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Horticultural Therapy: A Sustainable and Inclusive Approach to Supporting Older People in Brazil

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Abstract

This report examines an inclusive community vegetable garden project at Vila Vicentina, a long-term care facility in Bauru, São Paulo, Brazil. The project was initiated through methods of participatory action research, in which elevated garden beds were planned and constructed with the help of São Paulo State University students and Vila Vicentina staff. This report explores how the inclusive community garden initiative created a space for older adults to engage in leisure and horticultural activities, and contributed to improvements in physical engagement, social interaction, and overall well-being. Our findings suggest that governments and organizations should continue to develop and support initiatives that focus on horticultural activities, as they have the capacity to enhance the physical, environmental, and mental well-being of older adults.

Keywords: *Long-term care; Horticultural therapy; Sustainability; Sustainable development goals; Brazil*

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Due to increased longevity, the population of older adults is increasing on a global scale (WHO 2024). By 2030, the number of people aged 60 and over is expected to reach 1.4 billion, with 80 percent of those living in developing countries by 2050 (Thiyagarajan et al. 2022). This demographic shift introduces new challenges and opportunities in health, migration, employment, and social safety (Smith and Wesselbaum 2023). As a result, promoting healthy aging and enhancing well-being in later life have become key priorities in public policies worldwide (The Lancet Healthy Longevity 2024). Addressing these challenges requires the adoption of sustainable policies and the creation of inclusive societies.

In Brazil, the National Policy on Older People, established in 1994 and regulated by Law No. 8,842, marked a significant commitment to the social rights and health of older adults, emphasizing their autonomy and societal integration (Gobira and Guimarães Tomasi 2019). Despite these advancements, there are notable shortcomings in social and environmental programs for older individuals, which are linked to issues such as public health policy gaps, socioeconomic disparities, limited healthcare access, and inadequate infrastructure (Tupy et al. 2023). Of particular concern are the health conditions of lower-income older adults, which are exacerbated by these challenges, leading to higher rates of chronic illness and disability (Giacomin 2023). Addressing these issues requires comprehensive healthcare reform, targeted social intervention, and investment in infrastructure, if the well-being and quality of life for older adults, especially those from vulnerable backgrounds, is to be improved. While Brazil's legal framework supports older citizens, its effective implementation – particularly in terms of healthcare and infrastructure – remains a challenge. Therefore, policy adjustments and better resource allocation are essential to meet the evolving needs of Brazil's aging population.

Enhancing the quality of life of people as they age is crucial. The United Nation's 17 Sustainable Development Goals (SDGs) (United Nations 2015) underscore the integration of societal progress with environmental preservation, leading to impactful public policies. Such policies address poverty, hunger, and strategies to ensure a better quality of life for older individuals, in line with SDG 3 (Good Health and Well-being), SDG 10 (Reduced Inequalities), SDG 11 (Sustainable Cities and Communities), and SDG 17 (Partnerships for the Goals). This report explores how horticultural initiatives at Vila Vicentina can enhance the well-being of older residents while contributing to the broader societal goals of sustainability and social equity, as outlined by the SDGs.

Health and Wellbeing based on Horticultural Therapy

The American Horticultural Therapy Association (AHTA) (2024) defines horticultural therapy as a practice that involves gardening tasks as a form of therapeutic or rehabilitative exercise, with the purpose of offering benefits or reaching individual treatment objectives through either active or passive participation. Wang et al. (2023) define horticultural therapy (HT) as a therapeutic non-pharmacological approach that uses gardening activities to promote the well-being of older adults, particularly in care settings. Jueng et al. (2023) further note that these activities enhance physical, mental, and social health, highlighting HT's holistic benefits. These activities range from structured gardening tasks to simple, interactive plant care, aiming to enhance physical agility, reduce stress, foster social engagement, and improve overall well-being.

