THERAPEUTIC SENSORY STIMULATION GARDEN FOR A RESIDENTIAL CARE FACILITY, NOZOMI-NO-SATO, JAPAN

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ABSTRACT

This article shares experiences in a Therapeutic Sensory Stimulation Garden (TSSG), which the authors set up in Nozomi-no-Sato, a nursing home in Hiroshima, Japan. The set-up took a month to complete in the Spring of 2019. This project involved a multidisciplinary team consisting of rehabilitation physicians, agriculturists, landscape architects, therapists, nurses, care workers, and volunteers. The project planning involved detailed 1) site observations, 2) meetings, and 3) presentations to promote a design-based practice. The authors also incorporated Universal Design work areas to support outdoor rehabilitation therapy and improve users' experience. The outcomes of a completed TSSG are an increase in the number of residents using the TSSG, an increase in varieties of produce from each section of the garden, and an increase in rehabilitation activities. Also, there is a show of interest in expanding the function of the TSSG that can benefit the local community. There were experienced limitations while setting up the TSSG. Recruitment of volunteers was a challenge as the TSSG was a new project in the vicinity of the residential home. Communication was difficult as the researchers could speak English, but most team members could not. In addition, there are cultural differences between local and foreign researchers. The TSSG was a new concept to the team other than the researchers, and the researchers had to familiarise themselves with seasonal conditions in gardening.

Keywords: Universal Design, Outdoor Rehabilitation Therapy, Healing, Aging, Disabilities

1.0 INTRODUCTION

Gardens have long fascinated humankind as it brings us closer to nature; the sixth-century B.C. hanging gardens of Babylon, one of the world's seven ancient wonders, remains an interest for avid garden lovers and researchers (Klein, 2018). Gardens in health sanctuaries became a standard and gradually evolved into healing gardens in hospitals and sensory gardens for specific groups of people with disabilities, and therapeutic ones for older persons (Hartig & Marcus, 2006; Hussein et al., 2016a; Hussein et al., 2016b; Marcus & Sachs, 2014). The positive impact of a sensory garden on the psychological well-being, emotion, agitated behaviour, and quality of life of older persons, including those with dementia, is promising (Collins et al., 2020; Barnacle & Midden, 2003). Such gardens are now standardised architecturally based on the evidence, modernising it into a systematic research subject (Bengtsson & Grahn, 2014; Sanford, 2012; Winterbottom & Wagenfeld, 2015; Hussein et al., 2016c).

The nature principle about gardens prevails; books published by renowned traditional Japanese gardeners and regular garden-related programmes on home-viewed television testify to it (Ishimoto, 1962; Young et al., 2019). However, the role of gardens in health sanctuaries remains scarce despite the acceleration of nursing home numbers that make way for the rapid increase in the geriatric population. Since 2000, residential care for older people in Japan has been mainly funded by Long Term Care Insurance (LTCI), which is highly commendable and an envy of many internationally (Young et al., 2019). And a garden for residents to enjoy while in a nursing home remains novel and

disproportionately few. Our literature review failed to find any article that describes the process of initiating and setting up a sensory stimulation garden at a nursing home for the older population. This descriptive study attempts to address this gap in information.

In 2019, the authors set up a sensory garden (approximately 800 sq metres) in a nursing home in Hiroshima to add value to the residents' stay, funded by LTCI. There were 49 residents, and their average age was 89.1 years old. The objective was to use it for a sensory-stimulating experience and therapeutic value for residents; a therapeutic sensory stimulation garden (TSSG) is accessible, attractive, engaging, friendly, and safe. The objectives of the project were to achieve the aim: to understand how the residents, care workers, therapists, doctors, volunteers, and others engage with the garden features in the TSSG and to uncover the benefits of having a TSSG in a residential care facility. The integration of universal design principles (Erickson, 2021; Marcus & Sachs, 2014; Sanford, 2012) was aligned with the objectives set up by the therapists for the residents who use the TSSG. According to Saywell et al. (2017), universal design garden features involving physical activities have improved patients' health.

TSSG is based on the concept of eight sensory stimulation senses that can enhance garden users' functional capacity. These eight are the five conventional senses of sight, smell, hearing, taste, touch, and three supra-senses of space, emotion, and spirituality. The stimulation of these senses can improve many functions in the older population, including memory, emotion, spirituality, activities of daily living, social interaction, recreational activities, and participation, making life more promising and exciting (Figure 1).

