

ARTICLE

‘I can still swing a spade’: a qualitative exploratory study of gardening groups for people with dementia

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Abstract

This exploratory qualitative study aimed to evidence how community-based gardening groups can be used to support the psychological, physical and social health of those living with dementia. The views of people living with dementia in the community, care partners and group leaders were sought to better understand the benefits gained from gardening groups, as well as the features of gardening groups that are cited as enabling positive outcomes. Going beyond the existing single-group studies in this area, this research aimed to identify common themes across multiple gardening groups. Semi-structured interviews were conducted with six group leaders, three people living with dementia and ten care partners from seven gardening groups, either in person or remotely. Thematic analysis of the interview transcripts highlighted broad enablers – ‘the garden setting’, ‘features of activities’ and ‘organisational components’ – that were cited as facilitating a range of positive wellbeing outcomes, creating an environment that provides ‘physical and cognitive benefits’, ‘affirmation of identity’, ‘social connection’ and ‘benefits for care partners and others’. The wide-ranging benefits and enablers cited by participants within this research support the use of gardening groups as community-based interventions to reinforce positive psychological, physical and social outcomes for people with dementia. Themes also provide a clear framework for the design, implementation and evaluation of future gardening groups.

Keywords: horticultural; gardening; community; groups; dementia; care-givers; wellbeing; qualitative

Introduction

It was estimated in 2019 that worldwide there are 57.4 million people living with dementia and that this will increase to 152.8 million by 2050 (GBD 2019 Dementia Forecasting Collaborators, 2022). The majority of these individuals will

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live in their own homes, although estimates vary from 55 per cent living in their own homes in Western Europe to 100 per cent in Oceania (Alzheimer's Disease International, 2018). Estimates like these underpin the need to better understand how public health can meet the needs of people living with dementia in the community. Research examining factors that predict 'living well' with dementia points towards the need for support in the community that can benefit psychological as well as physical and social outcomes (Clare *et al.*, 2019). Mitigating against negative psychological influences (such as loneliness and depression) and promoting more positive psychological resources (such as self-esteem and self-efficacy) are particularly strong predictors of living well with dementia at home (Clare *et al.*, 2019). The current research therefore provides qualitative insights around the use of one support type – group-based gardening – as a way of supporting those living with dementia in the community.

Gardening groups for psychological, physical and social wellbeing

Gardening groups take a variety of forms, but typically involve meeting in a shared garden, community allotment or other greenspace which people can walk through, view and use for gardening and other nature-based activities. Positive effects of engagement with gardening groups are most often discussed in terms of the benefits gained from time in nature, but the benefits of the group context have also been noted (Noone *et al.*, 2017; Briggs *et al.*, 2023).

Natural environments are those spaces or landscapes, rural and urban, which feature natural elements (*e.g.* parks, gardens, woodlands, coastline, farmland; Natural England, 2016). A growing body of research points towards the benefits of engagement with natural environments for human health (Lovell *et al.*, 2018). Wilson's early Biophilia Hypothesis (Wilson, 1984) describes the human relationship with nature as an innate tendency that goes beyond material and physical needs, extending to 'the human craving for aesthetic, intellectual, cognitive and even spiritual meaning and satisfaction' (Kellert, 1993: 21). Attention Restoration Theory (ART; Kaplan, 1995) and Stress Reduction Theory (SRT; Ulrich *et al.*, 1991) further describe mechanisms through which spending time in natural environments is beneficial. ART argues that environments that require our directed attention can lead to fatigue and that natural environments (either being in or looking at) are especially good at providing a context for recovery. This is done not by trying to empty the mind but by distracting attention towards more effortless stimuli (Kaplan, 1995). SRT argues that unthreatening natural environments have benefits beyond mental fatigue, suggesting that they foster stress recovery, which is evident through more positive emotional state, reduced physiological arousal and greater attention (as with ART; Ulrich *et al.*, 1991).

Beyond the context of the natural environment, gardening groups provide opportunities for new social connections to be formed and so have the potential to combat loneliness, grow social connectedness (Noone *et al.*, 2017) and provide individuals with a shared social identity (Haslam *et al.*, 2018). Other health-based groups have been shown to operate in a similar way, whereby the shared social identity that group members form through group activities is instrumental in ensuring that the group promotes better health (Haslam *et al.*, 2018).

Agreeing with these nature-based and social theories, research looking at gardening groups (often including older people but not people with dementia), shows how allotment and community gardening are positively associated with improvements in wellbeing and psychological health (Genter *et al.*, 2015; Wood *et al.*, 2016; Howarth *et al.*, 2020; Briggs *et al.*, 2023), as well as social connectedness and sense of community (Genter *et al.*, 2015; Howarth *et al.*, 2020; Spano *et al.*, 2020). Wider benefits have also been reported for physical health, such as reduced Body Mass Index, healthier blood glucose levels, reductions in fatigue and falls, and improved balance and gait (Chen and Janke, 2012; Genter *et al.*, 2015; Wood *et al.*, 2016; Howarth *et al.*, 2020; Kunpeuk *et al.*, 2020); as well as psychological health through a sense of achievement and self-development (Genter *et al.*, 2015; Scott *et al.*, 2015). These wide-spanning benefits may stem from the physical, social and purposeful activity which is made possible by the garden context.

Gardening groups for people with dementia

In line with nature-based hypotheses, there is growing evidence for the benefits of engagement with broad 'nature-based activities' for people with dementia (Bennett *et al.*, 2022). Whear *et al.* (2014) more specifically reviewed the use of gardens/outdoor spaces in dementia care and reported promising impacts for people with dementia, including reduced agitation, and increased interaction and stimulation. However, the review also highlighted that evidence with people with dementia was limited, of poor quality and focused on those within care home settings. Very little research has examined the role of gardening groups for people with dementia who live in the community (Gigliotti and Jarrott, 2005; De Bruin *et al.*, 2009; Jarrott and Gigliotti, 2010; Noone *et al.*, 2017; Hall *et al.*, 2018; Noone and Jenkins, 2018; Smith-Carrier *et al.*, 2021).

Gigliotti and Jarrott (2005), Hall *et al.* (2018) and Jarrott and Gigliotti (2010) all examined the usefulness of structured horticultural activities (often led by horticultural therapists) as part of adult day-care services for people with dementia. Observational research methods showed increased engagement in activities, and positive affect and wellbeing among those given horticultural therapy. Other research on individual gardening projects describe giving people with dementia greater autonomy in gardening activities, as well as interviewing people with dementia to assess its impact (Noone *et al.*, 2017; Noone and Jenkins, 2018; Smith-Carrier *et al.*, 2021). These interviews suggest that the projects strengthened aspects of the self, supporting people's sense of identity, agency and community through these more autonomous gardening activities. The wellbeing benefits as well as positive sensory experience and reminiscence were also highlighted (Smith-Carrier *et al.*, 2021). Literature on Dutch 'Green Care Farms' argues that engaging in farm-related activities (rather than traditional adult day-care services) offers more opportunities for stimulation, autonomy and physical activity for people with dementia, but have yet to evidence this (Schols and van der Schriek-van Meel, 2006; De Bruin *et al.*, 2009).

People living with dementia often face restrictions due to physical and cognitive impairment, lifestyle alterations and stigma (Natural England, 2013; Kim *et al.*, 2021). This can lead to poor psychological health and reduced engagement in

physical and social activity (Alzheimer's Society, 2013; Snowden *et al.*, 2015; Birtwell and Dubrow-Marshall, 2018). Gardening groups may provide opportunities to do activities which are meaningful and productive, which allow for fun, creativity, agency and learning, can be adapted to different abilities, allow for increased movement, and support social interactions with others through sensory experience, reminiscence and familiarity (Jarrott and Gigliotti, 2010; Wolverson *et al.*, 2016; Noone and Jenkins, 2018; Age UK Exeter, 2019; Smith-Carrier *et al.*, 2021).

