The Use of Therapeutic Gardening in Addiction Recovery

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The Use of Therapeutic Gardening in Addiction Recovery

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NURS653: Internship

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May 12, 2023
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Abstract

Problem:
Numerous recent studies have emerged detailing the benefits of horticultural therapy on mental health and wellness. Despite this, substance abuse facilities rarely include an outdoor component in their programming. The project seeks to examine the advantages of therapeutic gardening as a complementary part of addiction treatment.

Context:
The microsystem where the study was conducted was at a 32-bed residential substance abuse treatment facility for adult men who have previously been involved in the criminal justice system. The facility utilizes mental-health informed treatment that follows the Integrated Dual Disorder Treatment (IDDT) curriculum.

Interventions:
A therapeutic gardening program was implemented to equip individuals in the recovery process with positive coping skills to use throughout their lifespan.

Measures:
A mixed-methodology approach was taken to acquire quantitative and qualitative data. Quantitative results were gathered through a series of Likert surveys administered over four weeks. The qualitative data was obtained through ethnographic observation: primarily through exit interviews and written survey responses.

Results:
A majority of clients within the microsystem reported that they can see themselves using gardening as a tool for recovery in the future. Additionally, most clients reported that they felt
reduced stress levels, improved wellbeing, and improved interpersonal connections following the
garden programming.

Conclusion:

Therapeutic gardening has the potential to have a positive effect on both the mental health and sobriety of individuals in recovery.
Statement of Problem

Emerging research has shown that "green care," or exposure to gardening and plants, can profoundly benefit both physical and emotional wellness. However, the understanding that nature and health are interconnected is not a recent development. Dating back to the father of modern medicine, Hippocrates, the Greek physician, would often prescribe "nature walks" as a mechanism to cultivate an optimal healing environment (Owens & Bunce, 2022). Even the founder of modern nursing, Florence Nightingale, touted the benefits of therapeutic gardens for both staff and patients (Thompson, 2018).

To further explore the benefits of green care, a team of six graduate nursing students implemented a therapeutic gardening program at a medical facility in Santa Clara County. The site is a 32-bed facility that serves male clients in the recovery process who have been previously involved in the criminal justice system. The clients served at the facility are predominantly court-ordered to be there, and the length of stay varies for each client. The program teaches classes that closely follow the Integrated Dual Disorder Treatment (IDDT) curriculum, including cognitive behavioral therapy (CBT) and comprehensive group-based exercises. Although the facility's curriculum thoroughly addresses both the recovery process and supports mental health, there are minimal options within the curriculum to get the clients outside.

In a preliminary investigation, several clients reported interest in finding additional outdoor activities to help manage their cravings beyond what is currently offered at the facility. Upon further investigation, it was revealed that clients at the facility previously experimented with gardening, but the project was discontinued due to insufficient resources and natural obstacles. Given the prior interest expressed by the clients, the reintroduction of a therapeutic
gardening program would be a welcome intervention to a curriculum that did not provide any formal outdoor programming.

**PICOT Question**

PICOT questions are used as a framework to structure the research study process. The PICOT used to guide the project was as follows: How can gardening and outdoor activity act as a supplemental tool in a microsystem where no such project has been previously implemented for adult males with a history of substance abuse impacted by the justice system who are seeking treatment.

**Literature Review**

This literature review aims to analyze the health benefits of therapeutic gardening on individuals involved in the criminal justice system and the recovery process. The primary literature search was conducted through Scopus, Pubmed, and ScienceDirect databases using the following keywords: *green care, nature-based therapy, substance abuse recovery, psychiatric care, gardening, plants, the criminal justice system, incarcerated individuals, residential treatment, correctional health facility, stress levels, cortisol levels, mental health benefits,* and *physical health outcomes.*

Therapeutic gardening has been found to decrease stress levels for individuals in substance abuse recovery. A retrospective study conducted at the Veterans Affairs Center in Salem, Virginia, analyzed the experiences of horticultural therapy on veterans involved in a residential rehabilitation program (Lehmann et al., 2018). Using ethnographic observation, the researchers found that the participants felt "serene" and "refreshed" following time spent in the garden. Additionally, once the study concluded, inpatient residents of the program took the initiative to continue the horticultural therapy program on their own. A randomized pilot study
was also conducted at the same facility that assessed how horticultural therapy influences cortisol levels, symptoms of posttraumatic stress disorder, depression, and substance cravings (Detweiler et al., 2015). The study found that within three weeks, participants experienced a 12% reduction in salivary cortisol following the intervention of horticultural therapy. In addition to the reduced cortisol levels, participants reported decreased depressive symptoms and improved overall quality of life.

