A Horticultural Therapy Program for The Elderly: Effects on Cognition, Quality of Life, and Loneliness

Mariah Ruth Baird

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A horticultural therapy program for the elderly: effects on cognition, quality of life, and loneliness

By

Mariah Ruth Baird

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A horticultural therapy program for the elderly: effects on cognition, quality of life, and loneliness

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Previous studies suggest there are numerous benefits of horticultural therapy programs. The current study explored the benefits of a horticultural therapy program with elderly populations at two facilities in Bowling Green, Kentucky. Fifteen participants attended a 2-hour session on horticulture techniques once a week for four weeks. Using a pretest to posttest study design, changes in participants’ cognition, quality of life, and loneliness were assessed. The pretest was administered verbally by the researcher before the first session and the posttest, including a series of questions about satisfaction with the program, was administered after the last session. Items on each assessment included the Mini-Mental State Exam, the Assessment of Quality of Life, and the Revised UCLA Loneliness Scale. Findings suggest that participants’ cognitive ability significantly improved after participation in the program while quality of life and loneliness perception did not significantly improve. Participants perceived the program as positive and enjoyable.
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CHAPTER I
INTRODUCTION

An increasing number of Americans are moving into their later years of life. In 2013, the average life expectancy was 78.8 years (Center for Disease Prevention and Control, 2015). Thirteen percent of the population was over the age of 65 in 2010. This figure is expected to rise to 20% by the year 2030, meaning the number of elderly is rapidly increasing (Centers for Disease Prevention and Control, 2013). Many aging individuals are moving into personal care and nursing home facilities due to the diminishing mobility of themselves or their spouse, financial reasons, or for the desire for more interpersonal relationships with others (Choi, 1996).

The number of elderly living in nursing and personal care homes will keep growing dramatically until at least 2050, with the most dramatic increase expected to be between 2010 and 2030. The elderly population should double in the next 40 years because the baby boomer population is aging and the increase in medical advances is causing life expectancy to continue to rise (Centers for Disease Prevention and Control, 2013).

With an increasing number of elderly living longer, the number of people showing signs of dementia has also risen. Dementia is a progressive disease that plagues people of all races, genders, ethnicities, and socioeconomic categories (Alzheimer’s New Zealand, 2016). It is a leading cause for elderly patients to move from their homes into
independent or nursing facilities (Alzheimer’s New Zealand, 2016). There are many ways to possibly help reduce the progression of dementia such as staying active, engaged, and social (Alzheimer’s New Zealand, 2016).

Some activities that can help keep elderly active and engaged include exercise classes, swimming, aerobics, crafting, playing games, doing puzzles, walking and gardening. Gardening is an activity enjoyed by many elderly that keeps people active both physically and mentally (Peacock, Hine, & Pretty, 2007). Being able to maintain such activities in any living setting could help elderly retain their cognitive ability.

**Statement of the Problem**

As people age, their cognitive abilities diminish significantly (Drageset, 2008). Many factors studied have been determined to affect this cognitive decline. Residents in nursing homes and independent living facilities start to experience diminished cognitive abilities when they experience loss of relationships (Drageset, 2008). Losing friends, significant others, and relatives has shown to significantly change the quality of life for elderly. As the loss of personal relationships increases, the desire to remain active diminishes. This lack of activity due to a decrease in personal contact and interaction can then transition into a diminished quality of life perception and decreased cognitive level (Drageset, 2008).

Residents also start to lose cognitive function as their physical activity levels drop (Yaffe, 2001). Individuals who choose to stay active through walking, gardening, and other exercise have a smaller level of cognitive decline compared to those who do not initiate activity on a daily basis. Other factors that affect cognition are high blood pressure (Tzourio, 1999), diabetes (Cukierman, 2005), and depression (Yaffe, 1999).
Activities that provide elderly with the means to improve their mobility and cognitive abilities are necessary to allow their quality of life perception to remain positive. Many studies, (Yaffe, 1999; Cukierman, 2005; and Whitson, 2007), have been conducted to explore methods for preventing the loss of cognitive abilities in elderly. However, little has been studied about the beneficial effects that horticultural therapy or gardening programs may have on diminishing cognitive abilities. The act of gardening can help maintain and improve the cognitive skills of elderly (Mun Yee Tse, 2010). Previous studies encouraged the act of gardening in elderly for cognitive and mobility retention; however, these studies did not focus on how these programs can help elderly’s perception of quality of life and loneliness.

**Background**

Around 5% of the elderly live in retirement homes and independent living centers by the age of 65; by the time they reach the age 80, 25% are living in these facilities, and by the age of 95, 50% are living there (Breytspraak, 2016). Of elderly patients in these facilities, a little over 18% have a disability of some kind, 13.2% of those with physical and cognitive disabilities (Centers for Disease Prevention and Control, 2015). The Centers for Disease Control and Prevention state that around 13.5% of elderly exhibit depression when in these facilities, causing a large rate of suicide in elderly over the age of 65 (Centers for Disease Prevention and Control, 2015).

Elderly have options to help reduce these cognitive ability losses. All of the above sources state that active residents experience fewer health issues, are more likely to maintain cognitive abilities, and are less likely to have depression (Centers for Disease Prevention and Control, 2015). Exploring hobbies while staying active is thought to help
keep the residents living in independent living homes from experiencing mental, physical, or depressive symptom (Choi, 1996). Independent living facilities sometimes provide crafting activities, exercise, swimming, gardening, and other events for the residents in a scheduled calendar. Other facilities, however, may lack the resources to provide these activities.

**Purpose and Research Questions**

The purpose of this research study was to explore the benefits of a horticultural therapy program on cognition, perceived quality of life, and perceived loneliness among elderly residing in an independent living facility.

The following research questions were addressed:

1. Do elderly who participate in a 4-week horticultural therapy program retain their cognitive abilities?
2. Do elderly in a 4-week horticultural therapy program report an improved perceived quality of life after the program as compared to before the program?
3. Do elderly in a 4-week horticultural therapy program report a decrease in perceived loneliness after the program as compared to before the program?
4. Do elderly in a 4-week horticultural therapy program report a positive satisfaction with the program?

**Significance**

Many activity directors in independent living facilities will state that residents who take care of plants seem to do better with depressive symptoms and mental stability,
but there is a lack of research to defend such statements. Much of the research cited in Chapter 2 supports the idea that horticultural therapy will help reduce loneliness and the decline of mental capabilities, but not many studies have measured the effectiveness of gardening programs on cognitive ability, quality of life, and loneliness.

This study resulted in a step-by-step horticultural therapy program that could be used in nursing and independent living facilities. An outline of the program is provided in Chapter 3 and serves as general instruction for others interested in the direction provided to participants.

Providing a way for elderly in an independent living facility to garden in their rooms and in the facility inexpensively can hopefully provide more activity allowing for less cognitive decline and depressive symptoms with the use of physical, cognitive, and mobility exercises. A gardening program would bring together residents for social time while planting their plants and seeds as well as provide a personal experience with the plants in their homes. It could also allow for socialization amongst the gardening group members on a daily basis when they check in with friends on how their plants are doing.

