



A pilot horticultural therapy program serving veterans with mental health issues: Feasibility and outcomes

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ABSTRACT

Background and purpose: Veterans face challenges when returning from deployment. Many have mental health difficulties because of their service and may have significant effects on veterans' lives. Horticultural therapy has been shown to be an effective treatment for these mental health conditions.

Materials and methods: The current study was a 5-week pilot conducted in the United States to assess a horticultural therapy program for veterans with mental health issues.

Results: Eight veterans completed the full 5-week pilot program. Participants reported significantly lower depression [$M = 6.25$ ($SD = 5.23$); $t = 3.38$, $p = .01$] and stress [$M = 5.00$ ($SD = 2.56$); $t = 5.52$, $p = .001$] on the Depression, Anxiety, Stress Scales.

Conclusion: Participants provided positive feedback about the program and indicated that it was beneficial for them. Future research should be conducted with a larger sample size and control group to further validate these results.

1. Introduction

1.1. Background

The current study focuses on veterans in the United States of America. Military service can be highly stressful and may lead to long-term challenges for veterans, especially for those who experienced traumatic events such as combat [9,35,36]. Combat exposure has long been associated with development of mental health disorders, such as depression, anxiety, posttraumatic stress disorder (PTSD), and substance use [31,37]. A report by the Deployment Health Clinical Center [7] found that 20% of active duty military in 2016 met criteria for a mental health disorder across all service branches, with the Army having the highest percentage of mental health conditions (approximately 27%). Unemployment and homelessness are common issues for veterans, with roughly 4.3% of veterans from all service areas unemployed [5]. Veterans also represent over 10% of the nation's homeless population [42]. Veteran suicides rates are yet another indicator of the serious mental health issues that veterans face, with veteran suicides accounting for 18% of all suicides in the U.S [44]. Further, Kemp [19] found that three out of five veterans who died by suicide had diagnosed mental health conditions.

The challenges faced by veterans can be further compounded by the stigma related to mental health and seeking treatment [20]. Moreover, while research suggests that mental health-related stigma among veterans has decreased over time, roughly two thirds of soldiers who screened positive for a mental health condition did not seek treatment [27]. Other related work indicates that veterans with probable mental health needs such as depression and PTSD may hold more negative beliefs about traditional mental health treatment [6]. Given this lingering stigma towards traditional forms of treatment, use of complementary and alternative therapies with veterans has steadily increased [35].

1.2. Horticultural therapy

Horticultural therapy is defined by the American Horticultural Therapy Association as the “participation in horticultural activities facilitated by a registered horticultural therapist to achieve specific goals within an established treatment, rehabilitation, or vocational plan” [1]. Existing evidence suggests that horticultural therapy provides physical, cognitive, social and psychological benefits for a variety of populations, including individuals who have mental health issues such as trauma, PTSD, depression, anxiety, schizophrenia, and alcohol and drug abuse

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[13,22,32]. Research [43] indicates that the task of gardening for as little as 30 min reduced salivary cortisol levels and improved mood in study participants, suggesting that gardening can reduce stress levels in individuals. Cortisol levels were also shown to be reduced in older adult populations when spending time in a garden [29]. Other work shows that interactions with plants and nature have a positive effect on an individual's overall well-being [3]. For example, a recent study by Wyles et al. [47] indicates that the quality of the natural area and designation status has an impact on enhancing psychological restoration. Further, Kellert and Wilson [18] suggest that interconnections between life, such as plants and humans, has a positive impact on an individual. Wilson defines this term as *biophilia*, or “the innate tendency to focus on life and lifelike process, to the degree that we come to understand other organisms, we will place greater value on them, and on ourselves” [18].

A 2017 meta-analysis reported the use of gardening has been shown to improve depression and reduce anxiety in a variety of populations [34]. Gonzalez [12] found a strong correlation between a decline in depression severity and engagement in therapeutic horticulture activities which helped to reduce depression severity and improve perceived attentional capacity in participants with clinical depression.

With accumulating evidence for the mental health benefits of horticultural therapy building, efforts to increase its use among the veteran population have expanded in recent years. Fleming [11] reported that agriculture horticulture vocational training services for veterans began forming in 2007, but the 2014 national Farm Bill encouraged even more veterans to consider farming as a career with access to agricultural programs and benefits. Veteran-to-farmer programs assist veterans in agriculture production. Increasing participation as well as increased agriculture production and profitability reflect the success of these programs. This and similar agriculture programs being offered are focused mainly on agriculture education, training, production, and profitability success [11]. Although such programs inherently provide veteran populations with a connection to nature and healing elements, most lack formalized treatment plans and documentation of therapeutic benefits.

