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Factors influencing access to green health prescribing in primary care for older adults – A qualitative systematic review

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Abstract

Background

Green health prescribing (GHP) refers to nature-based interventions (NBIs) prescribed by a clinician or qualified health or social care professional. Given the ageing global population and increasing care needs posing severe challenges for healthcare systems, green health prescribing has emerged as a potentially effective and efficient to support healthy ageing in older people living with long-term conditions. This evidence review aimed to identify the barriers and enablers to access, uptake, implementation and delivery of NBIs

Methods

We undertook a systematic review of qualitative evidence exploring the barriers and enablers of green health prescribing and engagement with nature-based interventions. Searches from 2000 up to October 2024 were conducted in Medline, PsycINFO, ASSIA (Applied Social Sciences Index and Abstracts), GreenFILE, Web of Science and Dimensions and Overton and Google for grey literature. Study selection (based on *a priori*-defined eligibility criteria), data extraction, and quality appraisal were conducted independently by two reviewers and discrepancies were resolved by a third reviewer. Qualitative data were extracted from each article, and we conducted an inductive thematic synthesis of data. We followed reporting guidance from the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), the Enhancing transparency in reporting the synthesis of qualitative research (ENTREQ) and GRIPP2 for patient and public involvement and engagement (PPI-E)

Results

Ten overarching factors were identified from 27 included studies representing barriers and enablers of access to or implementation of green health prescribing and nature-based interventions. Key barriers included challenges in programme accessibility, gaps in service provision and healthcare professionals' knowledge, prescriber hesitancy, limited organisational capacity, socioeconomic disparities, and limited evidence of effectiveness. Conversely, enablers included accessibility of green spaces, positive experiences in social engagement and connecting to nature and provider's enthusiasm and commitment.

Conclusions

Our findings explore factors that can directly influence access and engagement of older people with NBIs, and organisational capacity of service providers and prescribers. To realise the full potential of green health prescribing in supporting healthy ageing and reducing health inequalities, future efforts should prioritise accessible programme design, invest in community provision infrastructure, and improve the integration within primary and community care settings.

Systematic review registration

1. Introduction

With the number of people aged 60 years and older projected to increase from 1.1 to 1.4 billion globally by 2030 [1], addressing physical, psychological and social determinants of health in older people using preventative approaches have become critical. Ageing has been observed to be associated with reduced levels of physical activity and increased sedentary lifestyles leading to detrimental health outcomes [2, 3]. The literature shows a significant relationship between exposure to nature and improved mental, physical and social wellbeing among older adults who are often experiencing social isolation and limited time outdoors [4, 5]. Healthcare sectors are recognising the potential role of connecting with natural environments with green (including parks, forests, gardens) or blue spaces (including oceans, lakes, rivers, ponds) may help to reduce the risk or impact of diabetes, cardiovascular disease, cancer, anxiety and depressive symptoms [6–8].

Green health prescribing (GHP) refers to a prescription of nature-based activities that utilise materials connected to nature, and/or undertaking activities in the natural environment to benefit health [9]. GHP is a form of social prescribing, a broader practice connecting patients to community based and non-clinical organisations providing support including but not limited to nature-based activities [10]. GHP may involve community gardening, horticulture projects, and other physical or culture-based activities conducted in green spaces or other natural environments [11]. These can be prescribed by a qualified health or care professional; however, people may self-refer into services, or activities. Evidence shows that GHP is gaining an increased acceptance among some general practitioners (GPs), leading to a growing implementation of prescribed nature-based interventions (NBIs) across the UK [12, 13]. GHP may support potentially relieve economic strain on healthcare services [14, 15] and support and empower people in the self-management of their long-term health conditions [16].

However, there are challenges to delivery of GHP, including uncertainty about the frequency and attendance of interventions. Problems with lack of funding, organisational support and awareness of how to prescribe NBIs among service providers and key stakeholders have been identified [12, 13]. However, evidence is limited in exploring the barriers of the uptake of NBIs in diverse ethnic and marginalised communities and appears to have a lack of referrals and provision of non-medical prescribing within these populations [17], in spite of research suggesting that GHP would be of greater help in areas of lower socio-economic status [18, 19]. Disparities in access to natural environments and green health pathways are established to be key drivers of health inequalities [17]. Despite some literature showing no significant difference between proximity of green spaces and accessing natural environments with areas of socio-economic status [13, 20], studies have shown those with lower household incomes have reduced access to safe and secure green spaces, with a greater number of abandoned parks in these areas [21]. There is, therefore, a need to understand how GHP can be leveraged to potentially help to prevent and treat ill-health, also in communities with limited natural

environment, emphasising the importance of developing GHP services which are accessible and flexible for different geographical locations [22].

This qualitative systematic review is part of a broader evidence synthesis project that also examined quantitative evidence on the effectiveness of NBIs and GHP (reported separately). This qualitative work aimed to understand the barriers and enablers for increasing a) GHP by health and care professionals, and b) access to and engagement of healthcare providers and older adults with NBIs, with an emphasis on those living in areas of high socioeconomic deprivation

2. Methods

We followed the Cochrane Handbook for Systematic Reviews of Interventions guidance for undertaking the review [23]; PRISMA [24, 25] and the Enhancing transparency in reporting the synthesis of qualitative research (ENTREQ) guidance for reporting the analysis [26]. Completed checklists for PRISMA (Additional file 1: Table S1) and ENTREQ (Additional file 2: Table S2) are available in Additional files. The review has been registered on PROSPERO (registration no. CRD42025603199). The study protocol was developed and approved by the National Institute for Health and Care Research's Evidence Synthesis Programme on 20th February 2025.