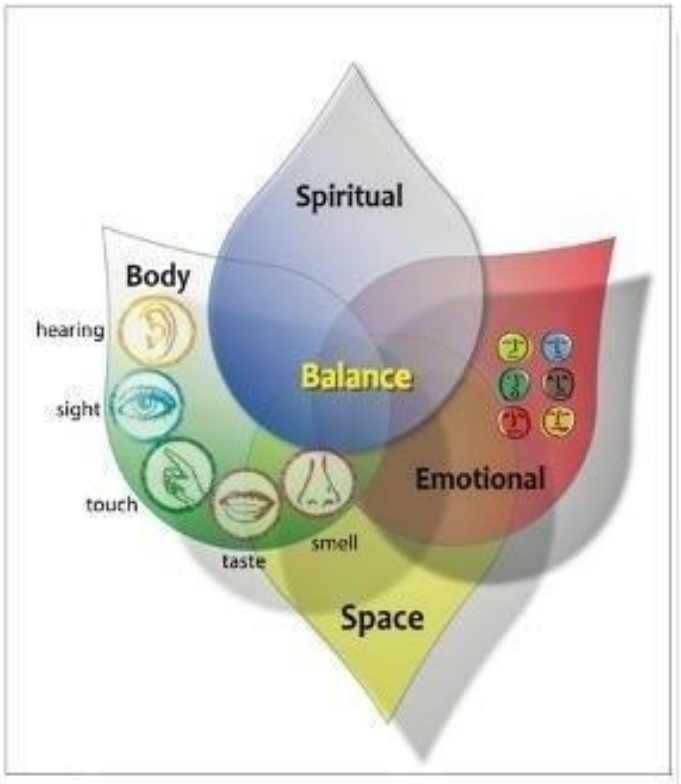

Fig. 1: Eight senses stimulation.
(Source: Zaliha & Hussein, 2017)

2.0 BACKGROUND OF THE TEAM MEMBERS

The TSSG is located on the rooftop garden of Nozomi-no-Sato, which was sparingly used for resident activities. Four team members collaborated on the project

i) A rehabilitation physician leads the research and development team. Other members are an agriculturalist, a retired researcher from the Malaysian Agriculture Research and Development Institute (MARDI), a landscape researcher from University Malaya whose expertise is sensory stimulation garden, and the Chief Executive Officer (CEO) of Heartful Medical Corporation (HMS) that manages the nursing home, Nozomi-no-Sato.
ii) The care team from Nozomi-no-Sato is led by its chief manager, a nurse, an administrative staff member who also serves as an interpreter (English Japanese language), and a general worker who is a keen gardener.
iii) The rehabilitation team from Amano Hospital was led by the rehabilitation service chief, a physiotherapist, an occupational therapist, and a resident doctor.
iv) The volunteers from HMS and the community were coordinated by the care team chief manager above (ii).

The project chairman was the CEO of HMS, and an administrator assisted her. The project leader was the rehabilitation physician, and the care team administrator served as her assistant as she spoke English.

3.0 PROJECT PLANNING

Before implementing the action plan, three planning meetings were conducted, chaired by the CEO of HMS, and led by the rehabilitation physician. These planning meetings discussed the following:

i) The fundamental concept of TSSG, i.e., the 8-senses stimulation and discussion on how it can be implemented (Figure 1).
ii) Team membership and roles (Figure 2).
iii) The research team prepared the landscape design drawings based on the drawing plan of the rooftop. The team prepared the drawings in phases: Planting, Structure, and Water. First, the planting phase was carried out. The garden was divided into eight sections of the long strip garden: Zen, floral, herbal, vegetable, lavender, fruit (grapes, berries, and citrus), and an interactive station. The structure and water phases are not implemented yet (Figure 3).
iv) Considerations on the choice of plants to be grown depending on the four-season adaptability of the crops. Types of crops needing trellises, creepers, and upright supports had to be placed according to available space. Crops with lateral roots were the best choice due to the 25 cm soil depth; hence arches as a feature would give shade during the hot summer months. However, it is hazardous due to typhoons being predominant in this area.
v) Universal design work areas will be incorporated into the three-square flower beds that were already present (Figure 4 and 5).
vi) Pre-existing features that will be conserved include the three mature trees, two Saru trees and Styrax Japonicus (Japanese Snowbell), a rose bush, and two organic composting areas.
vii) The care and rehabilitation team selected residents to participate in the garden activities.
viii) Plan for the validation of clinical assessment of residents by the rehabilitation team.