Research aims

This current research aimed to inform the future design, implementation and evaluation of gardening groups for people with dementia by gathering insights from a range of existing groups. To do this, it explored a wide range of outcomes and features of this complex intervention, including the nature-based and social contexts discussed. This guiding research question asked: what commonalities are there in how people with dementia, care partners and group leaders across different gardening groups report on the outcomes of gardening groups for people with dementia, as well as the features of groups cited as enabling these outcomes?

Methods

Design

Ethical approval for this study was granted by the University of Exeter College of Medicine and Health Research Ethics Committee. The study was an exploratory qualitative study using semi-structured interviews with people with dementia, their care partners and facilitators of gardening groups for people with dementia.

Participants

There is no set format for gardening groups for people with dementia, but for the purposes of this research we sought participants from groups whose predominant meeting place was in greenspace and where self-description of the group placed gardening as the main activity. Initial scoping showed that groups of this type are commonly set in gardens, allotments or community spaces, and so sampling aimed to capture a range of these settings.

From within these groups, people with dementia, family members or friends caring for those with dementia (termed 'care partners') and gardening group leaders were invited to participate. This approach was used to ensure a range of perspectives of those involved in gardening groups for people with dementia were obtained, but also to avoid the over-burdening of one group. Minimal exclusion criteria were used, to reflect the pragmatist view that participants selected for a study should resemble as closely as possible those who take part in that activity in real-life settings (Glasgow, 2013).

Due to the limited number of groups of this kind and the disruptions groups had faced as a result of the COVID-19 pandemic, sampling of participants was not stratified in any way (*e.g.* to represent a range of ages, gender and level of cognitive/physical disability), but instead was a 'convenience' sample within the groups

identified. As it was beyond the scope of this project to recruit participants who lacked capacity to consent, this meant that the symptoms of those with dementia who participated would be classified as ‘mild to moderate’. In addition, only people with dementia living in the community, rather than care homes or residential settings, were included.

Procedure

Recruitment

The researcher (HF-C) used local contacts and internet searches to identify appropriate gardening groups and first contacted the group leaders with an invite to engage with the research. Group leaders facilitated an invitation to group members to participate and provided them with printed research information sheets to take home at least one week before the researcher visit. Attendees with dementia and their care partner could then contact the researcher in the interim or meet them at the site visit. The researcher visited all but one site to complete interviews with any interested attendees and care partners, and agreed a time to complete online/telephone interviews with others. Interviews took place between 7 September and 23 November 2021.

Consent procedures

All interviewees were given the option of providing verbal or written consent, depending on mode of interview or recorded conversation (in-person, online or telephone) and to allow for any issues with motor difficulties, reading or vision. The information sheet and consent form were produced using the Dementia Engagement and Empowerment Project (2013) guide to writing dementia-friendly information to ensure readability and accessibility. For participants with dementia, while recapping the study information verbally and providing an opportunity to ask questions, capacity to consent was assessed. This was done using a capacity to consent checklist based on the Mental Capacity Act guidance (Social Care Institute for Excellence, 2017), which provides guidance for assessing an individual's ability to hold information in mind and make an informed decision. Only those deemed to have capacity to consent were asked to provide verbal/written consent and then interviewed. ‘Process consent’ was also used throughout data collection with participants with dementia, as a way of monitoring their active willingness to participate (Dewing, 2007).

Interviews

Semi-structured interviews – either online (Zoom), face-to-face during gardening group sessions or over the telephone – were offered to support the needs of all people with dementia, care partners and group leaders who wished to participate. Shorter recorded conversations (also semi-structured), which took place *in situ* with attendees whilst they took part in gardening activities, were also offered to people with dementia. This was based on the rationale that the cues of the garden could help capture in-the-moment experiences and benefits for attendees whose memory difficulties made it difficult or stressful to provide retrospective accounts.

Interviews with group leaders focused on the practical aspects of running the groups, strategies and activities which worked well, navigating the pandemic and

advice for setting up future groups. Zoom interviews, or shorter recorded conversations conducted in-person with people with dementia, focused on their experiences of attending the groups and the impact of these on their lives. Care partners were asked about any barriers and enablers to attendance for themselves and their loved ones, their own experiences of attending, how they felt they and the person with dementia benefited, and why (for a full list of interview questions, see Appendix C in the online supplementary material).

Data analysis

All data were recorded and transcribed verbatim, and qualitative analysis was supported by NVivo software. This analysis was based on framework analysis (Ritchie *et al.*, 1994, 2013), a systematic type of thematic analysis commonly employed in health-related research (Lacey and Luff, 2001). This approach has transparent steps outlining its procedure and generates a comprehensive descriptive summary of the data (Gale *et al.*, 2013). Analysis followed five interlinked stages:

- (1) Familiarisation: transcripts were read and re-read, making note of potential codes and themes.
- (2) An initial coding framework was developed, using a combination of a deductive and inductive approach, with codes and themes relating directly to the research questions, but also being open to new themes. All extracts were labelled with codes summarising their content and meaning, and codes grouped into themes. Codes and themes were reviewed to ensure coherence and support from the data, and provisional definitions written.
- (3) This thematic framework was systematically applied to the whole dataset, with codes and themes amended and further developed as necessary.
- (4) A chart was created by collecting quotes from across all participants to represent each code and theme with 'thick description', to gain a holistic understanding of the data and variations between participants.
- (5) A concept map (Figure 1) was developed as part of the analytical process, and these final themes and sub-themes are summarised in Table 2.

The main coding was conducted by HF-C. RAL second-coded two interview transcripts at an early stage, for comparison and discussion, and engaged in critical discussions regarding the thematic framework during stages 2 and 3. The researchers were aware of their positive personal stances towards gardening activities and nature, and therefore made efforts to identify drawbacks as well as positive outcomes of these groups for attendees during analysis. Analysis was judged complete at the point at which no 'new' codes or themes were identified within the data (inductive thematic saturation; Saunders *et al.*, 2018).

Findings

Gardening groups and participants

In total, seven gardening groups were recruited from the following regions: South West (N = 4), South East (N = 1), East of England (N = 1) and London (N = 1).

Table 1. Participants and interview types

Participants	In-person	Over telephone	Via Zoom
People living with dementia (N = 3; P1–P3)	1 ¹	0	2 ²
Care partners (N = 10; P4–P13)	2	2	6
Group leaders (N = 6; P14–P19)	1	1	4

Notes: 1. Recorded conversation. 2. Alongside or with the support of a care partner.

From these groups, 19 participants took part in interviews or recorded conversations (Table 1). Interview durations (once the research had been explained and informed consent taken) ranged from 13 minutes to 1 hour 16 minutes (mean = 34 minutes).

The seven groups were chosen because they all support people with dementia through gardening-based activities in greenspace. There were broad similarities in terms of their core features but also some differences in how they were organised. Key elements of the group format which differed included group size, attendance criteria, the length of time people attended, the type of site they met on, whether activities ran seasonally or all year round, and the full range of activities offered (described in more detail under the theme Activities). These differences are summarised in Table 2.

Figure 1 shows a concept map illustrating the key themes arising from thematic analysis of the interview data. The map begins with the three themes that broadly group the features of gardening groups which were described as supportive of beneficial outcomes: features of activities, organisational components and the community garden setting (for a full list, see Appendix A in the online supplementary material). As shown in Figure 1, these enablers are clearly interlinked and, in particular, are underpinned by the garden setting. For example, the garden context allows for activities with enabling characteristics, such as a focus on the present moment, links to personal history and concrete outcomes. Taken together, these enablers were reported to facilitate several positive outcomes for people living with dementia. These are grouped in the map as: physical and cognitive benefits, affirmation of identity, social connection, and benefits for care partners and others (for a full list, see Appendix B in the online supplementary material). Although attendees and care partners were asked about both the benefits and challenges of these groups, and whether they had any suggestions for improving groups, critical responses did not speak to any harmful outcomes or features of groups that can be included within this concept map of enablers and outcomes.