Recent studies have highlighted that horticultural therapy harnesses nature's restorative benefits to foster mental relaxation, stress relief, emotional healing, and both mental and physical energy (Han et al. 2018). Lin et al. (2021) demonstrated that horticultural therapy improves flexibility, aerobic endurance, emotional health, social functioning, and the quality of life of older adults, as well as a safe and promising non-pharmacological intervention for older individuals with cancer, dementia, and frailty. Han et al. (2018) and Lin et al. (2021) also noted that HT proved to be especially beneficial during the COVID-19 pandemic and recommended it for various long-term care institutions. Such horticultural activities can help counteract physical and cognitive decline, improve the quality of life of aging populations, and serve as a preventive measure in geriatric medicine (Ronkainen et al. 2023; Porter et al. 2022).

While there has been a substantial development of studies on horticultural therapy and gardening for older adults in long-term care facilities worldwide, there is a notable gap in systematic research and intervention on this topic in South America, generally, and Brazil, specifically, underscoring the importance of our work. The present report aims to fill this gap by providing evidence and support for the implementation and promotion of horticultural therapies as a care strategy for older adults, through a community garden project at a long-term care institution in Brazil.

Vila Vicentina in Bauru, Brazil

Vila Vicentina is a seniors' long-term care home that provides comprehensive support for vulnerable older adults, which includes 24/7 care workers (nurses and personal support workers) and weekly visits from a general practice physician. The institution also offers physiotherapy, administration of medications, balanced meals with nutritionists, and additional services focused on preserving residents' dignity, independence, and well-being.

Figure 1: The location of Vila Vicentina in Bauru / SP – Brazil. Source: Google Earth, adapted by the authors (2023).

The center has a green space that serves the residents, as well as their visitors. However, before the implementation of the community garden project, the area was underutilized due to accessibility challenges. The ground-level design of the original garden meant it was difficult for residents with mobility issues to use. This led to minimal engagement with, and upkeep of, the garden with the exception of the late Mr. Elizeu Eduardo de Brito. Mr. Elizeu had been the only resident able to attend and maintain the activities of the garden — such as planting, irrigation, and harvesting. He took great care to ensure the space was preserved until his passing, and when the garden was officially inaugurated on Jun 24, 2022, it was named in honor of the late Mr. Elizeu Eduardo de Britto.

Figure 2: Vila Vicentina, Bauru, Brazil. Source: Google Earth, adapted by the authors (2023).

In addition to the accessibility issues, maintenance of the facility, which relies heavily on community support due to limited public funding, has been a challenge. To address these issues, both administrators and residents advocated for the installation of elevated gardens, which would not only enable on-site food production but also promote social interaction among residents and visitors. The Vila Vicentina community garden project aims to improve the quality of life for its residents by making the space more accessible and engaging (Gomes et al. 2023).

Methodology

Project Design

This project employed a case study and action-research methodology, following the principles outlined by social scientist Robert K. Yin (2017). Action-research is a collaborative and iterative process where researchers and participants work together to identify problems, implement solutions, and evaluate outcomes. In this project, we followed a cyclical model with four key phases: Planning, Implementation, Description, and Evaluation (Figure 3). This iterative process ensured that theoretical insights were continuously integrated with practical steps, creating a seamless connection between research and real-world application in the development of the elevated gardens (Tripp 2005).

