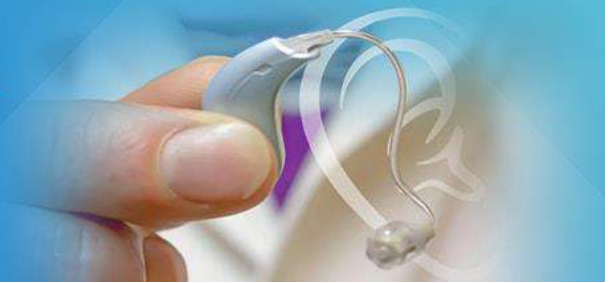


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Developing a sensory area for visually impaired person to impart horticultural therapy

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Abstract

The practicality and acceptance of the sensory area in the horticultural therapy garden were evaluated using a questionnaire. Those who are blind were exposed to and given the opportunity to engage with sensory area elements. Ten students were chosen at random, and we watched them interact in the garden. The children's reaction to the sensory area in the garden was observed using the inter-observer agreement method. By the use of the questionnaire and the interview schedule, recommendations and feedback were gathered. In order to determine the impact and applicability of the sensory area in the Horticultural Therapy garden, the input was compiled and examined. Interviews with students were set up to get their viewpoints. The questionnaire that was distributed nearby contained data about the student's demographic profile and serious issue related to the senses. On January 13, observations were taken of the goings-on there. Data was acquired starting with an interview with pupils from the visually impaired school. This was done in order to find out more about their objectives and the challenges they faced. The benefits of using sensory areas as part of investigating the surroundings while still using other senses were then investigated through interviews with the vision impaired individuals. Individual interviews are the most efficient way for qualitative research. Yet, there are several validity issues that come up when interviewing people who are visually impaired. Data collection from people with visual impairment may require more engagement than can be achieved with surveys and other quantitative methods. In case studies, a variety of methods have been used to carry out qualitative research with children who have vision impairment. This study's analysis was centered on making observations and getting feedback. The interview content serves as secondary data for the study. The interviews are a very efficient method for verifying the facts and adding a more individualized touch here.

Keywords: Sensory area, horticultural therapy, challenges, children

Introduction

For many years, people with impairments like depression, schizophrenia, and visual impairment have embraced gardening as a kind of therapy. People with visual impairment may benefit from interactions with plants in a variety of ways, including goal-oriented horticulture activities like active gardening and passive nature appreciation. First, horticulture may have positive effects on the emotions, such as lowering stress levels, regulating mood, and enhancing senses and enjoyment. Second, it might aid in regaining focus, spirituality, and satisfaction. Third, it might improve quality of life and self-esteem.

Review of literature

Horticultural therapy

Horticultural therapy (HT) has been defined as the use of plants and plant-based activity for the purpose of human healing and rehabilitation (Larson, 2022) [42]. "The "roots" of HT were established in the early 19th century by Dr. Benjamin Rush, a physician considered to be the first psychiatrist and signer of the Declaration of Independence (Relf, 1995) [36]. Scientists and doctors have recognized the beneficial influence of the people-plant connection and have started to bring the engagement with plants to the level of occupational therapy (DeSesto, 2017) [1].

Watson and Burlingame (1960) [43] attracted attention to the importance and value of horticultural therapy (HT) and defined it as an improvement of physical and mental health that may aid recovery and provide vocational rehabilitation for a client. After 20 years, Relf (1981) [37] presented a model demonstrating the therapeutic benefits of HT and clarified HT definition as a practice of using horticultural activities for human healing and rehabilitation.

She also explained the value of this therapy to the researchers and doctors, and these explanations are still valid. Relf (1981, 1992) ^[23] claimed that the goals of HT programs may differ but their basic assumption is that working and spending time with plants causes improvement in quality of life, illustrated by positive psychological and physical changes. Her approach coincides with the theory of biophilia presented by Wilson (1984) ^[34], which says that man has an innate need and desire to be in contact with nature, and it evokes positive reactions. The terminology may vary and new aspects in this field may appear but the benefits of the people–plant connection are indisputable, and this is why the use of plants in therapy is gaining popularity (Haller and Kramer, 2006) ^[4].

Materials and Methods

The present study aimed to develop a sensory area in the horticultural therapy garden for visually impaired people to impart Horticultural Therapy. A general description of the study is presented in this chapter under the following heads.

Location of the study

Selection of sample

Conduct of study

Feasibility study

Location of the study

The study was conducted in the HT garden at College of Agriculture, Vellayani, Thiruvananthapuram.

Selection of sample

Ten visually impaired students aged between 10 to 20 years were randomly selected from the Government school for visually impaired, Thiruvananthapuram.

