

Research Report

Evaluating the Impact of Community Gardening on Sense of Purpose for Persons Living with Dementia: A Cluster-Randomized Pilot Study

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Received 7 March 2022

Accepted 9 June 2022

Pre-press 23 June 2022

Published 4 July 2022

Abstract.

Background: Gardening has been shown to have positive effects on persons living with dementia, but no studies have explored the effects of gardening on sense of purpose.

Objective: Explore how gardening may influence sense of purpose for people with dementia.

Methods: Ten residents with dementia diagnoses living in a skilled care facility participated in hour-long gardening sessions twice weekly at outdoor raised beds over a two-month duration. One group ($n=5$) donated vegetables to a food pantry while the other ($n=5$) harvested produce for personal use. Semi-structured interviews with participants and their caregivers conducted post-intervention were analyzed for themes.

Results: Participants and caregivers reported biopsychosocial benefits of gardening, identifying four main themes: 1) Gardening outdoors provided specific physical benefits that improved quality of life; 2) Working on a project in a group setting improved mood and fostered a sense of community; 3) Gardening promoted reminiscence and reinforced a sense of self; 4) Gardening provided participants with a sense of purpose and pride.

Conclusion: Gardening has biopsychosocial benefits for persons living with dementia, and there appears to be additive benefit linked to improved sense of purpose via charitable giving.

Keywords: Arts, dementia, medical humanities, nature, psychosocial

INTRODUCTION

Over the last several decades, the United States has observed a steady increase in the number of

dementia-related deaths [1]. There are currently no validated disease-modifying therapies for the condition, and current treatments can cause substantial side effects [2]. Even aducanumab, the monoclonal antibody controversially approved by the FDA in 2021, has failed to show adequate clinical efficacy, while raising concerns about side effects (i.e., edema and micro-hemorrhaging, brain shrinkage) and cost [3, 4].

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In response to rising prevalence and lack of treatment options, researchers have begun investigating the use of non-pharmacological methods (e.g., music, storytelling, dance, light therapy) to increase quality of life (QOL) for people living with dementia [5]. A growing number of organizations including the American Geriatric Society and the American Association for Geriatric Psychiatry consider these interventions to be the first-line treatments, as they present far fewer side-effects than existing medications [6].

One promising non-pharmacological intervention is the use of gardening to improve the QOL of persons with dementia. Various studies have explored different garden settings, such as community gardens, Japanese gardens, and wander gardens, and data suggests that time spent in green spaces can reduce depression, agitation, anxiety, aggression, inappropriate behaviors, number of falls, pacing, and exit-seeking [7–13]. Additionally, evidence indicates that interacting with a garden can help restore aspects of life disrupted by dementia (e.g., improvements in sleep, mood, affect, psychological well-being, social relationships, level of engagement, and sense of community) [7, 8, 10, 14–20]. Gardening can also help people with dementia recover a sense of who they were by increasing a sense of identity, agency, and independence, as well as eliciting spontaneous reflection on past memories [8, 12, 16, 19].

Due to its goal-oriented nature, gardening may also provide a stronger sense of purpose in life (PIL) for participants. Recent studies have shown that increased sense of purpose can improve overall physical health, decrease depression, and improve cognitive function in older populations [21–28]. Conversely, decreases in PIL have been linked to lower self-efficacy, higher risk of mortality, depression, and loss of hope [29–33]. In general, older individuals are more likely to express a lower PIL due to decreased social expectations; specifically, adults in retirement may believe they have completed their life goals and are challenged to fulfill new aspirations [34–37]. Moreover, people with dementia are more likely to experience loneliness, have fewer close relationships, and feel excluded by their diagnosis [38, 39]. This puts those with cognitive challenges at even greater risk for diminished PIL, as social exclusion can reduce the perception of life as meaningful and facilitate further cognitive decline [40, 41].

This study aimed to assess a gardening intervention with focus on quality of life and specifically purpose. We used a randomized controlled design to evaluate: 1) the overall impact of a gardening intervention

on PIL, and 2) whether an added component of purposeful charitable giving as part of the gardening experience would enhance its therapeutic value.