Evidence suggests that horticultural therapy can be a positive intervention for individuals in the criminal justice system. For example, a therapeutic gardening pilot program was implemented by researchers at a female corrections facility, which revealed that the garden's implementation led to numerous positive outcomes for the clients. Through personal interviews and observation, the researchers found that the women reported improved health status, increased nutrition and technical skills knowledge, and reduced stress levels following the intervention (Jauk-Ajamie & Blackwood, 2022).

Horticultural therapy can play a role in reducing recidivism rates. Researchers in Hays County, Texas, analyzed probation revocation reports, agency records, and community service reports of criminal offenders (Holmes & Waliczek, 2019). Their objective was to ascertain if individuals who participated in horticultural community service experienced decreased recidivism rates compared to those who were given nonhorticultural community service. It was revealed that offenders who participated in horticultural community service experienced a 5.4% recidivism rate, while those who served nonhorticultural community service had a 14.1% recidivism rate. This data indicates that offenders participating in horticultural community service have a significantly lower risk of reoffending than those who served nonhorticultural service.
Gardening can lead to improved mental wellness outcomes. In 2017, a study investigated the effects of therapeutic gardening on adults receiving treatment at a community mental health recovery center (Smidl et al., 2017). Following the garden intervention, it was discovered that the clients reported considerable improvements in their mood. The researchers also observed that in the clients' journal entries, they frequently mentioned how gardening improved their self-worth, personal pride, and boosted their overall happiness. This finding is consistent with the results of Kam and Siu (2010) during their single-blind randomized controlled trial that evaluated the impact of horticulture therapy on stress levels among individuals with psychiatric illness (Kam & Siu, 2010). The study found that compared to the control group, individuals involved with horticulture therapy experienced significantly less depressive symptoms, anxiety, and stress.

There is mounting evidence that gardening can lead to improved physical health outcomes. A study conducted in the Netherlands examined the rates of chronic illness and physical activity among individuals who participate in allotment gardening compared to non-gardeners (van den Berg et al., 2010). Using self-reported survey results, it was discovered that the allotment gardeners reported significantly better health outcomes than non-gardeners in the study. The gardeners demonstrated increased physical activity, an improved sense of well-being, lower rates of chronic illness, and fewer acute health complaints than non-gardeners.

Engaging in outdoor programs can aid in the substance recovery process by building a sense of community and boosting self-efficacy. A recent study by Masterton et al. (2022) investigated how outdoor health programs can support recovery (Masteron et al., 2022). Through semi-structured interviews, the researchers spoke to 17 participants regarding their insights surrounding outdoor programming and recovery. The results of the interviews concluded that the benefits of outdoor programs could aid individuals in recovery by boosting self-efficacy,
encouraging the development of peer relationships, establishing a sense of purpose, and creating a place of self-reflection.

**Conceptual Framework**

Due to the project's complexity, the theoretical framework chosen to guide the project was Lewin's Change Model. Lewin's Change Model is composed of three components: unfreezing, change, and refreezing. The unfreezing process is the step in which the organization is briefed and prepared for the upcoming change. In this instance, the nursing students introduced a garden proposal to the clientele and executive staff, establishing a space where both parties could provide honest feedback and suggestions. In addition, the students were tasked with explaining why the outdoor area was underutilized and how transforming this space would benefit the entire facility's mental and physical health.

The next step was the change process, in which the students began to take action to meet their desired goals. During this process, the students created an implementation plan for the space, which required creating a budget, fundraising, acquiring materials, mapping out the garden, building the garden, and finally creating an education plan for the clients to supplement the outdoor work. The garden space was created with a wide variety of herbs, fruit, vegetables, and flowers that are uniquely suited to the climate and growing seasons of Santa Clara County. In addition to the garden, additional features such as picnic tables and a revamped horseshoe pit were added to foster an environment where clients look forward to going outside.

The final step was the refreezing process, wherein the change implemented has been established, and a sustainability plan is created to ensure the project's longevity. The nursing students taught the clients a lesson plan outlining the garden's care and what is necessary to keep the outdoor space vibrant and thriving. Additionally, the students met with the executive staff to
formulate a plan on how garden maintenance (watering, weeding, harvesting) can be added to the daily chore list for the clients. After the sustainability plan was mapped out and implemented, the nursing team attended a garden dedication ceremony celebrating the project's success. The participating clients felt a sense of accomplishment, thus finalizing the refreezing process.

**Microsystem Assessment**

Prior to implementing the project, a microsystem assessment was performed to gain a contextual understanding of the facility and its goals. Utilizing the 5Ps model, the nursing team obtained a more comprehensive understanding of the facility and its needs.

**Purpose:**

The purpose of the microsystem is to provide residential substance abuse treatment services to individuals with a prior history of involvement in the criminal justice system. In addition, the program aims to provide mental-health-informed substance abuse treatment while building community and reducing recidivism rates.

