



## STUDY ON THE TREATMENT MODEL OF REHABILITATION GARDEN FOR MIDDLE-AGED AND ELDERLY PEOPLE IN SUB-HEALTH STATE

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### ABSTRACT

The research on rehabilitation gardens has developed too many forms, however the design concept of rehabilitation gardens still lacks clear guidance for health promotion. Therefore, this study aims to: 1) study the forms and elements of types of rehabilitation gardens related to the promotion of community health, 2) analyze the principles of multidisciplinary rehabilitation garden design, and build rehabilitation gardens suitable for middle-aged and elderly people to improve the quality of life. Based on descriptive analysis, this paper uses multidisciplinary data integration process to conduct quantitative research. Using physiological and psychological related data, based on PDPA (Plan-Design-Prototyping-Assessment) design method, the population and samples are divided into two areas: Sunshine City Elderly Community Rehabilitation Garden and Dongfeng Qu Rehabilitation Garden, each area uses 3 sample groups: 1) 30 middle-aged and elderly people, 2) 3 medical staff, 3) designers and experts, a total of 6 samples, from 2 study areas. Collect data through interviews. Questionnaires and related literature reviews are used for the analysis of data practicality and health promotion dimensions for rehabilitation garden design.

The results showed that the morphology and composition of the rehabilitation garden was associated with health promotion, in the form of open spaces to fully absorb the morning sun, absorbing vitamin D; A shady space that gives full relaxation and relieves anxiety. In the questionnaire survey of 180 respondents, nearly 60% of the respondents recovered from a sub-health state to a healthy state, however the daily rehabilitation activities helped to relax the body and mind and relax the mood. At the same time, interviews and surveys were conducted regarding the spatial design, user sensations, plant configuration landscape design and other aspects of the revitalized garden and through descriptive analysis and statistics are nested in the planning process based on PDPA design method, and the characteristic rehabilitation garden design methods and elements are derived.

**Keywords:** Rehabilitation Garden, Design guidelines based on the PDPA method, Sub-health status, middle-aged and elderly population

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## Introduction

Rehabilitation garden is also known as rehabilitation landscape, healing garden, etc. In recent years, rehabilitation gardens have gradually emerged, which mainly refer to those landscape environments that are based on the natural environment and take the outdoor landscape as an important medical resource, in order to help people in need to maximize their physical, psychological, occupational and social life functions (Zhou, 2018), improve their ability to live, study and work independently, improve their quality of life, and promote their reintegration into society (Cooper, 1999). Existing research on healing gardens has revealed to some extent that specific outdoor landscapes can play a positive role in healthy, mindful, and soothing mood (Cooper, Luo & Kim, 2009).

The sub-health state of the elderly in this article refers to the group over 45 years old, whose physical and mental state has not reached the obvious degree of disease, however has not reached the level of complete health, and is in an intermediate state (Song, 2013). Such people often accompany age, and physiologically show characteristics such as slowing metabolism, decreased resistance, and decreased physiological function. If the body is sub-healthy for a long time, it can develop into a subclinical state, and then develop into a disease state (Tyson, 2008). This means that active intervention in sub-healthy populations can not only improve people's life experience, however also effectively prevent the occurrence of diseases (Zhang, Sun & Wu, 2016).

With the general nature of the disease and the changes in the ecological environment and rhythm of life, people's physical and mental health is facing new challenges, especially the increasing psychological pressure of middle-aged and elderly people. Long-term sub-health status results in physical decline and other issues in the process of such changes. It's not just people's concept of rehabilitation that has changed. But also the treatment method has been changed. Modern medical care has evolved from an old mechanistic model to a biomedical one. Biological, physiological and social medical model gradually, the landscape of the medical environment gained attention and the landscape became a means of treatment, rehabilitation and additional expertise in theory and practice. Recognition of the healing effects of natural landscapes by therapists and healing institutions. This makes the rehabilitation garden an important complementary medicine method. Additional scientific and methodological research can play a positive role in the planning and construction of revitalized gardens. To determine the positive social role of the landscape in the modern era and to design a therapeutic garden model for middle-aged and elderly populations living in deficient health conditions. That has a relationship with promoting the health of people in the community

## Research Objectives

1. To study the models and elements of rehabilitation gardens that are relevant to the promotion of community health.
2. To analyze the principles of multidisciplinary rehabilitation garden design. Design treatment gardens suitable for middle-aged and elderly people to improve the quality of life.

## Research Methodology

This study adopts a hybrid research method combining qualitative, descriptive and quantitative research, with a multidisciplinary data integration process. Use information related to physiology and psychology and propose a PDPA-based design approach with the following details:

### 1. Descriptive Analysis Research Methods:

- 1.1 Literature research, collecting data from documents, books, textbooks, and studies related to the sample.
- 1.2 Field investigation to select experimental bases: 1) Dongfeng Qu Rehabilitation Garden 2) Sunshine City Elderly Community Rehabilitation Garden



- 1.3 Use the following tools and methods to collect relevant data: 1) interview 2) use questionnaires  
3) About rehabilitation garden design concept, data analysis and design theory

## 2. Quantitative Research Methods:

2.1 Research health-related information. The TCM body mass table was used to investigate the respondents' questionnaires, and the IBM SPSS Statistics24 software was used to analyze the data of the interview questionnaires to compare the promotion of the rehabilitation garden to the health of the respondents.