The garden setting

Being outdoors, in *the natural environment* was described as promoting feelings of calm and perspective, being a common social interest for those who enjoyed gardening and nature, and providing opportunities for encounters with wildlife, bird-song, the soil and light:

Something we say [to] our volunteers is using nature as a way of supporting a person in those moments. So if [they're holding] on to a feeling [or] fixated on

Table 2. Community gardening group characteristics

	Attendees	Age	Mode of access and booking	Frequency and length of attendance	Time of year	Site	Activities	Typical number of attendees	Typical number of group leaders and volunteers
Group A	Those with dementia diagnosis and care partners	50+	Self-referral	Once per week, ongoing	All year round	Council-owned allotment	Gardening/ nature-based and creative activities	14–20	5–6
Group B (three sessions)	(1) For people with dementia and care partner (2) For older adults, inclusive of people with dementia (3) Intergenerational	No minimum	Referral or self-referral	Once per week, ongoing, regular or drop-in	All year round	Council-owned allotment	Gardening/ nature-based and green craft activities	(1) Up to 20 (2) 12–15 (3) 4 children and 4 adults	(1) 3–5 (2) 3–5 (3) 2
Group C	Those with dementia or memory issues, attending independently or with care partner	No minimum	Referral	Once per week, short course (May to October)	Seasonal (spring to autumn)	One private garden and one allotment in public park	Gardening/ nature-based and creative activities, poetry	8	5
Group E	Those with dementia or memory issues, attending independently or with care partner	No minimum	Referral or self-referral	Once per week, ongoing, regular or drop-in	All year round	Public spaces (woodland, park) and community garden	Gardening/ nature-based and creative activities, garden visits, poetry, mindfulness	2–10	2
Group F	Those with dementia or memory issues, attending independently or with care partner	No minimum	No booking required (drop-in)	Once per month, 2-hour session, drop-in	All year round	Large community garden	Gardening/ nature-based and creative activities	10	3–4

Group G (two sessions)	(1) Those with dementia diagnosis and care partners (2) Those with dementia diagnosis attending independently	No minimum	Referral	Once per week, 6-month course	All year round	Council-owned community garden	Gardening/ nature-based and creative activities, poetry and song, games, outreach	10	(1) 4–6 (2) 5–7
Group H	Those with a dementia diagnosis, attending independently or with care partner	No minimum	Signposted to service through client coordinator. No booking required (drop-in)	Once per week One-hour session followed by refreshments and social in allotment café (~30 minutes)	Seasonal (spring to autumn)	Allotment	Gardening/ nature-based and construction of garden items	6–10	2–3

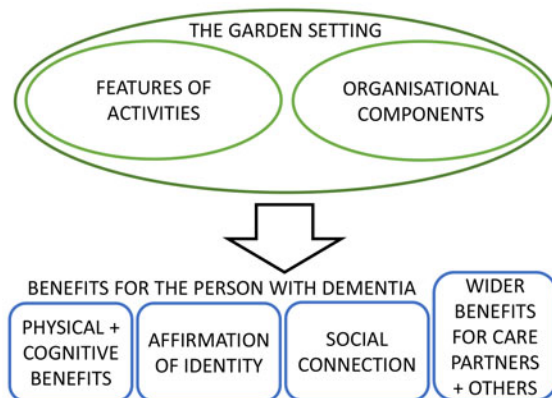


Figure 1. Concept map of key enablers and outcomes of gardening groups for those living with dementia, care partners and others.

something ... nature can be a really helpful tool because you can use it as distraction or it gives them perspective or just focusing on their breathing for a bit ... I think there are ways of using nature to [bring someone] back into the space and make them feel comfortable. (group leader)

Some care partners expressed that caring for their loved one in these outdoor spaces was ‘just so much easier than inside’ (care partner, Group C), due to the effects of being ‘out in the open air [and] connected to nature’ (care partner, Group B), as ‘it does make you feel better if you’re out’ (care partner, Group E):

You can’t argue with nature. It’s calming. You can just look at trees and get the feeling back, you know ... Everybody can get something from it and it’s like an oasis up here ... You wouldn’t believe there was a civilisation outside of it. (care partner, Group G)

Others described taking moments to themselves in these green spaces, contributing to feelings of respite:

They’ve got little [quiet] spaces all dotted around the garden ... I could hear them all doing their activity, and I just took a couple of hours out and just did some breathing and enjoyed the garden and I never get to do anything like that. (care partner, Group C)

One participant with dementia gave a tour of the garden in which he worked. Through both verbal and non-verbal cues he expressed pleasure at encounters with visiting foxes and the newts in the pond. Several of the gardening groups took place in a public space such as parks, community allotments or woodland, and this same attendee described how being in a *public space* (the park) contributed to spontaneous social interactions with others:

And we're getting little kids come in [and] again, I'm talking to people even if it's only little children, you know? And having a laugh with them ... it's got to beat the TV every time. (attendee, Group C)

During the pandemic, natural environments could also provide a safer space in which to attend social activities:

I think when the dementia starts, [they] kind of become a bit of a recluse and stop going outside, [and] you can't be in your four walls all the time. I've learnt this over lockdown, it's just depressing ... So being outside and with nature for anybody is great, but especially if you're losing your confidence and want to spend more time with people, and ... it's not like everyone is crowding into your house and you're worried. (care partner, Group C)

This theme and its illustrative quotes demonstrate some of the benefits of the garden setting and the unique opportunities this setting provides to spend time in nature and interact with others.

Characteristics of gardening groups

Despite some variations in how groups were run (described in Table 2), many common features were also identified in the group format. In general, sessions started with a welcome and orientation, which might involve reviewing the previous session, planning the day's activities, 'checking in' with everyone, grounding attendees in time and place, or an initial walk around the garden to admire the view or collect materials for activities. Next would come a range of activities, and all the gardening groups offered gardening-based tasks such as planting, digging, watering and harvesting. Most of the gardening groups also provided creative activities inspired by produce from the garden and nature, such as flower arranging, cooking, crafts (e.g. collage, clay tiles, leaf rubbing, cyanotype photos) or construction (e.g. benches, arches constructed from willow). Some groups also provided wider activities within the garden settings, from poetry and song, to physical activities and games (e.g. skittles, dominoes), museum outreach sessions, or wildlife activities such as pond-dipping and bird or tree identification.

Opportunities for socialising, usually with tea and cake, were built into all sessions, providing a familiar enjoyable ritual and an informal space for social interaction. All groups also included elements of sharing and celebration, sharing what they had done within or after sessions, creating memories such as books, videos or photographs, or holding celebratory events to say goodbye at the end of the course or season. Finally, there were typically links made with home, with attendees taking home craft items or produce, which helped support a sense of achievement and provided a joint focus of conversation for people living with dementia and their care partners. Both features of activities and organisational aspects of these groups were linked to positive outcomes for people with dementia.