**Patients:**

The patients are adult male residents of Santa Clara County who have been formerly engaged with the criminal justice system. The patients must be seeking substance abuse treatment and often have co-occurring mental health disorders. The patients are a diverse group that come from a wide variety of socio-economic backgrounds.

**Professionals:**

The professionals involved at the facility include a nurse practitioner, a registered nurse, recovery counselors, program administrators, and kitchen staff.

**Processes:**
The facility provides mental health-informed services using evidence-based practice from the Substance Abuse and Mental Health Services Administration (SAMHSA) as well as Medication Assisted Treatment (MAT). The facility also provides daily group classes to support recovery and build community.

**Patterns:**

The facility experiences a steady inflow and outflow of clients because when clients complete the program, new ones are admitted. It is not uncommon for clients to relapse and attend the program multiple times, a pattern the facility monitors. Regarding programming, the facility offers the same consistent group schedule and meetings to provide a structured environment.

**Specific Project Aim Statement**

The nursing team will aim to equip patients with an effective coping strategy that will enhance the recovery process through therapeutic gardening. The team will achieve this by conducting a comprehensive needs assessment of the client population to implement a client-centered therapeutic gardening program. The ultimate objective is to equip patients with evidence-based coping strategies that can be used throughout their lifespan. The project was formed after hearing expressed desire from the clients to develop a garden and the plethora of emerging research demonstrating the therapeutic effects of gardening. Through methodical implementation of the intervention, the nursing team is confident that the program will provide the clients with an accessible tool for a lasting recovery.

**Project Overview**

The project ultimately had four objectives: establish a garden, offer clients an additional coping strategy, deliver diet, nutrition, and agricultural education to the clients, and create a plan
to ensure the long-term sustainability of the project. The project was given a three-month timeline to coincide with the school semester; the established "end date" was May 12th. Due to the limited time, careful planning and consistent group meetings were critical in ensuring the project was completed by the deadline. Unfortunately, despite thorough planning, several unforeseen circumstances impeded the original schedule and timeline (see Appendix A for Gantt Chart).

The preliminary planning phase began by discussing onboarding requirements for the facility with the clinical instructor and determining a budget for the project (see Appendix B for budget outline). Next, the nursing team contacted regional nonprofits that specialize in therapeutic gardening for advice and guidance on the project. This step of the process included drafting an email outlining the project's goals and requests (see Appendix C). The organizations contacted included: Planting Justice, Santa Clara Valley Native Plant Society, Insight Garden Program, Collective Roots, UC Division of Agriculture and Natural Resources, Root and Rebound, Silicon Valley Community Foundation, and The Greenbridge Family Foundation. Unfortunately, despite the team's persistent efforts to reach out to the organizations, they are still awaiting responses.

In order to fundraise for the project, the nursing team created a GoFundMe page (see Appendix D). This process included drafting the fundraising text and images, publishing, and sharing the document. While the fundraiser was commencing, the team led a supplemental diet and wellness education course for the clients. The fundraiser met its goal within ten days following its initial publication. After acquiring the funds, the team contacted local hardware stores to find the most budget-appropriate resource to purchase the construction materials. The
team had to coordinate a delivery date with the hardware company that would coincide with a date the team would be physically present at the site.

While the delivery logistics were coordinated, the nursing team began physically working on the outdoor space. This process started by tilling the soil to increase aeration, improve moisture absorption, create space for planting, and reduce nuisance species. Unfortunately, the tilling process was delayed due to an unprecedented atmospheric river that resulted in excessive precipitation. After the weather cleared up, the necessary construction materials were delivered, and the ground was prepared, the team began building the planter boxes and garden enclosure. The nursing team enlisted help from clients with prior experience in landscaping and construction to aid in this process. The construction process took seven weeks and resulted in a large enclosure that included: a greenhouse, four raised beds, and a bench.

After the raised beds were completed and filled with soil, a model was created with what would be planted in each bed (see Appendix E). The team used extensive research to determine what plants were appropriate for the region and the growing seasons for each respective plant. Each bed was filled with companion plants to ward off pests, encourage growth, and attract pollinators. During the planting process, the clients were educated on the care and maintenance of each plant, including harvesting times, correct watering techniques, pruning, weeding, and pest prevention. A supplemental handout was created for the clients with photos of each plant type, care tips, and potential uses for each plant (see Appendix F).

Following the garden's completion, the nursing team facilitated exit interviews and surveys with the clients for additional data collection. The team then met with key stakeholders at the facility to discuss a sustainability plan for the garden. This process included creating a
sustainability proposal, a garden maintenance poster, and several group meetings to strategize how to promote the long-term success of the garden.

Lastly, a dedication ceremony was scheduled to celebrate the project's success and "officially" name the garden. After consulting with the facility and clients, it was decided to name the space the Renwick Craft Memorial Garden in honor of a former local leader and counselor in the recovery community. The dedication ceremony will include current and former clients, facility staff, and leadership.