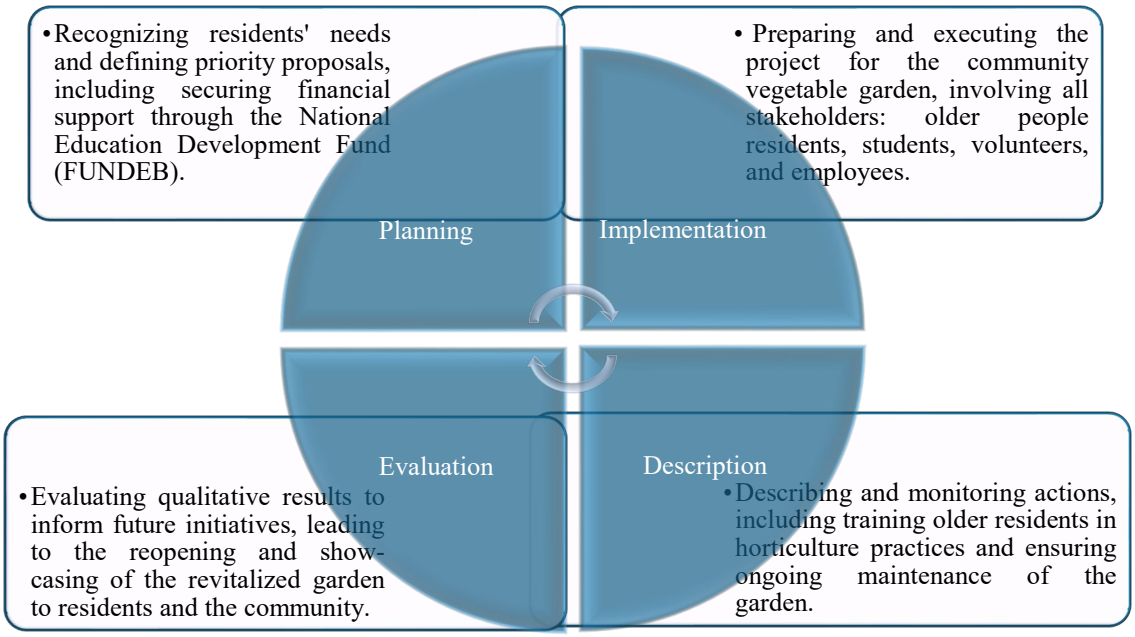

Figure 3: Research Phases (Planning, Implementation, Description, and Evaluation). Source: Adapted from Tripp (2005).

The action-research approach allowed the research team to gain a comprehensive understanding of Vila Vicentina's operations, infrastructure, administrative procedures, and resident dynamics, with the goal of developing and improving the community vegetable garden. The action-research methodology, in particular, focused on participatory action, emphasizing the practical application of research findings. This participatory approach was essential in facilitating the transition from research activities to the actual implementation of the elevated gardens at Vila Vicentina.

Project Establishment

The directors of Vila Vicentina initiated contact with São Paulo State University (UNESP) and the supervising professor to implement improvements at the facility. Before the implementation could begin, several meetings and discussions were held with the target audience, residents of Vila Vicentina, as well as with the employees and administrators of Vila Vicentina. During these conversations, the main points of need, improvement, prioritization, and desire of all Vila Vicentina residents were identified. The project was initiated by UNESP professors and students during the pandemic in 2021 and is set to be completed by June of 2025.

Participants and Research Team

The project was primarily led by Dr. Rosane Aparecida Gomes Battistelle, an Associate Professor from UNESP. The main research team included six undergraduates and two doctoral students from the departments of Architecture and Urbanism, Civil Engineering, and Production Engineering at UNESP Bauru. These students played key roles in managing garden activities, forging partnerships, and overseeing project operations. Their contributions included conducting initial surveys, designing the garden, setting up a worm farm (vermicomposting), and managing social media.

The project sought active participation from Vila Vicentina residents, such as contributing with ideas for the garden's design, decision-making, garden activities, and improving the community life within the

facility. In all, ten residents were chosen to be involved in the project, alongside nine care facility volunteers and sixteen of the facility's employees.

Data Collection Methods

UNESP students used a multi-method data collection approach comprising semi-structured interviews, daily observation of residents' activities, and structured surveys with residents, employees, and volunteers (White 2022). Semi-structured interviews included two types of questions: closed and open-ended. The closed questions aimed to collect demographic information about the participants (residents, employees and volunteers), such as age, gender, and length of residence/work/ volunteer service at the institution. The questions also measured their level of satisfaction with the care provided by the institution, measured on a three-point Likert scale from unsatisfactory to very satisfactory. Additionally, for residents, questions were asked regarding their level of disability and mobility. The open-ended questions were designed to understand residents' perceptions of the changes made in the garden, allowing them to freely express their opinions, feelings, and suggestions regarding the impact of the renovation.

Data collection was conducted by a graduate student who recorded the answers verbatim. The questionnaires were administered in Portuguese. They were then sent to a certified translator, to be translated into English, to ensure accuracy and fidelity in the translation. Data was organized and analyzed using a spreadsheet.