Features of activities

Group activities, which everyone completed together, provided a *joint focus*. This allowed social interactions and completion of physical tasks to be 'scaffolded' by

others, removing additional pressures on motor skills and memory. It was also described as building feelings of working as a team and being part of a community. Some care partners felt it also promoted increased engagement in activities for those attendees experiencing more advanced dementia symptoms:

His dementia is getting worse so he's finding it harder and harder to think what he has to do. I've just noticed [he] literally copies what I'm doing and that's the thing. It's hard to get him motivated so when you hear of a place like this, he's seeing other people doing it and he will take part then because other people are doing it. (care partner, Group F)

The benefits of activities which had *links with attendees' personal histories* were also noted – providing a sense of familiarity, emphasising the value of individual skills, and affirmation of personal identity such as ‘gardener’ or ‘craftsperson’:

[When the allotment opened up it] was really good for me, because my pride and joy is gardening and things like that [so] it was like a new lease of life for me, and I got involved straight away. (attendee, Group H)

Additionally, activities in these gardening groups often led to *concrete outcomes* that attendees with dementia could see and hold, potentially reducing reliance on memory:

Watering is something you can see. You put the water in and you see it coming out [and] he will go round the house and he will feel plants and say they're thirsty and so watering is a very important thing for him, very ... The first day he came ... he put his walking stick down and picked up his watering can. (care partner, Group B)

Edible or craft items also provided ‘a solid piece of evidence’ of achievement (care partner, Group G) and a shared social focus for families, whilst at the groups and afterwards at home. Overall, this theme highlights that a joint focus, links to personal histories and concrete outcomes may be important considerations in the creation of activities within gardening groups for people with dementia.

Organisational components

Beyond the features of activities used within these groups, broader organisational components were regularly highlighted as facilitating beneficial outcomes. All of the gardening groups made *dementia and disability-friendly adjustments* to the activities and materials they used, as well as to the sites themselves. These included measures such as having name stickers or lanyards, adapting instructions (e.g. showing photos of intended outcomes with tasks broken down step-by-step) and surroundings (e.g. colour-coded growing beds and adapted tools), and amending site features where possible to provide level, wheelchair-friendly surfaces and safe enclosed spaces. Such adaptations helped support accessibility, and feelings of physical and emotional security:

I think it's definitely [getting him out] in terms of his ability to be able to walk round because most places you can't ... With [his] condition he's always got to

have his full-time care partner with him really, [but here] if [my husband] fell ... I can get help ... Safety is crucial to me. If I don't feel safe, I'm not going to do it. [The paved surfaces are] absolutely perfect for him because he can wander around [and you] feel that he's going to be okay ... he can walk anywhere. That's total acceptance, isn't it ... because if somebody's got a barrier and you can't go past it, you're not accepted are you? (care partner, Group B)

There was a common thread noted regarding the benefits of a *flexible tailored approach* to running sessions, with group leaders and volunteers responding to individual needs by consulting with groups directly, providing multiple options, and close observation of attendees' response to activities:

[There's always] a range of tasks available, and in any one group, there might be a range of people and their physical [and] cognitive abilities, so you know ... we have one man who's quite a bit younger than the others, and though cognitively he's struggling, he's physically very fit and really likes to be quite active. So [we often just] give him a path to sweep and he so loves it, you know? ... whereas for other people ... they might really want to be in the greenhouse in the warm ... sowing seeds ... We're all different ... [so we] definitely try to tailor. (group leader)

Several group leaders emphasised the importance of balancing a flexible approach against 'overwhelming them with choice' (group leader), particularly as dementia progresses, and also that participation in active tasks was not expected:

...if people don't want to do anything, that's fine, you can just sit and be, and watch and listen ... [And] for some people who are less mobile, we can often take jobs to them. So whether it's things like scrubbing potatoes, podding broad beans, sorting out flowers and putting them into bunches, it's that sort of thing that people like to do. (group leader)

Support from volunteers, in addition to that of the group leaders, was described as critically important for all groups. This enabled one-to-one support with activities and safe management of sessions:

I can't praise [the volunteers] highly enough. They're just fantastic, warm, skilled, enabling people who are just there for the right reasons ... And I wouldn't be able to run the session [without them] ... If I just need to nip off and get a trowel ... I can't leave [the group] even I'm only going a few yards away. [And] when the participant numbers were very low ... maybe one, two people, it created the group ... Having the right people who are really willing to [listen to] the same conversations over and over [and do] training and feedback ... observations and bring cakes and just so many different aspects to what they offer. (group leader)

Linked to this was how volunteers' and group leaders' *understanding of dementia* were described as benefiting attendees and care partners. This sometimes came from working in this area and at other times from their own personal experiences of caring for someone with dementia:

I think the benefits [for] my mum spending time with volunteers and people who are experienced with dementia ... is a million times more beneficial to her than it is for me who has not really got any idea ... I mean, I know my mum, and I look after her, and we have fun ... but I'm in awe of all of them because they know exactly what to say, they know how to look after her ... and I'm so close that I get frustrated ... [so] I think the benefit for her spending time with people who understand her needs and her dementia ... I can't stress enough how important that is. (care partner, Group C)

This knowledge informed awareness of possible stressors, realistic expectations, and calm, positive attitudes, contributing to an inclusive environment and beneficial outcomes:

He doesn't talk very much anymore, whereas here he's talking quite a lot, and ... maybe that's because the people here ... they make those allowances. Their expectations are realistic and so he definitely enjoys the social contact. (care partner, Group A)

The group leaders and volunteers, their understanding and the wider gardening group community were credited with creating environments which were *welcoming, caring and inclusive*. They were characterised by humour, kindness and 'heart', and described as providing emotional safety, due to the removal of the stigma often associated with dementia. One care partner described their group as having an atmosphere of 'total acceptance', contributing to feelings of calmness and connection for their loved one:

I think the biggest thing with Alzheimer's is this disconnect [from] society ... You're looked on as being very strange and quite scary ... He doesn't feel that there ... He feels normal ... he can do things ... he's not on his own and ... he's not strange and people aren't staring ... [And] importantly it's the attitude of the people that run it. They're magnificent. They take everything in their stride. He throws a wobbly and they go, 'Okay, let's do something else.' So he's normalised in an abnormal world, if that makes sense. (care partner, Group B)

Attendees living with dementia also described their groups as positive environments, where they could 'go for a laugh', 'something [they] can do without getting frustrated' (attendee, Group C) and where they could be themselves:

...they never cast judgement and never criticise what people say and what people do ... It's a fantastic community, really. [And] anything you say with them is in confidence ... so you can talk about things that you've got on your mind. You can talk openly. (attendee, Group H)

Some group leaders also emphasised a *focus on the present moment*, 'letting go' to focus on processes and feelings rather than outcomes, during activities:

We would sort of try and create a mindfulness around it ... the end result is the least important part of all this ... [Focusing] on the present moment. Are people engaged? Can you hear laughter? Are people smiling? That is the test of whether or not you've had a successful group. Do people want to come back? [Do care partners say] that person was in a good mood when they went home? Those are the gold standard things to be alert to. (group leader)

This theme illustrates positive elements of the way groups are organised that were highlighted by respondents and so may be important for optimal outcomes. This includes the presence of dementia- and disability-friendly adjustments, a flexible tailored approach and a focus on the present moment, but also the importance of those running the group, the support from volunteers, experience and understanding of dementia, and the welcoming, caring and inclusive approach.

Wellbeing outcomes

The participants in this study described several beneficial outcomes from attending gardening groups for people with dementia, summarised as: physical and cognitive benefits, affirming identity, social connection, and benefits for care partners and others.