MATERIALS AND METHODS

Design

Ten residents at a skilled care facility in Grand Haven, Michigan were assigned to one of two groups: a control group that received a basic gardening intervention ($n=5$), and an experimental group ($n=5$) that received the gardening intervention with an added charitable component through which participants cultivated produce for donation to food insecure community members. Due to logistical necessity, group assignment was determined by location of residence; those living in the “general” wing, which houses both people who do and do not have dementia, were assigned to the control group, and residents living in a discreet dementia care unit were assigned to the experimental group. Eighteen gardening sessions were scheduled through the Life Enrichment Program at Grand Pines from July 1 to September 4, 2019. These sessions were supervised by the PI (ACS), Grand Pines staff, and community volunteers, and were one-hour in length, with two sessions held per week. Gardens with tomatoes, peppers, zucchini, squash, and cucumbers were planted in wheelchair-accessible raised beds located on patios accessible to residents. Due to logistical necessity, researchers and Grand Pines staff assembled the raised beds and did the initial planting without resident assistance. Activities in each session included watering, weeding, fertilizing, and harvesting the crops. Participants were encouraged to self-direct their activities during each session, taking part in whichever tasks they most enjoyed. Participants in the experimental group were reminded each time they went into their garden that the produce they were growing would be donated to a local food pantry that serves food insecure community members. A poster saying “Donation Tally” was placed on the patio when participants gardened and recorded the amount of each type of vegetable grown, harvested, and donated. Participants in the control group kept the vegetables they grew for personal use.

Study site

The study was conducted in Grand Pines Assisted Living Center, a residential living community offering varying levels of care including independent

senior living, assisted living, and specialized dementia care. Residents from any level of care were eligible to participate in the study, provided they had an established diagnosis of Alzheimer's disease (AD) dementia.

Recruitment

Eligibility for participation was based on permanent residence at Grand Pines Assisted Living Center, a physician-documented diagnosis of AD dementia, age greater than 50 years old, and the physical ability to garden (based on subjective evaluation by Grand Pines staff members). Additionally, Grand Pines uses Teepa Snow's GEMS Brain Change Model to stage residents with AD dementia [42]. This model focuses on the skills and abilities retained by those living with dementia (e.g., a person in the early "diamond" stage is "clear and sharp," and may simply need some additional time and repetition to absorb new information, while a person in the later "amber" stage may retain a strong drive to independently satisfy their desires, even if it means crossing others' boundaries to do so). Residents who were in the last two stages according to this model (i.e., the "ruby" or "pearl" stages), as determined by Grand Pines staff, were excluded from this study, due to lacking the functional status necessary to participate in gardening activities. As participants' GEMS stages were used only as exclusion criteria, the participants' individual stages were not recorded by researchers as part of the study.

Potential participants were identified by Grand Pines staff members, and interested residents met in person with the PI to discuss the research. Verbal consent was sought from participants and/or a legally authorized representative.

Caregivers of residents were also recruited for participation in interviews at the end of the study. Grand Pines caregivers were required to spend at least ten hours per week providing care for one or more of the participants. No incentives were offered for resident or staff participants.

Ethical approval

Approval for all aspects of the study was obtained from the Penn State College of Medicine Institutional Review Board and Human Subjects Protection Office (#36459) and the LH Ethics Committee.

Data collection

Semi-structured, qualitative interviews were held by ACS with participants at the end of the study to seek reflection on the experience. Interviews lasted an average of 10 min. Exit interviews were also conducted with caregivers who worked at Grand Pines to explore any changes they noticed in the participants. These interviews lasted an average of 5–10 min. All interviews were digitally-recorded and transcribed by the PI with identifiers removed.

Qualitative analysis

A thematic analysis approach was used to analyze qualitative data. In order to capture the full spectrum of effects of this intervention, a coding framework was established which included biological, psychological, social, and spiritual aspects. Using this framework, the transcripts from each interview were independently coded by the investigators until data saturation (when no new codes emerge) was achieved. Two analysts (ACS, DRG) used the codebook and applied constant comparison method to analyze data. Throughout the process, coding meetings were held to iteratively discuss discrepancies. Once themes and subthemes were identified, representative quotes were selected. All participants and caregivers were randomly assigned a pseudonym (Participant A-H, Caregiver A-C) in order to demonstrate the representation of a diversity of speakers while still protecting the participants' identities.

RESULTS

Participant characteristics

The control cohort included 5 white/non-Hispanic women, and the intervention cohort included 4 women and 1 man, all of whom were white/non-Hispanic. Three caregivers on staff at Grand Pines participated in interviews.

Qualitative results

Analysis of transcripts from interviews with the participants revealed four main themes relating to the biopsychosocial wellbeing of participants (Table 1).