Below, we present a selection of the open-ended questions that were posed to residents (Figure 4).

Why did you want to participate/help in the vegetable garden?
What have you learned from vegetable gardening?
What do you think of the elevated vegetable garden? What benefits has it brought to you?
How do you feel when you are working/helping in the vegetable garden?
Do you think the vegetable garden improves your motor skills (motor coordination), mobility, and disposition?
Did you meet new people by participating/helping in the vegetable garden?
Do you see the vegetable garden as a therapy, leisure time, and hobby? Why?
Do you feel happy working in the vegetable garden? Why?
What improvements do you think the vegetable garden has brought to the long-term care facility? What has changed?
Why do you think the vegetable garden has helped your mental and physical well-being, as well as the quality of life at Vila Vicentina?
What are the advantages of having this contact with nature? Do you enjoy it? Do you feel more relieved, less stressed, and anxious?
What is your relationship with the employees and volunteers who also help in the vegetable garden?

Figure 4: Interview guide

Results

Our findings illustrate the positive outcomes of the garden project and emphasize the garden's impact on improving the quality of life for residents at Vila Vicentina through thoughtful design and community involvement.

The results are organized into two key sections:

1. Garden Restructure: This section delves into the redesign of the garden, outlining the enhancements made to improve accessibility and usability for older residents. It also describes the process of expanding the garden, including the methods used, the involvement of various stakeholders, and the challenges encountered.

2. Horticultural Benefits: The next section evaluates the physical, mental, and social benefits of horticulture for older adults at the facility, demonstrating how the garden has contributed to their overall well-being.

1. Garden Restructure

The original ground-level garden at Vila Vicentina posed several challenges, including narrow pathways and limited space for cultivation, which was at ground-level (Figure 5). To address these issues and improve the garden's functionality, the project focused on redesigning the space to enhance accessibility and encourage participation from residents of all ages and genders. UNESP students developed a new design that included ten elevated garden beds within a 250 m² area, along with an additional 800 m² of ground-level space. The elevated beds, positioned at a comfortable height, help alleviate the physical strain on residents, particularly those with limited mobility or health issues, such as arthritis (Figure 6). These raised beds make gardening tasks easier and safer, reducing the need for bending or kneeling. To further support resident involvement in the garden, additional provisions were made, including handrails and sun protection measures, to ensure accessibility and safety for those with mobility challenges. These design features of the garden aim not only to promote horticultural therapy but also to improve the physical well-being and independence of older residents, allowing them to engage more fully in the garden and benefit from the therapeutic effects of nature.

Figure 5: Restructured community area at Vila Vicentina. Source: Vila Vicentina project (2023).

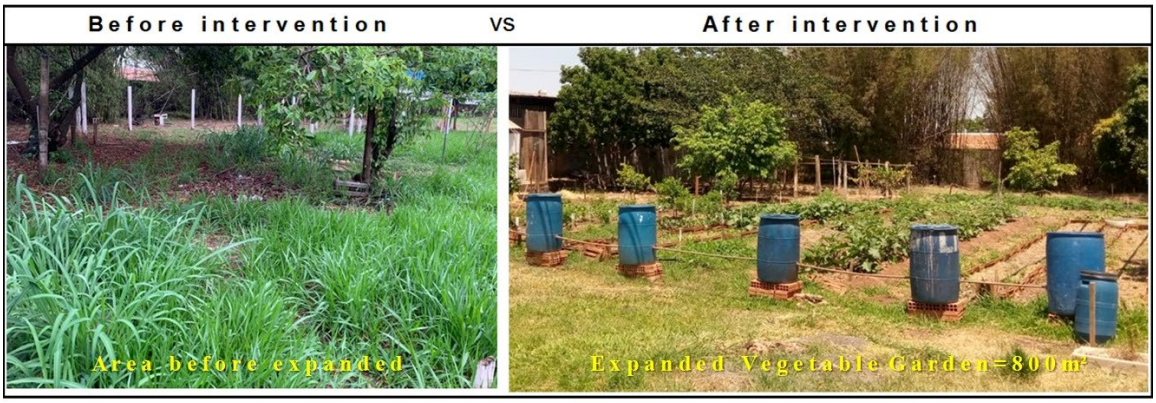

Figure 6: Before and after the garden expansion project, December 2021.