Physical and cognitive benefits

The activity within the garden promoted *physical exercise* for attendees as well as providing access to *freshly grown produce*, which attendees could take home to cook or share with their communities:

I'm getting on a bit and it keeps me fit ... I'll be 80 in January ... but I can still swing a spade and dig and whatever. (attendee, Group C)

We had so many courgettes, it was unbelievable, hundreds. [And] one of the ladies actually printed a laminated sheet of recipes [so] now I know what to do with it. It's got your name on, it's got a recipe so you know it's not just a bundle of courgettes, it's a bit more than that. (attendee, Group H)

Beyond these basic physical health benefits, the activities provided *cognitive and sensory stimulation*. One group leader relayed how one of their group attendees had said:

For some of us this is the only chance we get to put our hands in the soil. (group leader)

Gardening activities were also cited as:

Good for your brain as well, it's working. Everything we do is for working ... [it] keeps your brain active. (attendee, Group H)

This might lead to noticeable changes in the person with dementia. For instance, one participant talked about how the group encouraged greater engagement and wakefulness in their partner:

When I'm not around, he stays a lot watching TV and I think he falls asleep a lot on the chair ... but when he's there ... he's been encouraged [to do] active things, and things that he likes. Wish it was every day, because he really lightens up. (care partner, Group G)

Overall, this theme demonstrates the potential for broad positive health outcomes from gardening groups, including reports of improved activity levels, nutrition and levels of stimulation.

Affirmation of identity

A range of outcomes were reported that relate to the way in which groups supported positive aspects of the self for people with dementia, including promotion of *personal identity*, through a celebration of skills and personal history, and providing a sense of purpose, challenge and agency. In several cases, respondents reported how activities linked to past skills, occupations and interests helped affirm the personal identity of people living with dementia:

[Another allotment group is] going to invite us to go down and see what they've done [and] where we can help them in any way ... [And with] me being in the building trade before. I've got quite a bit of experience on safety ... So, I've applied all these things to our allotment. And they think that maybe I could help them apply the safety things to their allotment, as well. (attendee, Group H)

Carrying out work which was valued by others and achieving outcomes they could take pride in also provided a *sense of purpose* for some attendees:

I don't really know how to explain it, it just makes my day. When I was diagnosed with Alzheimer's, I thought, 'What am I going to do now?' You feel in sort of a lost state, but since I joined [this organisation], it has been a new lease of life, I've got a sense of purpose [and] things that I enjoy, things that I used to do. (attendee, Group H)

Participants described how groups *challenged* attendees, by encouraging them to move out of their comfort zones and try activities, despite common perceptions that 'people with dementia can't learn something new [but] it's not true' (group leader):

[And] if it's raining, you're expected to put your water boots on [and] still go on with it! (laughter) ... we've learnt not to be frightened of a bit of rain. (attendee, Group H)

Finally, group leaders aimed to provide opportunities for attendees to make decisions and act for themselves, with appropriate support. This, in turn, promoted *agency and self-confidence*:

The main shift, I think, has been people getting used to wanting their ideas to come forward. I think initially they can think, 'I don't know. I don't mind. I'll do whatever you want me to do...' but now because they've been given that space to think about what they might like to do it just flows more naturally and they look forward to talking about it. (group leader)

[One guy] originally came with two dementia nurses [and he was walking around] with one of them on each arm ... [but] now he comes by himself every week in a taxi, and he walks around by himself ... For us [those] are the biggest outcomes [that] we can have from the project. They can sound small and insignificant in one respect, but in terms of that man's life, that's a huge thing, isn't it? He's got a bit of independence ... confidence ... all those things that come from [him] being able to come along on his own is a massive outcome. (group leader)

Having identity and purpose, being challenged, and having agency and self-confidence all reflect aspects of this theme around the potential for gardening groups to affirm individuals' identity or sense of self.

Social connection

Groups were often described as being a hub for *social interactions* and allowing people with dementia to become part of a community. These aspects were described as central to the community gardening experience:

There are so many different people with us ... it's a very social thing. (attendee, Group H)

Although some attendees experienced communication difficulties, social interactions were described positively given an inclusive environment and the fact that 'everyone's in the same boat' (care partner, Group C). Social distinctions between staff, attendees and care partners were often broken down as 'everybody seemed to talk to everybody else' (care partner, Group F).

Some participants talked about the development of *sense of community* and identity as a group over time, where people started to look after each other:

[You] suddenly notice it and it's nice because it feels so teamly and everybody is all so supportive. [The] individuals are also very aware of each other's limitations. So, if they go for a walk in the garden [they'll] all walk at [a pace] they're all comfortable with, you know ... We call it 'club' ... Because that's the kind of feeling. It's not just a garden, if that makes sense. It's familiar faces. It's people. It's community. It's camaraderie. It's reassurance. It's supportive and it's fun, I guess. (care partner, Group G)

[Care partner: It's like a family, isn't it?] Yeah. It is, it's just like a family really ... We're always in touch with each other. (attendee, Group H)

Both care partners and group leaders observed that the nature of the tasks and social interactions allowed attendees with dementia to 'come alive', showing increased engagement in practical activities and social interactions, compared to other environments, and 'got more energy' (care partner, Group E) from taking part:

He literally walks through the door and he changes back to more like his old self. He's jokey. [At home] he sits watching TV. He doesn't talk a lot ... He comes through the door and he switches on to the mode, 'I've got people' ... He'll get

in the car to go home and he doesn't say a lot and he's kind of tired for the rest of the afternoon but it's a good tired [because] he's done something. His brain has worked. He's seen people ... It's that old [person] comes out. (care partner, Group F)

There were also several references during interviews to how interactions provided laughter and the use of humour as a coping mechanism:

We also have chats about dementia in some of the groups ... talking about their experiences and ways of coping ... in quite a humorous way as well often ... There's one or two people [who] don't take themselves seriously ... I don't [know how they are] at home ... but [here] people seem to be taking their condition reasonably lightly and laughing with it. (group leader)

One care partner also described the positive emotions her mum expressed on their drive home:

I think [what] really breaks my heart, she says 'everyone is so nice to me' and I just think 'well, of course, you know, it's a nice place to go' and [I think] she can't believe what a lovely environment it is to be in ... There's laughter and happiness ... so at the end of it she is just so, so happy and smiling ... She's tired, because it's two hours of walking around, and I think at the end of it she's ready to go home [but] she's been out of the house and she's been with lovely positive people who genuinely care about her. (care partner, Group C)

Social interactions and sense of community were central to many responses, forming a notable theme around social connection.

Benefits for care partners and others

In addition to positive outcomes for attendees with dementia, several important benefits were also identified for care partners. A strong sub-theme here was *respite*, whereby the groups provided a break from caring responsibilities. This sometimes arose from care partners attending the groups themselves, or through them taking 'time out', due to 'knowing that [their] people are being cared for, looked after' (care partner, Group F) physically and emotionally:

It really is the only place I come to in the whole week where I can [come and] just be me. I'm not having to worry about protecting [my husband] or making sure he doesn't get into a conversation where he's out of his depth or ... someone isn't telling him instructions to pass on to me and he can't remember them ... [The] experiencing of it is phenomenal actually ... It's like literally a weight going off. I think that's why I cried a few times the first time I was here, was just with sheer relief ... [And] I think ... it says something that for both of us the two hours just goes like that, and I don't leave here feeling sort of mentally or physically or emotionally exhausted, which I can do from other things. I go away feeling energised, actually. It gives you that extra sort of, we can manage. (care partner, Group A)

When the group is running, this period for my mum means that ... she can be out for the afternoon. She is free of having to be the sole care partner for my dad so it absolutely gives her an element of freedom. (care partner, Group F)

In addition, these gardening groups were able to provide *shared activities* for care partners with their loved one, within an 'equalising' environment, which they did not have to organise themselves, and provided a refreshing change from 'the day-to-day drudgery' (group leader) enabling them to see the person with dementia in a different light:

And ... suddenly they see the person they care for in a different way ... It's not, 'We've got to put your shoes on to leave the house and ... you don't want to go' [but] suddenly here we are together and we're laughing over a piece of cake and a cup of tea and somebody's made a joke and the pressure's off just for that moment. (group leader)