2.1 Patient and public involvement and engagement (PPIE)

We engaged with public contributors including service users who had experience in receiving GHPs and utilising NBIs, a GP, and service providers who have been involved in running a GHP related organisation and/or leading GHP related activities. We followed the ACTIVE Framework guidance to inform PPIE activities in systematic reviewing [27]. Our PPIE members involved and engaged with this research as outlined in Table 1. We followed the GRIPP2 reporting checklist to report the organisation and impact of PPIE in this review (Additional file 3: Table S3) [28].

Table 1
Levels of patient and public involvement

Level	Description
Influencing	Commenting and advising on studies included in the review, influencing the review process (data extraction, resolving uncertainties, and data interpretation stage).
Contributing	Providing thoughts and feedback that indirectly influence the review process (interpretation of findings and reporting).
Receiving	Receiving information about the review and results.
Critiquing	Critiquing/commenting on the applicability of study findings.
Sense checking	Sense-checking our presentation/interpretation of findings
Developing	Helping develop our logic model by sharing their lived experience and perspectives.

2.2 Search

Searches were developed and carried out by an Information Specialist on: MEDLINE, PsycINFO, ASSIA (Applied Social Sciences Index and Abstracts), GreenFILE, Web of Science and Dimensions from 2000 – October 2024 to identify published articles in English. We searched the literature from 2000 onwards as our scoping of the literature indicated that research on the referral of non-medical prescriptions involving NBIs only started to emerge in early 2000s [29]. Grey literature was searched for via Overton and Google. Published protocols were checked to identify the main publications for completed studies. Search results were managed and de-duplicated in EndNote 20. Titles and abstracts were exported into Covidence to facilitate the subsequent reviewing process [30]. The search strategy is available in the Additional file 4: Table S4.

2.3 Study screening and selection

Two reviewers independently screened titles and abstracts to identify potentially relevant studies. The full texts of relevant studies were retrieved for further assessment against the pre-specified selection criteria (Table 2) by two reviewers. At both stages, disagreements were resolved by discussion or referral to a third reviewer.

Table 2
Study selection criteria

Domain	Barriers, facilitators, perceptions and experiences
Design	Must have used either qualitative methods for data collection and analyses of qualitative evidence, or surveys that report individuals' perspectives, barriers or enablers of GHP.
Setting	Any country with no limitations. Primary care and community settings including general practice, out-patient care, integrated care services, residential care. Studies conducted in multiple settings were excluded unless data from the setting listed above were reported separately.
Population	Adults aged 50 years or above or studies reporting a mean age of 50 years and above.
Intervention	GHP, focusing on NBIs (this could involve undertaking activities in green space, urban natural environment, forest, garden, park, blue space, natural areas and landscape; or performing activities using materials sourced from nature or in connection with nature in indoor settings) that are prescribed by a clinician or other qualified personnel as part of health services; NBIs that were not yet part of health services but that focused on older people and were formally evaluated in research studies were also included.
Comparator	Not applicable.
Outcomes/ Evaluation	Barriers, enablers, engagement, experience and perceptions for service uptake, use and/or service provision and delivery.
Language	English
Publication	Inclusion: full-text and completed studies published from year 2000 onwards. Exclusion: studies published only as abstracts as they do not report sufficient details for appropriate assessment.

2.4 Data extraction

We developed and piloted a data extraction template form in Covidence. We aimed to extract the following data were extracted from each study: first author, date of publication, study location, design, setting, comparison group (where relevant), sample size, participants' characteristics (including social determinants according to PROGRESS-Plus), methods and techniques of data collection and analysis, results/themes including verbatim in text quotes, participants' ID and contextual data to illustrating the quote, and PPIE information. Extraction of data regarding study design and characteristics was carried out by one reviewer and checked by a second reviewer. Discrepancies were resolved by discussion or referral to a third reviewer.

2.5 Risk of bias assessment

We used the Mixed Methods Appraisal Tool (MMAT) to assess the methodological quality (rated 0 to 5*) of both quantitative, qualitative and mixed methods studies [31, 32]. The appropriate MMAT checklist was used, depending on the design of the study. For mixed methods studies, all three checklists

(quantitative, qualitative and mixed methods) were completed. Assessment was undertaken by two independent reviewers, with disagreements resolved by discussion or a third reviewer. MMAT scores were used to provide an indication of qualitative research design and/or reporting [32]. Studies are assessed choosing either yes, no or unsure to each of the 5 questions. Scores of 4* or 5* indicating high quality, a score of 3* moderate quality, and a score of 1* or 2* low quality.

2.6 Evidence synthesis

Qualitative data was synthesised using the inductive thematic analytical approach [33], facilitated by a juxtaposition matrix where rows were the key themes. This method focused on deriving themes from the content of the data using quotes from the included literature. Our synthesis began with the reviewing of relevant quotes which served as initial coding units to determine patterns in the data. These quotes and their unique codes were classified into either barriers or enablers and checked by two reviewers (JD and CL). Supporting statements and justifications were identified to support the patterns in the data. The initial codes were grouped and clustered based on their individual meaning and significance, which informed the development of analytical themes and sub themes. The grouped codes were subsequently refined into broader overarching categories which are presented with illustrative quotes and study data. The findings of the synthesis were shared with our PPIE groups, with whom we worked to develop our interpretation and refine a logic model. Our findings describing the processes underlying the influencing factors, pathways and experiences of GHP and NBIs in older adults.

3. Results

3.1. A total of 12,553 unique citations were imported into Covidence for screening. 41 studies were left to screen after which and 27 studies provided qualitative data to inform the qualitative synthesis. 21 studies generated quantitative findings measuring the effectiveness (submitted separately) and seven studies were mixed methods and were included in both reviews [34–40]. The main reasons for exclusion of studies included the lack of a ‘green’ element, populations under 50 years of age or, interventions that were conducted in multiple settings. The included studies were published between 2000–2024, with most studies published after 2019. The PRISMA flow diagram can be found in Fig. 1.