**Challenges**

The project faced several obstacles that can be broken down into three primary categories: financial constraints, client participation, and barriers from the natural world. To ensure that the project was successful, the nursing team made concerted efforts throughout the project to address these challenges.

Due to the facility's for-profit status, the nursing team was responsible for fundraising the project's total budget. Despite the team meeting the fundraising goal, it was quickly determined that sourcing the materials had to be thoroughly researched due to the high cost of building materials. In addition to materials that were bought, the team also had to request for material donations from the local community, which included: plant starters and cuttings, river rocks, compost, wood chips, and soil. These materials were acquired through Facebook Marketplace, Nextdoor.com, a local tree service provider, peers of the nursing team, donations from the clinical nursing lead, and Recology. The project's size and scope were ultimately limited due to financial constraints; however, expansion is always possible.

The main factors that influenced client participation were client turnover and physical ability to work on the garden. The client population at the facility was constantly changing due to
varied discharge and admission dates. Subsequently, the nursing team was tasked with ensuring that recently admitted clients felt as included and invested in the intervention as clients who were there the entire time. The nursing team bridged this gap by participating in client morning meetings to introduce themselves, get to know the clients and spend time individually talking to the clients about the project's purpose. Several clients were not physically able to participate in creating and maintaining the garden. To address this issue, the nursing team created supplemental education that covered diet, nutrition, and garden maintenance on days when physical garden maintenance was not scheduled. Additionally, the nursing team encouraged clients who were physically unable to help to sit outside and socialize, which aided in creating a sense of community in the outdoor space.

The most significant barrier to the garden's success was the wildlife and unforeseen weather conditions. The facility is surrounded by county land, home to abundant wildlife, including but not limited to coyotes, deer, turkeys, wild pigs, and gophers. Among the wildlife mentioned, the turkeys and the gophers were the most likely culprits to interfere in the garden. To address the turkeys, the nursing team placed most of the garden boxes in a physical enclosure surrounded by chicken wire and covered by a mesh netting from the top. To thwart gopher holes, the team placed a thick weed barrier and a layer of wood chips beneath the soil of each planter box to create a physical barrier for the animals. Following the implementation of these measures, there have yet to be any reported wildlife invasions within the enclosed garden space.

**Data Source**

Due to the qualitative nature of the project, the data was primarily collected through ethnographic observation. The most insightful data acquired was conducted through structured exit interviews and nursing team observations of the clients. A Likert survey was also
administered three times during the project to assess the project's progress (see Appendix G). An additional exit Likert survey was administered that featured a free-response section that enabled clients to leave additional comments at their discretion.

Results

Quantitative Results:

The facility experiences consistent client turnover, with regular new admissions and discharges—subsequently, the results from the Likert surveys that were administered varied from week to week.

The first three surveys included the following questions:

- Has your mood changed/improved after gardening?
- On a scale of 1-5, how much do you agree with this phrase: "I feel inspired to get outside in the garden."
- Can you see yourself using gardening as a tool to aid in your recovery process?
- On a scale of 1-5, how much do you agree with this phrase, "Being outside in the garden makes it easier to cope with my cravings."
- On a scale of 1-5, how much do you agree with the following statement: "I learned something new today."

Survey 1 Results

The first survey had the most client participation, with 70% of the total client population completing it. Regarding the first survey question on if gardening improved their mood, 47.6% of clients strongly agreed, 9.5% agreed, 38% partially agreed, and 4.7% disagreed. Relating to being inspired to get outside, 38% of respondents strongly agreed, 19% agreed, 19% partially agreed, 19% disagreed, while 4.7% strongly disagreed. In regards to using gardening as a tool in
the recovery process, 42.8% strongly agreed, 2.7% agreed, 19% partially agreed, 19% disagreed, and 14% strongly disagreed. When asked about their level of agreement regarding gardening as a coping mechanism for cravings, 38% of respondents strongly agreed that they would use it as a tool, while 19% agreed, 28.5% partially agreed, 9.5% disagreed, and 4.7% strongly disagreed. In response to agreeing with the statement that they learned something new, 52% of clients strongly agreed, 4.7% agreed, 14% partially agreed, 9.5% disagreed, and 19% strongly disagreed.

**Survey 2 Results**

The second survey had the lowest client completion rate, with a completion rate of 26%. For the first question, 62.5% strongly agreed that their mood improved, 25% partially agreed, and 12.5% strongly disagreed. Regarding getting inspired to get outside, 37.5% of respondents strongly agreed, 12.5% agreed, 37.5% partially agreed, and 12.5% strongly disagreed. Regarding using gardening as a coping tool, 75% of clients strongly agreed, and 25% partially agreed. In response to the level of agreement regarding using gardening to curb cravings, 62.5% of respondents strongly agreed, 12.5% agreed, 12.5% partially agreed, and 12.5% disagreed. Regarding learning something new, 62.5% of clients strongly agreed, 12.5% agreed, 12.5 partially agreed, and 12.5% strongly disagreed.