We did some lovely things. You know, we did making flowers, vases, all sorts of things [that] we would never do, so it was really nice to get away from the usual 'let's make sure you've got food in the fridge, have you had your meds' ... routine which is just so boring, and it was just lovely to do something else away from that with the person that I look after. (care partner, Group C)

Care partners also benefited from *peer support*, with opportunities to share emotions with those who understood, and sometimes gaining information and hope from others' experiences:

I don't read too much about dementia or Alzheimer's on the internet because of fear of being totally overwhelmed. So coming here and seeing [people] who have survived it and they're still functioning, really nice, friendly women. They've still got active lives ... I think it's been a godsend ... when [my husband] was first diagnosed, I just felt that kind of crashing in of our world ... [and] we're now nearly [seven months later] and things have ... in a sense they've improved because I've got more of that support network around me. (care partner, Group A)

In some groups, this peer support continued after the person with dementia had passed away. One group leader described how their thinking had shifted over time to consider the additional benefits for care partners as well as people with dementia:

I've just been to have a chat with one of our ex-care partners who would like to be a volunteer ... because he's got so much to give and there's so much support that care partners get when they're caring for a person with dementia but, as soon as they've died, they're just cut off from all support [and] we've had lots of people say, 'Can I keep coming? I'd love to keep coming to the group because they've become my friendship group'. (group leader)

I don't think you can separate the two? It's quite important that people understand [that] if we can support the care partner, then the care partner can support their

person for longer. And not start thinking, ‘Oh, I need respite’ or ‘I need to look at long-term care’. (group leader)

Some *wider benefits* were also noted for group leaders and volunteers, bringing together the surrounding community, and through challenging wider societal views and stigma:

I’d say personally this has been the most rewarding work that I’ve ever been involved with ... I absolutely love getting to know people; they become so much more than a diagnosis, and the care and sort of depth of feeling that is created in me in these two-hour sessions. (group leader)

[It] communicates [that] people with dementia can get stuff done ... And [the] organisation that manages [the green space that we’re using have] been getting loads of comments about how good it looks [and] it feels amazing to have got that success ... [people know] that it’s people with dementia who are doing those things ... And it also challenges these stigmas around dementia. [We] built a load of bat boxes that we’ve given to the council, and then I’ll put that on social media and be like, wow, look, we’ve created these things that are quite unexpected. (group leader)

Wider questioning of care partners and group leaders clearly highlight that the benefits of gardening groups for people with dementia do not stop at the person with dementia.

Discussion

This research paper provides rich descriptive accounts of community gardening groups for people with dementia, captured via reflections of people with dementia themselves, care partners and group leaders. The findings demonstrate the flexible and variable nature of groups like these, but also the core components which tend to characterise their activities, including an initial welcome and orientation, a range of gardening and nature-based activities, opportunities for socialising, sharing and celebration, and connections made between the groups and attendees’ home lives.

Four overarching themes encapsulate key outcomes that respondents derived from gardening groups (physical and cognitive benefits, affirmation of identity, social connection, and benefits for care partners and others), while three themes show key factors that were cited as enablers of these outcomes (features of activities, organisational components and the community garden setting). Here we bring together these themes to highlight key messages derived from this research. These provide insights about what benefits facilitators and/or researchers might expect from running this kind of group and highlight how these might be best derived from gardening groups for people with dementia.

Identity promotion

An individual’s self-concept, identity or what is sometimes called ‘personhood’ is their subjective appraisal of who they are (Kitwood, 1997; Vignoles *et al.*, 2011)

and is formed based on various components of their personal history, group memberships, possessions, characteristics and traits. Caddell and Clare (2010) reviewed 33 studies to examine whether those with memory loss maintain a self-concept. They found that although these studies had mixed conceptual frameworks for the self/identity/personhood, almost all provided evidence for the continuation of the self (to some extent) in the mild, moderate and severe stages of dementia. However, Caddell and Clare (2010) also reported that many studies found signs of deterioration in the self-concept. These losses may be a direct result of cognitive and physical decline, but the environment people live in can also be disruptive to the self. For example, people with dementia report losing their role and place within the community, as well as facing loss of social connections, loneliness and stigma (Birtwell and Dubrow-Marshall, 2018). The current research shows the potential for gardening groups to promote positive identity in people with dementia.

Indeed, the interviews highlighted how the social environment in which these groups occur can provide meaningful opportunities for people with dementia to develop a shared social identity and connection with others (Haslam *et al.*, 2018). Psychological connections were described as stemming from a range of enablers, including how the groups and activities were organised so that people with dementia experienced the groups as welcoming, inclusive and enabling environments. It was clear from the interviews that volunteers and care partners with shared experiences were key in creating this environment and a central part of the social outcomes achieved.

When promotion of aspects of the individual self were discussed within interviews – such as personal identity, sense of purpose and challenge, and agency – it was most often in relation to the garden-based activities. The context very naturally provides a joint focus, links with personal history and concrete outcomes for attendees. This evidence of support for aspects of both social and personal identity is further reinforced by care partners and group leaders noting increased levels of engagement of people with dementia in both activity and socialising when at the group. They talked of people ‘coming alive’ and how this differs from how they were in other contexts. This suggests that gardening groups do have the potential to reduce negative psychological influences and increase the psychological resources of people with dementia, in line with the recommendations of Clare *et al.* (2019).

Outcomes particular to the garden context and gardening activity

There are some positive outcomes that we suggest are unique or more naturally available within the context of gardening groups. These outcomes include stimulation (cognitive and sensory), the growing and taking home of fresh produce, and taking the time to connect with nature. These outcomes relate to the outdoor environment of gardening groups, something that many groups for people with dementia that take place in indoor facilities cannot replicate.

The growing and taking home of fresh fruit and vegetables is a unique outcome of this type of group, while promoting physical activity is not always part of group support for people with dementia. A recent meta-analysis of the impact of community gardening on nutrition and physical health outcomes (Kunpeuk *et al.*, 2020) noted some evidence of improved nutritional content from gardening but was

more confidently able to show a positive association between community gardening and Body Mass Index reduction (Kunpeuk *et al.*, 2020).

The opportunity to connect with nature was described by participants within the current research and again represents an outcome more difficult to replicate within indoor settings. Connection to nature and themes of identity, purpose and meaning discussed previously link back to Wilson's Biophilia Hypothesis (Kellert, 1993). The garden context is providing not just for the material and physical, but also for aspects of human meaning and satisfaction. In line with this, research has shown a positive association between people's subjective experience of 'nature connection' and eudemonic wellbeing which relates to self-fulfilment (Pritchard *et al.*, 2020).

Finally, respondents noted the cognitive and sensory stimulation that attendees with dementia derived from the gardening groups. The gardening activities involved physical tasks such as digging and sowing seeds which offered participants opportunities to 'get their hands in the soil'. The gardening activities provided participants with cognitive or mental stimulation in that they could have pride in 'doing' tasks valued by others and that used their skills. Some activities linked to past occupations and interests which provided continuity for participants and helped them retain a sense of self and identity (Phinney *et al.*, 2007). Importantly, such sensory experiences of nature were also accessible to those who were less mobile. Bringing nature to participants through activities such as 'scrubbing potatoes' and 'podding peas' ensured that they too could enjoy touching, feeling and smelling plants and vegetables grown in the gardens. Some participants could simply 'be in the garden' and through watching and listening, enjoy nature. It was possible that these sensory experiences helped those with dementia to connect with the present and have some respite from the symptoms of illness, as suggested by one group leader. These findings resonate with the argument of Orr *et al.* (2016) that sensory experiences in nature are important for making older people living with dementia in the community feel connected, and feel part of 'ordinary life', which, in turn, positively impacts their wellbeing and quality of life. These defining features of gardening groups present unique opportunities to support the health and wellbeing of people living with dementia.