3.2 Characteristics of included studies

Twenty-seven studies were categorised as barriers and enablers of GHP or engaging with NBIs among older adults. Twelve studies used mixed methods [34–45], thirteen were qualitative [46–58] and two studies employed quantitative methods using cross-sectional surveys [59, 60]. Study characteristics are detailed in Additional file 5: Table S5. Eleven studies included service users living in nursing or residential homes or attending medical welfare centres with or without disorders such as dementia and physical disabilities [34]. Eleven studies included service providers ranging from GPs or family physicians, other healthcare professionals, horticulture therapists (social and therapeutic horticulture practitioners), and other stakeholders such as link workers or community garden facilitators [41, 43, 44, 47–50, 54, 58–60]. Five studies involved both service users and providers [42, 51, 53, 55, 57]. The largest number of studies

(nine) were conducted in the UK, eight in the US, four in Eastern Asian countries, three in Europe excluding the UK, and one in each of Australia, New Zealand and Canada. The included studies were published between 2000–2024, with most studies published after 2019.

3.3 Quality appraisal

Eleven studies assessed as high quality, 5 studies as moderate, and 11 as low (Additional file 6: Table S6) [34–36, 38–40, 45, 46, 52, 56, 37]. Most qualitative studies were considered of high quality, whereas mixed methods studies were rated lower quality. The main methodological limitations was a lack of sufficient data, where quotes were not presented to support the justification of themes/evidence [34, 36, 38, 47]. The mixed methods studies often did not formally integrate both the qualitative and quantitative data and were characterised by poor reporting of qualitative methods and analysis. For example, four studies failed to address one of the two screening questions on MMAT, concerning *'Do the collected data allow to address the research questions?* [34, 59, 60, 62]. However, we judged that it was appropriate to continue the quality appraisal based on guidance for the MMAT [31, 32].

3.4 Qualitative synthesis

Our synthesis identified ten themes which were categorised as either addressing the barriers (7 themes, Table 3) or enablers (3 themes, Table 4) of GHP. Tables 3 and 4 list the studies that contributed to the development of individual factors, which are described in detail with illustrative quotes. A full list of quotes from data extraction can be found in Additional file 7: Table S7 (barriers) and Additional file 8: Table S8 (enablers).

3.4.1 Barriers

a. Accessibility and participation challenges

GHP posed many accessibility challenges for older adults to access or continue to adhere to prescribed interventions including transportation constraints, mobility challenges, and environmental hazards.

Transportation constraints

Challenges arising from the physical locations where the NBIs took place were an issue for most older adults, who emphasised that parks and gardens were too far away and that they were unable to travel the distance to access these environments due to transportation constraints.

"I would be interested to see what people's goals are, and if OT feels a need more to work on ways to accommodate or adapt the way that they're getting to the activity vs. actually participating in the activity, because I know the goal is to be in the community, to be outside. But if your goal is to.. . look at the flowers in the Botanical Garden, but you have to take a bus to get there. Then me as an OT, I'm thinking.. . How do we work to manage that part of the activity vs. engagement in the activity itself, because it seems like a prerequisite to get there.. ." [51].

Older adults described challenges to access green spaces due to mobility issues suggesting a lack of inclusivity within the interventions. Older adults in care homes or those with disabilities experiencing impaired mobility or cognitive function reported having trouble adhering to prescribed activity, if interventions are too physically demanding.

"On the weekends you better hope someone comes to visit so you can go outside, otherwise the days are long" "Sometimes I can't find my way out into the garden, I walk around and around. Well, it makes you sad when you get lost. The halls are so long, I call them runways" [46].

Environmental hazards

Studies showed that the harshness of winter and extreme heat such can present many obstacles comprising the safety and accessibility of outdoor settings and limiting compliance to outdoor activities.

"Even being too hot is a challenge. The weather I would say, sometimes environment and surroundings, is the most challenging part of it" "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" [48].

"But still even in the winter, we get lots of people who hunker down in their apartments all winter long and get really, really depressed. So, I think the barrier is simply environmental, three hours or no hours of daylight, with temperatures that can frequently be stuck somewhere between − 35∘ and − 45∘, is a pretty big barrier for some people" [42].

b. Cultural sensitivity

Service providers expressed concerns about the cultural appropriateness of prescribing NBIs, to indigenous individuals from Australia and Northwest territories of Canada. In these countries papers describes respondents having a deep relationship with nature and land.

"*Telling Indigenous patients that they need to spend more time on the land, being a white person in a white institution that has done several horrific things in the past and continues to do so, is very problematic, and I'm very sensitive to that. So, knowing what's right for the patient and giving an order, or a prescription, for the patient, to do something that was taken away from their people by the people of the doctor, I'm not comfortable with"* [57].

"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" [48].

c. Prescriber hesitancy and lack of buy-in due to medicalisation of nature

This theme covers the experiential barriers faced by healthcare professionals, where providers express a philosophical aversion when formally prescribing NBIs conflicting between medical formalism and desire for cultural normalisation of engaging with nature related activities [50] [48]. It is discussed that engagement with nature should be embedded within general activities of everyday nature working towards cultural normalisation and not administered as a clinical prescription governed by medical formalism.

"You don't want to be in a place where you end up over-medicalising something that should just be innate and all around us, and naturally and freely accessible for all and yet it is really important to create this much needed reconnection, and to value the therapeutic benefits…. My only fear that I would have is that does it then become just another form of consuming nature and commodifying it" [50].

"*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"* [48].

d. Lack of knowledge and experience of nature

Limited understanding among Service Users

A major barrier for effective implementation of GHPs was individuals' knowledge gaps around the utilisation of nature as a health intervention. A recurring pattern was the lack of awareness of the value of engaging with nature, making it challenging to commit and view these as credible health interventions.