Terms and Definitions

Elderly – adults aged 65 and older (Phillips & Sternthal, 1977)

Horticultural Therapy – a process through which plants, gardening activities, and the innate closeness we all feel toward nature are used as vehicles in professionally conducted programs of therapy and rehabilitation (Davis, 1998)

Cognitive Abilities – The ability to perceive the world through processes such as language, memory, learning, perception, and reason. The performance of
cognition is related to the comprehension of ideas through these processes and learning new skills to improve those areas (Coviello, 2015)

**Quality of Life** – A multidimensional concept encompassing several subcategories: life satisfaction, well-being, happiness, meaning and economic indices (Bagwell, 2016)

**Loneliness** – A subjective feeling of being alone, separated, or apart from others, causing distress to the individual as a result of lack of satisfaction from social relationships (Shankar et al., 2011)

**Assumptions**

1. Elderly who participate in this program do not have a condition that will affect cognitive abilities.

2. Elderly participants have the dexterity to complete the program activities.
CHAPTER II
LITERATURE REVIEW

This literature review will be presented in three sections: 1) research on cognitive decline in elderly; 2) loneliness, depression, and quality of life in elderly; and 3) research on gardening programs with elderly.

Cognitive Decline

Cognitive decline in elderly, also known as dementia, is prevalent in independent living facility residents, eventually causing them to move to nursing homes. Many researchers, (Vance et al., 2005; Blumenthal et al., 1999), have studied some of the causes of this decline, and evidence suggests that it relates, at least in part, to the socialization and physical activity of the patients. Vance et al. (2005) stated that the loss of physical activity causes a decline in socialization for seniors. Seniors who spent time with a larger social network had a better cognition rating than those who did not. As these patients spent more time in a sedentary position, the more depression and dementia symptoms prevailed (Vance et al., 2005). Blumenthal et al. (1999) supported this by noting that several studies have linked physical fitness and a higher cognitive function. It was also noted that since physical exercises are often conducted in a group setting, the social interaction could have influenced the positive cognitive effects as well (Blumenthal et al., 1999).
Other studies have measured the cognitive decline of elderly using the Mini-Mental State Exam (MMSE). Guerrero-Berroa (2009) conducted a study using the MMSE to look at the dementia levels of people with a mean age close to 85 years old and found that the majority of the people were scoring low enough to be compared to an 8-year old on cognitive abilities and levels. The study also indicated that there were no differences in dementia when looking at people from different socio-demographic groups, suggesting that living conditions do not affect whether one suffers from dementia.

There are other factors that do seem to correlate with dementia patients, however (Whitson, 2007). For example, loss of cognitive ability and loss of eyesight as people age are also, very importantly, seen in congruence with other problems that elderly face, including mobility or physical decline and perception of quality of life (Whitson, 2007).

**Loneliness, Depression, and Quality of Life**

Studies show loneliness and depression affect the mental capacity of elderly in independent living homes. As briefly stated in the previous section, depression and cognition are interrelated (Lawrence et al., 2006). Loneliness is a direct cause of depression in elderly (Lawrence et al., 2006). Vance et al. (2005) found a decline in processing speeds due to depression. With loneliness and depression such important factors in the mental health of elderly, any type of activity that can help prevent loneliness and depression is encouraged. Gardening, which can be done in a group or individual setting, is a physical activity that can help reduce the depression and loneliness in elderly. Xavier et al. (2003) studied elderly and compared their daily activities with
their perceived quality of life. Results found that domestic and rural activities, including gardening, were the most prominent source of pleasure for elderly studied.

The quality of life that one possesses can determine whether an elderly person will embrace an activity presented to him or her. According to Miu and Chan (2010), patients who are experiencing depression have a higher and earlier rate of morbidity and physical decline. The study showed that patients have an increased amount of diseases and physical disabilities after they become depressed. The converse is the premise that people become depressed due to these illnesses. Providing elderly with activities can increase the quality of life and reduce the amount of disease and depression among residents (Miu & Chan, 2010).

**Gardening Programs for Elderly**

Studies have investigated the advantages and long-term benefits of elderly participating in horticultural activities. Sommerfield et al. (2010) conducted a study looking at the effects of gardening on quality of life in elderly. They noted that gardening allowed patients to have a more positive outlook on life and that the social interactions were a direct cause of their positive outlooks. Out of the patients who gardened, 74% felt they had gotten what they expected out of life, while 66% of patients who did not participate in gardening activities felt the same. It was concluded that gardening activities can take the place of social gaps and are very effective in allowing the patients to continue life with happiness and health. They also noted that the highest sign of distress was the loss of physical activity and socialization causing loneliness. Gardening was determined to produce a feeling of self-fulfillment amongst elderly populations while still being cost effective (Sommerfield et al., 2010). Wang and
Macmillan (2013) found similar results by observing that gardening activities are enjoyable for elderly and benefit their overall quality of life and physical abilities.

A similar research study by Mimi Mun Yee Tse (2010) included a control and experimental group which was used to document how elderly participants’ lives changed from engaging in horticultural activities for 8 weeks. Both groups filled out a questionnaire that used a Likert-scale to assess loneliness, activity, and feelings of self-worth before and after the experiment. Results in the experimental group showed a heightened sense of ownership and self-worth and increased happiness, while their feelings of loneliness decreased dramatically. Additionally, the research suggested that elderly gained a sense of enthusiasm and ownership by working with plants. This study also suggested that many elderly wanted the ability to care for and be a part of something. Gardening activities could provide an enjoyable, activity-based program not just for the day, but throughout the year. There are not many studies that look at the ability of formal gardening programs to enhance quality of life and maintain cognitive abilities in elderly.

Conclusion

In conclusion for this chapter, cognitive decline, or dementia, is a concern as people grow older and can be reduced through the use of physical activity and socialization. Perceptions of quality of life and loneliness are also factors of concern as elderly move into nursing and independent living facilities. Gardening could be an ongoing activity to help reduce cognitive decline and perceived loneliness while increasing perceived quality of life.
CHAPTER III
METHODS

Introduction

The following chapter outlines the horticultural therapy program among elderly residents of an independent living facility (Facility A) and a nursing facility (Facility B). A detailed description of the program, surveys, and analysis methods are described in this chapter.

Purpose and Research Questions

The purpose of this research study was to explore the benefits of a horticultural therapy program on cognition, perceived quality of life, and perceived loneliness among elderly residing in an independent living facility.

1. Do elderly who participate in a 4-week horticultural therapy program retain their cognitive abilities?

2. Do elderly in a 4-week horticultural therapy program report an improved perceived quality of life after the program as compared to before the program?

3. Do elderly in a 4-week horticultural therapy program report a decrease in perceived loneliness after the program as compared to before the program?

4. Do elderly in a 4-week horticultural therapy program report a positive satisfaction with the program?
**Design**

A one-group pretest to posttest design was used to measure cognition, perceived quality of life, and perceived loneliness before and after a 4-week horticultural therapy program with elderly who resided at Facility A or Facility B. This study design was selected because it allows for comparison of participants before and after the program, thus answering the research questions. A control group was not used.

