

Comparison of Plant Application and Design of Chinese and Western Healing Gardens

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Received Date: **31.01.2024**; Accepted Date: **15.02.2024**; Available Online: **08.03.2024**

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ABSTRACT

Using plants in therapeutic gardens has become an essential element in healthcare environments. In the future, as research and practice delve more profoundly, the application of plants in therapeutic gardens will continue to evolve. Scientific foundational research will explore the deeper connections between plants and human health, providing a more significant basis for plant selection and combinations. Cross-cultural collaboration will enrich the diversity of plants, benefiting users from various regions. Involvement will drive the collaborative design of plant landscapes to better meet user needs and create more personalised therapeutic gardens. Objective: As therapeutic gardens are outdoor garden spaces primarily catering to users' psychological health and therapeutic needs, this study compares the application and design of plants in therapeutic gardens in both Western and Eastern countries. We aim to review the literature on this topic, categorise and compare plant design elements in therapeutic gardens from both regions and provide plant design guidelines for medicinal gardens. Methods: A comprehensive review of literature and case studies related to this topic. Conclusion: From a comparative perspective between Western and Eastern approaches, it is concluded that plant design in therapeutic gardens should incorporate both strengths to enhance the therapeutic environment in these gardens. Our design guidelines provide essential components for landscape designers to effectively integrate plant design when creating therapeutic gardens.

Keywords: *Therapeutic Gardens, Plant Utilisation, Cross-Cultural Collaboration, Design Guidelines, Comparative Analysis*

INTRODUCTION

A healing garden, also known as a therapeutic or beneficial garden, is a type of landscape design that emerged in the 1950s and 1960s in the United States and European countries (Bates, 2018). Healing gardens encompass four key aspects: they are oriented towards vulnerable populations, have the purpose of promoting recovery, primarily utilise plants as essential elements, and employ interaction as a medium (Mariana & Wijaya, 2020). Plants represent versatile elements in landscape design, capable of creating diverse garden spaces and composing various landscape effects. This paper primarily focuses on how plants are applied and designed in healing gardens by comparing the practices in Western and Eastern contexts. It begins by discussing the role of plants in healing gardens, then proceeds to describe the application of plants in healing gardens in Western and Eastern contexts, and finally contrasts the similarities and differences in the design elements of healing gardens between these two regions. This comparative analysis identifies issues and strategies suitable for the international design and application of plants in healing gardens.

LITERATURE REVIEW

Role of Plant Landscapes in Healing Gardens

Plants play multiple roles in landscaping in healing gardens, positively impacting mental and physical health.

Psychological Relaxation and Stress Reduction

The plant landscapes in natural environments can promote psychological relaxation and alleviate stress and anxiety. The colours, shapes, and textures of flowers, plants, and trees can evoke positive emotional experiences, aiding individuals in mitigating their feelings of tension.

Facilitating Recovery and Rehabilitation

The selection of plants in healing gardens should consider rehabilitation needs beyond their aesthetic appeal. Plants, through photosynthesis, absorb carbon dioxide from the air and produce oxygen. They can also absorb harmful gases from industrial pollution and vehicle emissions, maintaining fresh air for a comfortable atmosphere. Furthermore, photosynthesis in plants generates a photoelectric effect, producing negative air ions, which have therapeutic effects (McIntosh et al., 2022). Some plants release significant amounts of volatile substances during their growth, including aromatic flammable substances like eugenol. Phenolic substances can enhance the human immune system, and the resin produced by pine trees has effective air disinfection properties (Sekhon et al., 2017).

Providing Ecological Experiences

Interacting with natural plants in healing gardens enables users to experience the balance of ecosystems, fostering a deeper connection with nature. This ecological experience assists people in better engaging with their surroundings, promoting emotional and physical recovery. It creates a healing atmosphere that aids patients in alleviating the tension associated with clinical environments.

Plant Applications in Healing Gardens

It introduces the use of plants in healing gardens internationally and in China. It concludes with a comparison based on a classification of the different theoretical bases for using plants in healing gardens in China and the West.

International Research Overview

In recent years, the research on the psychological impact of the built environment on human health has highlighted the growing importance of medicinal plant design and its positive effects on users, as discussed by Silva et al. in 2018. This overview underscores the need for the tailored design of hospital rehabilitation gardens to address the specific requirements of different patient types. The study provides standard evidence-based design (EBD) recommendations for hospital rehabilitation gardens, including considerations for the diverse selection of plant species, such as the cautious choice of plants when catering to patients undergoing treatment, for instance, cancer patients who benefit from avoiding strongly scented plants.

Research findings, such as those in the study titled "The Importance of Healing Gardens in terms of Palliative Care Center", emphasise the importance of customising the design of hospital rehabilitation gardens based on the needs of various patient categories. It suggests that various plant species with different features can be employed in these gardens (Silva et al., 2018).