"*I don't think people even the general public are fully aware not everybody of the benefits of nature connection, green prescriptions"* [48].

"The general public doesn't understand the incredible importance of time outdoors. There are also issues of trust with prescribers" [44].

Lack of knowledge among primary care professionals

The evidence showed that prescribers may lack the awareness and practical experience to offer GHPs. Healthcare practitioners should not solely rely on literature but should gain a practical, personal relationship with nature [58].

"Doctors are reluctant to prescribe for a variety of reasons especially if they do not have positive personal outdoor experience" [44].

"When we start something new like this (a nature-based intervention), it is important that someone has already tried it out and that we can rely on the literature. We always start with a literature review and then we look at what already exists, but when we get into practice, we also let go of that to some extent, like, okay the science is there but we look to what we can use practically and what is workable for us." [58].

e. Socio-Economic and environmental disparities

Areas of higher deprivation may lack safe, accessible natural spaces or appropriate support and resources to enable their utilisation for health purposes. Economic and resource constraints can make it challenging for individuals to participate in NBIs, undermining the ability for GHPs to promote equitable access.

"May not work if perceived barriers still exist, such as not feeling welcome or safe in the park/space/facility or if someone feels they can't participate without the "right" clothing, shoes, equipment, etc. May be costly and hard to sustain without financial support to cover fees, transportation, program staff, etc." [44].

"If somebody is impoverished and struggling just to make ends meet and raise their children, the thought of going out and spending time in nature can be a huge barrier" [57].

Frequent engagement with green spaces can be influenced by level of deprivation, as deprived areas appeared to have a correlation with poorly maintained environments [54]. This environmental disparity may limit access to green spaces among older adults living in deprived areas who could benefit most from NBIs.

"So you know, I've got quite a lot of green space where I live. There's not as much deprivation where I live but literally the next borough to me or not even the next borough, the next ward to me is red [on the map]… It's got low levels of natural green space and is considered to have high levels of deprivation. So really it doesn't just vary from county to county; it's borough to borough and then ward to ward. It's like anything else, you only have to drive 5 minutes in a city to see the disparity" [43].

f. Organisational capacity for service delivery

The overarching theme of organisational capacity for service delivery is composed of four sub themes focusing on time constraints, financial instability, lack of staff and training. These represents systemic challenges within healthcare and community providers.

Consultation time constraints

The time available to administer GHPs whilst conducting other clinical tasks such as assessments of patients' health was a significant barrier for prescribers. It was often noted that healthcare professionals are already overburdened with work and therefore it is not practical or feasible for them to provide guidance and support to older adults regarding NBIs.

"Sometimes the conversation doesn't get that in depth when it is part of a larger visit with a lot of other issues. So, if somebody specifically came in and said, 'I'd like to have some recommendations regarding exercise and weight loss,' then I think we'd have to, and we're afforded the time to do that. But when you are trying the assess them for their blood pressure or their heart disease or whatever, and I don't think the conversation gets that in depth" [49].

"They're working so hard. You know they've got that many patients per day and where is the time for them to know about new activities…they will have their 3 or 4 goes to for nature-based activities. I can guarantee" [43].

Financial sustainability and resources

Studies emphasised the issue of retaining funds in the long-term for supporting design, delivery and maintenance of GHP. The continuous cycles of unstable and short-term funding caused difficulty in organising interventions, workplace management and contributed to unstable environments, especially for small business providing NBIs.

"Any conversations that you have with community groups, it always comes back to funding. So, the need and the want to do it is always there but they have to fund it. And so that can always be a barrier. They're probably in the best position to actually run a nature-based activity" [43].

"It wasn't funded. It was mandated. It was a partnership that had really come about at a local level through the kind of goodwill of partners" [54].

Lack of staff

Recruiting staff that are willing to provide these services was reported as a major issue. Studies reported high staff turnover and the lack of recruitment creating a burden on the workplace. Undeveloped infrastructure offering appropriate support and guidance for staff and volunteers involved in providing NBIs was considered an important barrier.

"*And finding good volunteers isn't easy. And affinity with the target group as well as the outdoors aspect, that combination, those are unique people"* [41].

"And the sector in terms of people working in it, they change jobs quite a lot… you know people thinking right, probably I'll move… so as soon as you could get something up and running, that person might leave for a different green job" [43].

Lack of training and standardisation

A recurring theme across the studies was the inadequate supply of training and accreditation for healthcare professionals offering GHP. Establishing a clear structure and organised approach were considered significant for safe and effective implementation of GHP, though it was acknowledged that there are no existing frameworks.

"*It is clear that healthcare staff are aware of the benefits but require training and development of clear referral pathways to effectively prescribe nature-based interventions"* [50].

"I think it would be helpful to have some more general standardisation… somebody needs to be confident about things like safeguarding and making sure it's legitimate, and it's a quality activity and it's safe… so

there may well be a role for some kind of accreditation… And although they might do things differently in the Southwest compared to up Northeast, for example, we could learn lessons off each other. I'm sure we could have something that was almost like an overarching standard, if you like." [43].

g. Evidence-based evaluation and practicality

Issues were identified regarding the practicality and need for stronger evidence for the effectiveness of GHP to meet the benefits that this service could provide. Healthcare professionals working in organisations that associate with parks or recreation services stressed the lack of evidence for the clinical effectiveness of GHP in the management of targeted medical conditions.

"There are no randomized controlled trials (although one is currently in progress at Unity Healthcare in DC). Doctors get no training on the benefits of outdoor visits. Research on dosage is not sufficient to connect outdoor setting with the treatment of specific medical conditions. Doctors who are willing to prescribe have difficulty finding the time in the clinical setting" [44].

