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Running head: *Following Prisoners through the Gate*

**Following Prisoners through the Gate: A Qualitative Exploration of the Long-term Impacts of
Prison Based Horticultural and Gardening Activities on the Previously Incarcerated**

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Contribution Statement

The idea for the overall study was developed mutually by the two authors, in terms of the development of the research question, design, and gaining ethical approval. The first author recruited participants, completed the initial coding and analysis, and produced the draft write up. The second author provided guidance on the coding and interpretation of data, gave feedback on the draft, and edited the document for submission.

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Abstract

Nature deprivation is common in prison populations, with repercussions that may be contributing to severe mental health issues. Although literature has illuminated countless benefits of nature exposure within prisons, there is little research surrounding the effects of in-prison nature-based activities post release. To 'follow prisoners through the gate,' this research explores post-release reflections of people previously incarcerated (PPIs) in relation to the impacts of prison based gardening and horticultural activities (GHAs). Although the terms are often used interchangeably, gardening is typically a leisure activity while horticulture relates more often to work and studying plants. Both terms relate to plant cultivation (Rae, 2014). An inductive approach was adopted using a written qualitative design to guide data analysis. Using a set of online qualitative questions, 11 ($N=11$) participants from different countries across the globe were recruited via social media platforms and contacting relevant services. To generate data-driven themes and address the research question, Braun et al.'s (2022) Thematic Analysis procedure was followed to allow for an iterative, flexible approach. PPIs generally experienced GHAs as beneficial in prison, with their value remaining after release. Such benefits included self-development, better mental health, community reconnection, enhanced interpersonal relationships and improved employability. The present study illuminated a need for further research to explore post-release reflections of GHAs in prison. If such research were to support the findings from this study, there may be potential for improvements in PPIs' rehabilitative outcomes and desistance from crime. Areas of focus for future research might include longitudinal and quantitative studies, nature-based community programmes and creative ways to incorporate nature into prison environments. Prison systems across the globe vary in how gardening and horticulture are used, so this could also be a focus for future research.

Positive Impacts of Prison-Based Gardening and Horticultural Activities for Previously Incarcerated Individuals

Nature Deprivation and Mental Health in Prisons

Having been homebound due to the COVID-19 pandemic, some people have been reminded of the value of contact with nature (Briggs, 2021). In populations such as prisons where nature deprivation is common (Nadkarni et al., 2017), the repercussions of absence from nature may be creating severe mental health issues among some of the most vulnerable members of society (Baybutt et al., 2014). Although the amount of exposure to nature in prison varies due to geographical constraints, level of prison security and individual sentences, historically prisons have provided little opportunity for access to nature and outdoor space (Moran, 2019).

Poor mental health is a challenging and prevalent issue in prisons across the globe (Van Dunk, 2021), with COVID-19 having had significant adverse effects on the mental wellbeing of prisoners (Johnson et al., 2021). Rates of self-harm and suicide are consistently high in prison, with the latter being 8.6 times more likely than in the general population (Moore, 2019). Likewise, over 61,000 self-harm incidents occurred in English and Welsh prisons throughout 2019 (Moran et al., 2021). It is likely that COVID-19 heightened rates of self-harm and suicide due to increased isolation, fewer visitations and reduced mental health services (Johnson et al., 2021), which links with recent research that suggests mental health problems in prisons may be exacerbated by detachment from nature (Moran et al., 2021).

Prisoners across England and Wales are failed at every stage when it comes to their mental health (Syal, 2021). It has been argued that the UK's public attitude and prison system are geared towards facilitating suffering and harsh punishment (Moran, 2019). However, this

attitude does not address the ever-increasing levels of poor mental health, violence and self-harm in prisons that we continue to observe (Durcan, 2021; Favril et al., 2020; Shanahan et al., 2015). Consequently, the vitality of tailored interventions and adequate support within prison environments cannot be underestimated (Farrier et al., 2019; Justice Committee 2022).