Additionally, data on healing garden elements will determine the types of plants to be used, as indicated in the work of Yosica Mariana and Yulianto Wijaya in 2020. These plants, with diverse characteristics, will be placed strategically in specific areas within the healing garden to support rehabilitation activities.

Furthermore, the investigation into the significance of plants and gardens in healthcare design, as conducted by Nurizzati M. Yusri and Khairul Asyraf Mohd Rodzi in 2020 (McIntosh et al., 2022), provides valuable insights. Their analysis highlights the characteristics of garden plants as reference points for enhancing spatial environmental quality considerations, especially in design and planning. The study proposes the incorporation of green vegetative landscapes within existing spaces, intensifying and supporting the therapeutic effects of the proposed areas.

One facility that exemplifies this approach is the Philippe Pinel Psychiatric Hospital in Pezinok, serving as a pilot case study for healing and therapeutic design (Hansen et al., 2017). Surveys were conducted among staff and patients, ultimately affirming the pivotal role of green vegetation as an essential tool in creating medical facilities.

Internationally, the application of plants in healing gardens primarily centres on enhancing users' psychological well-being and fostering positive impacts through the selection and characteristics of plant species. This approach aims to elevate the quality of the spatial environment (Gann et al., 2019).

Chinese Research Overview

In the 1990s, research on therapeutic landscape architecture in China made significant progress, drawing on international experiences. A concept emerged in which the integration of plants, traditional Chinese medicine, and native culture was proposed, explicitly defining the concept of rehabilitative

healthcare garden design. This brought forth fresh ideas and approaches for developing therapeutic landscape architecture.

Scientific research indicated that plants such as spruces, pines, peonies, and other species produce chemical substances with significant therapeutic effects (Belčáková et al., 2018). These substances can alter the negative air ionisation of the surrounding natural environment and reduce the concentration of negative electrons in the human body. Furthermore, the sensory stimulation provided by plants can promote the generation of brainwave activity, revitalising individuals in a short period.

Research demonstrated that plants can significantly affect the humidity of the surrounding environment, aiding in the recovery of children with pulmonary diseases and alleviating the emotional states of individuals with depression (Semenya & Maroyi, 2013). As a result, scholars conducted in-depth studies on various population groups, seeking to make further discoveries.

In the late 20th century, Shanghai began to explore therapeutic garden tourism landscapes and achieved substantial success in major cities such as Hong Kong, Beijing, and Shenyang (Yi et al., 2020). These endeavours have promoted both the theoretical and practical development of this field. For example, the Lujiazui Green Space Park in Shanghai incorporates the traditional Chinese Five Elements theory and organ theory, creating a unique natural landscape by combining different plants. The Mingzhou Hospital in Ningbo utilises trees from both northern and southern regions, such as red pines, deciduous trees, and mangroves, applying the principles of Tai Chi and using light- and shade-loving vegetation to create a landscape where nature and humanity coexist, allowing visitors to experience the allure of nature in tranquillity. Additionally, cities like Kunming have established specialised medicinal plant gardens.

These developments signify a dynamic shift in the study and application of therapeutic gardens in China, incorporating traditional concepts and modern research to create environments that promote health and well-being.

Classification of plants in healing gardens

At this stage, there are many kinds of classification for plants in the healing garden; for example, according to the human senses, the efficacy of plants, the decorative effect of plants, and the configuration of plants in China also join the theory of the five elements of Chinese medicine.

According to the different psychological and physiological feelings generated by the five senses of human health plants, they are divided into five types: visual, auditory, olfactory, tactile, and gustatory. Different healthcare plants permeate each other in the rehabilitation garden to form a diversified rehabilitation landscape. The following list represents the different types of sensory plants and their functions.

Table 1. Representation Of Different Types of Sensory Plants and Their Roles

No	Category	Representative Plants (e.g.)	Functions
1	Visual Plants	Flowers (e.g., roses, tulips, peonies)	Provide visual delight with beautiful blooms.
		Plants with colourful leaves (e.g., Japanese maple, golden pine)	Add a diversity of colourful elements to the landscape.

2	Auditory Plants	Wind chimes (e.g., wind chimes, bamboo)	Create gentle sounds, such as those of wind chimes in a breeze.
		Plants with rustling leaves (e.g., herbaceous plants, bamboo)	Produce soft sounds when swaying in the wind.
3	Olfactory Plants	Mint, rosemary, culinary herbs	Release fragrances, offering olfactory stimulation.
		Fragrant flowering plants (e.g., jasmine, roses, lavender)	Emit pleasant scents from their flowers.
4	Tactile Plants	Lamb's Ears (Stachys)	Feature soft leaves suitable for touching.
		Succulent plants (e.g., cacti, succulents)	Offer a variety of textures that induce tactile experiences.
5	Gustatory Plants	Fruit trees (e.g., apples, cherries, citrus)	Provide edible fruits, satisfying gustatory needs.
		Vegetable plants (e.g., tomatoes, carrots, peppers)	Offer fresh flavours to users.