Table 3
Barriers reported in included qualitative and mixed-methods studies

Theme	Sub theme	Participant	Study
Accessibility and participation barriers	Transportation constraints	Service users	[35, 51, 55, 56], [35, 42, 46, 48, 50]
	Environmental Hazards	Service users and providers	[46, 48, 50, 55]
Cultural sensitivity		Service providers	[47, 48, 54, 57, 59]
Prescriber hesitancy and lack of buy-in due to medicalisation of nature		Service providers	[44, 48–50, 54, 58, 59]
Lack of knowledge and experience with nature and the concept of GHP	Lack of experience and knowledge from service users	Service users	[43, 47, 48, 53, 54, 59]
	Lack of experience and knowledge from service providers	Service providers	[43, 47]
Socio-Economic and environmental disparities		Service users	[43, 47, 49, 50, 55, 57] [43, 54, 55, 58]
Organisational capacity and service delivery	Consultation time	Service providers	[41, 43, 49, 59]
	Financial sustainability	Service providers	[43, 47, 50, 54, 55]
	Lack of Staff	Service providers	[41, 43, 44, 50, 51]
	Lack of training and standardisation	Service providers	[43, 47, 48, 50, 59]
Evidence-based evaluation and practicality		Service providers	[43, 44, 47, 58]

3.4.2 Enablers

a. Green Space accessibility and environmental factors

The location of green space was identified as a critical factor for the uptake of interventions as living within proximity to green spaces enabled greater interaction with nature. A further observation was the importance of good weather explaining the benefit of NBIs on mental health.

"Man, we can access nature within minutes of just about anywhere in the North... We're just so fortunate to live in a part of the world where we're absolutely blessed with an absolutely phenomenal nature environment that's easily accessible" [57].

"*Ever since I came here, I've tried to take advantage of every ray of sun there's been*", *"Yes, it's the sun I enjoy, my best ever free friend"* [46].

b. Social engagement and motivation

We find that NBIs can foster social engagement and increase motivation and confidence, all of which were recognised as important factor to contributing to participants' adherence to interventions which may ultimately influence health outcomes. Studies revealed how the natural surroundings and the opportunity to engage in social interaction with like-minded peers played a pivotal role in participants' enjoyment and meeting their needs.

"*I liked having a chance to talk with others and having something to do together. I got to know more friends through the horticultural therapy activities … lots of friends…. Joining the horticultural therapy activity was nice; it was fun. We chatted while working together in a group. I liked having a chance to talk with others and having something to do together"* [39].

"Old people tend to have lots of health issues, and they just want someone to talk to about them. So, having this project would give them this chance to moan about their issues, and then maybe reduce the likelihood that they will go to a doctor to do the same. I don't think they're looking for help, like medical help, they just want someone to moan to about it" [55].

NBIs seemed to offer personal fulfilment and increase older adults' motivation through the act of connecting with nature, suggesting an intrinsic satisfaction that enhances self-worth. In addition, having an objective and desire to complete tasks was identified as a key driving force to bringing positive experiences into participants' lives.

"I do not feel useless, dodging about the house, I have a sense of purpose, I have to garden", "I have tasks to do, so am doing something" [56].

"It's made me think more about expanding [sharing] my own gardening knowledge. Like maybe going down to the local school and planting a bean plant or something…that maybe I could do something more than just for myself. And, especially in this economy, a lot of people are not eating like they should 'cause they can't afford the food…So, I think, I wanna make a bit more of an effort to help - somebody, in some small way" [37].

c. Provider commitment and enthusiasm

This theme explores how a supportive network of healthcare professionals and providers offering appropriate supervision and enthusiasm can impact older adults' uptake of NBIs, despite the absence of

sufficient structural support with limited funding and high staff turnover.

"And I think that's another critical thing. It often comes down to individuals…so you've got [a certain individual] running this green care network. He's like a sort of dynamo of energy. He's brilliant. And without him I don't think any of that would have happened. So, he's brought together all of this stuff into a network. New activities are happening simply because you've got that one individual who's really bought into it all. And, you know, we could do with [a person like this] in every county really" [43].

Table 4
Enablers reported in included qualitative and mixed methods studies

Main Theme	Participants	Study ID
Green Space accessibility and environmental factors	Service users	[46, 52, 57]
Social engagement and motivation	Service users	[35, 38–40, 52, 55]
	Service users	[35, 38–40, 46, 55, 37]
Providers commitment and enthusiasm	Service users and service providers	[39, 41, 43, 44, 46, 48, 51, 54]

3.4 Logic model

Based upon our findings from both quantitative and qualitative evidence and informed by lived experience and additional insight shared by our PPIE group members, a logic model was created to show possible mechanisms and pathways through which GHP may influence health and wellbeing outcomes in older adults **(**Fig. 2**)**. Co-developing a logic model to map the possible components, mechanisms and outcomes of GHP programmes helped to identify opportunities and priorities for research and implementation, which remain crucial as health systems make further investment to promote GHP [12]. Synthesis of the quantitative evidence from intervention studies (submitted separately) showed GHP may potentially lead to positive effects on mental health, reduced loneliness and social connectedness [63].

4. Discussion

We critically examined and synthesised the findings from research evaluating the barriers and enablers of GHP and NBIs in older adults. We explored both service users' service providers' and prescribers' perspectives of GHP and engagement with NBIs.

4.1 Main findings

Participants who engaged in NBIs shared positive experiences, related to the opportunity for social engagement and perceived benefit for mental and spiritual health. NBIs brought a sense of purpose and were seen as motivating and enjoyable for many service users. The completion of horticulture related

tasks directly contributed to a significant boost in motivation and accomplishment. This was not only linked to personal self-esteem but deeply intertwined with social connection. The scenic outdoor environments and the convenience of accessing local parks were key enablers for older adults. Service providers demonstrated credible assistance and commitment to administering nature prescriptions to older adults and going beyond the level of demand despite the lack of organisational support and practical evidence to assist them.