**Population**

The populations for this study consisted of elderly aged 65 or older in a nursing home and an independent living facility in Bowling Green, Kentucky. The independent living facility, Facility A, housed elderly who still cared for themselves to a certain extent and were allowed to travel if desired. However, most residents must have physical help with many aspects of life and have personal nurses who work with and for them throughout the day to maintain their ‘independent’ status. The nursing home facility, Facility B, housed residents who were unable to take care of any basic household chores and needed the care of nurses and doctors on an around-the-clock basis. The nursing home was where the fastest decline in cognitive ability and quality of life was present. Both facilities, though named differently, had moderately-able residents who were still able to physically implement program activities and were most likely to maintain the plants.

**Intervention**

The horticultural therapy program was designed as a way to keep elderly living in independent living facilities active. The program taught elderly participants how to work
with and maintain plant materials during and beyond the time restraints of the program. This program was developed, implemented, and evaluated by the author.

Participants engaged in a horticultural therapy program for four consecutive weeks. This program focused on activities that encouraged quality of life through hands-on activity and socialization, as well as mental exercises, while working with the plant materials. Each week of the program focused on different aspects of gardening and always provided participants with plants to keep (See Appendix A).

General topics of the program included 1) planting seeds in a pot, 2) making mixed planters for seasonal enjoyment, 3) indoor plant care and cleaning, and 4) transplanting root-bound plants into new pots. These activities each focused on a specific physical ability while using cognitive recognition and repetition to help teach elderly to a state of retention. The group setting allowed for participants to engage in socialization and work with others on a common task. Intermittent, group discussions focusing on whether the patients were caring for the plants and to what extent were conducted each week. This allowed for questions about the plants, their growth, and care to be addressed. Each weekly intervention session lasted between approximately one and a half to two hours.

**Recruitment and Retention**

The study participants were invited to join the program in one of three ways. Flyers were hung on the activities boards on different floors of the facilities (See Appendix B). Some patients were personally invited by the activity directors and encouraged to join the program. The program was also placed on both facility activity calendars that were distributed to all residents on a monthly basis.
Retaining the participants was key, but was a bit easier since the residents tended to remain, for the most part, in the facility. Participants were assisted to the activity by the staff if mobility was a problem. External factors, including illness and doctor visits, was the most common cause for a participant missing an activity. Some participants were able to make up the activity the next day to stay in the program. If the participant was unable to make up the activity, they were eliminated from the study.

**Participants**

The MMSE was used to assess the ability level of residents who were interested in participating in the program. Interested residents who scored 16 or above on the MMSE were considered to have the ability to accomplish horticultural activities and were, therefore, eligible to participate. Everyone who expressed interest in participating met the aforementioned score, indicating they had the cognitive ability at a third-grade level or above. The participants were not required to have any background in gardening and did not need to have existing interests in plants or horticultural activities.

Eighteen residents completed the MMSE screening and pretest. Of the 18 participants, 15 completed all of the workshops and surveys, an 83.3% completion rate. Participants (N=15) of the program were asked questions regarding their personal characteristics. The average participant age was 81.2. All (100%) of the participants were Caucasian and 73.33% of participants already had a plant in their apartment.

**Facility A**

All participants (N=5) at Facility A were experienced with plants in their previous homes and reported enjoying helping with plantings at the facility already. After signing
the consent forms (See Appendix A) and completing the initial survey, the participants chose from many types of annual seeds and planted their seeds in 6” pots. Each person planted three pots and many expressed the desire to re-plant them into hanging baskets later in the season. Soil, seeds, and pots were provided to the participants, and they were responsible for doing the activity. None of the participants requested help with the tasks, but did receive help with transporting the plants to their homes.

All five participants returned to the second week of the program. A few seeds had started to emerge, and the group looked at the progress. They were given large baskets in which to plant a variety of annuals. They chose from a large variety of 4” starter plants that all possessed similar water and light requirements. One participant requested help scooping the soil into the basket. They chose to let the plants remain outside in the gazebo for easier watering and to allow the others in the facility to enjoy them also.

During the third week, three participants attended the program and two missed due to doctor appointments. The week’s activity focused on plant cleaning and maintenance. Because the facility had an indoor walkway full of house plants that needed attention, the participants chose to work on the existing plants rather than bring in new ones. They used scissors and hand-held cutters to trim dead leaves and stems out of the plants. While going through the plants cleaning them, they determined which plants may need to be repotted for the activity the next week. They also were taught how to identify which plants were being watered too much and too little to adjust watering habits to encourage healthy plant growth.

In the fourth week, four participants attended the activity. Though one participant missed the week before, she was able to join the activity; however, her participation in
the study was removed due to missing an activity. Large pots, soil, stakes, and fertilizer were brought to repot the plants identified as in need in week three. The participants needed a bit more help with this activity since the root-bound plants were hard to remove from their original pots for re-planting. All heavy lifting was done by the researcher to protect participants from excessive physical strain. Immediately after this activity, surveys were administered to the three participants who completed all four weeks of the program. A follow-up satisfaction survey was completed by the three participants a month later.

**Facility B**

Facility B started the program three weeks after the last week of activity at Facility A. Activities were the same as those completed at the first facility with a few small adjustments. The first week, participants (N=13) completed the consent form and initial survey via interview with the author. They completed the activity in the same way the first group did. The members in this group needed a little more help with scooping the soil into their pots and getting the seeds out of the containers, but they all were able to transport their planted seeds to their rooms without help.

The second week, all thirteen participants arrived for the activity again, and a few extra residents also attended. The new participants were welcomed to join the activity, but were not included in the study since they did not start at the beginning of the four-week program. As the week before, more participants needed help scooping the soil into the basket, but they were all able to plant the variety of plants into the baskets and transport to their rooms.
During the third week, twelve of the study participants arrived to complete the activity. One person was eliminated from the study due to inability to come to the activity that week. This facility did not have many house plants available for the participants to clean and maintain. Participants were provided with a 6” Money Tree plant in need of grooming and cleaning. They proceeded to clean the leaves and trim them like participants at Facility A.

In the fourth week, the original thirteen participants arrived for the activity. They repotted root-bound peace lilies provided to them. Since the plants were repotted into 12” pots, they were placed throughout the facility to be enjoyed by everyone, but maintained by the participant residents. As with the first group, participants needed a bit more help with this activity due to the nature of it; however, the participants teamed together to get all plants repotted and placed in the common area of their choice. Following the plant placement, twelve participants who completed all four weeks of intervention completed the survey. A month later, the twelve participants completed the follow-up satisfaction survey.