Gardening and Horticultural Activities as Rehabilitative Environments

To achieve a halt in rising mental ill-health and encourage desistance from crime, prisons must become healthier, safer, and more rehabilitative environments (Farrier et al., 2019). As per current government strategy, “time during the daily routine should be well-spent and shaped to enable prisoners to improve their mental health” (Justice Committee, 2022). Prisons could adopt a holistic approach that aims to benefit mental health, increase desistance from crime, and encourage prisoners to take part in constructive, meaningful activities, which may include those that involve nature (Baybutt, 2019; Timler et al., 2019). This approach would reflect principles of the Good Lives Model (GLM), a strength-based framework proposing intervention that encourages prosocial behaviour and desistance from crime by simultaneously upholding the interests of offenders and the community (Ward, 2002).

Gardening and horticultural activities (GHAs) would fit within the GLM, helping to enhance protective factors and employability, facilitate social engagement and emotional regulation, and allow people to obtain their goals in more appropriate ways. For example, goals might include leaving prison, desistance from crime, becoming financially independent, improving mental health and wellbeing, gaining qualifications or employment, and rebuilding lives and meaningful social connections. Evidence that nature-based activities help reintegrate marginalised people back into society implies that GHAs may be a missing piece in the challenge of prison reform (Hart & Reisner, 2021). For the past 170 years, gardening, farming and horticulture have been part of the prison system in England and Wales, with numerous positive impacts on wellbeing and health having been found both within and beyond prison

(Devine-Wright et al., 2019). Such activities have taken a variety of forms, including farming and growing food for communities, staff and prisoners, horticulture lessons and qualification opportunities, gardening groups, and employment within prisons (Devine-Wright et al., 2019).

More recently, attempts have been made to replicate the community environment within prisons by investing in nature-based activities with the aim of creating Health Promoting Prisons (Aslan, 2016; Moeller et al., 2018). Greener on the Outside for Prisons (GOOP) is a therapeutic programme underpinned by conservation and horticulture (Farrier et al., 2019). Through increased nature engagement, GOOP implemented innovative methods that improved prisoners' physical health, mental wellbeing, environmental awareness, and employability (Farrier & Kedwards, 2015). The GOOP impact report highlighted that 94% of people experienced enhanced opportunities for social interaction, 89% felt increased confidence to manage their lives, and 81% reported new knowledge or skills (Farrier & Kedwards, 2015). Other programmes have found similar benefits; even a 10% increase in green space within prisons could reduce self-harm by 3.5%, staff assaults by 3.2% and prisoner violence by 6.6% (Moran et al., 2021). Such statistics provide hope that challenges of incarceration such as mental health struggles, increasing costs, and low desistance from crime rates might begin to be addressed if a nature informed approach is adopted (Grant, 2020; van der Linden, 2015; Welch, 2020).

Benefits of Nature Exposure

Research has illuminated numerous benefits of exposure to nature in a variety of settings and populations (Jordan, 2015; White et al., 2019). This includes reductions in stress, anxiety, depression, aggression, self-harm, and violence, alongside increases in desistance from crime, wellbeing, problem-solving skills, physical health, mental health, work prospects,

interpersonal relationships, knowledge and skills, emotional development, and community reconnection (Jenkins, 2016; Moore, 2019; Rice & Lremy, 1998; Thompson et al., 2012; Vujcic et al., 2017). Reductions in self-harm, stress, aggression, and violence persist even when crowding, age, prison type and size are controlled for (Moran et al., 2021). Similar findings are observed with vicarious nature exposure, where benefits were detected for both inmates and staff, including a 26% reduction in violence (Nadkarni et al., 2017). Research has also demonstrated a reduced level of staff sickness absence in prisons with an increased proportion of natural vegetation, emphasising the value of nature amongst both prisoners and staff (Moran et al., 2022). Collectively, current research suggests nature-based activities and surroundings have therapeutic benefits for many people in many settings (Annerstedt & Währborg, 2011; Barton et al., 2016). This supports the Biophilia Hypothesis, proposing that humans have an innate need to interact with nature to avoid poor mental health and violence (Kellert & Wilson, 1993). Although prison violence is a complex problem, research to date concludes that involving nature-based activities and surroundings in rehabilitation could reduce violence and self-harm, while encouraging desistance from crime and improving rehabilitative outcomes, physical health, and mental wellbeing (Anderson, 2018; Söderlund & Newman, 2017).