Different plants can be selected based on the design objectives of healing gardens and users' needs to create a rich sensory experience, aiding users' health recovery, relaxation, and overall well-being. Plants can also be classified according to functional factors, such as medicinal vs. non-medicated.

Medicinal Plants encompass those with medicinal value and therapeutic efficacy, while Non-Medicinal Plants serve primarily ornamental and aesthetic purposes. Medicinal Plants are selected for their specific medicinal functions, which can be utilised for treating certain physical discomforts or promoting health. Regional Adaptation is another classification criterion, categorising plants based on their adaptability to local climate and soil conditions. This ensures that the plants within the garden can thrive and flourish in their environment.

In Chinese healing gardens, plant arrangements are often integrated with Traditional Chinese Medicine's Five Elements theory to create a harmonious environment that fosters individuals' physical and mental well-being (Zhu et al., 2021). Here are examples of how plant arrangements can be harmonised with the Five Elements theory:

Table 2: Examples of Plant Configurations Integrated with the Five Elements Theory

No	Five Elements Attributes	Color and Plant Examples	Representative Significance
1	Wood	Tall, lush green plants such as trees and shrubs.	Symbolises growth and vitality.

2	Fire	Plants with bright red, orange, or purple flowers like roses, geraniums, or violets.	Evokes passion and vitality.
3	Earth	Plants with yellow and brown colours like sunflowers or oncidium orchids.	Creates stability and balance.
4	Metal	White or golden-yellow flowers like lilies or tulips.	Offers a sense of freshness and purity.
5	Water	Plants with blue and black colours like blue irises or black bamboo.	Creates a fluid and calm atmosphere.

RESEARCH METHODOLOGY

Literature Review

The literature review involves collecting, synthesising, and analysing relevant existing research literature to extract meaningful information regarding the design and effects of plant landscapes in healing gardens, particularly within both Eastern and Western contexts. This approach aids in accessing research findings from a global perspective, exploring the use of plant landscapes from various angles, and understanding their impact on users of healing gardens. Information is gathered through database searches, literature cataloguing, and specialised journals concerning cases, experimental results, design concepts, and more related to using plant landscapes in healing gardens. Subsequently, this literature is organised, analysed, and compared to extract common design principles, effective plant species, and user feedback, supporting decision-making in healing garden design.

Case Studies

Case studies are an effective research method for in-depth exploration of the application of plant landscapes in healing gardens. The following is a detailed description of the case study methodology.

Case Selection: When studying plant landscapes in healing gardens, one or more representative healing gardens can be selected as research cases. These cases can represent different countries and types of healing gardens to ensure the broad applicability of research results.

Data Collection: For each case, comprehensive data collection can be conducted. This includes on-site observations and recording the design elements of plant types, layout, colours, shapes, and more in the healing garden. Additionally, interviews with garden designers, hospital administrators, and users of the healing garden can provide insights into the design rationale, real-world application effects, and user feedback.

Data Analysis: The collected data can be subjected to in-depth analysis. The strengths and weaknesses of plant landscape designs in healing gardens can be summarised by comparing the design

characteristics and effects between different cases. Furthermore, observational data can be combined with user feedback data to analyse the impact of plant landscapes on the physical and mental health of users in healing gardens.

Discovering Design Principles: Through case studies, researchers can find design principles for plant landscapes in healing gardens. For example, which plant species can effectively alleviate user stress and anxiety, or what layouts create a comfortable environment for rest and interaction? These design principles can serve as guiding recommendations for the planning and designing future healing gardens.

Case Comparisons: Through comparisons of multiple cases, researchers can understand the differences in healing garden design across different countries and cultural backgrounds. This helps extract universal design principles while uncovering unique design features in specific cultural environments.

Limitations and Future Prospects: Case studies have limitations as each case may be influenced by specific environmental and contextual factors. However, conducting comprehensive research across multiple cases enhances the reliability and effectiveness of the study. Future research can further explore the effects of different plant landscapes in healing gardens and how to tailor designs more precisely to user needs.

In summary, case studies are an effective method for gaining an in-depth understanding of the application of plant landscapes in healing gardens. They allow researchers to derive design principles and lessons from real-world cases, providing valuable insights for the planning and designing healing gardens.

FINDINGS

By analysing the use of plants in Chinese and Western healing gardens and examining the use methods. Key design elements of healing garden landscapes can be summarised. By examining the commonalities and differences in the application and design of plants in healing gardens, it is possible to gain a more comprehensive understanding of the theoretical and practical aspects of the application and design of plants in healing gardens.