ix) Discussion Iton how best to implement the plan of action. The research team agreed that the TSSG groundwork would be done over five days in the morning, considering the end of spring.

x) The care team general worker, a garden enthusiast, was responsible for getting the equipment for volunteers to use.

Inter-sectoral collaboration was established through the chairman's contact with a volunteer, who roped in partners from the Japan Agricultural Department whose expertise is vegetable farming.

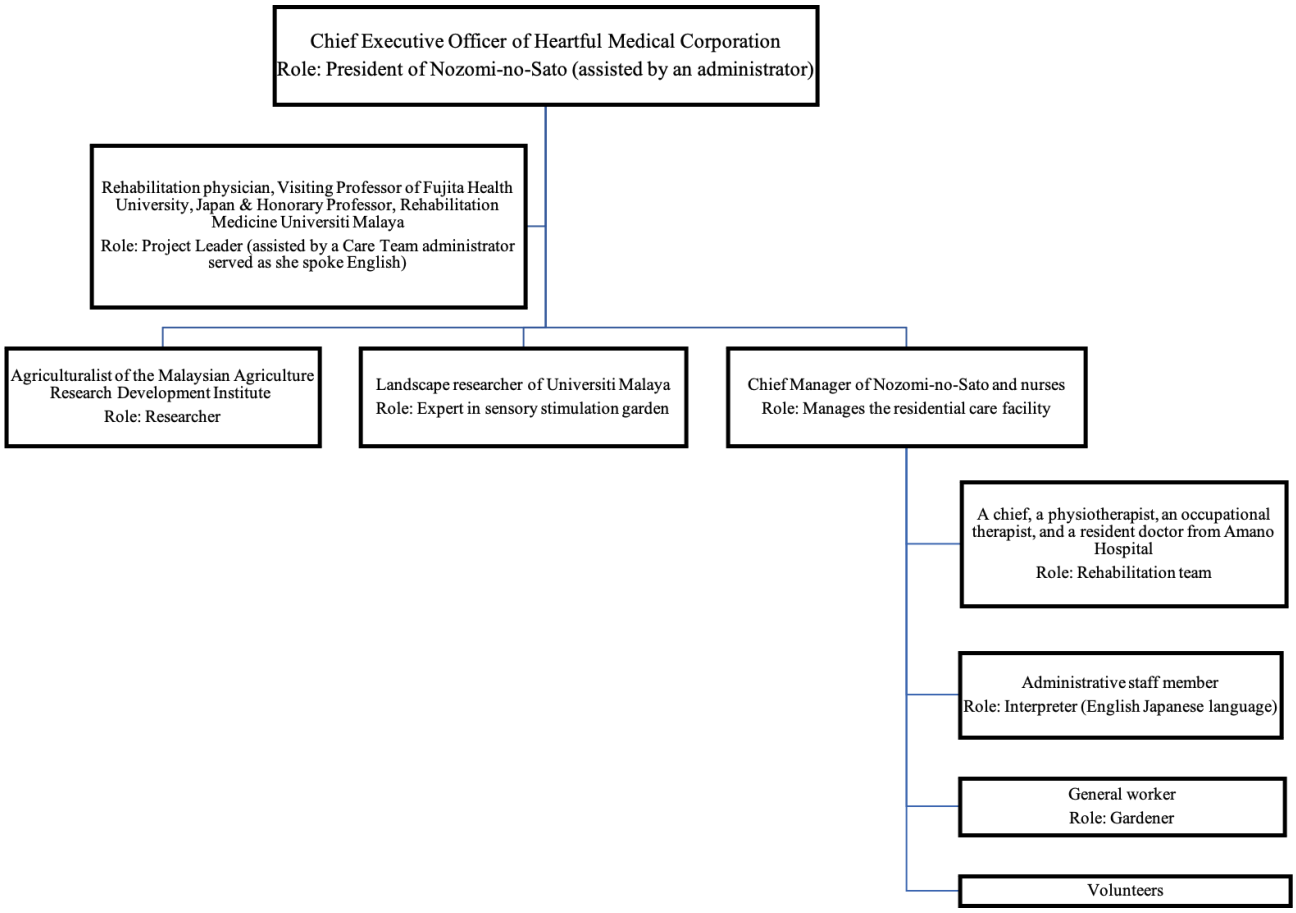

Fig. 2: Flow Chart showing the roles of team members

Team members' roles include contributions towards implications on the healing process as one of the outcomes of a completed TSSG; residents requested to go to the garden, and family members asked to go. Care workers also took residents who chose to be outdoors for rehabilitation activities such as gardening, walking, and wheeling exercises. In addition, an intergenerational activity had been initiated between toddlers of the organisation's creche and the residents. It will be made a regular activity in future. The local welfare council has suggested everyday activities in the TSSG for their Older Persons' Social Withdrawal program. Local schools are keen to organise voluntary activities for the residents and the community.