**Survey 3 Results**

The third survey had the second-highest completion rate, with 66% of the total client population participating. Regarding mood improvements, 35% of respondents strongly agreed that their mood improved following the intervention, while 25% agreed, 30% partially agreed, 5% disagreed, and 5% strongly disagreed. In response to getting inspired to get outside, 30% of participants strongly agreed, 30% agreed, 20% partially agreed, 5% disagreed, and 15% strongly disagreed. Regarding using gardening as a recovery tool, 20% of respondents strongly agreed,
35% agreed, 25% partially agreed, 10% disagreed, and 10% strongly disagreed. Pertaining to being outside to cope with cravings, 30% of participants strongly agreed, 15% agreed, 35% partially agreed, 10% disagreed, and 10% strongly disagreed. Regarding learning something new, 55% of the clients strongly agreed, 25% agreed, and 15% partially agreed.

Exit Survey

For the last day of in-person programming, a new survey was created to evaluate the project's overall success and evaluate if the clients gained an additional understanding of diet and nutrition (see Appendix H). This survey had a 43% completion rate. The survey asked the clients to rank their agreement on a scale of 1-5 with the following statements:

- Do I feel less stressed after spending time in the garden or just being outside?
- I have begun to think more about what I eat and cook as a result of the garden project.
- I would be interested in learning about diet and nutrition.
- I have an improved sense of well-being after being at MW during the garden project.
  implementation (examples can include decreased stress, increased happiness, decreased cravings, increased mindfulness).
- I felt like I was part of a team trying to achieve a greater goal.

Regarding feeling less stressed, 69.2% of participants strongly agreed with the statement, 15.4% agreed, and 15.4% partially agreed. Regarding thinking more about what they eat and cook, 38% of participants strongly agreed with the statement, 15.4% agreed, 23% partially agreed, 15.4% disagreed, and 7.6% strongly disagreed. Pertaining to the diet and response statement, 62% of clients strongly agreed, 23% agreed, and 15% strongly disagreed. Regarding improved well-being, 69.2% of participants strongly agreed, and 30.7% partially agreed. Finally,
in response to being part of a team trying to achieve a larger goal, 76.9% of respondents strongly agreed, while 23% partially agreed.

**Qualitative Data:**

The nursing team utilized interviews, observation, and written survey responses to gather qualitative data and gain insight into the client's perspective on the gardening program. Several clients mentioned how the program fostered teamwork and the opportunity to work towards a shared goal. As one client stated, "I also really like the teamwork aspect and being able to work with others towards something bigger." Another client noted how gardening "allows us to work as a team, which isn't really something we do here." Furthermore, the garden programming helped clients build patience, which emerged as a predominant theme. One client shared that the garden makes him feel "patient," watching the process of "growth-seeing things materializing and growing slowly."

As stated by one client, the garden provided clients with something to look forward to: "I love being able to see the progress of the garden from week to week." Clients would eagerly share any changes to the garden during the weekly morning meetings. One client monitored the daily turkey activity in the yard and joked that the turkeys were "planning a coup" to raid the garden. Clients that were unable to physically participate in the program often still spent time in the yard, conversing with other clients and creating a sense of community.

The gardening programming was found to be beneficial for some clients in ways that conventional therapy did not address. As one client expressed, "It helps me see life in a different way. Sometimes talking doesn't work for me; taking action and doing something positive is also something that I value." To other clients, the garden provided an area of refuge for them, with one stating that the garden "calms my soul, and calms me down". Other clients saw the garden
program as a place to become more active, with one client commenting that in the future, "it will help my family and kids get involved in outdoor activity."

Discussion

The quantitative and qualitative data aligned with the project's objectives. Despite consistent client turnover, in every survey, most clients indicated that the garden programming led to positive improvements in their mood. Regarding gardening aiding in the recovery process and coping with cravings, most survey participants agreed that the garden programming positively influenced their recovery process. The data demonstrated that most clients felt inspired to get outside in the garden, had an improved sense of well-being, and were less stressed after spending time there. A large majority of participants in the exit survey indicated that they felt like they were part of a team, which is a critical finding as research demonstrates that the "creation of a sense of community" plays a paramount role in the recovery process (Stevens et al., 2018). Finally, most participants indicated that they have begun thinking more about diet, nutrition, and cooking following the garden implementation. The quantitative data suggests that the four project objectives were met.