Commonalities

Interactivity: Healing gardens in both Eastern and Western contexts emphasise the role of plants in providing interactive experiences, such as touch and fragrance. Introducing such plants in healing gardens can enhance users' sense of engagement and enrich sensory experiences.

Sustainability: Plant selection and design considerations encompass the growth cycles, maintenance requirements, and resistance to drought and cold, among other factors, to ensure the sustainability and enduring aesthetics of healing gardens.

Colour and Texture: The colours and textures of different plants can evoke varying emotions and experiences (Pichersky & Raguso, 2016). In healing gardens, one can opt for gentle colours and rich textures to create a calm and comfortable environment that aids users in relaxation.

Plant Layout: The arrangement of plants should consider creating different areas based on plant attributes. These may include relaxation zones, walking areas, viewpoints, and more, with plants strategically positioned to support various activities and experiences.

Divergent Aspects

The following points highlight the contrasting elements in the planning and design of plant landscapes in healing gardens in Western and Chinese contexts:

Plant Selection

Western Approach: In designing healing gardens, selecting plants suitable for the local climate and environment is paramount. The plant varieties should encompass herbs, flowers, trees, and more, contributing to visual aesthetics while releasing oxygen and fragrance, all with potential benefits to human health.

Chinese Approach: Healing gardens in China emphasise the selection of plants based on the traditional Chinese Five Elements theory. This approach considers the plants' visual appeal and medicinal value, viewing plants as valuable medical resources.

Sensory Stimulation

Western Approach: Healing gardens in the Western context focus on stimulating the users' senses, including visual, auditory, and olfactory sensations. Plants like wind chimes and lavender create soft sounds and pleasant aromas in the garden, enhancing the sensory experience.

Chinese Approach: Besides visual, auditory, and olfactory elements, Chinese healing gardens also emphasise plants that engage the senses of taste and touch, providing a more comprehensive range of sensory stimuli.

Cultural Philosophy

Western Approach: Healing garden designs typically emphasise psychological well-being and happiness. They aim to create a comfortable environment that can alleviate stress and anxiety, reflecting values in Western culture.

Chinese Approach: Chinese healing gardens incorporate traditional Chinese philosophical concepts, emphasising balance and harmony, often reflecting values and philosophies rooted in Chinese culture.

Function and Rehabilitation Objectives

Western Approach: These gardens aim to provide emotional well-being, reduce stress, and enhance users' psychological and emotional health. They are often used for leisure and relaxation rather than traditional medical treatment (Martínez et al., 2020).

Chinese Approach: Healing gardens in China are designed to promote physical and mental balance and recovery. The selection and arrangement of plants are typically based on traditional Chinese medical principles to aid users in addressing physical and mental health issues.

In summary, incorporating plant landscapes in the planning and designing healing gardens should harmonise with the overarching landscape philosophy. Through plant selection, layout, and interactivity, a tranquil environment conducive to physical and mental well-being can be created (Hesselink et al., 2020).

CONCLUSION

Several essential design principles have been summarised by comparing plant landscape application and design elements in healing gardens in both Western and Chinese contexts to ensure that gardens can provide maximum therapeutic effects and pleasant experiences. The design application of plant landscapes in healing gardens in both Western and Chinese contexts places human needs at the forefront, catering to the psychological and physiological requirements of the users. The shared goal is to enhance the quality of the space and better serve the users. Given that the concept and practice of healing gardens have been developed for a considerable period, applications are well-established, offering various specialised healing gardens to accommodate different types of patients. In China, healing gardens are predominantly situated within the outdoor spaces of large hospitals, major parks, and a few smaller parks, catering to a wide range of users. This necessitates an environment and facilities within healing gardens that align with the needs of the public, resulting in broad design principles with limited specificity (Gann et al., 2019). In the future, there is a trend toward creating specialised functional zones within smaller healing garden environments and integrating advanced Western healing garden plant application and design theories with local culture. Such efforts will significantly enhance the spatial quality established by healing garden plant design.

The application of plants in healing gardens will continue to deepen and innovate. With advancements in scientific research, we will gain a deeper understanding of plants' physiological and psychological impact on the human body, allowing for more precise selection and design of plants in healing gardens. Innovative technologies will give plant landscapes additional dimensions, offering richer experiences. Regarding plant selection, cross-cultural and interdisciplinary collaboration will become a trend. Plant and herbal knowledge from different regions and cultural traditions can be integrated into healing garden design to meet diverse user needs. Sustainability will also receive more attention, with the selection of native plants and a focus on ecological balance becoming critical design factors. Social participation will become a significant aspect of plant application, allowing users to engage in plant selection, maintenance, and use, thus actively participating in the healing process.

ACKNOWLEDGMENT

I am immensely grateful to my supervisor, Dr. Nurhayati Abdul Malek and my classmate, Ma YaoDong, for their invaluable guidance and support. Their expertise and encouragement have been crucial to my success.

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