Engaging in activities like gardening, nature walks, and horticultural qualifications can enhance prisoners' social networks by providing safe, collaborative environments and a sense of belonging (Weir, 2020). Supportive interpersonal relationships are incredibly important for successful health, psychosocial, and rehabilitative outcomes (Smoyer, 2015). Nature-based activities in prisons have also been recognised as vehicles for promoting skill acquisition and employment (Grimshaw & King, 2018). Activities provide meaning, challenge, skill development, and a sense of purpose while promoting prisoners' employability and increasing their chances of successful outcomes post-release (Prison Reform Trust, 2017). Equipping

prisoners in this way promotes good mental health and desistance from crime (A-Young et al., 2021). Almost 50% of people previously incarcerated (PPIs) in the UK are reconvicted within a year of release at huge social, financial, and personal cost (National Audit Office, 2012). This is likely to decrease if prisoners have skills, knowledge, tools, and qualifications upon release to increase their chances of employment and desistance from crime (Ramakers et al., 2016). Unfortunately, PPI's often leave prison having lacked adequate opportunities to develop skills and a work ethic that will facilitate post-release employment, with many experiencing disconnection and isolation upon re-entry to society (Hamilton et al., 2015).

Notably, there is a danger of horticultural work becoming solely focused on employment and accreditation. While this is certainly valuable, other outcomes should not be neglected, including improved physical health, interpersonal relationships, and mental health (Horton, 2019). The myriad of benefits nature exposure can bring begs the question: how can we differentiate which benefits stem from nature itself, and which are derived from the group environment, or gaining knowledge and skills? In answer, one would have to question the value of differentiating between direct and indirect benefits at all. Rather than exploring which elements of nature-based activities produce these benefits, perhaps the focus should be on 'following prisoners through the gate' to determine whether these impacts last.

The Present Study

Research involving nature has been particularly significant in the recent climate where COVID-19 was limiting prisoners' time outdoors (Rees, 2020), and time pressures of the climate crisis are ever-increasing (Armeni & Lee, 2021; Hewson et al., 2020; Suhomlinova et al., 2022). However, there is a gap in the literature surrounding post-release reflections of prison-based nature activities (Farrier et al., 2019). Thus far, programmes such as GOOP have

been unable to ‘follow prisoners through the gate’ and investigate post-release reflections of GHAs (Farrier et al., 2019). This study aimed to help fill this gap by asking “How do PPIs describe their experiences of prison-based GHAs following their return to the community?” Exploring PPIs’ perceptions helped to provide a novel and valuable perspective, lay the groundwork for further research on this topic, and add to current literature for findings to have a meaningful and sustained impact.

Methods

Ethical Review

Ethical approval (reference number: 21-268) was obtained from the [*name removed for masked review*] Psychology Research Ethics Committee. As participants were asked questions surrounding their mental health, measures were taken to mitigate potential issues concerning their wellbeing. This included a debrief providing the opportunity to ask questions or raise concerns, and information pertaining to relevant mental health support services such as Samaritans. Informed consent was received both before and after the study.

Design

A pragmatic stance was adopted with the view that reality is continuously interpreted in diverse ways, so must be examined using the most appropriate tools (Guyon et al., 2018). To explore PPIs’ experiences of GHAs and abide by study restraints, online qualitative questions were deemed the most appropriate tool to allow for an in-depth understanding of subjective experiences (Gibbs, 2018). Consideration was given to possible limitations of this method due to the known poor literacy rates in the prison population (Morken et al, 2021), however it felt a written format would be most suitable to maintain anonymity, reduce time pressures and create a safe space for participants to share their reflections.

Participants

To meet the inclusion criteria, participants had to be PPIs who had engaged in GHAs while in prison for at least three sessions, each at least an hour long. Exact information regarding the duration and frequency of each participant's GHAs was not collected. Participants also had to have been living in the community for at least a month post-release. Participants could refer to their most recent prison stay or a previous one. Loosely guided by the recommendation of 6-10 participants by Braun & Clarke (2012), a sample of 8-15 participants was deemed appropriate. Although open questions were asked, less detailed responses were expected for this study than might be expected from alternative methods such as interviews. Thus, the expected sample size was adapted to fit the present study.