Figure 7: After restructuring: a garden with ten elevated supports.

The garden project resulted in the creation of two distinct community gardens, intended to meet the vegetable needs of residents and the people in the neighbourhood, with surplus produce sold to support Vila Vicentina's operations.

Figure 8: The use of hats for sun protection.

Figure 9: Daily vegetable production at Vila Vicentina.

The automated irrigation system at Vila Vicentina, as shown in Figure 10, incorporates sustainable practices that align with several Sustainable Development Goals (SDGs). By utilizing rainwater, groundwater, and a hydraulic pump from a dug well, the system addresses SDG 6 (Clean Water and Sanitation) by reducing water costs and managing moisture levels for crops. This also supports SDG 11 (Sustainable Cities and Communities) through efficient water management.

Additionally, the system contributes to SDG 3 (Good Health and Well-being) by creating a supportive environment for physical activity and SDG 10 (Reduced Inequalities) by providing accessible gardening

opportunities for all residents, regardless of mobility challenges. The collaboration involved in this system reflects SDG 17 (Partnerships for the Goals), showcasing how partnerships between academia, communities, and local governments can support sustainable development.

Automated irrigation systems reduce the physical strain on older adults by eliminating the need for manual watering, allowing them to maintain the gardens with less physical effort.

Figure 10: Irrigation system.

Figure 11: Vegetable garden is accessible to older people with wheelchairs, walkers, and crutches.

2. Benefits of Horticulture for Residents at Vila Vicentina

The upgraded vegetable garden has led to greater engagement in gardening activities, reduced sedentary behavior, and fostered a stronger sense of community among residents promoting physical movement, cognitive stimulation, and improved mood for residents. Residents who are able to actively participate in gardening activities take full advantage of the elevated garden structure designed and built by UNESP students. They are involved in planting, maintaining, and harvesting the vegetables, with ongoing support from volunteers and experts from both Vila Vicentina and UNESP, who provide guidance on horticultural practices (Figure 8).

This collaboration between residents, volunteers, and academic students not only fosters social interaction but also facilitates educational exchanges among the residents. Such interactions contribute significantly to their well-being and ensure a steady supply of fresh vegetables for meals at the facility (Figure 9).

We expand on our findings below, elaborating upon the various ways horticulture has impacted the older residents, employees, and students involved in the Vila Vicentina project.

2a. Perceived Subjective Benefits

Before the introduction of the elevated and adapted garden, many residents at Vila Vicentina, particularly those in wheelchairs, spent their time in their rooms watching television. However, the newly designed wheelchair-friendly garden has transformed this routine, encouraging greater participation in gardening activities. As a 35-year-old male employee emphasized, "There are benefits in terms of food and accessibility for everyone, including wheelchair users." A 74-year-old female resident also shared, "This garden has helped us a lot, not only because it gives us something to do, but because we can move more." This shift has fostered socialization, knowledge exchange, and motor activity, significantly increasing satisfaction, reducing distress, and enhancing the overall well-being of the community.

Engaging in horticultural tasks such as planting, watering, and harvesting provides gentle physical exercise for older residents. This participation has notably improved mobility, motor coordination, and overall disposition, offering substantial benefits for those with mobility challenges or health conditions that restrict movement. For example, a 64-year-old male resident explained, "It has improved, yes, it has minimized some pains. I spend the day there, occasionally in the garden," highlighting improvements in both mobility and mood. Similarly, a 75-year-old female resident remarked, "It improved my movement, and now I am more active."

At Vila Vicentina, older residents with varying levels of mobility engage in activities such as observing the gardens, watering plants with lightweight hoses, and enjoying the amenities of the restructured space. This arrangement has greatly enhanced their engagement during leisure hours. Both active and passive participation in the garden are encouraged, tailored to the abilities of each individual. Active participation—such as watering plants or tending to the elevated garden beds—promotes physical activity, coordination, and a sense of accomplishment. As one 78-year-old female resident mentioned, "I think it [the elevated garden] has improved because I always work with my hands, and now I feel less anxious and more relaxed." On the other hand, passive participation, such as simply observing the gardens or enjoying the surroundings, provides relaxation, sensory stimulation, and opportunities for social interaction.