The qualitative data reaffirmed the data acquired from the quantitative results. In interviews and written feedback, clients indicated that they valued the opportunity to work as a team. The garden provided a positive outlet for clients to build patience and work towards a shared goal. Some viewed the garden as a place to become more active, while others saw the garden as a place of refuge and relaxation. For some, the garden provided a therapeutic tool that traditional therapy could not, while for others, changes in the garden became a source of excitement and entertainment. The findings suggest that the garden became a valuable asset for the client's physical and emotional well-being.
Nursing Relevance

Nurses working in recovery and mental health centers can use the findings of this project to inform their care and implement evidence-based practice within their facility. The positive results of this project indicate that therapeutic gardening can be a valuable complementary therapy in a variety of mental health settings. Clinical nurse leaders can use the findings of this project to expand research on green care in alternative medical settings and explore if similar benefits will be noted. Through further exploration, nurses can add to the growing body of literature on the benefits of green care in medical settings.

Limitations

Due to consistent patient admissions and discharges, the team could not directly compare the quantitative data acquired from the surveys. As the patient population constantly changed, tracking individual progression in the survey outcomes was impossible. Additionally, since the intervention was implemented for the entire facility, it was not possible to create a control group to compare the results against. To address this in the future, the project could be recreated at a facility where all clients have the same start and end dates to accurately assess any progression. It is also important to note the possibility of survey bias within the project. The nursing team was directly administering surveys to the clients, which may have led to clients feeling encouraged to select more positive responses. However, after analyzing the data, it appeared that most clients provided honest feedback, as evidenced by the number of responses indicating disagreement with certain statements.

Conclusion

The project's findings strongly indicate that therapeutic gardening can be an effective supplemental coping tool for individuals in substance abuse recovery. However, to ensure the
project's longevity, it will be imperative for both staff and clients to continue to participate actively, as gardening requires constant upkeep and maintenance to flourish.

In order to expand upon the existing project, the facility would greatly benefit from the future involvement of an additional nursing team. The nursing team could expand the physical garden space, teach the clients about garden maintenance, add additional outdoor lounge areas, and provide additional nutrition education to future clients. This would not only help ensure the project's continued success, but it would also provide an opportunity for the benefits of therapeutic gardening to be explored on a deeper level. By making additional nursing students stakeholders in the project, there is significant potential for them to discover additional evidence-based interventions for individuals in the recovery process.


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https://doi.org/10.3389/fpsyg.2022.740210


https://doi.org/10.1186/1476-069x-9-74
Appendix A
GANTT Chart
### Appendix B
#### Budget Outline

**Therapeutic Garden Budget**

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<th>Quantity</th>
<th>Estimated Cost (per unit)</th>
<th>Total Cost (B x C)</th>
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<td></td>
<td></td>
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<tr>
<td>2'x12'x12 boards</td>
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<td>$23.75</td>
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<td></td>
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<td>28</td>
<td>$1.18</td>
<td>$33.04</td>
<td>Joist supports</td>
</tr>
<tr>
<td>weed barrier</td>
<td>2</td>
<td>$36.98</td>
<td>$73.96</td>
<td>weed/mole mitigation</td>
</tr>
<tr>
<td>Screws</td>
<td>1</td>
<td>$35.99</td>
<td>$35.99</td>
<td></td>
</tr>
<tr>
<td>Polycarbonate panels for Greenhouse</td>
<td>16</td>
<td>$18.93</td>
<td>$303.68</td>
<td></td>
</tr>
<tr>
<td>Chicken Wire (4'x100')</td>
<td>1</td>
<td>$124.99</td>
<td>$124.99</td>
<td>Perimeter of enclosure</td>
</tr>
<tr>
<td>Bird Netting</td>
<td>1</td>
<td>$25.99</td>
<td>$59.99</td>
<td>Top of enclosure</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>$1,351.21</strong></td>
<td></td>
</tr>
<tr>
<td><strong>with tax (conservative 10%)</strong></td>
<td></td>
<td></td>
<td><strong>$1,486.33</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Where/Items**

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
<th>Total Remaining</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Available</td>
<td>$15.19</td>
<td>2,051</td>
</tr>
<tr>
<td>Gloves</td>
<td>$310.73</td>
<td>2,038</td>
</tr>
<tr>
<td>Lowe's (Lumber)</td>
<td>$452.62</td>
<td>$872.96</td>
</tr>
<tr>
<td>Fairfax Lumber</td>
<td>$172.62</td>
<td>$700.34</td>
</tr>
<tr>
<td>Lowe's (wire, door mats, brackets)</td>
<td>$231.16</td>
<td>$469.18</td>
</tr>
<tr>
<td>Lowes</td>
<td>$96.04</td>
<td>$373.14</td>
</tr>
<tr>
<td>Home Depot (Lumber + Polycarbonate)</td>
<td>$98.79</td>
<td>$274.35</td>
</tr>
<tr>
<td>Plants from HD</td>
<td>$143.31</td>
<td>$131.04</td>
</tr>
<tr>
<td>Amazon (Bird Netting)</td>
<td>$40.98</td>
<td>$90.06</td>
</tr>
<tr>
<td>Gas Reimbursement for Pickup Truck</td>
<td>$75.00</td>
<td>$15.06</td>
</tr>
<tr>
<td>Screws for polycarbonate</td>
<td>$14.22</td>
<td>$20.84</td>
</tr>
</tbody>
</table>
Appendix C
Nonprofit Outreach Email Template