A total sample of 11 ($N = 11$) PPIs were recruited. Participants were aged 22-61, with 8 male and 3 female participants from a variety of ethnicities. Recruitment was originally aimed at participants within England and Wales, however the study was picked up by people further afield, such as the USA. We felt these participant responses were appropriate to keep within the study as our research question was based around participant experiences of engaging in GHAs while incarcerated rather than investigating a specific country's prison system. All participants had taken part in GHAs regularly during their sentence. A further 126 people who clicked on the hyperlink did not complete the study. Among other reasons, this might have been due to lack of motivation or reward, disinterest, not being eligible, misunderstanding the study, not consenting, and/or accidentally clicking the link.

Procedure

Recruitment involved methods that maintained participant anonymity and were appropriate within the ethical approval received. This included recruitment via social media platforms (such as Facebook, LinkedIn, and Twitter) using advertisements with a brief outline of the research, as well as within relevant online communities associated with psychological

research, gardening, horticulture, and the PPI population. Approximately 150 charities, services and people were contacted that had links to PPIs, such as probation services, Offender Personality Disorder services, gardening and horticulture schemes, psychologists, and researchers. Service were contacted with an email explaining the study and their potential role in recruitment. Although some responses were received, most people contacted this way either did not respond or said they were unable to assist with the research. Consequently, recruitment challenges included accessing the target population, correspondence difficulties, ethical restrictions, and limited responses.

Once participants opened the hyperlink, they read an information page before being asked to give consent. Those that were eligible and consented to participating completed the study using electronic devices, protecting all persons involved from COVID-19 related risks (Chenneville & Schwartz, 2020). A set of qualitative questions administered online using *Qualtrics* (Qualtrics, Provo, UT) was chosen to aid practicality, feasibility, anonymity, and accessibility of a hard-to-reach population. Open questions were used with text boxes for narrative responses; an approach deemed appropriate with vulnerable populations, including PPIs and those with mental health disorders (Fogarty et al., 2017; Kyprianides et al., 2019). Questions related to participants' experiences of GHAs in prison and how this may have impacted them since release to provide a comparison and highlight any continuities. Participants answered demographic questions, five short answer questions such as "How often did you take part in GHAs in prison?" and seven long answer questions such as "How did GHAs influence your life in prison?" The study typically took 15-30 minutes to complete. Participants then saw a final consent page and a debrief.

Data Analysis

Due to the novel and exploratory nature of this study, thematic analysis was deemed a flexible, appropriate approach for exploring experiences (Braun et al., 2022), and is highly

established amongst the literature (Hamilton et al., 2015; Kyprianides et al., 2019). Thematic analysis accommodated the less rich data that came from written responses while being appropriate for a variety of questions and sample sizes (Terry et al., 2017). Having been widely used (Kiger & Varpio, 2020), Braun and Clarke's (2012) approach was taken to data analysis, including familiarisation, initial codes, theme development, then the iterative elements of reviewing, defining and re-naming themes. Analysis was conducted with NVivo 12, a software facilitating an initial semantic analysis; therefore, the data was analysed on a surface level without interpreting underlying concepts or meanings. An interpretivist, inductive approach was adopted to allow for expansive analysis and data driven themes (Kiger & Varpio, 2020). Themes and codes were reviewed iteratively under supervision to ensure accuracy and increase inter-rater reliability. MindGenius 20 was used to create thematic maps, allowing themes to be clarified, refined, and named appropriately. Relevant quotations were selected from the transcripts to address the research question.

Data Availability Statement

Researchers may approach the author and the University of Bath for access to anonymised materials used to complete this study. Materials will be stored securely by the University of Bath until 2032.

Results

Multiple themes representing PPIs' reflections of impacts of prison based GHAs were generated from thematic analysis. Themes and subthemes were organised into two superordinate themes which related to experiences and mechanisms; experiences of GHAs in prison and mechanisms by which GHAs helped during and post-release (See Figure 1).

