultation time and the need to cover multiple dimensions of patient care within each consultation, particularly when the provider is the patient's primary point of contact for health care.

"Pressure to deal with all their medical problems and review their medications, change those that need to be changed, do their referrals and all the other things that you have to do for good quality medicine. So there's not always enough time to prescribe the lifestyle changes that you'd really wish to in the vast majority of cases". Participant 12, General practitioner.

Participants described these limitations as being compounded by perceived resistance to change in both prescribers and patients, the quantity of time required to support patients through behavioural change, and a lack of focus on psychosocial factors in medical models of care. The potential to address these limitations was seen in roles played by prescribers and providers from other health and lifestyle professions who may have more time to

spend with patients to support the implementation of nature prescriptions (e.g., practice nurses, life coaches, and forest therapy guides).

“Not just time, it’s about the model of health you’re educated under I think, (. . .) a lot of other disciplines think a little bit more socially and so those ideas of going for a walk, being outside, being in the garden, spending some time in the sun, you know that sort of thing most probably makes more sense and has value for that minute of conversation”. Participant 1, Primary care director.

3.5. Prescriptions: Recognising the Foundations

The foundations of nature prescription implementation are discussed in the themes of this domain. Participants described how the lifestyle-based health behaviours embedded in nature prescriptions can be encouraged through a psychosocial approach to patient care and prescribing, which was represented in three themes: (1) person-centred delivery; (2) supporting behavioural change for uptake and sustainment; (3) social engagement as an enabler and an outcome.

3.5.1. Person-Centred Delivery

The importance of tailoring nature prescribing to individual patients or consumers was a common theme raised by participants in relation to selecting interventions and communicating the topic in patient care. Successful implementation was considered to be reliant upon prescriptions being accessible to an individual’s circumstances, not only in relation to physical capability, but also in terms of emotional, cultural and family needs. These aspects of accessibility and compatibility were discussed as being achieved through open, non-judgemental communication and shared decision-making led by patient interests, values and motivations.

“That’s probably more patient dependent than universal, so my sort of basic ethos for prescribing exercises to find something for the patient that they enjoy and try and work out what the enablers are for them to continue to do that”. Participant 3, Sport and exercise physician.

“It can be as simple as just engaging with a plant in the garden, you know touching the leaf. I use to take people with dementia out into the garden, walk around and smell flowers and touch leaves, and that’s as far as we would go”. Participant 2, Primary community care nurse.

3.5.2. Supporting Behavioural Change for Uptake and Sustainment

Implementing and sustaining patient engagement with nature-based interventions was acknowledged by participants as a barrier to nature prescription. Participants noted the impact of sociological factors on behavioural change as an additional challenge; however, they discussed the promotion of behavioural change as a pathway to implementation. The acquisition of skills to support behavioural change was proposed as an enabling characteristic for prescribers and providers, whether the skills were derived from specific training or experience in clinical care, as explained by one participant:

“Just telling someone to go out and do something through a script it is, I would dare say, very ineffective. But if you have health coaching/behaviour change skills, you can work with someone over their ambivalence to change and get them to a point where they may be ready to action some change”. Participant 1, Primary care director.

Participants also described how the facilitation of nature-based interventions by providers could potentially support behavioural change in patients, although solo and self-guided activities were also seen as playing a role in patient self-efficacy. Prescribers discussed how they encouraged behavioural change by focussing on the individual patient’s motivations or values, such as educating patients about the potential benefits of nature prescriptions for their specific health conditions, or by incorporating a sense of purpose in the interventions selected (e.g., growing food and creating art).

“I’ll try and use their physical medical conditions as a motivating tool. (...) You relate the situation to the medical condition and they become motivated to do something about it and they see the results, and so they keep doing it”. Participant 12, General practitioner.

3.5.3. Social Engagement as an Enabler and an Outcome

Many participants discussed the concept of social engagement or social prescribing as an integral component of successful nature prescribing, with particular value given to face-to-face interactions. Nature-based activities that involved a social element with other patients/community members and activity providers were considered enablers of implementation and effectiveness, as described by one participant:

“It’s a fantastic thing to do; to grow things together, to learn together, to learn how to do things, to be part of something. It’s very, very healing, it’s very connecting. (...) I mean there’s places for both—there’s places for individual but there’s also places for community. And it can build community”. Participant 6, Occupational therapist.

A bi-directional relationship was described by some participants, noting social engagement as a potential beneficial outcome of nature prescribing, particularly for patients with unmet social needs. Nature-based activities undertaken with a provider and/or in a group were also considered to promote safety and enhance patient experiences.

“Let’s say I’m working with someone who’s isolating at home. First walk that we’ll do outdoors will be somewhere where it’s not likely that we’ll see many other people, and then progressively I’ll work towards busier places in nature. (...) As they become more comfortable with walking past people, maybe even stopping for a chat, we’ll just notch it up a level. So yeah, people seem to be a lot more comfortable in that early stage when they’re in nature”. Participant 9, Exercise physiologist.