Table 1
Benefits of gardening, organized by theme and subtheme

Theme	Subtheme	Sample Quotes
Physical Benefits	Exposure to the outdoors	<ul style="list-style-type: none"> • I think just being outside, and, you know, getting to move around • I just enjoyed being out in the open, in the air, the fresh air • I love to get out there, I love, I know . . . but I love them, because I like the birds and the birds are all down, out there
	Hands-on nature of gardening, tangibility of results	<ul style="list-style-type: none"> • We're working with our hands, and getting dirty • I enjoyed the . . . picking the, the things that were ripe • The people are thankful . . . to see that growth, the new flowers • Caregiver: I definitely think them getting their hands dirty, you know- being productive, and picking the vegetables, was really satisfying
Improvement in Mood	Feelings of happiness associated with gardening	<ul style="list-style-type: none"> • Being in the garden makes me happy • I think [gardening], actually it makes you happier, because you're enjoying . . . well, what's around us • I was happy out there, [because] I like to be outside • Caregiver: I know they were happy when they were doing it . . . I just know after leaving the activity they were happy
	Social connections formed with other participants	<ul style="list-style-type: none"> • [My favorite part was] mingling with the other, you know, residents, that are here . . . we've made friends • They took me out this, they- it was nice, because I guess all those people, they were right there, and it was pretty, the pretty ones to see • I enjoyed the trips out there . . . the other play lady is a real good sport
	Opportunities to take on new social roles	<ul style="list-style-type: none"> • [Gardening] makes you happier . . . because you're . . . helping other- other people find what's good about it
Reinforcement of Sense of Self	Reminiscence; reinforcing memories related to gardening	<ul style="list-style-type: none"> • I always had a garden, um . . . and I love flowers, you know . . . and just gettin' dirty! • It reminded me of when I was a little girl and I lived in a house that had a garden. And I used to love it, I used to love to be out there • It was good, and most people, city-bitty wouldn't, didn't, receive the good . . . but I had known it because, I've been living on a fig, farm • Caregiver: A lot of the older ladies that used to do stuff like that, you know, so when they would come back inside they would talk about it
	Reminiscence; reinforcing memories <i>not</i> related to gardening	<ul style="list-style-type: none"> • Did you know I have a boat? • Did you know I've taken [another participant's] daughters water skiing? (This participant talked about their boat each time they were outside, and invited other participants to join them next time they took the boat out)
	Connections to spirituality	<ul style="list-style-type: none"> • I feel that you get closer to- well, closer to God by being [in a garden]
Improved Sense of Purpose	Activity to look forward to	<ul style="list-style-type: none"> • It was [something I looked forward to], because it gives me a little outdoor activity • Caregiver: It seemed like something that they did enjoy doing and they looked forward to
	Sense of pride in accomplishment	<ul style="list-style-type: none"> • I'll bring [friends and family] around, and show them . . . • I thought that the people were content and in . . . these apples, and these little, um, oranges, and- not oranges either, but they were green peppers, and yeah, they were proud that they had those to give to them, and that they were vegetables • Caregiver: When we would walk by the windows . . . They would say 'oh, well, we worked on those,' and they would talk about the vegetables that they would grow, and they seemed to be really proud of the fact that they were the ones that helped grow those
	Helping others	<ul style="list-style-type: none"> • I go out and do what I can to help . . . I do, I like to have it, I . . . she has me over out there, and I like that • Caregiver: They knew that this was going to someplace where people needed it, and . . . I think they understood that

Theme 1: Gardening outdoors provided specific physical benefits that improved quality of life

Participants identified discreet physical benefits associated with hands-on gardening activities, with basic exposure to the outdoor elements serving as one means of improving QOL. As one participant said:

“I think it . . . actually it makes you happier. Because you’re enjoying, well, what’s around us” (Participant A).

Another participant noted specific aspects of the outdoor setting improving QOL:

“I love to get out there, I love, I know . . . but I love them, because I like the birds and the birds are all down, out there. They took me out this—they took me down there, and it was . . . it was nice” (Participant E).

A third participant (Participant G) repeated four times during their interview that their favorite aspect of gardening was that “it got me outdoors!” Other participants identified similar enjoyable elements associated with being outdoors, including “being out in the open, in the fresh air” and “seeing the beautiful flowers,” (Participant A), “I always had a garden, um . . . and I love flowers” (Participant C), and simply “I like to be outside” (Participant D).