Superordinate Theme 1: Experiences of GHAs in prison

The superordinate theme ‘experiences of GHAs in prison’ was divided into three themes: GHAs were a negative experience in prison, GHAs promoted better physical, emotional, and psychological wellbeing, and GHAs improved knowledge, skills, and employment prospects (see Figure 2). The theme ‘promoted better physical, emotional, and psychological wellbeing’ contains two subthemes relating to GHAs as an escape and enhancing positivity and growth. Ten participants stated that GHAs improved their time in prison, with one participant disagreeing. Similarly, nine participants felt that GHAs in prison helped them cope during release. Although frequency of GHAs in prison varied slightly, most participants took part in GHAs multiple times per week.

Theme 1.1: GHAs were a negative experience in prison

Although most participants viewed GHAs as a positive experience while in prison, one participant did not share this view. This participant expressed that they “hated it” (P11¹) and felt as though they were treated “like a slave” (P11). They did not however explain why this was the case, so to avoid making assumptions or risk inadvertently imposing the researchers’ thoughts on what this participant may have meant, no further analysis or interpretation was made. This does not however subtract from the significance of this comment and the importance of understanding more about those who have had similar experiences of GHAs.

Theme 1.2: Promoted better physical, emotional, and psychological wellbeing

Most participants experienced GHAs as having a positive influence on their mental and/or physical health. Some experienced a calming effect, where GHAs “reduced stress” (P1) and “kept madness at bay” (P3). Others felt as though GHAs enhanced their self-control and decision making (“Helped me not get into depression or drugs like my fellows” (P6)), as well as their physical health (“Gardening helped me cope because it’s a physical activity” (P5)) and

¹ Numbers (e.g., P11) represent the number of the participant from which the quote was extracted.

ability to nurture themselves (“It helped me to navigate myself...the wellbeing of myself in the terrible uncultured grounds of negative people” (P3)).

Enhanced positive feelings and personal growth. Most participants agreed that taking part in GHAs in prison increased their positive feelings. Many centred around inner joy and happiness: “It helped me enjoy my time” (P1), making participants “feel good” (P8) and be “pleased and happy to be outdoors” (P5). For some, GHAs inspired passion, and participants expressed “thanks to the horticulture department for the smooth life I had back then” (P6). One participant felt particularly strongly about the way GHAs made them feel: “If the plants not caring who grows it...brings hope to oneself, self-worth, a purpose, you’re needed, wanted and the plants respond to that...contentment, peace, inner joy, wholeness...life vibrant in a cold callous steel house of confinement” (P3). This illustrates the power of GHAs to make a difference in the most challenging environments. It also outlines several aspects of good mental health enhanced by GHAs: inner joy, peace, and hope. GHAs helped this participant not only to find a purpose in such a hostile environment, but to grow and develop elements that are often lacking in PPI’s but are crucial for living a good quality life, including self-worth, self-perception and understanding, and self-care (Warr, 2016).

Created an escape from physical and mental confinement. Several participants felt GHAs in prison were an escape from physical and mental confinement. One person viewed GHAs as a rarity and something that brought them peace: “To get away inside to an actual place is unheard of, let alone one of tranquillity that...horticulture brought” (P3). GHAs were also viewed as a mental escape: “Growing kept me from the prison mentally, emotionally and psychologically” (P3), making participants feel “happy with a sense of freedom and satisfaction” (P5) that contributed to a better quality of life.

Theme 1.3: Improved knowledge, skills, and employment opportunities

Several participants found value in GHAs as they provided opportunities for employment and payment. This was particularly significant for one person: “It was a full-time job...it made life much easier as I was able to purchase items needed from the prison canteen...particularly important because I didn’t really have any support from anyone outside prison” (P5). Not only did GHAs provide financial support by providing paid work, but for many they were vehicles for knowledge and skill acquisition, where participants “Learned to manage my time really well” (P1) and were “Learning about nature” (P2). Both practical and coping skills were learned by participants, stimulating their thinking: “Ease me of boredom and added more ideas to me” (P8).

Superordinate Theme 2: Mechanisms by which GHAs in prison helped during and post-release

The superordinate theme ‘mechanisms by which GHAs in prison helped during and post-release’ was divided into three themes: enhancing self-development, improving navigation of social situations, and promoting community re-connection. The theme ‘enhancing self-development’ contained two subthemes relating to wellbeing and employment prospects. This superordinate theme represents the novel aspect of this study that investigated PPIs’ experiences of in-prison GHAs after release, suggesting that positive impacts may remain after leaving prison (see Figure 3). In the present sample, post-release equated to between three months and 25 years since leaving prison. Notably, nine participants had taken part in various nature-based activities since release, many of which related to gardening and horticulture.