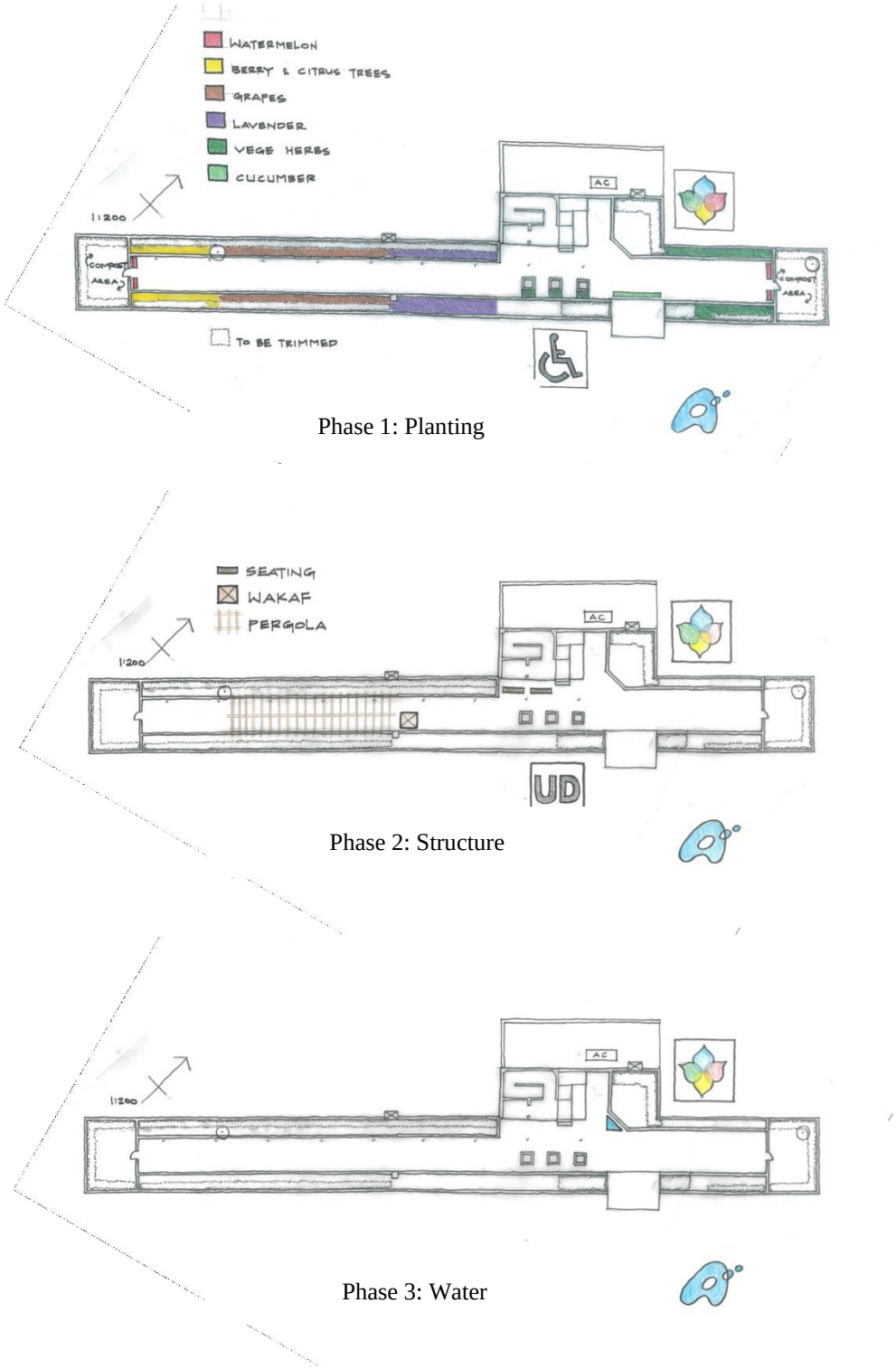

Fig. 3: Proposed landscape design drawings for the TSSG in phases.

Fig. 4: Before implementation, the authors measured the flower bed to transform it into an accessible, structured planter.

Fig. 5: After implementation, an accessible, structured planter caters to wheelchair users and other disabilities in the TSSG.

4.0 PROJECT PLANNING

4.1 Site Observations

The researchers conducted a detailed site observation and measurements of the existing hardscape features. The site observation aims to understand the potential use of space and how users utilise it for their activities. The main findings based on the site observations are categorised below:

i) View
The garden views the scenic Sato Inland Sea and Miyajima Island, a calming effect view to behold.

ii) Users
A case mix by age, an average of 89.2 years old, and young severely disabled persons were ageing with disabilities, many of whom are bedridden.

iii) Utilisation
The rooftop garden was not very well used, though it hosted some flowering plants and was managed by volunteers with consent from the manager, a nursing sister.

iv) Activities
Regular indoor activities were organised, including calligraphy, handcrafting, music, exercises, and other indoor ones closely related to formal events, festivities, and Japanese culture. However, outdoor activities were scarcely conducted.

v) Operation
Volunteerism was a regular practice here. It is possible to systematically reorganise everyday interactive activities into a stimulating environment that can further help enhance residents' quality of life and the creativity and innovativeness of the care team. A structured therapeutic gardening rehabilitation programme was proposed where care teams, family, volunteers, and research and development teams at the outset collaborated and interacted regularly.

4.2 Planning Meetings

Three planning meetings were conducted before the implementation of the TSSG.