**Data Collection**

All project procedures were approved by the Mississippi State University Office of Regulatory Compliance Institutional Review Board (IRB) (See Appendix C). Residents who met the screening criteria (described above) and provided written consent were included in this study. A full description of the program and measurements were provided verbally to all participants to ensure full understanding before a written agreement was obtained.
The initial survey that included the Mini-Mental State Exam (MMSE), Assessment of Quality of Life (AQoL), and the Revised UCLA Loneliness Scale was presented to the participants the day the intervention began (See Appendix D). The following week, the intervention group completed the week one activity. The next three activities were conducted at weekly intervals from the first activity. The second survey, including all aforementioned measures except demographic questions, was presented after the final activity was completed (See Appendix E). A follow-up satisfaction survey was administered one month after the second survey and was completed by each group (See Appendix F). Once all surveys were administered, differences in outcomes of interest, before and after the program, were compared.

The researcher administered the pretest, posttest, and follow-up satisfaction survey via individual interviews. The researcher conducted all interview surveys personally to ensure participants’ understanding of the questions and to ensure privacy was maintained. Interviews took anywhere from 10 to 30 minutes for each participant depending on participant comprehension and speed of researcher.

**Personal Characteristics**

In addition to the surveys, personal demographic information was collected from the participants. Participants were asked to provide information about (1) gender (e.g., female or male), (2) age, and (3) race/ethnicity.

**Outcome Variables**

Outcome variables of interest in this study are cognitive abilities, perceived quality of life, and perceived loneliness among participating elderly. These outcomes
were measured at two points in time, before program implementation and immediately following program implementation.

**Mini-Mental State Exam**

The first outcome of interest, cognition, was assessed using the MMSE created by Folstein et al. (1975). It is an 11-question, 30-point maximum questionnaire that determines the cognitive level of a person as related to a standard age range. As previously stated, it served as an eligibility screener and was used to assess the dependent variable, cognition. The minimum score deemed able to participate in the program was a 16, or 3rd grade level. A score of 25 is equivalent to a high school education, and 26-30 is some college or higher. Pretest scores ranged from 16-30. The final question on this survey asks the researcher to rate the participant’s perceived state of awareness. Answers were rated from 1-alert, to 4-comatose. The awareness measurement was not included in the 30-point scoring, but was analyzed separately. This instrument is commonly used in many health care capacities, including neurology offices and nursing facilities to identify mental losses. A mean of 0.48 in elderly and nursing facilities indicated this instrument to be reliable. For the current study, this instrument was used to assess the cognitive level of the participants before and after the program.

**Assessment of Quality of Life**

The second outcome of interest, Quality of Life, was assessed using the Assessment of Quality of Life, or AQoL, created by Richardson (1998). The assessment had 15 questions that are scored using a provided algorithm created for use in SPSS looking at multiple attributes associated with quality of life. Scores could range from 15
to 60. This algorithm looked at many different parts of life that work together to provide a quality of life score. Factors included Independent Living, Relationships, Mental Health, Coping, Pain, Senses, and a Composite quality of life score. Richardson et al. (2014) researched the validity of this measure. A mean of 0.69 indicated the AQoL-8D (multi attribute) measure was reliable for use (Richardson et al., 2014). For the current study, the instrument was used to assess a person’s quality of life and how he or she was affected prior to and after the program.

*The UCLA Loneliness Scale*

The third outcome of interest, loneliness, was assessed using the Revised UCLA Loneliness Scale, devised from the original UCLA Loneliness Scale (Russell et al., 1980). The revised scale is comprised of 20 questions. The questions from the pretest and posttest were scored with the number 4 being positive and the number 1 being negative. Questions were stated in both the positive and negative, so the negative questions’ answers were given a direct opposite score (reverse coded) to correlate correctly with the positive questions’ answers. This is the adjustment made to the original scale. A composite score for this scale could range from 20 to 80 points. The revision allowed the researcher to ensure a more accurate measurement of loneliness when the survey was administered. It was validated by Russell, Peplau, and Cutrona (1980) in a study correlating the scale to three others. All r’s were at r=0.40 or higher, indicating that the Revised UCLA Loneliness Scale is a reliable measure for loneliness (Russell, Peplau, & Cutrona, 1980). For the current study, the instrument was used to assess a person’s feeling of loneliness before and after the program.
Satisfaction

A follow-up survey was administered four weeks after program completion to assess participant satisfaction and maintenance of plants. All of the questions were rated on a scale of 1 (strongly disagree), 2 (neutral), to 3 (strongly agree). A three-point scale was used for ease of participant understanding and clarity.

These questions helped the author understand what parts of the program were enjoyed and successful and what parts needed modifications. The basis of these questions was to find out if the plants, activities, and socialization made elderly participants feel more at home and happy in their corresponding facility, hopefully increasing their sense of quality of life in the process. It also gave insight into whether a majority of the participants thought the program was worth their time and whether they would refer others to participate (See Appendix F).

These questions assessed the amount of time spent with the provided plants and how many of the participants kept up with the plants and activities. Responses to these questions indicated whether the program provided an activity outside of the 4-week program. See Appendix E for the full Satisfaction Survey.

Analysis

Analysis began by calculating the composite mean score of each outcome of interest: cognition, quality of life, and loneliness for the pretest and posttest. Next, the mean score of each outcome of interest before the horticultural therapy program began was compared to the mean score on each outcome posttest in SPSS (Version 22.0, 2013). The overall scores were compared between the pretest and posttest surveys for each individual. A paired sample t-test was calculated to assess changes in cognition, quality
of life, and loneliness from before to after the program. Participant’s scores on outcomes of interest are considered statistically significantly different if the $p$-value is at the .05 level or below.

The MMSE was scored according to the built-in scores of the measure. The pretest and posttest MMSE scores were entered into SPSS and analyzed using a paired samples $t$-test.

The AQoL was scored using an SPSS algorithm provided by the measure’s creators and looked at the multiple attributes linked to a perception of quality of life (Richardson & Hawthorne, 1998). All answers were entered into the software, and then the algorithm was run to determine whether the participants’ quality of life improved significantly throughout the program. Simple frequencies and percentages were calculated on the satisfaction follow-up survey questions.
CHAPTER IV
RESULTS

This chapter provides a description of the participants that completed the program. Paired sample $t$-tests were conducted to determine the effect of the horticultural therapy program on cognitive abilities, quality of life, and loneliness.

Purpose and Research Questions

The purpose of this research study was to determine whether a 4-week horticultural therapy program would affect cognitive decline and reduce depressive inclinations in an independent living and a nursing facility. This chapter describes the findings of the research questions proposed in this study:

1. Do elderly who participate in a 4-week horticultural therapy program retain their cognitive abilities?

2. Do elderly in a 4-week horticultural therapy program report an improved perceived quality of life after the program as compared to before the program?

3. Do elderly in a 4-week horticultural therapy program report a decrease in perceived loneliness after the program as compared to before the program?

4. Do elderly in a 4-week horticultural therapy program report a positive satisfaction with the program?
Participant Demographics

Frequencies and means were calculated on variables of interest, including demographic variables (See Table 1). Participant ages ranged from 67 to 96. There were 14 females (93.3%). Eleven of the participants had plants in their home already (73.3%), and four (26.7%) did not. All participants were Caucasian.