Theme 2.1: Enhancing self-development

Improved psychological and emotional wellbeing. Several participants felt that GHAs in prison improved their psychological and emotional wellbeing post-release and at the time.

Most had taken part in nature-based activities since release, whether this be “Gardening as a hobby” (P7), “Doing horticulture” (P6), physical activities such as “Hiking...huge in my life” (P3) or simply spending more time in nature: “I was privy to having a savoury part of nature life and promised myself to always keep it with me when I left” (P3). Many still “Spend a lot of time gardening” (P4) and appear to have learned the value of nature in maintaining good mental health: “The amount of walking I do prevents relapse into more severe mental health problems” (P5).

Interestingly, one participant recognised their own behavioural triggers and the value in gardening projects where “There’s no triggers to potentially harmful behaviours that could negatively affect my mental health” (P5). Another person felt that GHAs helped to permanently alter their mindset and thinking style, bringing with it independence, improved emotional management, better decision-making, and acceptance of reality: “Changing my thoughts about life, who I am and not want to be anymore...I have grown and cultivated my life in spite of the lying wicked weeds that is in my life” (P3). GHAs seem to have helped some participants reconnect with themselves by reconnecting with nature.

Enhanced employment prospects through knowledge and skill acquisition. GHAs in prison appear to have enhanced employment prospects by equipping participants with knowledge and skills that made significant contributions to their lives post-release. Some reported that GHAs helped them with practical skills such as gardening, time management and financial skills alongside “coping skills” (P4). For one participant, GHAs also enhanced their learning: “Good/bad seed thinking I still use today...a very in-depth course” (P3) and environmental awareness, contributing to more informed decision-making and pro-environmental behaviour: “Making a more conscious [decision] in food sources and no canned, processed worthless eats anymore...I seek out organic products...all about earthy non-pesticide foods” (P3).

By creating opportunities to learn skills and acquire knowledge, GHAs enhanced employment prospects post-release for several participants: “The horticulture I did will surely and has absolutely helped me in that I can start my own small business selling flowers” (P6). One participant proceeded to obtain horticulture-based employment: “Gardening...as a job for six months” (P7), while another reported that there are “Numerous job opportunities available...I can get my own work this way as no background checks involved, brings independence” (P3). For these individuals, the importance of GHAs both within and outside prison in promoting models of good citizenship is clear.

Theme 2.2: Improving navigation of social situations²

Since release, some participants experienced an improved frequency of interpersonal interactions and advanced ability to navigate social situations (see Figure 4). For one participant gardening remains: “One of my main forms of social interaction...it’s a non-competitive pastime” (P5). By engaging in group gardening, this participant found the calming, non-competitive nature of gardening in a safe, collaborative environment to improve the quality of their interpersonal interactions and extend their social network. Another participant used metaphors to emphasise the extent to which GHAs help them navigate social situations and recognise toxic people in their life: “Make better choices...I hear bad seed advice stay away...it has grown me up while keeping out the weeds in my life...not let it seed propagate/grow up in me” (P3).

Furthermore, GHAs in prison facilitated a lasting friendship for this participant: “Stood by me in prison and has been a friendship grown in there, but we came out together now best friends for life” (P3). Interestingly, this demonstrates the vitality of supportive interpersonal

² Please note that this theme was derived from the responses of only two participants, so findings must be interpreted with caution.

relationships in maintaining emotional regulation and enhancing rehabilitative outcomes (Grant & Kinman, 2015; Smoyer, 2015). Not only can PPIs benefit directly from GHAs, but also indirectly via the collaborative group environments that GHAs often create, helping to ease adjustment to life after prison.