This review explored challenges of GHP highlighting cultural sensitivity, prescriber hesitancy, low levels of knowledge among primary healthcare professionals, limited provider capacity and lack of organisational support. Limited consultation time and lack of staff was observed among prescribers and GPs whilst service providers and NBI related organisations were concerned with financial sustainability. Concerns were raised of overburdening the small scale commercial and/or community-based, voluntary organisations with referrals if GHPs continue to increase without the necessary staff and organisational support. Prescribers were hesitant regarding the concept of a nature prescription due to medicalising green spaces. This may frame the connection with nature as a clinical treatment when it should be a natural behaviour in society. This may be because it undermines the traditional value of nature stripping away its sole purpose of providing spiritual and healing benefits [64].

Many older adults also emphasised the difficulty in accessing green spaces due to transportation constraints, whilst others experienced participation barriers due to mobility issues and dangerous environmental hazards such as snow and ice. A small number of studies considered older people living in deprived areas [43, 44, 49, 55, 57]. The issues surrounding participants' engagement and access to GHP may indicate avoidant behaviour, but these expressions can also reflect contextually rooted barriers within the broader context of health inequalities and not solely individual preferences. Concerns were raised relating to the inequality among green space access and provision of support impacting older adults from disadvantaged backgrounds. It is unclear whether GHP provision is influenced by local green space availability and the quality of maintenance [20]. If so, this may contribute to the amplification of existing health inequalities, where GHP provision is poorer and physical and mental health outcomes are disproportionately affected in more deprived areas [20, 65, 66]. There is clear gap in the literature, with existing studies not investigating GHP in marginalised groups [67]. This emphasises the need for further research of understanding how GHP can be utilised in deprived areas for whom it appears increasingly valuable [68].

4.2 Interpretation of findings in the context of previous research

Findings of this review suggest the increased motivation, confidence and reduced apprehension among service users are common in nature-based programmes that are endorsed by health professionals and provided under the supervision of a qualified prescriber. This aligns with the findings of a recent systematic review indicating that well-organised interventions, either recommended or organised by a health or social care professional, appeared to confer more benefit than those not formally organised by

such professionals [69]. Although social prescribing and the role of link workers have been actively promoted through official contracts in some countries, including in England [12], our findings indicated that GHP programmes may still lack the organisational structure and standardisation to support the delivery. The poor capacity to provide resources, staff, funding, and accreditation of organisations echoes the concern of a previous report indicating that GHP services may not yet be readily available due to funding and resource constraints [22].

Prescribers' hesitancy of prescribing a nature-based intervention was cited in a mixed methods study where healthcare professionals were tentative of proposing NBIs to older adults [55]. The study suggests the lack of empirical evidence around GHP partly explains this behaviour. Our complementary evidence reviews focusing on the effectiveness of GHP and NBIs evidence (submitted separately) also indicated a lack of robust evidence base of the effectiveness of GHP and its suitability for older adults with long-term conditions, although this should not be confused with evidence of lack of effectiveness. The important findings in our synthesis was the lack of strong evidence for GHP that may be partly attributed to the discrepancy between the traditional biomedical model of treating a targeted illness using a specific therapy and the holistic approach to improving individual wellbeing adopted by social/green prescribing [70]. As the exact content and /activities prescribed through GHP are varied and personally tailored by its nature, the traditional way of evaluating GHP focusing on a specific type of activity (e.g. horticultural therapy) and outcomes related to a specific disease condition may not be able to fully capture the impact of GHP.

Concerns regarding the uncertainty of prescribing NBIs demonstrated from health professionals may also be influenced by cultural context. Prescribers were culturally sensitive about providing a formal nature prescription to certain individuals of a diverse ethnic and religious background. This may be attributed to varying relationships with nature and traditional, medical prescribing, influencing their expectations of healthcare and non-pharmacological interventions. This issue was highlighted in mixed methods study emphasising the need for cultural adaptation where activities should align with cultural practices [17]. Our issue was prescribing NBIs to indigenous populations which was deemed culturally inappropriate because of their specific and deep relationship with nature [57]. They refer this to 'land-based healing' which is commonly practiced in their culture and should not be confused with the western conception of nature and green health prescribing [71]. Therefore, the notion of GHP could be seen as presumptuous and patronising to certain cultures when prescribed from a westernised setting which may have a detrimental effect and engender less participation from those contexts.

4.3 Strengths and limitations

Strengths of this review include the thorough systematic literature search including grey literature; rigorous assessment of the quality of study designs; robust synthesis of qualitative evidence from a range of mixed methods and qualitative studies; and involvement of both service users, providers and prescribers to bridge the gaps between evidence and experience of GHP in practice. Our review was undertaken during a period of rapid expansion of social prescribing activities worldwide and although our search strategy was comprehensive, given finite time and resources, we did not use additional

search measures such as reference checking or citation tracking to identify additional studies. Consequently, there may be some relevant studies not included in this review. The intention was to examine the use and impact of GHP for older people with special attention to those living in deprived areas, however, very few studies reported comprehensive information on socioeconomic drivers or presented data on disadvantaged populations.

While the focus of this review was on prescribed NBIs from primary care settings our initial scoping of the literature indicated that the number of studies exploring the barriers and enablers of GHP within health services was likely to be very small. Consequently, studies of NBIs which were not explicitly prescribed by a healthcare professional but were recruited from any of the relevant settings (e.g. studies inviting participants directly through community organisations) and if they were specifically targeted at older adults were included.