Conduct of study

Preliminary study

A preliminary study was conducted before developing the sensory area and feasibility study. In the preliminary study the investigator explored about sensory gardens, the community of persons who are visually impaired, the effects of horticultural therapy on these individuals, the fundamentals of sensory gardens, the components of sensory gardens, and other related topics. Hussein (2012) ^[11], Hussein (2016) ^[38] and Abidin (2016) ^[39] conducted studies on the sensory garden as a tool to improve the educational development and social interaction of children with special needs and these studies were referred to develop a sensory area.

Designing a sensory area focused on smell, sound, touch and taste in ht garden

Setting up of garden

'No dig concept' was used in garden settings. Plants were planted in single pots and arranged on specific stands. Plants are chosen based on the senses. Location of sensory area were chosen in accordance with the appropriate sunlight, a resting space were there called hut and wheelchair accessibility, and then consulted olericulture professor for plant selection. She made a few suggestions regarding the sensory area. A subtle nursery called Kuzhipallam Botanical Garden provided some of the plants, while others were planted and cared by the investigator at her' homes. These plants were transported to the sensory garden area once it is attained a medium growth along with the bamboo wind

chimes.

Selection of plants

Plants are selected according to the five senses (touch, taste, smell, sound, vision). Aromatic, medicinal, textured plants are used in the sensory area. The sensory area for visually impaired people was set up in the HT garden at College of Agriculture, Vellayani. The plants used in the sensory garden were categorized into five types means which evoke sound, smell, taste, touch and vision.

For the easy accessibility of visually impaired people, plants were arranged on two metal stands. Moreover, The garden was set up with vertical garden, small raised beds, and hanging bottles. Additional elements like Braille name boards were also included in the garden.

Smell

Freshly cut grass, earthy aromas, and beautiful floral fragrances are some of the great garden scents to stimulate a sense of smell. A variety of aromatic plants, such as mint, sage, and jasmine strong-scented roses, herbs with enticing scents were planted in the garden.

Sound

The sensory garden needs components that provide opposing noises. Different sounds can be heard in the HT garden such as the leaves of trees, bamboo stalks, grasses, and plant foliage which rustles in the wind. Some additional component like wind chimes made of bamboo, steel and aluminum were installed in the sensory area of the garden. Green bottles filled with water and plants were hanged in different heights in the sensory area which produce different frequency of sound.

Touch

In order to create a sensory experience for touch, a variety of surfaces were utilized. Textures included contrasting aspects that are solid, liquid, smooth, rough, or harsh, soft were used in sensory area. The smooth surface of succulents, the feathery and plumed ornamental grasses, and the soft fuzzy leaves of ZZ plant, begonia, green pothos and rough surfaced leaf like sansevieria, cemetery plant, aralia, turtle veinare all pleasant and calming to the touch. Various interesting textures were used in sensory area like, rough seed pods, tree bark, and spongy mosses. Other architectural elements like wall was also present in the garden to give the garden a dynamic textural feature.

Taste

Specific vegetable with different tastes were used to tantalize taste buds. Fresh herbs, veggies, and fruits. There were so many fruit and vegetable in the garden, from papaya, jackfruit and Banana was there. Herbs like basil, coriander, mint, were also planted. In order to provide a little flavour, plants like erynjium, sarvasugandhi were also planted.

Sight

In the garden, sight is one of the easiest methods to arouse the senses. To make a visual feast for the senses of partial visually impaired children, variety of plants with colour, shape, size, texture, and pattern were planted in the garden. Vibrant and striking flowers like marigold, calendula,

petunia and zinnia were planted. These vibrant wildflowers were also entice pollinating bees and butterflies, giving the garden movement and an additional aesthetic depth. Different species of trees, shrubs, and other plants were also used to produce a range of architectural styles, heights, shapes, colours, and patterns.

Feasibility study

A feasibility study was conducted among the visually impaired people to assess the acceptability and practicality of the sensory area in a HT garden for the visually impaired population. Visually impaired persons are able to use non-visual receptors, such as tactile, olfactory, and aural ones, which enable the development of accessible environment. To maintain the orientation of the fully visually impaired and partially visually impaired individuals in the sensory environment, it is important to consider not only the visual properties of the plants but also their potential impact on hearing, smell, touch, and other sensations. Feasibility study was carried out in the visually impaired individuals to assess the orientation in the sensory domain and in order to create a sensory area that is accessible to those with visual impairments.