Theme 2.3: Promoting community re-connection

Several participants appeared more connected with their community having taken part in GHAs (see Figure 5). Many became more engaged in community-based activities, such as “Community gardening” (P1), “Volunteer gardening for local charities” (P5) and “Gardening...as a job” (P7). Increased community involvement enabled participants to further their self-development, interpersonal interactions, and employment prospects, as well as gain a sense of belonging and re-connect with the communities they had been detached from: “It really helped me...I was able to adapt easily in the modern society and hustle” (P6). Participants were able to “Give back and nurture others” (P3), exhibiting altruistic behaviours that strengthen community acceptance and cohesion (Hansen-Ketchum & Halpenny, 2011): “People easily accepted me back to the community” (P1). Being accepted by the community after incarceration is vital for PPIs not only to rebuild their lives and desist from crime, but also to accept their actions, forgive themselves and move on without living in the shadow of their past (Hamzah & Kumalasari, 2018).

Discussion

Framing Present Findings within the Literature

To address the research question: ‘How do PPIs describe their experiences of prison-based GHAs following their return to the community?’ most PPIs felt that GHAs held their value beyond the gates, as well as improving their lives in prison. Findings from this study support

and extend current literature, suggesting that for many people, nature-based activities in prison have a positive impact and continue to do so post-release by encouraging pro-social behaviour, improving self-development, and helping PPIs to rebuild their lives. Findings also provide some additions to the wider literature in relation to Biophilic connectivity, whereby benefits from connection to nature for several participants post-release extended from GHAs to broader Biophilic environments through hiking, walking and spending time outdoors.

Current findings also fit within the GLM, as many participants, some possibly with histories of trauma (Liu et al., 2021), reported feeling that GHAs helped with community resettlement post-release, encouraged pro-social behaviours such as employment and volunteering, and enhanced protective factors, such as social networks, economic stability, wellbeing and connection with nature. The positive impact of GHAs on self, society and quality of life reported by most participants may also have implications for helping shape public attitudes to move from a punitive to a rehabilitative perspective (Moran, 2019). It should be noted however that positive impacts of GHAs were not observed for everybody, with one participant feeling they were treated like a slave during GHAs. Although this participant did not expand on why they felt this way, other research has highlighted similar experiences, where it has been argued that increasing access to nature in prisons can further the problems of incarceration (James, 2023). Perhaps the type of nature interaction determines the impact; for example, GHAs for leisure may be more helpful than GHAs in a work context. Likewise, GHAs may have greater benefit than simply being in green spaces, such as improving social connections, contributing to the community, or increasing practical skills and knowledge.

Strengths and Limitations

To our knowledge, this is the first study that ‘follows prisoners through the gate’ and explores post-release reflections of prison based GHAs with the addition of sustained

engagement, providing a foundation for future projects with more time and resources to investigate further. Unfortunately, the small sample size of this study limits generalisability of findings. Moreover, data could have been positively or negatively skewed as people may have been more likely to participate if they held strong views on the topic. Themes were directly derived from participant experiences. However, a significant quantity of the data was generated by a small proportion of participants, so caution must be exercised when interpreting results. Furthermore, participants had spent varying lengths of time in the community since their release, ranging from three months to 25 years. It is possible that longer lengths of time post-release may have impacted retrospective recall, however the majority of participants were referring to their most recent stay in prison, therefore memories of GHAs were less likely to be disrupted by memories made since. A further limitation may have been the lack of opportunity to follow up with participants and check on their wellbeing, however signposting for wellbeing support was provided, and participants were made aware of the study content at the start to enable informed decision making.

Using online qualitative questions had both advantages and disadvantages. This method used few resources, maintained anonymity, and eradicated both COVID-19 related complications and the presence of the researcher that could have influenced responses. A qualitative approach also allows for the discovery of topics that are often missed by quantitative enquiries. Although written correspondence may have allowed participants to feel comfortable enough to share their experiences in a way that was not time constrained and did not apply pressure to answer questions, due to the known low literacy rates in the prison population (Morken et al., 2021), for some this may have reduced engagement. Furthermore, less detail in the written responses limited in-depth analysis, generalisability of findings and implications for practice. Additionally, dropout rates were high, perhaps due to lack of incentive and motivation and/or fatigue. Information relating to the exact duration

and frequency of each participant's GHAs was not collected in this study, however this would have provided a valuable comparison of participant experiences and could be explored further in future. This was a significant limitation as frequency and duration of GHAs may have had a direct impact on participant experiences; perhaps the more time spent regularly engaging in GHAs, the more benefits people may have experienced.