Benefits beyond the person with dementia

Evidence suggests bidirectional links between the wellbeing of care partners and care recipients, such that caring for a person living with dementia can lead to care partners' needs, such as companionship, being unmet, putting them at greater risk of mental ill health and burnout (McCabe *et al.*, 2016; Hazzan *et al.*, 2022). Social support for care partners may help maintain psychological health (Cross *et al.*, 2018), enhancing their ability to meet the progressively changing needs of loved ones (Hazzan *et al.*, 2022). In their responses, care partners spoke about the importance of the social support provided by the gardening groups in the form of temporary respite from caring responsibilities and support from peers. Therefore, such groups could potentially play an important part in current moves towards more 'holistic' and 'relational' approaches to dementia care (Gudnadottir *et al.*, 2021), through community-centred activities which support families as a whole. The focus on enjoyable activities which care partners and

recipients can do together may also contribute to more positive experiences of care-giving (Faw *et al.*, 2021), also linked to better quality of life outcomes for care partners (Quinn and Toms, 2019). It has been suggested that social support interventions for care partners are most effective when the person they care for is involved and when they are modified to meet care partners' individual needs (Brodady *et al.*, 2003), key features of the gardening groups to which we spoke. Further benefits were noted for group leaders, volunteers and the community as a whole, in particular by addressing stigma through positive examples of what people living with dementia are capable of (Kim *et al.*, 2021).

Study limitations

The challenges of recruiting people with dementia for research are well documented (Lepore *et al.*, 2017). The research team was aware of a need to balance the benefits of inclusivity and representation of people with dementia against the importance of fully informed consent and minimisation of risk to participants. Therefore, many of the benefits for people with dementia were described 'second-hand' through the voices of care partners and group leaders in this study, and future studies would aim to better capture the experiences of attendees first-hand. Nonetheless, groups leaders and care partners may be well placed to observe these benefits, as well as highlighting some of the wider benefits for others, which is under-studied.

Minimal demographic data were collected for this sample to minimise the possibility of inadvertently de-anonymising participants. Based on this decision and other possible biases in those choosing to attend existing groups, it is likely that the participants in this study did not reflect the socio-economic or cultural diversity of people with dementia. Future studies might address this through purposive sampling and (for larger samples) collection of additional demographic data.

A final limitation is the almost wholly positive outcomes and enablers identified by participants, which may be a feature of this self-selecting sample. As noted, attendees and care partners were asked about both the benefits, challenges and possible ways to improve groups, but any critical responses did not speak to negative outcomes for attendees. Instead, they commonly centred around providing greater numbers of sessions, over a wider geographical area, so that more people could benefit. Future research might therefore aim to also capture the views of those attendees who decided that the groups were not a good 'fit', to ascertain the reasons why. However, what this positive focus did provide was information on what currently works well and why.

Conclusions

This qualitative exploration of the outcomes from gardening groups for people with dementia and the factors underlying these demonstrates overall positivity towards gardening groups among people with dementia, their care partners and group leaders. Gardening groups were places where people could experience connection with others, affirm aspects of their identity, as well as experience the unique health and wellbeing benefits of gardening and nature-based contexts. Future research in this

area might use the identified themes as a framework for the design, implementation and evaluation of similar gardening groups.

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Data. The study data have not been made available. Participants did not consent for datasets to be stored or accessed outside the research team.

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References

- Age UK Exeter (2019) *The Allotment of Time*. Available at <http://www.idealproject.org.uk/projects/almo/chapbooks/>.
- Alzheimer's Disease International (2018) *Global Estimates of Informal Care*. Available at <https://www.alzint.org/u/global-estimates-of-informal-care.pdf>.
- Alzheimer's Society (2013) *Dementia 2013: The Hidden Voice of Loneliness*. Available at https://www.alzheimers.org.uk/sites/default/files/migrate/downloads/dementia_2013_the_hidden_voice_of_loneliness.pdf.
- Bennett J, Wolverson E and Price E (2022) Me, myself, and nature: living with dementia and connecting with the natural world – more than a breath of fresh air? A literature review. *Dementia* **21**, 2351–2376.
- Birtwell K and Dubrow-Marshall L (2018) Psychological support for people with dementia: a preliminary study. *Counselling & Psychotherapy Research* **18**, 79–88.
- Briggs R, Morris PG and Rees K (2023) The effectiveness of group-based gardening interventions for improving wellbeing and reducing symptoms of mental ill-health in adults: a systematic review and meta-analysis. *Journal of Mental Health* **32**, 1–18.
- Brodsky H, Green A and Koschera A (2003) Meta-analysis of psychosocial interventions for caregivers of people with dementia. *Journal of the American Geriatrics Society* **51**, 657–664.
- Caddell LS and Clare L (2010) The impact of dementia on self and identity: a systematic review. *Clinical Psychology Review* **30**, 113–126.
- Chen TY and Janke MC (2012) Gardening as a potential activity to reduce falls in older adults. *Journal of Aging & Physical Activity* **20**, 15–31.
- Clare L, Wu YT, Quinn C, Jones IR, Victor CR, Nelis SM, Martyr A, Litherland R, Pickett JA, Hindle JV and Jones RW (2019) A comprehensive model of factors associated with subjective perceptions of 'living well' with dementia: findings from the IDEAL study. *Alzheimer Disease & Associated Disorders* **33**, 36–41.

- Cross AJ, Garip G and Sheffield D** (2018) The psychosocial impact of caregiving in dementia and quality of life: a systematic review and meta-synthesis of qualitative research. *Psychology & Health* **33**, 1321–1342.
- De Bruin SRD, Oosting SJ, Kuin Y, Hoefnagels EC, Blauw YH, Groot LCD and Schols JM** (2009) Green care farms promote activity among elderly people with dementia. *Journal of Housing for the Elderly* **23**, 368–389.
- Dementia Engagement and Empowerment Project** (2013) *Writing Dementia-friendly Information*. Available at <http://dementiavoices.org.uk/wp-content/uploads/2013/11/DEEP-Guide-Writing-dementia-friendly-information.pdf>.
- Dewing J** (2007) Participatory research: a method for process consent with persons who have dementia. *Dementia* **6**, 11–25.
- Faw MH, Luxton I, Cross JE and Davalos D** (2021) Surviving and thriving: qualitative results from a multi-year, multidimensional intervention to promote well-being among caregivers of adults with dementia. *International Journal of Environmental Research & Public Health* **18**, 4755.
- Gale NK, Heath G, Cameron E, Rashid S and Redwood S** (2013) Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC Medical Research Methodology* **13**, 117.
- GBD 2019 Dementia Forecasting Collaborators** (2022) Estimation of the global prevalence of dementia in 2019 and forecasted prevalence in 2050: an analysis for the Global Burden of Disease Study 2019. *Lancet Public Health* **7**, e105–e125.
- Genter C, Roberts A, Richardson J and Sheaff M** (2015) The contribution of allotment gardening to health and wellbeing: a systematic review of the literature. *British Journal of Occupational Therapy* **78**, 593–605.
- Gigliotti CM and Jarrott SE** (2005) Effects of horticulture therapy on engagement and affect. *Canadian Journal on Aging/La Revue canadienne du vieillissement* **24**, 367–377.
- Glasgow RE** (2013) What does it mean to be pragmatic? Pragmatic methods, measures, and models to facilitate research translation. *Health Education & Behavior* **40**, 257–265.
- Gudnadottir M, Ceci C, Kirkevold M and Björnsdóttir K** (2021) Community-based dementia care re-defined: lessons from Iceland. *Health & Social Care in the Community* **29**, 1091–1099.
- Hall J, Mitchell G, Webber C and Johnson K** (2018) Effect of horticultural therapy on wellbeing among dementia day care programme participants: a mixed-methods study (Innovative Practice). *Dementia* **17**, 611–620.
- Haslam C, Jetten J, Cruwys T, Dingle GA and Haslam SA** (2018) *The New Psychology of Health: Unlocking the Social Cure*. Abingdon, UK: Routledge.
- Hazzan AA, Dauenhauer J, Follansbee P, Hazzan JO, Allen K and Omobepade I** (2022) Family caregiver quality of life and the care provided to older people living with dementia: qualitative analyses of caregiver interviews. *BMC Geriatrics* **22**, 1–11.
- Howarth M, Brettle A, Hardman M and Maden M** (2020) What is the evidence for the impact of gardens and gardening on health and well-being: a scoping review and evidence-based logic model to guide healthcare strategy decision making on the use of gardening approaches as a social prescription. *BMJ Open* **10**, e036923.
- Jarrott SE and Gigliotti CM** (2010) Comparing responses to horticultural-based and traditional activities in dementia care programs. *American Journal of Alzheimer's Disease & Other Dementias* **25**, 657–665.
- Kaplan S** (1995) The restorative benefits of nature: toward an integrative framework. *Journal of Environmental Psychology* **15**, 169–182.
- Kellert SR** (1993) Introduction. In Kellert SR and Wilson EO (eds), *The Biophilia Hypothesis*. Washington, DC: Island Press, pp. 18–25.
- Kim S, Richardson A, Werner P and Anstey KJ** (2021) Dementia stigma reduction (DESeRvE) through education and virtual contact in the general public: a multi-arm factorial randomised controlled trial. *Dementia* **20**, 2152–2169.
- Kitwood T** (1997) *Dementia Reconsidered: The Person Comes First*. Maidenhead, UK: Open University Press.
- Kunpeuk W, Spence W, Phulkerd S, Suphanchaimat R and Pitayarangsarit S** (2020) The impact of gardening on nutrition and physical health outcomes: a systematic review and meta-analysis. *Health Promotion International* **35**, 397–408.
- Lacey A and Luff D** (2001) *Qualitative Data Analysis*. Sheffield, UK: Trent Focus.