Administration tool

Questionnaire was constructed in order to assess the practicality and acceptability of the sensory area in horticultural therapy garden. The visually impaired people were exposed and allowed to interact with components in the sensory area. The randomly selected ten students were observed while they interacted in the garden. Inter observer agreement method was used to observe the children's response towards the sensory area in the garden. The suggestions and feedback were collected through the interview schedule using the questionnaire. The feedback were consolidated and it was evaluated to find the effect and practicality of the sensory area in HT garden.

Descriptive and qualitative analysis

Since there were only 10 participants. Descriptive analysis were carried out.

Results and Discussion

As a result of the study a sensory area were put up at the HT garden at the College of Agriculture, Vellayani, the sensory area, the design was made to support visually impaired people's potential use of non-visual sensors (such as auditory, olfactory, tactile) and to impart HT.

Visually impaired individuals with disabilities are two different categories. Visually impaired people may navigate in space using tactile sensations in addition to colour and light contrasts, which is especially essential for blind people. That is to say, translating visual images into images in a form that is accessible for tactile and/or sound perception is a key component of the organization of landscape items for people with visual impairments. The accommodations and spatial orientation of the blind were different from those of other people; therefore, compensating components like Braille, elevated beds, some useful natural landmarks, and other decorative plants were employed in the sensory area. Based on the research, ten visually impaired students from a government school for visually impaired interacted in a sensory environment that the researcher had created. The students ranged in age from

10 to seventeen. Three girls and seven boys were watched during the investigation. The students were highly intelligent and engaged. They had never been in the sensory section before. First, the researcher provided a brief overview of sensory gardens. According to the researcher, 'a sensory area is a tiny location for activating one's remaining senses that contains various types of plants and other garden-related aspects'. Following the introduction, the students engaged in smell, touch, taste, and hearing interactions with plants that are set up in separate stands along the sidewalk. Based on the general guidelines for employing plant material, the landscape design of the sensory area utilized plants by taking into account their biological and environmental properties, their decorative merits, and the climatic conditions of the sites for plant placement. Also considered were the characteristics of plants, such as their scent, the colour of their foliage, the colour of their blooms, and the texture of their branches, trunks, and leaves, all of which were important in creating a comfortable environment for those with visual impairments. There are restrictions on how planting kinds could be used. Even though the plant mixtures used could be varied, it is vital to put ornamental plants together into uniform groups, divide the compositions based on their decorative qualities, avoid mixing their aromas. Trees and shrubs serve as the foundation of any landscape planting. The primary selection criteria of the species were the texture of the trunk and branches, a pleasant smell, as well as the shape of the crown and the colour of the leaves, which helped create an accessible environment for those who are blind and visually impaired. When establishing a friendly environment for blind and visually impaired individuals with disabilities, a variety of views for creating green plantings, wonderfully flowering, with a distinctive colour of leaf, with flowers having a nice smell, were utilized. The garden contained a variety of herbs, shrubs, medicinal plants, and hardscape components. Sansevieria, begonia, ZZ-Plant, pothos, and coleus were among the plants used to stimulate touch. Plants like thulasi, jasmine, warm wood, and njavara were utilized for smell stimulation. Plants including pudina, mally, sarvasugandhi, and centella were used to stimulate taste. Wind chimes consisting of bamboo, steel, aluminium, and water-filled glass bottles were hung at various heights to create auditory stimulation.

Interview result

Students' opinions were gathered through scheduled interviews. The information on the student's demographic profile was contained in the questionnaire that was asked nearby. Major question concerned the senses. On January 13th, observations of on-site activity were made. Starting with an interview with students from the school for visually impaired, data was gathered. This was done in order to learn more about their goals, and the difficulties they encountered. Interviews with the vision impaired people were then done to examine the advantages of using sensory areas as part of exploring the environment while still employing other senses. The most effective method for qualitative research is the individual interview. However, conducting interviews with individuals who have visual impairment presents a number of validity challenges. Surveys and other quantitative techniques are not always successful in gathering data from individuals with visual impairment, with whom greater engagement may be

required. Numerous techniques have been employed in case studies to conduct qualitative research with kids who have visual impairment. The focus of the analysis in this study was on observation and gathering feedback. The study's secondary data is the interview material. The interviews are a highly effective technique of confirming the facts and giving it a more personal touch.