Table 1  Participant Demographics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60-69</td>
<td>3</td>
<td>20%</td>
</tr>
<tr>
<td>70-79</td>
<td>3</td>
<td>20%</td>
</tr>
<tr>
<td>80-89</td>
<td>4</td>
<td>26.7%</td>
</tr>
<tr>
<td>90-99</td>
<td>5</td>
<td>33.3%</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>14</td>
<td>93.3%</td>
</tr>
<tr>
<td>Male</td>
<td>1</td>
<td>6.7%</td>
</tr>
<tr>
<td><strong>Participant has plants currently</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>11</td>
<td>73.3%</td>
</tr>
<tr>
<td>No</td>
<td>4</td>
<td>26.7%</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>15</td>
<td>100%</td>
</tr>
</tbody>
</table>

(N=15)

Comparing Means on Outcomes of Interest

**Do elderly who participate in a 4-week horticultural therapy program retain cognitive abilities?**

The MMSE was used to answer research question 1. The pretest mean for the MMSE was $M=25.73$ and the posttest mean was $M=27.13$. The difference in the MMSE pretest to posttest study, presented in Table 2, was significant ($M = 1.40$, $SD = 2.23$).

With this test, the higher the score, the higher level of cognitive function. A statistically
significant difference was seen between the pretest and posttest scores ($p = 0.03$). A Cohen’s $d$ score of 1.30 shows the study had a large effect on the MMSE scores of participants. The mean score of awareness for participants in the pretest was 1.27, while the posttest awareness score was 1.07, with a score of 1 being aware and 4 being comatose. The difference in awareness between the pretest and posttest was positive, but not statistically significant ($p = 0.08$).

Table 2  Mini–Mental State Exam Scoring

<table>
<thead>
<tr>
<th></th>
<th>Pretest Mean</th>
<th>Posttest Mean</th>
<th>Mean Difference</th>
<th>Standard Deviation</th>
<th>df</th>
<th>$t$-value</th>
<th>$p$ (&lt;0.05)</th>
<th>Cohen’s $d$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest To Posttest</td>
<td>25.73</td>
<td>27.13</td>
<td>1.40</td>
<td>2.23</td>
<td>14</td>
<td>2.43</td>
<td>.029*</td>
<td>1.30</td>
</tr>
<tr>
<td>Awareness</td>
<td>1.27</td>
<td>1.07</td>
<td>0.20</td>
<td>0.41</td>
<td>14</td>
<td>1.87</td>
<td>.082</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*(N = 15)*

* Note: Significant at the level $p < 0.05$.

**Do elderly in a 4-week horticultural therapy program report an improved perceived quality of life after the program as compared to before the program?**

The AQoL was used to answer research question 2. The pretest mean was $M=0.79$ and the posttest mean was $M=0.79$. The mean difference of the AQoL areas of interest are presented in Table 3. None of these areas showed a statistically significant change in a positive direction.
Table 3  
Assessment of Quality of Life Scoring

<table>
<thead>
<tr>
<th></th>
<th>Pretest Mean</th>
<th>Posttest Mean</th>
<th>Mean Difference</th>
<th>Standard Deviation</th>
<th>df</th>
<th>t-value</th>
<th>P (&lt;=0.05)</th>
<th>Cohen’s d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent Living</td>
<td>0.48</td>
<td>0.52</td>
<td>-0.041</td>
<td>0.17</td>
<td>14</td>
<td>-0.93</td>
<td>0.37</td>
<td>-0.50</td>
</tr>
<tr>
<td>Relationships</td>
<td>0.71</td>
<td>0.75</td>
<td>-0.05</td>
<td>0.29</td>
<td>14</td>
<td>-0.59</td>
<td>0.56</td>
<td>-0.32</td>
</tr>
<tr>
<td>Mental Health</td>
<td>0.79</td>
<td>0.77</td>
<td>0.02</td>
<td>0.28</td>
<td>14</td>
<td>0.24</td>
<td>0.82</td>
<td>0.13</td>
</tr>
<tr>
<td>Coping</td>
<td>0.81</td>
<td>0.80</td>
<td>0.01</td>
<td>0.37</td>
<td>14</td>
<td>0.09</td>
<td>0.93</td>
<td>0.047</td>
</tr>
<tr>
<td>Pain</td>
<td>0.66</td>
<td>0.72</td>
<td>-0.06</td>
<td>0.30</td>
<td>14</td>
<td>-0.81</td>
<td>0.43</td>
<td>-0.44</td>
</tr>
<tr>
<td>Senses</td>
<td>0.88</td>
<td>0.88</td>
<td>-0.01</td>
<td>0.26</td>
<td>14</td>
<td>-0.09</td>
<td>0.93</td>
<td>-0.05</td>
</tr>
<tr>
<td>Composite</td>
<td>0.79</td>
<td>0.79</td>
<td>-0.01</td>
<td>0.24</td>
<td>14</td>
<td>-0.15</td>
<td>0.88</td>
<td>-0.08</td>
</tr>
</tbody>
</table>

(N = 15)

Do elderly in a 4-week horticultural therapy program report a decrease in perceived loneliness after the program as compared to before the program?

The Revised UCLA Loneliness Scale was used to answer research question 3. The Revised UCLA Loneliness Scale results are presented in Table 4. The pretest mean was $M=33.47$ and the posttest mean was $M=32.40$. The mean difference for the pretest and posttest scores were not significant ($M = 1.07$, $SD = 11.80$). The mean scores were slightly more positive after the workshop, but a statistically significant change did not occur from pretest to posttest. A Cohen’s $d$ score of 0.19 shows the effect of the horticultural therapy program on loneliness was minimal.
Table 4  
Revised UCLA Loneliness Scale Scoring

<table>
<thead>
<tr>
<th></th>
<th>Pretest Mean</th>
<th>Posttest Mean</th>
<th>Mean Difference</th>
<th>Standard Deviation</th>
<th>df</th>
<th>t-value</th>
<th>p</th>
<th>Cohen’s d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pret to Postt</td>
<td>33.47</td>
<td>32.40</td>
<td>1.07</td>
<td>11.80</td>
<td>14</td>
<td>0.35</td>
<td>0.73</td>
<td>0.19</td>
</tr>
</tbody>
</table>

(N = 15)

Do elderly in a 4-week horticultural therapy program report a positive satisfaction with the program?