4.4 Stakeholder involvement and implications for policy and practice

Public members were involved who have utilised GHP and service providers who have been involved in prescribing, developing, organising and running NBIs throughout our review process. We shared our review plans and findings and listened to their experiences and perspectives. Overall, the input from our public contributors corroborated the barriers related to accessibility, knowledge and training, cultural sensitivity, attitudes towards non-medical interventions, and resource constraints identified from qualitative research included in our review. Connections with nature and with other people, alongside a sense of doing something meaningful through nature-related activities were highlighted to be very important. PPI-E members confirmed the importance of green outdoor environments being conducive for social interaction compared with traditional office-based settings, and the additional benefit of improving community cohesion through running a GHP programme.

4.5 Further research and Practical recommendations

Current evidence is clearly showing that patients and providers lack the knowledge of GHP and may be hesitant in engaging with such programmes. Additionally, GHP lacks current evidence and rigorous evaluations as an option for preventative healthcare. As social connection, sense of purpose and motivation were valued as key facilitators in GHP, measures of NBIs should focus on individual psychosocial outcomes. This could improve patient experience and ultimately increase adults engagement breaking the hesitation barrier of GHP and building effective communication and trust between service users and prescribers.

We were able to identify challenges related to the socioeconomic differences among GHP; the evidence overall shows very few papers which presented subgroup data for marginalised groups. There is a further need to understand the density of barriers for NBIs among older adults in deprived communities. Evidence should explore the perspectives and experiences of adults from underrepresented communities and their relationship with NBIs. These perspectives will enable the design of NBIs to

effectively mitigate these barriers, allowing more equitable access to GHPs among vulnerable populations.

4.6 Conclusions

Our qualitative evidence synthesis explored the factors influencing the access and engagement of GHP. We aimed to understand the barriers and enablers through the perspectives of health and care professionals, service providers and older adults with NBIs. Findings demonstrated accessibility of green space, knowledge and attitudes towards GHP and NBIs, and availability of sufficient time and resources that can directly influence access and engagement of older people with NBIs, and organisational capacity of service providers. To realise the full potential of GHP in supporting healthy ageing and reducing health inequalities, future efforts should prioritise the implementation and evaluation of accessible, well-organised and safe NBIs, investment in community infrastructure, and increased integration of GHP within primary care settings. Our review has highlighted the need to clarify the role of GHPs through robust health services research, and to address questions regarding inequalities in access, uptake, and benefit from GHP.

Abbreviations

GHP
Green Health Prescribing
NBIs
Nature Based Interventions
PRISMA
Preferred Reporting Items for Systematic Reviews and Meta-Analyses
ENTREQ
Enhancing transparency in reporting the synthesis of qualitative research
GRIPP2
Guidance for Reporting Involvement of Patients and the Public version 2
PPI-E
Patient and Public Involvement and Engagement
GP
General Practitioner
MMAT
Mixed Methods Appraisal Tool

Declarations

Ethics approval and consent to participate

Ethics approval and consent are not applicable for this review

Consent for publication

Not applicable

Availability of data and materials

The datasets supporting the conclusions of this article is included within the article and its additional files

Competing interests

The authors declare that they have no competing interests

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Authors’ contributions

JD: Protocol development, screening and selection, data extraction, quality appraisal, qualitative synthesis, writing and editing.

FB: Protocol development, screening and selection, data extraction, quality appraisal, quantitative synthesis, writing and editing.

CL: Screening and selection, data extraction, quality appraisal, editing, reviewing drafts.

ND: Protocol development, developing and conducting searches, editing, reviewing drafts.

SS: Conceptualisation, protocol development, oversight PPIE and stakeholder involvement, reviewing drafts

LAK: Conceptualisation, protocol development, reviewing drafts

TMS: Data extraction, quantitative evidence synthesis, editing, reviewing drafts.

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HF: Conceptualisation, protocol development, reviewing drafts

AG: General oversight, conceptualisation, protocol development, reviewing drafts

Y-FC: Supervision, project administration, conceptualisation, protocol development, evidence synthesis, writing and editing.

DvdW: Supervision, protocol development, evidence synthesis, writing and editing.