Good Afternoon,
My name is (insert your name here), and I am a student in my final semester of the University of San Francisco’s ME-MSN nursing program. My colleagues and I are currently implementing a quality improvement project at a residential substance treatment facility in San Jose. Our project focuses on the connection between gardening and sobriety. We are striving to reach two important goals--facilitating lasting sobriety and reducing recidivism back into the criminal justice system. To reach these goals, we need your help. Any financial contributions would go directly to soil, planters, and other materials necessary. Thank you for your time and consideration.

Warm Regards,
(insert your name and contact info here)
Appendix D
Gofundme Fundraiser

Therapeutic Gardening for Addiction Recovery

Welcome, and thank you for checking out our GoFundMe page! We are a group of Master’s Nursing students at the University of San Francisco working on our final Quality Improvement project. As graduate students interested in mental health, we are working on a holistic intervention plan with patients recovering from substance abuse and congruent mental health disorders. Within this capacity, we will be focusing on holding educational groups and helping residents to build a community garden at a residential treatment facility in San Jose. The intended goal for the project is to create something impactful and lasting and, ultimately, to cultivate healing. Individuals who suffer from substance use disorder (SUD) go through debilitating experiences and feel a profound loss of control, independence, and purpose. We believe that by educating and empowering this population through therapeutic gardening, harvesting, and preparing healthy meals, we can help create an environment that fosters independence, encourages healthy coping tools, promotes community, and strengthens resiliency. The experience will create a space to allow these individuals to reconnect with nature, revitalized their minds to eradicate negative thoughts or stressors, and improve their concentration. This project will enable the kitchen staff to cook with organic local produce for the residents benefiting both their physical and emotional health. Please join our mission to build a community garden and help us positively impact their lives (and the lives of future residents) by donating today. Your generous donations will fund the supplies essential for the project. This includes but is not limited to lumber (for planter boxes), soil, compost materials, labor costs, seedlings, planting tools, and protective netting.
Appendix E
Garden Model
## Appendix F
### Plant Guide Handout

<table>
<thead>
<tr>
<th>Plant</th>
<th>Features</th>
<th>Care Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marigold</td>
<td>Marigolds attract pollinators, assist with pest control, and the blooms can be used for holidays and special events.</td>
<td>Marigolds thrive in bright full sunshine. Once the marigolds are established, pinch off the tops of the plants to encourage growth. Water at the base of the plant instead of from above.</td>
</tr>
<tr>
<td>Nasturtium</td>
<td>Nasturtiums are a peppery edible flower that attract pollinators, and deter pests.</td>
<td>Nasturtiums prefer full sun and moist soil. Cutting the dead flowers can promote growth. If the plant is heat-stressed it may stop blooming (water regularly to prevent this).</td>
</tr>
<tr>
<td>Pumpkin</td>
<td>A classic symbol of fall, pumpkins are a nutrient-rich food that provides ample vitamin A, vitamin C, and fiber.</td>
<td>Pumpkins require a lot of water, it is best to avoid wetting the leaves. Pumpkins grow aggressively, make sure the plants are spaced apart to give them ample room to grow.</td>
</tr>
<tr>
<td>Onion</td>
<td>Onions are an excellent crop for any type of cooking and they also act as a pest repellant due to their strong odor.</td>
<td>Do not cover emerging onions, if you want sweeter onions water more (onions do not like to be over-watered). When the onion is mature the top will become yellow and start to fall over.</td>
</tr>
<tr>
<td>Spinach/Kale</td>
<td>Spinach is a low-maintenance, high-yield crop.</td>
<td>Spinach needs 6 weeks of cold weather from seeding to harvest. Sow every couple of weeks. Keep the soil consistently moist. Thin the plant to keep them around 3-4 inches apart (what you pull is edible still).</td>
</tr>
<tr>
<td>Vegetable</td>
<td>Description</td>
<td>Harvest Tips</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Carrot</td>
<td>Great source of vitamin A and can be eaten raw or cooked.</td>
<td>Harvest the carrots in stages so you can harvest for many weeks. When the carrot is ready to harvest, the top will likely be ¾-1 inch in diameter and pop out of the soil (not always). They are normally ready after 60-80 days.</td>
</tr>
<tr>
<td>Cilantro</td>
<td>Cilantro is a fast-growing delicious herb.</td>
<td>Thin seedlings to 6 inches apart. Once established, the plants do not need excessive watering. When cilantro grows its stalk, cut the plant after the seeds drop to allow it to self-seed.</td>
</tr>
<tr>
<td>Peas</td>
<td>Peas are easy to grow and delicious, they also produce wonderful flowers.</td>
<td>Water peas sparsely (no more than 1 inch per week) unless the plant is wilting. Most are ready to harvest 60-70 days after planting. Harvest the peas regularly to encourage additional pods to develop.</td>
</tr>
<tr>
<td>Beans</td>
<td>Beans are great to grow with limited space and are highly productive.</td>
<td>Water regularly (otherwise they will stop flowering). Harvest beans in the morning (they will be the sweetest then). Harvest every day if possible to encourage additional growth.</td>
</tr>
<tr>
<td>Tomato/Tomatillos</td>
<td>Tomatoes/tomatillos are delicious sun-loving crops.</td>
<td>Avoid overhead watering (water at base). Watering the foliage encourages disease. During drought periods, place flat rocks next to the plant to decrease water evaporation. Water during the morning so the plants have enough moisture to get through the day. Harvest when the plants are firm and vibrant in color (size does not matter).</td>
</tr>
<tr>
<td>Peppers</td>
<td>Peppers are a nutrient-rich warm flavorful crop that are luckily resistant to most pests and diseases.</td>
<td>Peppers love to be in full sun. Peppers enjoy slow, deep watering to establish health roots. Inconsistent watering can lead to blossom-rot. As soon as the peppers reach their full size and color, pick them to encourage more consistent growth.</td>
</tr>
<tr>
<td>----------</td>
<td>----------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Strawberries</td>
<td>Strawberries are fast-growing and low maintenance.</td>
<td>Regular weeding and watering is critical. Harvest only fully-red berries every couple days.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Peppers</strong></th>
<th><img src="image1" alt="Peppers" /></th>
<th>Peppers are a nutrient-rich warm flavorful crop that are luckily resistant to most pests and diseases.</th>
<th>Peppers love to be in full sun. Peppers enjoy slow, deep watering to establish health roots. Inconsistent watering can lead to blossom-rot. As soon as the peppers reach their full size and color, pick them to encourage more consistent growth.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strawberries</strong></td>
<td><img src="image2" alt="Strawberries" /></td>
<td>Strawberries are fast-growing and low maintenance.</td>
<td>Regular weeding and watering is critical. Harvest only fully-red berries every couple days.</td>
</tr>
</tbody>
</table>
Appendix G
Likert Survey