- Lepore M, Shuman SB, Wiener JM and Gould E** (2017) Challenges in involving people with dementia as study participants in research on care and services. Paper presented at the Research Summit on Dementia Care. Available at <https://aspe.hhs.gov/sites/default/files/private/pdf/256696/Session%25205%2520Background.pdf>.
- Lovell R, Depledge M and Maxwell S** (2018) *Health and the Natural Environment: A Review of Evidence, Policy, Practice and Opportunities for the Future* (Defra Project Code BE0109). Available at <https://ore.exeter.ac.uk/repository/handle/10871/36923>.
- McCabe M, You E and Tatangelo G** (2016) Hearing their voice: a systematic review of dementia family caregivers' needs. *The Gerontologist* **56**, e70–e88.
- Natural England** (2013) *Greening Dementia: A Literature Review of the Benefits and Barriers Facing Individuals Living with Dementia in Accessing the Natural Environment and Local Greenspace* (NECR137). Available at <http://publications.naturalengland.org.uk/publication/6578292471627776>.
- Natural England** (2016) *Methods, Glossary and Evaluation Resources: Evidence Briefing*. Available at <http://publications.naturalengland.org.uk/publication/5206598725664768>.
- Noone S and Jenkins N** (2018) Digging for dementia: exploring the experience of community gardening from the perspectives of people with dementia. *Aging & Mental Health* **22**, 881–888.
- Noone S, Innes A, Kelly F and Mayers A** (2017) 'The nourishing soil of the soul': the role of horticultural therapy in promoting well-being in community-dwelling people with dementia. *Dementia* **16**, 897–910.
- Orr N, Wagstaffe A, Briscoe S and Garside R** (2016) How do older people describe their sensory experiences of the natural world? A systematic review of the qualitative evidence. *BMC Geriatrics* **16**, 116.
- Phinney A, Chaudhury H and O'Connor DL** (2007) Doing as much as I can do: the meaning of activity for people with dementia. *Aging & Mental Health* **11**, 384–393.
- Pritchard A, Richardson M, Sheffield D and McEwan K** (2020) The relationship between nature connectedness and eudaimonic well-being: a meta-analysis. *Journal of Happiness Studies* **21**, 1145–1167.
- Quinn C and Toms G** (2019) Influence of positive aspects of dementia caregiving on caregivers' well-being: a systematic review. *The Gerontologist* **59**, e584–e596.
- Ritchie J, Lewis J, Nicholls CM and Ormston R** (eds) (2013) *Qualitative Research Practice: A Guide for Social Science Students and Researchers*. London: Sage.
- Ritchie J, Spencer L, Bryman A and Burgess RG** (1994) Qualitative data analysis for applied policy research. In Bryman A and Burgess RG (eds), *Analyzing Qualitative Data*. London: Routledge, pp. 173–194.
- Saunders B, Sim J, Kingstone T, Baker S, Waterfield J, Bartlam B, Burroughs H and Jinks C** (2018) Saturation in qualitative research: exploring its conceptualization and operationalization. *Quality & Quantity* **52**, 1893–1907.
- Schols JM and van der Schriek-van Meel C** (2006) Day care for demented elderly in a dairy farm setting: positive first impressions. *Journal of the American Medical Directors Association* **7**, 456–459.
- Scott TL, Masser BM and Pachana NA** (2015) Exploring the health and wellbeing benefits of gardening for older adults. *Ageing & Society* **35**, 2176–2200.
- Smith-Carrier TA, Beres L, Johnson K, Blake C and Howard J** (2021) Digging into the experiences of therapeutic gardening for people with dementia: an interpretative phenomenological analysis. *Dementia* **20**, 130–147.
- Snowden MB, Atkins DC, Steinman LE, Bell JF, Bryant LL, Copeland C and Fitzpatrick AL** (2015) Longitudinal association of dementia and depression. *American Journal of Geriatric Psychiatry* **23**, 897–905.
- Social Care Institute for Excellence** (2017) *Mental Capacity Act: Assessing Capacity*. Available at <https://www.scie.org.uk/mca/practice/assessing-capacity>.
- Spano G, D'Este M, Giannico V, Carrus G, Elia M, Laforteza R, Panno A and Sanesi G** (2020) Are community gardening and horticultural interventions beneficial for psychosocial well-being? A meta-analysis. *International Journal of Environmental Research & Public Health* **17**, 3584.
- Ulrich RS, Simons RF, Losito BD, Fiorito E, Miles MA and Zelson M** (1991) Stress recovery during exposure to natural and urban environments. *Journal of Environmental Psychology* **11**, 201–230.
- Vignoles VL, Schwartz SJ and Luyckx K** (2011) Introduction: Toward an integrative view of identity. In Schwartz SJ, Luyckx K and Vignoles VL (eds), *Handbook of Identity Theory and Research*. New York, NY: Springer, pp. 1–27.

- Whear R, Coon JT, Bethel A, Abbott R, Stein K and Garside R** (2014) What is the impact of using outdoor spaces such as gardens on the physical and mental well-being of those with dementia? A systematic review of quantitative and qualitative evidence. *Journal of the American Medical Directors Association* **15**, 697–705.
- Wilson EO** (1984) *Biophilia: The Human Bond with Other Species*. London: Harvard University Press.
- Wolverson EL, Clarke C and Moniz-Cook ED** (2016) Living positively with dementia: a systematic review and synthesis of the qualitative literature. *Aging & Mental Health* **20**, 676–699.
- Wood CJ, Pretty J and Griffin M** (2016) A case-control study of the health and well-being benefits of allotment gardening. *Journal of Public Health* **38**, 336–344.