### 2.2 PDPA design methodology

The PDPA evidence-based design cycle method mainly includes four processes: analysis and sorting of feedback data, transformation of design language, construction of prototype entities, and evaluation feedback of users. These four processes complete a cycle through (data-graphics-prototype entities-use crowd practice feedback), and the feedback results open the next round of design loops, continuously generating data flow, updating and improving efficiency in the loop operation, realizing the maturity of design content and techniques, improving the design drawing model, and finally completing the prototype entity of the rehabilitation garden. In this design experiment, three rounds of evidence-based design were carried out for each area.

## Research results

The PDPA evidence-based design cycle itself splits the design steps, combines the multidisciplinary professional field team to embed the activity test practice content (test and investigation of physiological, psychological and other health indicators) into the design cycle process, and constantly grinds the design theory and practice content, and finally obtains the design results that are most in line with the phased activities. This leads to the design methods and elements of the characteristic rehabilitation garden.

**Table 1** Supportive design strategies for physical and mental health

Psychosomatic characteristics of the body	Supported mode	Design guidelines	Design a strategy
Disruption of circadian rhythms, sleep disturbances, emotional depression, irritability	Provides morning light, promotes vitamin D absorption, improves sleep quality, and relieves sunset syndrome	Absorb the sun	Design open space, activity space to soak up the sun, etc
Perception deteriorates, and it is not possible to perceive strong light and high temperatures	Avoid extreme light and temperature irritation	Shade shelter is provided	Shade, canopy, porch, table and chairs with umbrellas create a comfortable space to rest

Sleep disturbances, emotional depression, mental malaise, etc	Horticultural therapy	Gardening activities are available	Horticultural therapy related facilities, raised flower beds, tool sheds, small greenhouses, shallow plate planting ponds, simple operation watering facilities, etc
Decreased comprehension, depression, lack of happiness	Make it in contact with nature, happy mood, emotional comfort	Create sensory stimulation	Brightly colored flowers, aromatic plants, bird-attracting plants, flowing water, etc
Special physical and mental conditions, aggressive behavior	Differentiated care, differentiated isolation	Independent space	Isolated exclusive space design, according to different performance design different independent space
Physical activity is limited, anxious, and likes to wander	Avoid fatigue, risk of falls, and negative emotions	Rest facilities are available	Seats are set up at high frequency along the road, providing selectivity of seats and resting spaces

Source: Yingying Zhou

**Table 2** The design content of the landscape in the rehabilitation garden

Element	Design essentials	Role and effect
road	Road grading is clear and simple. Use arcs and circular roads to avoid or prohibit the existence of polyline-type, end-of-end roads. The width and slope of the road need to take into account the needs of different groups of people, and try to meet the needs of people of different ages and physical conditions to move freely in the courtyard at the same time. Handrails can be set up along the roadside to accompany the treatment	Clear, simple and smooth circular road can reduce the attention that people need to pay when walking in the garden, thereby reducing psychological pressure, which is especially important for sub-healthy people with memory loss, and the complex garden road will lead to their loss, increase psychological pressure, and affect treatment. Multi-scale, multi-type ergonomic road design facilitates communication between different groups of people
Paving	The paving is non-slip, wear-resistant and reduces reflections. The overall paving area should not be too much, and it should be controlled within one-third of the whole park. Paving with different physical properties can be used in small areas	Ensure the safety and comfort of sub-healthy people active in the park, and ensure the naturalness of the landscape. Increase the sensory function of the elderly and vulnerable groups through the color and texture of the pavement. Some pavings with special surfaces can be treated with horticultural therapies in terms of perception