5 Quick Questions

1. Has your mood changed/improved after gardening?

   1  2  3  4  5
   Totally Disagree  Partially Agree  Totally Agree

2. On a scale of 1 to 5, how much do you agree with this phrase: "I feel inspired to get outside in the garden."

   1  2  3  4  5
   Totally Disagree  Partially Agree  Totally Agree

3. Can you see yourself using gardening as a tool to aid in your recovery process?

   1  2  3  4  5
   Totally Disagree  Partially Agree  Totally Agree

4. On a scale of 1 to 5, how much do you agree with this phrase: "Being outside in the garden makes it easier to cope with my cravings."

   1  2  3  4  5
   Totally Disagree  Partially Agree  Totally Agree

5. On a scale of 1 to 5, how much do you agree with the following statement: "I learned something new today."

   1  2  3  4  5
   Totally Disagree  Partially Agree  Totally Agree
## Appendix H
### Exit Survey

**Resident Exit Survey**

1. **How would you rate your time spent in the garden?**
   - 1: Waste of time
   - 2: No opinion
   - 3: Productive and Fun

   How much do you agree with the following statements:

2. **Do I feel less stressed after spending time in the garden or just being outside?**
   - 1: Totally disagree
   - 2: No opinion
   - 3: Totally agree

3. **I have begun to think more about what I eat and cook as a result of the garden project?**
   - 1: Totally disagree
   - 2: No opinion
   - 3: Totally agree

4. **I would be interested in learning more about diet and nutrition?**
   - 1: Totally disagree
   - 2: No opinion
   - 3: Totally agree

5. **I have an improved sense of well being after being at MW during the garden project implementation?** (examples can include decreased stress, increased happiness, decreased cravings, increased mindfulness).
   - 1: Totally disagree
   - 2: No opinion
   - 3: Totally agree

6. **I felt I was part of a team trying to achieve a greater goal?**
   - 1: Totally disagree
   - 2: No opinion
   - 3: Totally agree

7. **After working on the garden project, some residents were inspired to build outdoor furniture. Are there any other similar (outdoor) projects you would like to see happen in the future?**

8. **Do you feel as if implementing your own garden once discharged would have a positive impact on your sobriety? Why or Why not?**

9. **Where do you see room for improvement in the gardening project?** (Examples could include projects that renovate the horse-shoe pit, more outdoor seating, more planter boxes, etc.)

10. **Do you have any additional comments?**