Both active and passive forms of engagement in the garden have played a crucial role in enhancing the well-being and quality of life of the residents. By fostering meaningful interactions with nature and the community, the garden has proven to be a valuable space for improving both physical and emotional

health. An 83-year-old female resident noted that the garden's user-friendly design made her feel more relaxed and less anxious. Similarly, a 70-year-old female resident observed that the project introduced joy, provided purposeful activities, and contributed to a reduced sense of depression and anxiety among her peers.

As an 84-year-old male resident shared, "I feel calm, my head is untroubled, and then I forget about the stress of the world." Similarly, an 84-year-old male resident expressed, "It was a tranquility, peace to the body; this garden is a sea of roses for me." This feedback highlights how the garden offers a space with therapeutic potential, not only providing physical and social benefits, but also promoting emotional and mental well-being. Indeed, a 92-year-old male resident described the garden "as therapeutic," commenting on how visitors from the city are often amazed by its beauty. A 78-year-old female resident echoed this sentiment, adding, "I feel good, and I enjoy harvesting vegetables, because I can do what I like."

2b. Community Connections

The horticultural activities at Vila Vicentina have proven to be a powerful tool for fostering community connections, particularly among older residents. As one 70-year-old female resident shared, "Definitely, I feel happy doing what I can in the garden. It's very good, and I feel God's presence while watering there." These gardening activities have cultivated not only happiness but also a deep sense of connection, offering emotional comfort and helping to alleviate feelings of loneliness and anxiety.

Socialization has been a key outcome, with residents forming new relationships and strengthening existing ones. An 83-year-old female resident expressed, "I met new people and reconnected with those I already knew. It has been very good for me, both physically and socially." Shared experiences, whether through active participation in gardening or simply exchanging knowledge, encourage social interaction. A 75-year-old female resident shared, "I met new people, but I only remembered those I talked to frequently." Similarly, a 78-year-old female noted, "I met and talked to several people, and these interactions brought a new joy to my routine." A 61-year-old, female resident added, "Yes, I met several new people, and now I feel more connected to my neighbors."

The social value of these interactions was also highlighted by an 84-year-old male resident: "I met some people from outside and reconnected with old friends in the garden. It became a place for us to share not just stories, but laughter too." These remarks illustrate how the horticultural activities at Vila Vicentina have not only fostered new friendships but also strengthened existing relationships, demonstrating that the garden is more than just a place for planting—it has become a vibrant, communal space for connection and joy.

A 64-year-old male resident summed up the importance of the experience by saying, "I feel happy because I'm participating and doing something that will bring us benefits." By using "us" instead of "me," he emphasized the collective nature of the garden experience and its role in building a sense of community. He added, "I met new people in the garden and made new friendships, which has enriched my daily life." Similarly, an 83-year-old male resident shared how the activities had improved his relationships: "I get along very well with the staff and other residents, and these activities have helped build strong friendships." The garden has become a space where individuals can connect, share, and grow together, both socially and emotionally.

2c. Intergenerational and Community Benefits

The horticultural activities at Vila Vicentina have created a unique platform for residents, volunteers, and family members to engage together, fostering strong intergenerational connections. A 92-year-old resident shared the impact of these interactions, saying, "It's a good relationship; I share stories of my youth with UNESP students and volunteers, and this has strengthened my connection with them." Similarly, an 83-year-old female resident noted, "I meet new people there, and in the garden, I enjoy working with younger family members. It brings us closer." This intergenerational engagement not only enhances social bonds but also provides physical and mental benefits for older adults.