Studies show that horticulture-focused programs for veterans can provide a sense of purpose, reduced stress, improved self-esteem, increased social engagement, increased physical activity, and improved career outcomes [2,4,11]. Some evidence of the positive outcomes for veterans with PTSD and other health related diagnoses who participate in these programs exists. Van Den Berg and Custers [43] found that gardening promotes restoration from stress; gardening for as little as 30 min reduced stress and improved mood. Detweiler [8] reported that horticultural therapy programs help veterans modulate stress and improve overall quality of life. Both studies [8,43] utilized cortisol as a biomarker for stress reduction, which is a standard approach to measure stress in humans [14]. These outcomes indicate the positive benefits horticultural therapy programs can have on veterans' mental health and overall well-being.

1.3. Purpose of the current study

The purpose of this pilot project was multi-faceted. First, we wished to design and provide horticultural therapeutic intervention program for veterans with mental health issues, which might serve as a model pilot program for other facilities working with veterans. The pilot project was a 5-week horticultural therapy program called Veterans Experiencing Growth through Garden Interactive Experiences (VEGGIE). Another aim of this study was to examine the potential benefits of horticultural therapy intervention on a small veteran group with mental health issues. This study aims to extend the growing body of research that supports horticultural therapy as a significant, measurable intervention for veterans.

2. Methods

2.1. Participants

Participants were recruited through several methods. We first contacted healthcare organizations in the local community who serve veteran populations. We also connected with veterans who were involved with college and university veterans' resource centers. We also joined a Regional Military Affairs Council (MAC) and presented our pilot program study at their monthly meeting. MAC also sent out information about our pilot study to their membership to help recruit study participants. Eleven military veterans expressed interest in participating in the pilot study. However, one participant was unable to attend the pilot due to a medical issue and a second participant only attended the first session. Thus, our final sample consisted of 9 veterans. Mean age of participants was 50.8 (SD = 13.4; range 31–68 years). Five males and four females participated in the study. With regard to service era, two of the study participants served in Vietnam, one in post-Vietnam, one in the Gulf War I, and five participants served in Operation Iraqi Freedom/Operation Enduring Freedom. All self-reported at least one mental health diagnosis. One veteran did not attend the final session and therefore did not complete the post-evaluation. The dropout rate was 28%.

2.2. Measures

Depression, Anxiety, Stress Scale-21 (DASS-21) [23]. The DASS-21 consists of three subscales of 7 items each which measure the respondent's level of depression, anxiety, and stress, respectively, over the past week. Respondents rate how much statements applied to them on a 4-point scale ranging from 0 (*Did not apply to me at all*) to 3 (*Applied to me very much, or most of the time*). Previous research [33] has demonstrated the internal consistency with Cronbach's alpha for scales ranging from .80 (Anxiety) to .91 (Depression) of the DASS-21. Concurrent validity also has been supported [3]. Internal consistency reliability for DASS scales in the current study was .84 (Depression), .83 (Anxiety), and .78 (Stress).

Quality of Life Enjoyment and Satisfaction Questionnaire-Short Form (Q-LESQ-SF) [10]. The Q-LESQ-SF is a 16-item self-report measure designed to assess how satisfied the respondent was about various areas of daily functioning, such as mood, physical health, and relationships over the past week. Items are rated on a 5-point Likert-type scale from 1 (*Very poor*) to 5 (*Very Good*). The first 14 items are summed to create a total score, which ranges from 14 to 70, with higher scores indicating greater satisfaction. The summary scores were found to be reliable and valid measures of these dimensions in a group of depressed outpatients. Internal consistency reliability for the Q-LESQ-SF in the current study was .88.

2.3. Procedures

The horticultural therapy pilot program was developed using formal therapeutic frameworks and methodologies. Wise [45] outlines the theory and program characteristics needed to develop a horticultural therapy program for veterans. This pilot utilized the basic program components outlined by Wise. This pilot study was conducted in July. Due to the length of our 5-week pilot and the time of year, we selected program components that fit within our timeframe. Although program length in the research ranges from a few weeks to 12 months, research has not been conclusive on how long a program should run.

The program consisted of ten 1.5 h sessions offered twice per week over the course of 5 weeks [Table 1]. The sessions included 15 min at the beginning of the session for introducing the session/activity, and 15 min at the end for debriefing the session. The horticulture activity would last 1 h within each session. Van Den Berg and Custers [43] found that gardening for as little as 30 min helps reduce stress. Kolb's

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