Implications for Research, Policy, and Practice

The limitations of this study reflect a need for further research to explore longitudinal effects of prison based GHAs. Prisons have the potential to make a meaningful shift to support rehabilitation and recovery. Introducing GHAs more widely may improve the ability of prisoners to process the potential traumas of incarceration, highlighting a need for the current evidence base to be widened before governments and authorities consider investment opportunities.

Based on our findings, there are several areas that would be beneficial for further research to address. Both quantitative and qualitative studies are needed to explore lasting effects of GHAs in prison; ideally, longitudinal studies with large samples. Moreover, studies investigating lasting impacts of nature-based community programmes for PPIs, such as offender and nature schemes, would be a valuable addition to those focusing on effects of in-prison GHAs. Research exploring other ways besides GHAs to incorporate nature-based activities and surroundings within prisons on a wider scale would also be informative, as well as investigating whether they have lasting impacts. Additionally, exploring how GHAs differ in prisons across the world would make for valuable research to allow for comparison across countries. Perhaps this would relate to differences in types of GHAs used and how they are implemented alongside how people experience prison based GHAs in different countries.

Likewise, further investigation of those who do not view GHAs as a positive experience would be helpful to gain a broader understanding of post-release impacts.

If future research replicates this study and lasting benefits of nature-based activities within prisons are observed, collectively these findings may help inform policymakers and healthcare providers. They may guide authorities to place more emphasis on the human need for nature in prisons and help encourage humanistic models of rehabilitation, placing importance on developing the individual as a whole. Perhaps consideration could be given to creating green spaces and opportunities for reciprocal relationships to be developed between nature and prisoners (Moran & Turner, 2019; Varanasi, 2020). Further investment in offender-nature schemes, community programmes and qualifications could be put into place to assist transition into the community and help PPIs build foundations for life after prison.

It is widely acknowledged that immediate climate action is needed to avoid catastrophic impacts of global warming and tackle the current climate emergency that is threatening humanity (Gills & Morgan, 2020). As a result, the importance of increasing knowledge and literacy relating to sustainability, conservation and environmental protection cannot be underestimated. This can be extended to many contexts and people, including prisoners and people previously incarcerated. For example, the environmental literacy that prisoners may gain from GHAs could have the potential to be passed on to future generations, perhaps increasing the likelihood of others making decisions with sustainability, nature, and climate conservation in mind (Iwaniec & Curdt-Christiansen, 2020).

Although this study supports the use of nature-based activities both within and beyond prison, implications on practice are limited as the decision to implement GHAs on a wide scale remains with professionals in the criminal justice system. However small steps can be taken, including further research, and taking measures to increase environmental literacy

within prisons. Without a robust and extensive evidence base, policy and practice is unlikely to change.

Conclusion

The present study adds to existing literature suggesting that GHAs are valuable for people when in prison, with PPIs generally reporting that GHAs in prison hold their value beyond the gates. As this is a novel study with a small sample, further investigation is required to determine whether in-prison GHAs remain beneficial post-release. If future research is conducted and lasting benefits are consistently observed, there may be potential for authorities to join justice and health agendas by prioritising nature-based activities and create wider systemic change through design, intervention, policy, and practice within prison environments (Baybutt et al., 2019). This could be extended to community settings, helping PPIs prepare for resettlement and enhancing rehabilitative outcomes, including increased desistance from crime. To conclude, GHAs in prison appear to provide an array of tools with which PPIs can rebuild their lives. Nature alone is not the answer to the complex problems surrounding prisoner mental health and rates of crime. However, GHAs may have the potential to leverage wider, more significant changes within the criminal justice system.

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Figure Legends

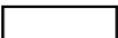
The following figure legends provide explanations for any abbreviations or symbols that appear in Figs 1-5:


Key:

Shape:

Topic = 

Superordinate Theme = 

Theme = 

Subtheme = 

Code = _____

Colour:

Green = Referenced by 1 person

Purple = Referenced by 2-3 people

Orange = Referenced by 4-7 people

Blue = Referenced by 8+ people

GHAs = Gardening and Horticultural Activities

PPIs = Persons Previously Incarcerated