The involvement of family members has further enriched the experience, strengthening relationships within the family unit. A 78-year-old female resident explained, "I met people, and we exchanged experiences. This helped create a deeper connection with my family when they joined us." Another 74-year-old male resident expressed, "When Camila [Vila Vicentina employee] took me to the garden, I met new people, and that made me feel more integrated into the community." Vila Vicentina actively promotes family involvement, hosting events at the garden like the annual barbecue, ensuring that families remain an integral part of the community.

2d. Subjective Wellbeing Benefits

The horticultural activities at Vila Vicentina have proven to be deeply meaningful for residents, offering them a renewed sense of purpose, accomplishment, and connection. As a 61-year-old female resident expressed, "I find it good and enjoyable to participate and help in activities." By nurturing plants and witnessing their growth, residents experience a sense of pride and fulfillment, which boosts self-esteem, encourages lifelong learning, and enhances overall life satisfaction. She added, "I feel good, and I feel useful."

For many older residents, these activities also provide opportunities to learn new skills. An 83-year-old female noted, "I learned how to harvest vegetables, water plants, and clean the vegetables; we learned a lot of good things." She further emphasized, "I see it as therapy; it passes the time and keeps me active." This involvement fosters a strong sense of ownership and connection to the community, contributing to a more positive outlook on life.

For some, the garden has also sparked emotional memories, adding a layer of personal meaning to their participation. A 74-year-old female resident shared, "I like to participate because it makes me feel good, and my family loves agriculture. I am the person who enjoys cultivating the most." She added, "I feel very good, and when I see the beautiful garden, I feel happier."

As another 64-year-old male resident reflected, "I feel happy because I'm participating and doing something that will bring us benefits." His sense of accomplishment is evident. As he noted, "It brought many improvements for me and for everyone." Similarly, an 83-year-old female shared, "Yes, I see it as therapy; it helps me feel less anxious." These reflections highlight the therapeutic and emotional rewards that gardening has brought to the residents of Vila Vicentina, significantly enhancing their overall well-being.

In conclusion, the horticultural activities at Vila Vicentina have provided older adults with a profound sense of purpose, connection, and achievement. These activities have played a crucial role in improving residents' subjective well-being, fostering a sense of belonging and community, and contributing to their overall quality of life.

Conclusions

The implementation of the elevated and expanded vegetable garden at Vila Vicentina not only transformed an underutilized space into a vibrant hub of activity but also demonstrated the profound benefits of horticultural therapy for older adults. This project highlighted how a participatory and community-driven approach can effectively address accessibility challenges, enhance social interaction, and improve physical and mental well-being. The positive outcomes observed—such as increased mobility, reduced anxiety, and stronger social bonds—are a testament to the therapeutic and inclusive potential of well-designed gardening activities.

Furthermore, this project underscored the importance of tailoring interventions to the specific needs of participants. The use of elevated garden and automated irrigation systems made the garden accessible to residents with varying levels of mobility, while the collaborative design process fostered a sense of ownership and pride among participants. These efforts not only enhanced the residents' quality of life but also created a sustainable model that aligns with the UN's Sustainable Development Goals, particularly those focused on good health, reduced inequalities, and sustainable communities.

Future research should explore key areas to build on the findings of this study. Investigating the long-term impacts of horticultural therapy on physical and mental health outcomes for older adults could provide insights into its effectiveness and sustainability. Additionally, research could examine the implementation of assistive technologies in diverse horticultural settings to further enhance accessibility and participation for individuals with varying levels of mobility. For instance, adaptive gardening tools with ergonomic designs and extended grips can support those with arthritis or limited strength, while raised garden beds enable individuals using wheelchairs or with difficulty bending to engage comfortably in gardening activities. Automated irrigation systems, which use timers or sensors to maintain plant hydration, reduce the physical demands of manual watering, and vertical gardens bring plants within easy reach, offering a practical solution for those with mobility challenges. Moreover, smart gardening technologies, such as app-controlled irrigation and robotic maintenance tools, can simplify complex gardening tasks, fostering greater inclusion. Exploring the potential benefits of horticultural therapy across different cultural contexts and institutional settings could also yield valuable data on its adaptability and effectiveness in various environments, further demonstrating how these interventions can be tailored to meet diverse needs and promote broader participation.

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