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Figures

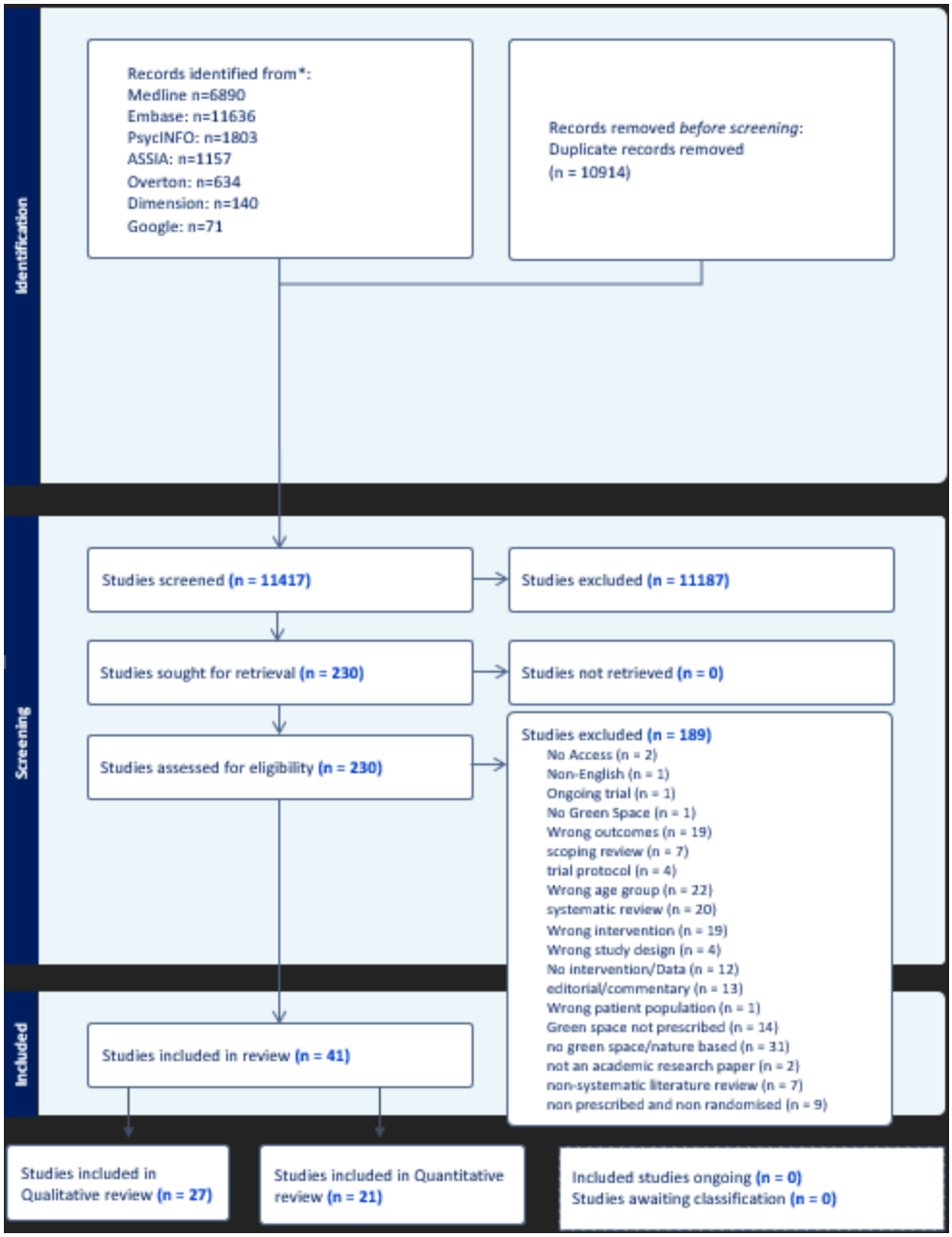


Figure 1

PRISMA Flowchart

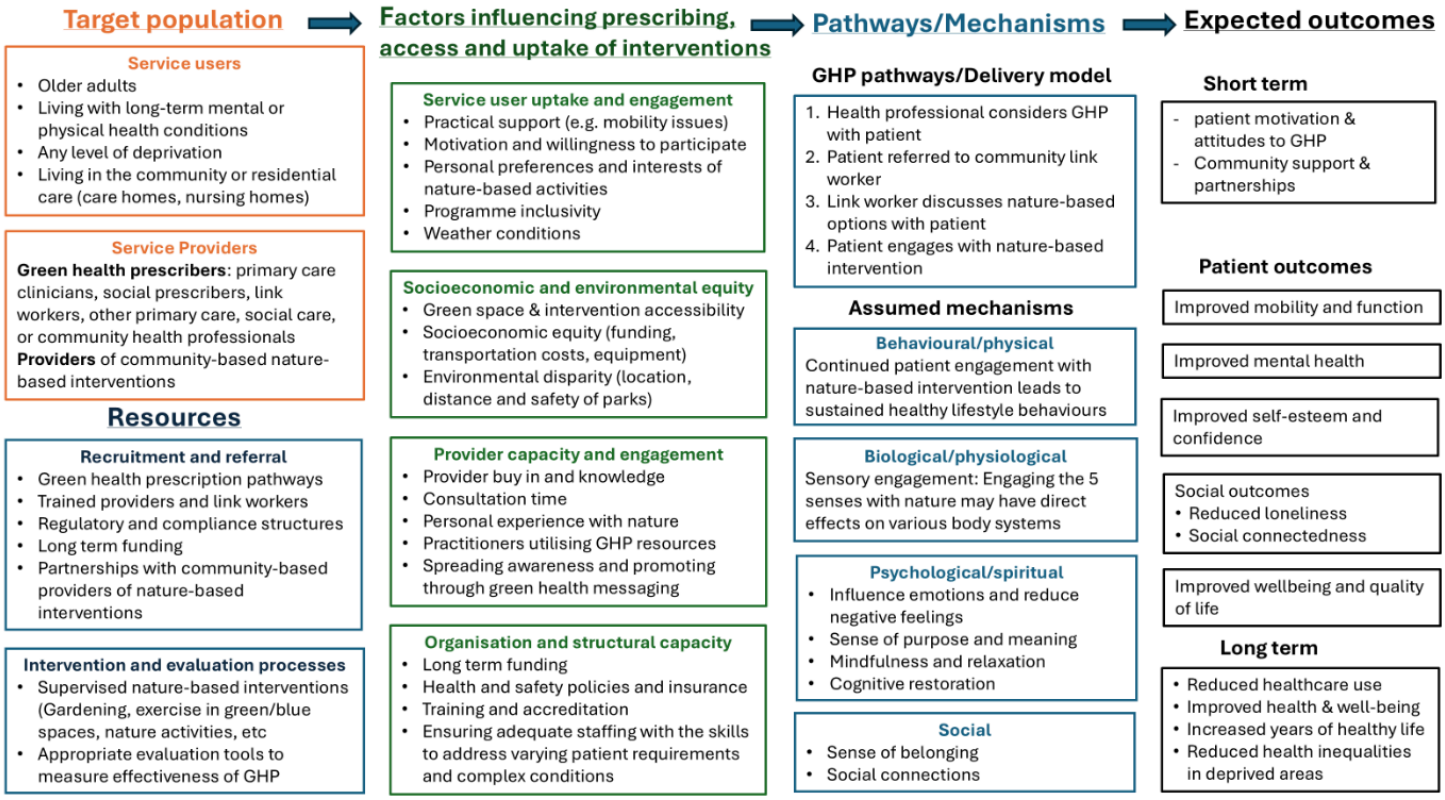


Figure 2

Logic model represneting the potential meahcnisms and outcomes of GHP

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- Additionalfiles.docx