13 May 2019: The first one was held at the Nozomi-no-Sato residential home, attended by the Chief Executive Officer (CEO) of the Heartful Medical Corporation (HMS), the Care Team of Nozomi-no-Sato, the Rehabilitation Team of Amano Hospital, the project leader, an agriculturalist, and an expert on sensory stimulation garden. This meeting introduces the concept of TSSG, showcases examples of successful TSSG design and use, and promotes a sustainable lifestyle in the garden.

16 May 2019: The second planning meeting was held at the Amano Hospital, attended by the same attendees from the previous session with an addition of the Nozomi-no-Sato gardening team. The expert in sensory stimulation garden presented the proposed implementation plan, which consists of three phases (Figure 3): 1) Soft Landscape creation, including clearing and sprucing, 2) Hard landscape with infrastructure, and 3) Wholesome landscape, including a water feature.

29 May 2019: The third meeting was held at the Nozomi-no-Sato residential home, chaired by the CEO of HMS, and present were members of the Research Team, Care Team of Nozomi-no-Sato, and volunteers. Site meetings followed. Extensive discussions were held on the choice of vegetables and other plants for the garden and when to purchase them. The meeting unanimously agreed that the following were to be acquired - seedlings comprising vegetables, tomatoes, eggplants, cucumber,

watermelon, blueberries, citrus, lavender, rosemary, sage, thyme, basil, mint, lemongrass, and chillies. In addition, universal design work has been integrated into the garden features to support outdoor activities and improve the users' experience in the TSSG (Figure 6 and 7).

Fig. 6: The new bench with new armrests installed.

Fig. 7: Portable stool for sitting during gardening activities

4.3 Presentations

The project leader, a rehabilitation physician, delivered a presentation on the concepts of TSSG to the Chief Executive Officer of the Heartful Medical Corporation, the Care Team of Nozomi-no-Sato, and the Rehabilitation Team of Amano Hospital. Amongst the topic presented are the eight senses that need to be incorporated into the garden, occupational therapy able to conduct care outdoor activity programs, and the need to assess the patients using the garden.