Case: 1

The first case is a 11-year-old child enrolled in the sixth grade at a government- school for the visual impaired. He has partial visual impairment. He was really cordial and helpful. He was in the garden for 30 minutes. He almost fully explored every aspect of the garden in the sensory area. He was in smell-stimulating plants for over ten minutes. He inhaled the scents of every plant in the vicinity. He was quite excited about the sensory garden. He was interviewed by the researcher utilizing an interview schedule after he had examined the garden. According to the questionnaire, he really enjoyed the sensory area. The sensory stimulation plants were the main element he preferred. He was given extra sensory stimulation through njavara and mulla. According to the boy, he claimed that he was quite enthusiastic about the garden since it introduced him to a fresh idea about gardening. According to the interview schedule, he stated that he would be interested in spending more time in the sensory area since he like the garden element used there, particularly the smell-stimulating njavara, mulla, and mint plants. Mulla is a highly likely smell and is extremely common for him, but he claims that Njavara enjoyed it a lot because it was unfamiliar to him. He had never experienced the plant's aroma before. The boy noted that the aroma was similar to some herbal oil and remarked on how delicate and tender the leaves were. According to (Jo *et al.*, 2022) ^[44] research's on the physiological and psychological impacts of flower aroma on people demonstrated that the advantages of plant interaction can also be obtained through other senses, such smell, in addition to sight. This olfactory sense suggests that the plants can be utilized therapeutically for the best impact on physical, mental, and psychological health. He also enjoyed sound-stimulating elements, notably wind chimes, in the sensory area. The garden contained three different types of wind chimes. The first one is built of steel, the second one of aluminum, and the third one is composed of glass water bottles suspended at various heights. The wind chime made of metal was his favorite since it produced pleasing sounds at various frequencies. He enjoyed scent stimulation the best in the sensory garden he explored. He was able to identify additional plants utilized in the sensory garden, including begonia, turtle vein and thulasi. The statement of the boy were more liked to the study of (Mehdi *et al.*, 2017) ^[41] the study was carried out in 2017 at the elementary school in Stasin (Province of Lublin). The study's goal was to discover how sensory gardens affect young children. According to research, gardens have a therapeutic influence on kids, which leads to advantages including the growth of their imagination and creativity, greater worldly curiosity and motivation to study, enhanced memory, more confidence, lessened stress, and better interactions with other kid.

Case: 2

A ten-year-old boy enrolled in fourth grade makes up the

second sample. He was a little boy who had some sight impairment. Highly spirited and lively. In the sensory area, he touched, smelled, tasted, and felt several plants. The phrase "sensory garden" appealed to him. The tinkling of wind chimes. He felt the various sounds that the wind chimes made by touching each one and doing so. The boy prefers the bamboo wind chime the most. He also appreciated the hard wood and other elements, such as njavara, mulla plants. Because of their powerful scent, he preferred hardwood plants the most. He caressed plants like begonias, ZZ- plants, green pothos, and coleus as he wandered the garden. He recognized the coleus as a flower when he touched it since it felt like flowers. The Sanseveria plant felt like huge leaves when he touched it. The texture is quite harsh and unyielding. He recognized the jasmine as marigold when he touched it. Warm wood and thulasi were his favorites among the sensory garden's flora. Due to its distinctive and pleasant scent. He also named other plants, including mint and money plant. Wind chimes were the element of the sensory garden that he liked the most. This is composed of aluminum. He claimed that the sound was reminiscent of a coin colliding. It gave him such joy. According to the study of (Beyer *et al.*, 2014) ^[40] encircled the wide range of urban and rural areas and they concluded that the higher levels of local green space were linked to considerably lower levels of depression, anxiety, and stress symptoms. Their findings show that "greening" is a technique for improving population mental health in the United States. The boy experienced no problems in the sensory area. He felt completely at ease when he was in the garden. He had some ideas for improving the garden and would have liked to include additional elements like a swing and slide. He desired to spend more time in the garden.

Case: 3

The sample was a 13-year-old kid who was enrolled in ninth grade. He had some visual impairment. He relished his time in the sensory area. He investigated every type of plant in the sensory area. In the sensory garden, sound and smell stimulation were the most popular sensory inputs. A study of (Kopeva *et al.*, 2020) ^[15] is more likely to this study. According to the study, a research experiment in the town of Artyom, Primorsky Krai, on the effect of landscaping on the visually impaired children. From this research trial he concluded that spending time in natural settings and caring for plants has been shown the positive effects in blind and visually impaired children thus resulted in developing different abilities such as controlling emotions, and maintaining self-confidence. The suggested project might have a favorable therapeutic healing impact on school pupils being in nature, allowing mobility-impaired children to experience the same senses as other normal children during their walks. He like the sound of bamboo and metal wind chimes. He claimed that the wind chimes' rhythmic sound is quite soothing to the ears. He couldn't identify the scent of the thulasi plant when he first smelled it, yet it has a well-known scent. Warm wood and jasmine are his preferred sensory-area plants. Because of the fragrance. He also preferred sadavary and kattumally as plants. He experienced a ticklish sensation due to the sadavary's microscopic, prickly structure. Appreciated the begonia's stem's tiny hairs as well. He said that because the garden is so pleasurable and calming to the mind, he would like to go there frequently. He didn't provide any suggestions for enhancing

the garden.