In addition to the measures described above, questions were presented to the participants in a follow-up survey to determine program satisfaction and participants’ gardening practices to answer research question 4 (See Table 5). The majority of the participants, 60%, reported spending an hour or less working with their plants daily. The remaining 40% spent more than an hour working with plants daily. Maintaining the plants provided for the study should take between 10 and 20 minutes for the average person to thoroughly clean and water all of the plants. To spend more time with the plants can be attributed to slower mobility and/or pure enjoyment of the time spent with the plants. This time could have also included socialization amongst participants engaging in conversation about the plants. Eighty percent of the participants stated that they would join the program if it were offered again, while the other 20% responded that they would encourage only others who were interested in plants to join the activities but that they would not return. Participants were also asked to tell the researcher anything else they would like to add about the program. Two common statements included: participants did not get new plants since the program ended, and the program provided too many plants for them to keep in their small living spaces.
<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Time Spent with Plants</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hour or more per day</td>
<td>6</td>
<td>40%</td>
</tr>
<tr>
<td>Hour or less per day</td>
<td>9</td>
<td>60%</td>
</tr>
<tr>
<td><strong>Discuss Plants with Others</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Five or more days a week</td>
<td>9</td>
<td>60%</td>
</tr>
<tr>
<td>Four or less days a week</td>
<td>6</td>
<td>40%</td>
</tr>
<tr>
<td><strong>Participant Return</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participant would return to the program</td>
<td>12</td>
<td>80%</td>
</tr>
<tr>
<td>Participant would not return to the program but refer others</td>
<td>3</td>
<td>20%</td>
</tr>
</tbody>
</table>
CHAPTER V
SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary
The number of elderly moving into assisted living and nursing facilities is increasing dramatically with the advancements of medicine and the baby boomer population moving into the latter years of life. As this occurs, a decrease in mental awareness, an increase in depression, and a decrease in quality of life perception are prevalent. Finding ways to reduce these issues is important to the residents, families, and facilities.

This study focused on two elderly populations in Bowling Green, Kentucky, who lived in assisted living facilities. The participants attended a hands-on gardening class held once a week over four weeks. Participants kept plants in their rooms or in common spaces of the living facilities and cared for them as needed. The research study showed a significant increase in the Mini-Mental State Exam (MMSE) scores from the beginning to the end of the horticultural therapy program. The UCLA Loneliness Scale and some AQoL scores both showed a positive change, but not enough to be statistically significant.
Do elderly who participate in a 4-week horticultural therapy program retain cognitive abilities?

The MMSE scores showed a significant change between the pretest and posttest program surveys. It can be assumed that the hands-on gardening program for the elderly provided residents with an activity to stimulate their mental capacity and allow it to remain after the program ended while maintaining their plants. This supports the information presented by Vance et al. (2005), which stated that physical and group activities allowed for more socialization and a higher cognitive capacity score.

Sommerfield et al. (2010) and Mimi Mun Yee Tsi (2010) focused on gardening as a way to encourage elderly socialization and quality of life. Neither looked at the actual effects of the program on mental capacity, which the program in the present study included.

Do elderly in a 4-week horticultural therapy program report an improved perceived quality of life after the program as compared to before the program?

The AQoL scores did not show a statistically significant difference between the pretest and posttest surveys, even though they did show a small change for the better. This could be attributed to a few factors. Participants who attended this workshop had the opportunity to be around others all day long, if they so choose. This could have be a factor that may have caused the scores to already be quite positive with the pretest surveys. Another factor that must be considered is the desire to give approving answers to the questions. Before the activity started, patients were surveyed, and not knowing the researcher may have caused them to respond with answers more positive than what reality was. As the researcher moved through the workshop and got to know the participants, a more ‘real’ sense of who they were and their limitations were observed. It was hard to tell whether a need to impress had a hand in the scoring, but it is a limitation.
that must be considered. Xavier et al. (2003) stated that physical and group activities, along with personal relationships, guided elderly to a higher perception of quality of life. However, the study did not look at the interpersonal relationships before the study to understand whether there was a significant increase in socialization amongst the participants.

**Do elderly in a 4-week horticultural therapy program report a decrease in perceived loneliness after the program as compared to before the program?**

The UCLA Loneliness Scale did not show a significant change from the pretest to posttest survey scores. However, the qualitative follow-up questions asking personal opinions on the program showed a positive response from the participants in regards to making new friends, socialization about their plants, and having the plants in their homes. As in the AQoL, a positive change was seen in the UCLA Loneliness Scale, but not enough of a change to be statistically significant. It is believed that this could again be attributed to the need for participants to impress during the pretest survey while a more personal connection allowed for a more honest and accurate survey response in the post surveys and follow-up questionnaires.

**Do elderly in a 4-week horticultural therapy program report a positive satisfaction with the program?**

The satisfaction survey showed positive feelings towards the study by participants. The majority of participants reported spending a more than necessary amount of time with their plants and socializing about them. Eighty percent noted they would return to the study, and the other 20% stated they would encourage others who enjoy plants to attend the study even though it was not for them. A majority of
participants who wrote notes at the end of the satisfaction survey stated they would like to see more interesting and unique plants and varieties.

**Practical Significance**

The program developed through this study could become a curriculum that could be used as a service project for students or philanthropy groups as well as a program for Extension Services. The weekly curriculum provided in Appendix F can be utilized by high school, college, or private organizations, college faculty, and nurseries/garden centers as a way to do service projects with elderly. It can also be published as a program for implementation by Extension Service agents, garden clubs, or program staff at independent living and nursing facilities.

**Lessons Learned**

Some unforeseen observations should be considered heavily when looking at the study and how it should be conducted if it were to be replicated. As expressed earlier, the need for these residents to ‘look good’ for a guest may have been important. It is hard to admit that it is not easy to hear, see, and understand the world around them, and it is even harder to express thoughts of sadness, a family disconnect, or loneliness to a stranger. This could have easily swayed the results of the AQoL and UCLA Loneliness Scale. The MMSE results are not as easy to disrupt due to the factual nature of the questions involved. There is no way for the participants to adjust what the day, date, season, month, and year are, therefore, their answers were either correct or incorrect.

Another study would benefit from the researcher getting to know the residents in a voluntary manner before commencing the study. This would allow the residents to be a
bit more honest with their feelings of quality of life and loneliness. Additionally, a detailed record of socialization before, during, and after the study would be of great benefit to see whether an increase of socialization has occurred, and if it did, if that directly correlated with an increased sense of quality of life and decreased sense of loneliness amongst elderly.

**Methodological Limitations**

There were several limitations of this study. First, the participant population only included 15 elderly in Bowling Green, Kentucky. It is likely that the background of residents at the two facilities are similar to each other but could differ from other residential facilities in other regions. Second, the number of eligible participants at each participating facility resulted in a small sample size. This small sample size limits that generalizability of findings from the study. Another limitation includes the various threats to validity, especially selection. Stated another way, differences observed between the pretest and posttest could be due to something other than the horticultural therapy program. Differences could be due to how the participants were selected (volunteered or self-selected) to be in the program. For example, all participants at Facility A reported past gardening experience. Those who decided to participate could be different from those who did not decide to participate. Because of such differences, results might not be observed among participants without gardening experience.

Another limitation of the study seemed to be the amount of activities offered by the facility. Facility A is a higher-end Assisted Living Facility with unlimited funds and activities. The residents seemed to score higher on the surveys as a whole, and fewer residents attended the activity. Facility B is a lower-end facility with extremely limited
funds and activities available to the residents. More people attended this workshop in the lower income facility, and it was observed as a more important and exciting event. This could have also affected the outcomes of the surveys with participants coming from two different locations and socioeconomic backgrounds.

Additionally, the large Cohen’s $d$ observed between the two time periods on the MMSE should be interpreted with caution. Large effect sizes can be observed through chance alone in studies with fewer than 30 participants (Ary, Jacobs, & Sorensen, 2010).