3.6. External Setting: Interfacing Social and Natural Environments

This domain acknowledges the interface between people and the natural environment through which nature prescriptions take place. Participants discussed the need to respond to the changing dynamics of the human–natural environment relationship and to develop greater public awareness of this relationship and nature prescribing; this was illustrated through two themes: (1) adaptive response to environmental challenges and changes and (2) raising the public profile of nature prescribing.

3.6.1. Adaptive Response to Environmental Challenges and Changes

With the natural environment forming a fundamental component of nature prescribing, participants noted practical challenges inherent to the changeability of natural environments (e.g., seasonal and weather variations) and the divergence of some modern lifestyles from natural rhythms (e.g., long work hours or night-shift).

“Even being too hot is a challenge. The weather I would say, sometimes environment and surroundings, is the most challenging part of it”. Participant 8, Forest and nature therapy guide.

Changes in the social environment were also noted, such as the various impacts of the COVID-19 pandemic.

“Up until COVID two years ago, we’d go every second morning. We take a walk to the beach. So that’s where the green script comes in. And now, we’ve got to try and retrain the doctors, but they’re all very nervous still and management haven’t given me the go ahead because they’ve stopped things like day leave (...) because when our patients go on day leave or shopping or overnight with family, they’ve brought COVID back to the ward”. Participant 10, Psychiatric nurse.

Adaptive strategies were discussed as ways to enable implementation in these circumstances, such as planning ahead with weather apps, having back-up plans in alternative locations, and embracing outdoor settings as lower risk settings for COVID-19 transmission.

However, the impact of climate change and an increase in severe weather events were noted as an emerging barrier to sustained implementation of nature-based interventions, as described by one participant in regard to an extreme weather event involving prolonged periods of rain:

“It’s a tricky one because if someone really wants to build up a thing, where they’re enjoying going for a walk in nature or down their favourite park and it’s just a mud pit and it’s just constantly raining (...) you can look for other spots, but it’s pretty rare to find somewhere that’s suitable at the moment”. Participant 9, Exercise physiologist.

3.6.2. Raising the Public Profile of Nature Prescribing

Similarly to the previous theme regarding *Prescriber awareness and familiarity with nature prescribing and its benefits*, participants discussed a perceived lack of familiarity with nature prescribing amongst the general population.

“I don’t think people even the general public are fully aware—not everybody—of the benefits of nature connection, green prescriptions”. Participant 11, Forest and nature therapy guide.

“Some people just don’t have much experience in nature or think it’s a bit, you know, airy-fairy, or they might have an aversion to bugs or getting dirty feet”. Participant 9, Exercise physiologist.

This perceived lack of familiarity amongst potential end-users, alongside low general health literacy, were viewed as reasons for the poor uptake of nature prescriptions by both health professionals and the public in Australia. Participants noted that individuals who are more familiar with nature are likely to already be spending more time engaged in nature-based activities and, as a result, are not necessarily the target population for nature prescribing. While there was a suggested need to raise awareness and further normalise nature prescribing in Australian society, some participants also touched on considerations surrounding the terminology used in nature prescribing and the potential implications of medicalising the human relationship with nature.

“I don’t know whether we want to put ‘engaging with nature’ as a formal script or not. It’s sort of thinking towards the future. We kind of just want it to be embedded in what we do, don’t you, that value of it”. Participant 2, Primary community care nurse.

4. Discussion

This study maps the landscape surrounding the implementation of nature prescribing from the perspective of prescribers and providers of nature prescriptions, in a country where nature-based health interventions are not yet embedded within local health systems. While previous research has argued that nature prescribing should be a fundamental component of primary health care [15], in many places, this is not represented in routine practice. The available evidence suggests that the constraints to nature prescribing programs are diverse and may include lack of access to suitable infrastructure, lack of providers offering opportunities for therapeutic nature-based experiences, poor understanding of nature prescribing, local socioeconomic deprivation and inadequate collaborations between stakeholders [1,21]. The evidence from the present study corroborates these constraints; however, our research also points to possible solutions.

A key finding from this research is that the implementation of nature prescriptions requires community support and collaboration. Participants in this study indicated that a one-size-fits-all approach to the provision of green spaces and associated activities is unlikely to be as effective as engaging the community and individual patients, and adapting opportunities to ensure relevant needs are met. This emphasis on tailoring nature prescriptions to the specific needs of communities and individuals through collaboration and person-centred care is consistent with a recent nature prescribing trial in Australia, which recommends that future endeavours co-design programs with intended users in order to optimise outcomes [27]. Previous research on physical exercise interventions also

recommends tailored approaches to addressing barriers arising in groups with different needs, such as elderly patients [28], children and culturally diverse populations [29,30].