Case: 4

One of the 16-year-old boys was the sample. He had complete visual impairment. He enjoyed the garden and its surroundings. He is a boy with a lot of positive energy and enthusiasm. He had a great time in the sensory garden. He is with his teacher, who has just introduced the garden to him. He made a touch on the tactile board. Every plant in the sensory region was touched by him. The metal wind chimes were the most popular garden accessory in the sensory area. He installed a variety of wind chimes in the sensory area. He stayed in the wind chimes longer because he was so excited. The teacher took the youngster through every aspect of the garden. The young boy patiently listened to it. He was quite helpful. He responded to all inquiries from the researcher. He also looked into the flavor and touch of plants. He inhaled deeply of the njavara plant and declared that it smelled like a herbal oil and was similar to a therapeutic plant. He could not identify the names of the plants but liked the way they smelled. He kept inquiring about the various plant species in the sensory area. Sansevieria was the more popular plant in the sensory area. Because to its lengthy leaf and distinctive feel. He had no prior knowledge of the plant. He liked the plant when he touched it and felt its structure and texture. The boy claimed that the long, stiff leaf gave him a touch of finger sensation. He did not experience any sensory issues. He definitely appreciated and enjoyed his time in the sensory section. He made no suggestions regarding the sensory garden. He enjoyed the sensory garden's entire experience. A study of (Wajchman *et al.*, 2021) carried out an experiment in Poland; in this study they examined 15 gardens and a sensory path. From this study they concluded that gardens have therapeutic function that is based on the effect of plants on both the physical and mental well-being and the treatment might be passive or strong. Forest zones, which provide recreational opportunities as well as impacting individual well-being.

Case: 5

The next sample was an 11-year-old girl who was enrolled in sixth grade. She is a young girl who were partially blind. She is really quiet and reserved. She has less interest in exploring the sensory area. She doesn't particularly enjoy the sensory area's flora. Wind chimes were the feature that she liked the most. She enjoyed each wind chime. She favored the aluminum wind chimes the most. For her, Euphorbia was the favorite plant in the sensory garden. Due to the structure's soft cushion appearance. She felt a tactile stimulation from it. She recognized the aromas of mint, thulasi, and njavara. Warm wood was the sensory area's favorite scented plant. Due of its overpowering fragrance. In Wysocki's study the majority of visually impaired respondents indicated the smell of greenery as their favorite scent, ahead of the smell of food or perfume (Wysocki, 2010). She did not have any unease while in the garden. She did not offer any suggestions for how to improve the sensory garden. She acknowledged that sensory areas were a novel concept for her at the time of the interview. She relished her time in the sensory area.

Conclusion and Summary

The study allows us to conclude that when designing an

accessible sensory area is particular, when choosing greening elements and compositional methods for combining them, it is necessary to take into account not only the visual qualities of the plants but also their possible impact on hearing, smell, tactile and other sensations to ensure the orientation of the blind and visually impaired people in sensory area. The assessment revealed that the visually impaired people in sensory space are a fantastic opportunity for to experiment with their senses and discover their surroundings. The essential point of designing a sensory garden is to offer sensory Experiences to the user. Accessibility and safety are also the two principles that play a significant part in sensory garden design. Creating opportunities for sensory experience is more important than the design being an aesthetic entity. Garden with an assortment of sensory components is especially successful in visual impairment community. According to the sensory garden, wind chimes and smell-stimulating plants are the most popular garden elements. The wind chime made of aluminum was preferred by 8 of the kids. The bamboo wind chimes were loved by 2 more cases. In seven of the cases, the smell-stimulating plants jasmine and njavara are preferred. Sansevieria and the ZZ-plant are the most favored touch-stimulating plants. The visually challenged were drawn to wind chimes in large numbers to stimulate their hearing. The smaller wind chimes with bells provide a more alluring sound than the larger ones. Bamboo wind chimes were also popular, although wind chimes made of bottles were not as well received. Steel wind chimes are not particularly popular. Following the completion of the case study, the researcher discovered that the sensory area has to undergo some alterations for improved accessibility. To allow access to the plants for those who are visually challenged, the gap between the pots must be extended. The enclosed garden setup can be used with various colors to stimulate the eye. Several varieties of plants should be used to promote touch. The sensory region was loved in almost all cases. They preferred to linger in the sensory region longer. They exhibit interest in returning to the garden again.

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