**Recommendations**

As a result of the findings observed, lessons learned, and limitations, the following recommendations are made.

**Practical Recommendations**

- Develop a community garden or provide plants in a common space that program participants can help maintain, instead of providing plants that go to a participant’s homes.
- Provide information on more unique and interesting plant materials to maintain participants’ interest. Many of the participants already loved plants and had them at one time in their homes before moving into the assisted living and nursing home spaces.

**Research Recommendations**

- Allow participants to work together to maintain a common planting to encourage more socialization with less plants.
- Expand this study and strengthen the design through additional research.
REFERENCES


APPENDIX A

PROGRAM PROCESS
Week 1 Activity—Planting Annual Seeds

Before doing the activity, the AQL, MMSE, and UCLA Loneliness Scale will be researcher administered. (This will provide all Pre-Intervention Information)

- Materials needed:
  - 6 inch pot/participant
  - Pot saucer/participant
  - 2 packs of seeds/participant
  - Soil
  - Handheld shovel/participant
  - 2 Watering cans to be shared by participants

- Activity plan
  - Lay out all materials needed at each seat.
  - Help patients get seated at each station.
  - Start the class with an introduction of each of the helpers.
  - Thank the patients for participating in the study and give an introduction to what will be done that day, planting seeds.
  - Teach everyone the steps of planting seeds with a demonstration example
    - Use handheld shovels to fill the pot with soil.
    - Water the soil before seeds have been planted
    - Depending on seed type, insert seeds no more than 1 inch into the soil, or sprinkle the seeds into the soil.
    - Add a small layer of soil to the top of the seeds
    - Water lightly to ensure a thorough watering of the soil
  - During the activity helpers will go around the room to help the patients plant their seeds
  - Discuss watering and light needs for the plants and explain the timeline to see new plants emerge.
  - Help patients take the plants to their rooms and find a place they would like to keep the pot.
  - Remind the patients of the care procedures and give them a handout on how to care for their seed pots and expectancy for when they should see the plantlets emerge. (This will allow a reference item to help remind them how and when to care for their plants.)

Week 2 Activity – Creating a Mixed Planter

- Materials needed:
  - 6 inch pot/participant
  - Pot saucer/participant
  - 4-5 small seasonal plants
  - Soil
  - Handheld shovel/participant
• 2 Watering cans to be shared among all of the patients

❖ Activity plan
  • Lay out all materials needed per seat
  • Help all participants to a seat.
  • Thank them all for coming back and remind them how important their participation is to the study.
  • As patients are being seated, study leader and helpers will ask a few questions about how the participants are caring for their plants.
    • -How often are you watering your plant?
    • -Are you enjoying having the plant there to take care of?
    • -Have your seeds started to sprout?
    • -Tell me about what you’ve been doing to care for your seeds.
  • Teach how to create the mixed planter with a demonstration example
    ➢ Pour soil into the pot about ⅔ to 2/3 full
    ➢ Water slightly to ensure soil is moist before planting
    ➢ Insert plants into the top of the pot
      o Taller in the middle
      o Shorter to the outsides (As demonstrated in front of the group)
    ➢ Put a fresh layer of soil over the top and gently compress all plants into place
    ➢ Lightly water the top of the soil
  • During the activity helpers will go around and help the patients create their planters
  • Discuss watering and care needs for the plant materials with the patients
  • Help patients take their planters to their rooms.
  • Remind them of the care for their week 2 planters verbally and with a handout similar to week 1.
  • Check to ensure they have the week 1 handout still, and remind them of care needs for the seed pots.

Week 3 Activity – Maintaining Indoor Plants

❖ Materials needed:
  • Indoor plant with some need for maintenance/participant
  • 1 pair of scissors/participant
  • 4 Bottles of Plant cleaner or soapy water/participant
  • 1 Sponge/participant

❖ Activity plan
  • Lay out all materials needed per seat
  • Help all participants to their seat
• Thank them all for coming back and remind them how important their participation is to the study.
• As patients are being seated, study leader and helpers will ask a few questions about how the participants are caring for their plants.
  - How often are you watering your plants from week 1 and 2?
  - Are you enjoying having the plants there to take care of?
  - Have your seeds started to sprout?
  - Are the plants in your mixed planter doing well?
  - Tell me about what you’ve been doing to care for your seed pot and mixed planter
• Teach how to maintain the plants
  - Show how to cut off ‘burnt’ parts of the plant by trimming it off with scissors
  - Remove dead or declining leaves
  - Wash the leaves with the soapy water to remove any dust, mites, or water marks that exist on the plant
• During the activity helpers will go around and assist with the activity
• Discuss watering needs for each individual plant.
• Help patients take their plants to their rooms
• Remind the patient of how to care for the new, cleaned plant
• Check on the progress of the weeks 1 and 2 plants
  - Discuss with the patients what they are doing with their plants and the enjoyment level they are experiencing.

**Week 4 Activity – Replanting Root-Bound Plants to Extend Their Livelihood**

• Materials needed:
  - 6 inch Plant needing repotting/participant
  - 8 inch empty pot/participant
  - Pot saucer for the 8 inch pot/participant
  - Bags of soil
  - Handheld shovel/participant
  - 2 Watering cans to be shared by participants

• Activity plan
  - Lay out all needed materials
  - Help patients to their seats
  - Thank them all for coming back and remind them how important their participation is to the study.
  - As patients are being seated, study leader and helpers will ask a few questions about how the participants are caring for their plants.
  - How often are you watering your plants from weeks 1-3?
  - Are you enjoying having the plants there to take care of?
  - Are the plants doing well?
  - Tell me about what you’ve been doing to care for plants
• Teach how to repot the plant
  ➢ Fill the new pot with a layer of soil in the bottom
  ➢ Add water to moisten the soil
  ➢ Remove the plant from its original pot and break up the root balls
  ➢ Place the plant into the new pot spreading the roots to where they have room to grow
  ➢ Fill in voids with new soil and compress lightly
  ➢ Water to moisten the soil
• During the activity helpers will go around and assist with the activity
• Teach patients how to care for their re-potted plants
• Help patients take their plants to their rooms
• Remind the patients of how to care for their plants and give them a handout to keep and remind them of the care practices.
• Check on the progress of their plants from the previous workshops
  ➢ What are they doing with their plants
  ➢ How are they caring for them
  ➢ How are the plants making them feel
JOIN US FOR
Watch Your Plants Grow!

Workshop Information

- Four Weeks starting on Monday, May 4

- Workshop will meet every Monday after at 3pm!

- Meet us in the cafeteria for fun!

Join Mariah Baird for a fun workshop with plants! The four week hands-on workshop series will start May 4 at 3pm! Sign Up TODAY to reserve your spot!
APPENDIX C

CONSENT FORM
Consent Form for the Horticultural Therapy Program for the Elderly

Conducted at  
Village Manor  
1800 Westen St., Bowling Green, KY 42101

Administrator:  
Mariah Baird  
1702 B Park Street, Bowling Green, KY 42101  
662.312.2746

Advisor:  
Dr. Laura Downey

This program is a research study that will provide you with plants and the knowledge to care for them. The research will look at how the care of plant materials can impact your quality of life and cognitive function.