QOL also arose from the physicality of gardening itself. As one participant said:

“[Gardening] makes me happy, because we’re—we’re working with our hands, and getting dirty!” (Participant C).

That same resident expressed that there was benefit not “Just being outside, [but] . . . getting to move around.” A caregiver also noted the physical benefits of gardening and harvesting fruits and vegetables:

“Getting their hands dirty – being productive, you know, and picking the vegetables was really satisfying” (Caregiver C).

Theme 2: Working on a project in a group setting improved mood and fostered a sense of community

Nearly all participants expressed that they enjoyed working on a project with others. In discussing her favorite aspects of the project, Participant C reflected on friendships made with other residents in the garden (“mingling with . . . the other people in here.

You know, we’ve made friends”), while Participant F thought of the garden and said “Ooh yeah, they can go out with me, there!” and Participant D spoke of “. . . just being outside with the others.” This participant, who was observed by a caregiver to have formed a particular bond with another resident in their group, commented:

“I enjoyed the trips out there! The other play lady is a real good sport” (Participant D).

Similarly, nearly every participant reported that they associated a positive mood with the garden, with three participants specifically sharing that it made them happier (“It makes me happy;”, “I think it, um, actually it makes you happier;”, “Well, I was happy out there”). One participant connected their positive mood with the charitable aspect of the garden, saying:

“Yeah . . . I go out and do what I can to help . . . she has me over out there, and I like that” (Participant E).

Another participant connected their positive mood with the opportunity to take on a new social role as the member of the group who helped maintain a cheery attitude and uplift the collective mood, saying that being in the garden “makes you happier . . . because you’re enjoying . . . well, what’s around us. And um . . . helping other-other people find what’s good about it.” (Participant A)

Theme 3: Gardening promoted reminiscence and reinforced a sense of self

Spending time in the garden prompted participants to reminisce about past experiences. In the interviews, four participants identified that they had formerly lived on farms or worked in gardens. One participant said:

“It reminded me of when I was a little girl, and I lived in a house that had a garden. And I used to love it, I used to love being out there” (Participant A).

In response to a question investigating whether gardening reminded her of anything from the past, Participant G shared: “Oh yeah, I used to love gardening.” A third participant shared a story connecting the gardening experience to when she had lived on a farm in her youth, saying:

“I had been in here before, I don’t know why, but they . . . had me out there . . . but it

was before the stuff, was before the stuff was quite ready to be processed. And so, this time . . . because the weather had warmed up and gotten more . . . they were very happy to have that ripened . . . Most people, city-bitty wouldn't, didn't, receive the . . . the good of, the good of . . . but I had known it because I've-I've been living on a fig- . . . a farm" (Participant H).

Caregivers felt the mnemonic aspects of the activity had been beneficial as well. As one said:

"A lot of [the participants] grew up on farms, so it, I think it was kind of cool for them to do" (Caregiver C).

Additionally, participants were able to draw connections between their experiences in the garden and other aspects of their lives that they remembered fondly. Participant D in particular spoke about how much they liked beautiful sunny weather and would connect this weather with memories of a boat they formerly owned. Nearly every time this participant was outside, they would share these memories with the other participants, and invite the others to go out on their boat with them sometime.

Gardening also helped one participant connect to her selfhood in a spiritual sense. In response to a question about whether she felt that gardening is an important thing for people to learn, the participant said:

"Yes, I do feel that way, and um . . . I feel that . . . you get closer to – well, closer to God, by being there" (Participant A).

Theme 4: Gardening provided participants with a sense of purpose and pride

Nearly all participants said that they looked forward to spending time in the garden, largely due to the abovementioned benefits to their QOL. In response to questions exploring whether they looked forward to spending time in the garden, participants variously responded:

"It was, because it gave me a little outdoor activity" (Participant D).

"Yes! I think just being outside, and mingling with the other residents, you know. With the other people in here" (Participant C).

Caregivers uniformly agreed that gardening had been a purposeful activity for participants. One caregiver said:

"I feel like [gardening] made them, it kind of lit up their day, you know? Especially a lot of the older ladies that used to do stuff like that, you know, so when they would come back in, they would talk about it . . . it seemed like something that they did enjoy doing and they looked forward to" (Caregiver B).

While another caregiver observed that "I just know after leaving the activity, they were happy" (Caregiver A).