The value of a tailored approach to the implementation of behavioural health interventions is well documented [31,32]. Input from community members is arguably critical to delivering a tailored approach, as these members are well-positioned to provide necessary local context and to identify local unmet health and social needs. Community collaboration may also provide opportunities to enhance local literacy around health and nature, the lack of which was identified as a potential barrier to the implementation of nature prescriptions in another study [27]. Consistent with previous research examining the perspectives of UK prescribers [21], participants in the present study emphasised the need to communicate the benefits of nature for health and raise the public profile of nature prescribing through partnerships between the health system, government and other relevant stakeholders.

As well as building connections with community, participants in this study suggested that nature prescribing programs need to be supported by well-designed systems and carefully considered partnerships between prescribers and providers; a finding also reported in previous research [21]. However, beyond the provision of appropriate systems and processes, prescribers need to be confident that providers are able to offer recommended health interventions, as well as deliver individually focused care that fosters health behaviour change. Research on the prescribing of physical exercise has shown that suitably trained providers (e.g., physical activity specialists) are able to offer patients appropriate, safe, effective and individualised counselling when implementing a prescription, and importantly, patient support from such providers can have a positive impact on behaviour change [33].

The presence of activity providers also introduces a social element, particularly in group settings [9,22]. This perspective was corroborated by participants in our study, who noted that ‘provider presence’ was valuable to the process and outcomes of nature prescribing. The creation of local directories and resources was seen as an opportunity to connect prescribers and their patients with intervention providers; these resources served to not only support the uptake of nature prescribing, but also to facilitate sustained patient engagement and health outcomes by fostering networks between primary care professionals and providers with targeted expertise in nature-based activities (e.g., forest therapy guides and therapeutic horticulturalists) [16,34]. Participants in our study also noted the value of including additional stakeholders in such networks, such as health/community organisations, policymakers, local government and infrastructure managers. These inclusions are reflected in other studies, which underscore the importance of collaboration across different sectors of health care and public resources for successful, sustainable implementation of nature prescribing [21,27].

Different elements were considered by our participants to be integral to nature prescribing (e.g., natural environments and green infrastructure) or necessary for its success (e.g., person-centred care and behavioural change support). These elements spanned multiple sectors, disciplines and skillsets, highlighting the complexity of nature prescribing. Such complexity is not always aligned with extant health care systems or models of patient care, as voiced by participants both in this study and others [17,34]. This may be compounded by the lack of public and prescriber awareness of nature prescribing [21,27]. Even so, previous research suggests that health care practitioners are open to implementing nature prescribing if suitable pathways are created [22]. The development of frameworks and other resources to guide the systematic, multi-disciplinary design and implementation of evidence-based nature prescriptions could enable more widespread use of nature prescribing in Australia and elsewhere. The findings presented in this paper provide an impetus for such change, by revealing a set of foundational criteria to guide the development of such tools through further research, which is currently underway. Future research could build upon this work by exploring how these foundational criteria apply in specific and specialised settings, developing deeper and more concrete guidance for a range of stakeholders involved in nature prescription implementation.

While the development of accessible tools and streamlined systems could practicably enable increased nature prescribing, other barriers may be more challenging to address, such as those raised by study participants regarding climate change and severe weather events. Despite the difficulty of responding to such intractable challenges, nature prescribing may present its own solution in the bi-directional relationship between human and environmental health; that is, individuals who engage more with nature are more likely to exhibit concern and care for the natural environment [35,36]. Additionally, communities exposed to more green space may demonstrate greater resilience to distress and trauma from severe weather events [37]. Nature prescribing may also directly encourage environmental care through the incorporation of conservation initiatives [5]. Such incorporation also lends a sense of purpose to the nature prescription, which some participants of this study considered an enabling factor, which is consistent with previous research [5].

The findings of this study offer valuable guidance on the implementation of nature prescribing; however, the translation of these insights requires consideration of the study limitations. Due to nature prescribing being uncommon in Australia, and the need to protect the confidentiality of participants, detailed demographic data were not recorded, which may have resulted in the perspectives of some relevant demographic groups being under-represented. Similarly, the use of purposive sampling may have introduced some degree of selection and cognitive bias, as individuals with experience of nature prescribing (i.e., participants in this study) may encounter different barriers and enablers to prospective prescribers/providers who have not yet implemented the practice. To some extent, the recruitment of a broad range of professional roles, from both prescriber and provider perspectives, helped mitigate these limitations. Finally, although the small sample size was considered suitable for the research aim and design, qualitative findings from small samples need to be interpreted with consideration of contextual factors.

5. Conclusions

This study has shed new light on the needs, preferences, barriers and enablers to implementing nature prescriptions among Australian prescribers and providers. The findings highlight the complexity of implementing nature prescription, including the various stakeholders involved and the numerous barriers to implementation that need to be overcome. The need for greater guidance on how to facilitate the implementation of nature prescription (such as a guiding framework) may provide a potential solution to facilitating more widespread use of nature prescribing in Australia and elsewhere.

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