An expert in sensory stimulation gardens presented on the design of TSSG's worldwide. Amongst the topics presented were special structures or aids required in a TSSG, flaws found in some TSSGs, and maintenance of the garden. The agriculturalist, a retiree at the Malaysia Agriculture Research Development Institute, presented the need for organic methods to be implanted in the garden. The topic presented was the need for organic in TSSG and enhancing soil fertility through composting.

5.0 THE PROJECT IMPLEMENTATION

The first four days of work on the TSSG went on very well. A typical day started with the TSSG working team planning meeting, where all team members gathered in the gymnasium to ensure all members knew the basic plan of the eight senses TSSG and ascertained goals for the week and the day. In addition, the three supra senses, namely, spiritual, emotional, and space, were highlighted to uplift the emotional and spiritual well-being of the residents. This meeting usually took about 15 - 20 minutes, after which all proceeded to the rooftop garden, and a site tasking assignment was made to reinforce the plan for the day. Volunteers were free to select which part of the work they liked. They vary by skills and numbers; hence each planning and site meeting helps ensure smooth work continuity.

DAYS 1 and 2 (20 and 21 May 2019):

It was predicted to rain on the first day. Lucky, it did not, and the weather was not so hot. The general worker care team member had laid out all the garden equipment, enough for ten people to work with for the day. The team leader's assistant kept records of volunteers and minutes of meetings and interviewed volunteers and staff so they could be documented.

Hedges in the eastern end were trimmed to enable the wheelchair users to get an uninterrupted view of Miyajima Island and the water – a perfect spatial sensory stimulation, which can lead to a calming effect, hence an emotional sense and appreciation of nature, the spiritual sense. The hedges away from the water were kept high but trimmed. It would serve as a soundproofing effect from the nearby road (Figure 8).

Fig. 8: Site clearing to achieve a beautiful view of the Sato Inland Sea and Miyajima Island from the rooftop garden: 'Therapeutic Sensory Stimulation Garden'.

DAYS 3 and 4 (22 and 23 May 2019):
The daily weather conditions continued to be good. By the fourth day, just as planned, weeds had been cleared, soil raked and cleared of unwanted roots and plants, and some plants uprooted and replanted. One part of the garden was already cleared for sunflowers; spaces in front of the sunflower row were weeded to accommodate lavender plants. Unfortunately, the sprinkler system was not functioning; hence the old water hoses were removed. A replacement was organised by the care team general worker, with the help of officers from the Agriculture Department of Hiroshima. The total number of volunteers who participated in the initiation of the TSSG was 50; they were from the local community, family members of residents, and staff from other sections of the organisation.

6.0 DISCUSSIONS

It is believed that applying the therapeutic garden's design (Sanford, 2012), and the features (Winterbottom & Wagenfeld, 2015) used in it will lead to achieving a user-friendly and accessible (Marcus & Sachs, 2014) outdoor garden. As a result, the patients' and therapists' outdoor rehabilitation activities may improve. Furthermore, offering a barrier-free environment will encourage more older people and people ageing with disabilities to socialise in the garden without discrimination (Talay et al., 2010). Therefore, a special care facility's garden must be thoroughly designed to suit a wider group of users (Hussein et al. 2016a, Hussein et al. 2016b, Hussein et al. 2016c). In this study, barrier-free facilities already in place included a lift to the garden exit and a gentle ramp of 1:20 from the building exit into the garden level.

The following were added during the implementation of the TSSG garden project:

i) Universal-designed planter box (Figure 5)
ii) Universal-designed bench with a new armrest installed (Figure 6)
iii) Universal design stool for use in the low-lying planter areas (Figure 7)
iv) The vegetable planter beds were horizontally aligned for easy reach
v) The vine supports were low enough for the grapes to be reached from wheelchair height
vi) Garden tools with long handles were light for ease of use by older persons.