A key component of feeling purposeful appeared to be the sense of pride participants felt toward the work they were doing. Three participants reported that they had brought up their work in the garden to their family members, with one reporting that they would "bring them around and show them." Another participant felt that the tangible results of the work were especially meaningful:

"I thought the people were, were, content, and in . . . these apples, and these little, um . . . oranges, and- not oranges either, but they were . . . green peppers" (Participant H).

One caregiver took particular note of the pride participants showed in their work, saying:

"When we would walk by the windows, and we would mention the flowers, they would say 'oh, well we worked on those,' and they would talk about the vegetables that they would grow, and they seemed to be really proud of the fact that they were the ones that helped grow those . . . it gave them something that they could actually do, and- you know, just for them to be able to see that they were the ones that grew those plants and the vegetables and what not. It made them so happy" (Caregiver B).

For those participants who experienced the added charitable component, this appeared—to some degree—to enhance the meaningfulness of the activity, though it was unclear whether all participants had retained memory of this aspect of the experience. One participant, when asked if it was important to them that their vegetables were donated, said: "Well, if they needed it, then yeah!" Another participant said: "[We] were proud that they had those to give to them, and that they were . . . vegetables" (Participant H).

One caregiver reported that participants did seem aware of that aspect of the project:

“[We] kept saying, you know, ‘we’re donating it’ so many times, you know . . . they knew that this was going to someplace where people needed it” (Caregiver C).

DISCUSSION

To our knowledge, this is the first study investigating the impacts of gardening on QOL with specific focus on sense of purpose in life. Qualitative results suggest that gardening does increase PIL through multiple mechanisms linked to QOL.

Most prominently, gardening provided participants with an activity they could look forward to and imbued many residents with a sense of pride. The tangible act of creating something from nothing, and seeing growth with concrete results also appeared to be important to participants. Caregivers noted that these benefits seemed to persist even on days when the participants were not gardening—that participants would draw caregivers’ attention to the fact that *they* were the ones who had cultivated the beautiful plants they could see through the windows. Lastly, the charitable component—donating the vegetables to a food pantry—also added to the purposefulness of the activity for many participants. That gardening is generally cost-effective and available to most facilities, suggests that it may be a beneficial activity for facilities to add to their standard of care—particularly if there is a purposeful component built in for residents.

Limitations

This study had several limitations. The study population was small and restricted to a single facility, with the intervention occurring over a relatively short interval. Nearly all participants were female and lacked racial/ethnic diversity, which also limits generalizability. Moreover, randomization into groups was, out of logistical necessity, assigned based on the physical location of the participant within the facility, which could have biased the composition of control/intervention groups. Larger sample sizes with greater diversity of participants would improve depth of data and generalizability of future quantitative/qualitative studies. It is possible that the simple act of leaving the facility and being outside—rather than gardening specifically—is responsible for the benefits observed in the qualitative data.

With respect to data collection, there is a possibility that desirability bias could have affected interview responses from participants and staff, as the residents may have associated the PI with their time in the garden and felt pressured to give positive feedback during interviews (i.e., the “halo effect”). Future studies could control for this, and perhaps elicit greater candor from participants, by using an interviewer with whom those in the study are not acquainted, and who lacks an association with their time in the garden. Future studies may benefit by enabling staff to share subjective experiences more frequently throughout the study, rather than just at the end.

Researchers may also find an additional opportunity to support PIL by encouraging residents to participate in the early stages of planting, or even in assisting with the assembly of raised-bed planters when physically able. Future work might also evaluate how the degree of direct participation in charitable work influences the meaning of that activity for participants. This study did identify that the hands-on nature of gardening was enjoyed by the participants, but they did not participate in the physical act of delivering the vegetables to the food pantry. It is possible that strengthening the reinforcement of the charitable aspect of the intervention could improve outcomes. Indeed, in this study, caregivers discussed the donation with participants whenever possible, but, due to short-term memory loss, it was not always clear if participants remembered this. Further research into the benefits of charity work could investigate the benefits with gardeners at varying stages of dementia, to determine whether there are diminishing returns as the disease progresses.

ACKNOWLEDGMENTS

We would like to thank the residents and staff at Grand Pines Assisted Living Facility for their participation in and support of this project. We would also like to thank the Department of Humanities at Penn State College of Medicine for providing funding for this project through the Caputo Grant and Ballantine Award and for supporting staff time to carry out this research.

FUNDING

Funding for this project was provided by The Joseph and Mary Caputo Research Award and The

Ballantine Endowment for Medical Student Work in the Arts

CONFLICT OF INTEREST

The authors have no conflict of interests to report.

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