Procedures: We would like to ask you to participate in a research study. If you decide to participate in this study, you will be asked to be a part of the following:  
- Surveys will be presented before the plant program starts to get initial data. (30 minutes)  
- Four weeks of hands-on plant workshops will be held to provide you with plants. (1.5 – 2 hours each week)  
- Each week the administrator will check on your plants' progress.  
- Surveys will be given again immediately after the week 4 project (30 minutes) and one month after the activities are complete (30 minutes).

Questions  
If you have any questions about this research project, please feel free to contact Mariah Baird at 662.312.2746 or Mariah.baird@wk.edu.

This program is completely voluntary. All information provided will be kept confidential.

If you would like to or need to discontinue the program early, you may do so.

I ____________________ consent to participate in Mississippi State University's Horticultural Therapy Research Program for the Elderly.

Signature of Participant: ______________________________

Signature of Witness: ______________________________
APPENDIX D

PRETEST SURVEY
Pre-Intervention Questionnaire

Name: ________________________________ Participant Number: ______
Age: ________ Race: _________________
Do you keep plants in your home currently? Yes   No

Concerning my use of prescribed medicines:
   A. I do not or rarely use any medicines at all.
   B. I use one or two medicinal drugs regularly.
   C. I need to use three or four medicinal drugs regularly.
   D. I use five or more medicinal drugs regularly.

To what extent do you rely on medicines or medical aid? (Not glasses or hearing aid) (IE walking frame, wheelchair, prosthesis etc.)
   A. I do not use any medicines and/or medical aids.
   B. I occasionally use medicines and/or medical aids.
   C. I regularly use medicines and/or medical aids.
   D. I have to constantly take medicines or use a medical aid.

Do you need regular medical treatment from a doctor or other health professionals?
   A. I do not need regular medical treatment.
   B. Although I have some regular medical treatment, I am not dependent on this.
   C. I am dependent on having regular medical treatment.
   D. My life is dependent upon regular medical treatments.

Do you need any help looking after yourself?
   A. I need no help at all
   B. Occasionally I need some help with personal care tasks.
   C. I need help with the more difficult personal care tasks.
   D. I need daily help with most or all personal care tasks.

When doing household tasks: (IE Preparing food, gardening, using the video recorder, radio, telephone, or washing the car)
   A. I need no help at all
   B. Occasionally I need some help with household tasks.
C. I need help with the more difficult household tasks.
D. I need daily help with most or all household tasks.

Thinking about how easily you can get around your home and community:
A. I get around my home and community by myself without any difficulty.
B. I find it difficult to get around my home and community by myself.
C. I cannot get around the community by myself, but I can get around my home with some difficulty.
D. I cannot get around either the community or my home by myself.

Because of my health (for example: with my friends, partner or parents) generally:
A. Are very close and warm.
B. Are sometimes close and warm.
C. Are seldom close and warm.
D. I have no close and warm relationships.

Thinking about my relationships with other people:
A. I have plenty of friends, and am never lonely.
B. Although I have friends, I am occasionally lonely.
C. I have some friends, but am often lonely for company.
D. I am socially isolated and feel lonely.

Thinking about your health and relationship with your family:
A. My role in the family is unaffected by my health.
B. There are some parts of my family role I cannot carry out.
C. There are many parts of my family role I cannot carry out.
D. I cannot carry out any part of my family role.

Thinking about your vision, including when using your glasses or contact lenses if needed:
A. I see normally.
B. I have some difficulty focusing on things, or I do not see them sharply. (For example: small print, a newspaper, or seeing objects in the distance.)
C. I have a lot of difficulty seeing things. My vision is blurred. (For example: I can see just enough to get by with.)
D. I only see general shapes, or am blind. (For example: I need a guide to move around.)

Thinking about my hearing, including using my hearing aid if needed:
A. I hear normally
B. I have some difficulty hearing or I do not hear clearly. (For example: I ask people to speak up or turn up the TV or radio volume.)
C. I have a lot of difficulty hearing things clearly. (For example: Often I do not understand what is said. I usually do not take part in conversations because I cannot hear what is said.)
D. I have very little indeed. (For example: I cannot fully understand loud voices speaking directly to me.)

When I communicate with others: (For example: by talking, listening, writing, or signing.)

A. I have no trouble speaking to them or understanding what they are saying.
B. I have some difficulty being understood by people who do not know me. I have no trouble understanding what others are saying to me.
C. I am only understood by people who know me well. I have great trouble understanding what others are saying to me.
D. I cannot adequately communicate with others.

If you think about how you sleep:

A. I am able to sleep without difficulty most of the time.
B. My sleep is interrupted some of the time, but I am usually able to go back to sleep without difficulty.
C. My sleep is interrupted most nights, but I am usually able to go back to sleep without difficulty.
D. I sleep in short bursts only. I am awake most of the night.

Thinking about how you generally feel:

A. I do not feel anxious, worried or depressed.
B. I am slightly anxious, worried or depressed.
C. I feel moderately anxious, worried or depressed.
D. I am extremely anxious, worried or depressed.

How much pain or discomfort do you experience?

A. None at all.
B. I have moderate pain.
C. I suffer from severe pain.
D. I suffer unbearable pain.
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Total Score

ASSESS level of consciousness along a continuum: Alert  Drowsy  Stupor   Coma
APPENDIX E

POSTTEST SURVEY
Post-Intervention Questionnaire

Participant Number: ______

Concerning my use of prescribed medicines:

A. I do not or rarely use any medicines at all.
B. I use one or two medicinal drugs regularly.
C. I need to use three or four medicinal drugs regularly.
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To what extent do you rely on medicines or medical aid? (Not glasses or hearing aid) (IE walking frame, wheelchair, prosthesis etc.)

A. I do not use any medicines and/or medical aids.
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Do you need regular medical treatment from a doctor or other health professionals?

A. I do not need regular medical treatment.
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D. My life is dependent upon regular medical treatments.

Do you need any help looking after yourself?

A. I need no help at all
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Total Score

ASSESS level of consciousness along a continuum: Alert Drowsy Stupor Coma
APPENDIX F

FOLLOW-UP SATISFACTION SURVEY
In the section below, please tell me the answer that best represents your work with your plants since the gardening workshop.

How many hours a day do you spend with your plants?  
0  1  2  3+

How many plants have you obtained (purchased or gifts) since the gardening workshop?  
0  1-2  3-4  5+

In this section, Please tell me your answer:  1 (Strongly Disagree),  2 (Neutral), or 3 (Strongly Agree)

Do you think having plants in your apartment makes you happier?  
1  2  3

Have you felt more at home since obtaining the plants?  
1  2  3

Do you feel more active since working with the plants?  
1  2  3

Did the gardening workshop introduce you to new social groups or friends you enjoy?  
1  2  3

Would you refer others to take this workshop in the future?  
1  2  3

Please provide any other comments below:

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________