<b>Gardening facilities</b>	Gardening facilities such as flower beds, shallow plate planting beds, removable flower bowls, etc. of different heights are provided, while providing special gardening tools and storage tools for the place	It is convenient for different groups of people to feel the plants fairly, and the shallow plate planting bed is convenient for wheelchair users to carry out gardening activities. Moving flower bowls makes the space for gardening activities more flexible. Special gardening tools improve the user's operational efficiency
<b>Sculptural sketches</b>	Abstract sculptural landscapes should be avoided around the premises, and they should be figurative and easy to understand	Some sub-healthy people are often mentally fragile and like to associate. Abstract artworks can easily lead to negative associations such as death and failure, which produce bad emotions and affect the healing effect
<b>Relaxation facilities</b>	It should be ensured that the activity area contains recreational facilities with shading and rainproof functions, and through the placement and enclosure of different positions, different rest spaces are created, and the transition of light from indoor to outdoor is natural	Many sub-healthy people are more sensitive to light, and the diversification of recreational spaces can meet people's needs for different light intensities and privacy, and improve comfort. Fixed facilities that reduce harm to others or self-harm in certain populations
<b>Identifies the system</b>	Clear, easy-to-understand floor plans and guide signs are required. Therapeutic interpretations of gardening therapies that are interesting and easy to pass	Simple and easy-to-understand floor plans and guidance signs help people quickly integrate into the environment, help people subconsciously believe in the rehabilitation effect, achieve the psychological "placebo" effect, and enhance the rehabilitation effect
<b>Plant</b>	Non-toxic and harmless, the selection of indigenous tree species, ornamental, can provide a rich sensory experience; Pay attention to community collocation and ecological stability; Has certain therapeutic properties; Choose plants with positive symbolism	The main therapeutic medium borrowed by the rehabilitation garden is the plant, so the non-toxic and harmless nature of the plant is the premise of safety, the native plant is easy to maintain, and the familiar community landscape can bring a sense of intimacy and reduce anxiety. Viewing and touching a rich plant type can also better stimulate people's sensory function, therapeutic plants can soothe nerves and regulate physical indicators, and symbolic plants can help people recover their spirits from the subconscious aspect
<b>Body of water</b>	The combination of dynamic and static creates a rich acoustic environment and a climate micro-environment. The	Water is a symbol of life, dynamic water features can create a cheerful, vital atmosphere, while static water features can



height of the water feature should be diversified

calm people's mood. Water features of different heights meet the hydrophilic needs of different groups of people. However, because of its reflectiveness, it may be troublesome for some people

Source: Yingying Zhou

The elderly community provides services for middle-aged and elderly people in sub-healthy conditions. Therefore, the healing garden has the theme of "meditation", "Zen Buddha" is an artistic element that uses "Zen space" as a medium to divide the space through hedges, dividing the space into several parts. Create spaces for leisure activities, communication, conversations. Meditation, viewing, etc. provide space for spiritual lifting and physical healing for middle-aged and elderly people. The healing garden consists mainly of the main garden and four auxiliary gardens. Interconnected by buildings and corridors. Accessible to all areas for user convenience (Figure 1).



Figure1 General plan of rehabilitation garden design for elderly community

Source: Yingying Zhou

The whole park is mainly divided into three parts. In the middle is a water scenic area, and the main water source comes from the Yiran Pavilion in the middle high. After falling into the water, the water flows into the south, forming an artificial lake. Then to the north form an open body of water ---- Mirror Lake, on which there are two small islands, Peony Island and Ecological Island. The water then turns northwest to form Ming Lake, and to the south to join the gallery on the south side, combining with the closed plants to form a quiet and pleasant space. At the same time, the water pump is used at the gallery on the north side, combined with the water network square, to form a high waterfall overhanging listening space. Not only does it create a beautiful water feature, however it also purifies the water quality. The northeast is a dense forest recreation area with many colorful trees and flowering shrubs. Suitable for



middle-aged and elderly people in sub-health state to walk, communicate, relax, enjoy the scenery, the southwest is combined with the Dongfeng Canal Green Plaza, and a fitness area is created on the south side. It facilitates the exercise and communication of middle-aged and elderly people in sub-healthy state. In addition, Peony Island was established in the lake, a large number of peonies were planted, and a peony pavilion was built on the mountain. From the surrounding waters, Peony Island is scenic. Between the central observation deck and the southwest observation deck, a space for rest and communication is set up, including a waterfall pavilion and gallery, and a water net square on the east side. (Figure 2).



Figure 2 General plan of Dongfeng Canal Rehabilitation Garden

Source: Yingying Zhou

## Conclusions and suggestions

The design of the therapeutic garden model for middle-aged and elderly people with impaired health, the form and composition of the therapeutic garden is associated with health promotion the characteristics and components were planned according to the PDPA design method and the garden therapy design method.

1. Through the research respondents' perception and feedback on the spatial design, use feeling, plant configuration, landscape elements and other aspects of the rehabilitation garden, the design patterns and element characteristics of the rehabilitation garden to promote the physical and mental health of community users were obtained.

2. Introduce multidisciplinary research methods such as psychology, traditional Chinese medicine, PDPA evidence-based design method for rehabilitation garden design, and empirically verify its healing effect on the physical health of middle-aged and elderly people in sub-healthy state, and summarize the design principles and design elements of rehabilitation garden suitable for middle-aged and elderly people.

Suggestions for design Garden therapy model for middle-aged and elderly people with low health conditions In the PDPA evidence-based design cycle, designers can incorporate identity, form, and design elements. By requiring



designers to have multidisciplinary intellectual abilities ability to collect information data integration and the ability to organize and coordinate interdisciplinary teams. To the completion of the evidence-based design cycle. PDPA is a reference for the design team uses the design cycle at different stages. How to form a design and coordination team that needs further study.

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