The average age of residents at the nursing home studied was 89.2 years; they were baby boomers who lived with nature and gardens throughout their active life. The authors arbitrarily termed a garden that provides stimulation to the senses and therapy to its users a therapeutic sensory stimulation garden (TSSG). Adherence to landscape standards for gardens combined with gold standard outcome measures for activities may stimulate a wide range of applications for geriatric rehabilitation; that way, precision for impact can be made. Hence initiating a TSSG at a nursing home can grow into discussions on the inclusion of TSSG in many more such homes, and its benefits can be researched within a standardised system. Planning and coordination with the in-house staff, volunteers, and experts must be detailed so the program can be sustainable.

Stimulation to the senses: five conventional senses of smell, taste, hearing, seeing, and touch. In addition, the design and environment also stimulate the supra-senses of space, emotion, and spirit. These supra-senses are essential elements in geriatric rehabilitation. The spatial sense allows the older person to retreat into their own space, often reflecting on events in similar spaces in the past. At the rooftop TSSG at Nozomi-no-Sato, this is further enhanced by the serene view of the sky and scenic view of the inland sea and the island visible from most parts of the garden. Many residents

spontaneously speak about their younger days on the island, bringing smiles to their faces. These lead to expressing emotions and appreciating nature and spiritual sense.

Therapy included enhancing gait and daily living skills and fundamental physical, occupational and psycho-socio therapy. Maintaining the range of motion of all movable joints, stretching, breathing, and mindfulness with the standard means that are usually done in the confines of their bedrooms and typical indoor gymnasium can be much more effective and often bring boundless joy when done in the garden. The fresh air alone and even the mild variations in weather often instantly stimulate or enhance all the eight senses mentioned above.

7.0 FUTURE PLANS

In terms of research and development activities amongst staff from other sections of the organisation, a pilot study on the use of the face-reader to study the immediate effect of the TSSG on facial expression has been initiated. An in-house community-based rehabilitation training for the multidisciplinary staff of the organisation has selected an ongoing improvement project at the TSSSG. Two manuals (administrative and cultivation) have been prepared and can be used to implement work processes at the TSSG to ensure the project's sustenance. Discussions have been held with Fujita Health University for collaborative real-world research to promote evidence-based practice at the TSSG. Heartful Medical Corporation is preparing to organise the National Care and Community-based Rehabilitation Conference in October 2023. Work done in the TSSG shall be a component of the conference.

Design-based practice is the order of the day when it comes to all things in life to promote the sustainability of healthcare and fitness amongst the older population and those ageing with disabilities. It is hoped that research activities can be conducted at the TSSG to get analytical data on the advantages or limitations that TSSG can offer to the geriatric population and people living and ageing with disabilities. Establishing TSSG at the residential care facility has seen a whole local community network together to carry out a community-inclusive development project harmoniously. It is the essence of community-based rehabilitation. It is hoped that the community continues to support this good work that will ultimately benefit society, as studied at the University Malaya Medical Centre in the past (Figure 9).

Fig. 9: Different heights of planter boxes that cater to different users as an example of successful use of and design of TSSG.
(Source: Zaliha & Hussein, 2017)

8.0 CONCLUSION

This five-year project will determine the usefulness of the eight-component-sensory-stimulation as an activity tool to promote residents' quality of life at a nursing home. It can show the dedication and commitment of staff towards its residents. It has the potential to serve as an enhancer for an innovative model of care for older persons and people ageing with disabilities, the numbers of which are rapidly escalating. TSSG as an intervention tool for holistic health and psychosocial well-being of nursing home residents using biomarkers for cognitive, emotional, social, psychological, and physical function in promoting evidence-based practice remains to be seen.

Japan is trying hard to overcome problems consequent to ageing with disability, including comprehensive long-term-care insurance, smart homes, and robotics. TSSG can be regarded as an innovative approach to holistic care for the older population in a nursing home. The TSSG and community-based rehabilitation care model can be emulated in Hiroshima, Japan's 11th most populated city. It can be popularised in Japan and the world via interactive discussions at conferences. This study shows a possibility of using TSSG as a value-added feature and activity to expand the credentialling of the associated Rehabilitation Hospital by the Commission on Accreditation of Rehabilitation Facilities (CARF). In addition, it is by honouring the philosophy behind Long-Term-Care-Insurance (LTCI) and Heartful Medical Corporation's mission of being community oriented in its service provision.

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