Principles of design and features of therapeutic garden formation for the treatment and rehabilitation of patients with various types of illneses

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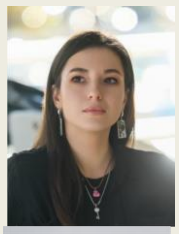
Abstract. The article explores the role of therapeutic gardens as a rehabilitation tool in Ukraine, which has been in a state of full-scale war for three years. Constant stress, psychological trauma, and limited access to medical services have led to an increase in illnesses, particularly cardiovascular and oncological diseases, as well as post-traumatic stress disorder (PTSD). Statistics indicate that chronic illnesses worsen due to stress, weakened immunity, and reduced access to medical examinations, highlighting the need for new rehabilitation methods.

The research methods include an analysis of international practices, specifically the "Enabling Garden" at Bryn Mawr Rehabilitation Hospital, and the development of recommendations for adapting such spaces in Ukraine. Key elements of therapeutic gardens have been identified: the selection of vegetation tailored to specific conditions (e.g., mint and lavender for stress relief or roses for emotional recovery), spatial solutions (winding paths for light physical activity), sensory accents (smooth materials, pleasant sounds), and water elements (small fountains for relaxation).

The research findings show that therapeutic gardens contribute to stress reduction, emotional well-being, and an accelerated rehabilitation process. Specifically, gardens for patients with cardiovascular diseases help stabilize heart rhythm, for cancer patients — support a positive perception of life, and for individuals with PTSD — create a sense of safety. A gradual integration of therapeutic gardens into the urban context is proposed, starting with small plots near hospitals or rehabilitation centers, with a perspective for systematic expansion.



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INTRODUCTION

In Ukraine, three years into the full-scale war, the issue of deteriorating public health has become critical. Constant stress, psychological trauma, and limited access to healthcare services contribute to the rise in physical and psychoemotional disorders. The war has become a catalyst for the aggravation of chronic illnesses, including oncological and cardiovascular diseases, due to stress, weakened immune systems, and reduced access to medical examinations.

In these circumstances, therapeutic gardens

are gaining importance as a rehabilitation tool. They help improve physical and mental health by reducing stress, restoring inner balance, and strengthening patients' well-being, opening up new opportunities for their application in Ukraine [1].

THE ROLE OF THERAPEUTIC GARDENS IN OVERCOMING THE CONSEQUENCES OF WAR

The war in Ukraine is already leaving a profound mark on the health of the population, with these effects, as a post-traumatic phenomenon, expected to manifest for decades after the end of hostilities. Addressing this issue requires a comprehensive approach in which architecture and design can play a significant role in supporting the rehabilitation and recovery of society.

Therapeutic gardens are an essential complement to medical treatment, as their influence helps enhance the effectiveness of traditional methods and accelerate the healing process. The unique feature of therapeutic gardens lies in their adaptation to the needs of specific patient groups, depending on the nature of their illnesses. These spaces become an integral part of the urban environment and hospital grounds, where they are best situated for patients to access them easily.

The integration of therapeutic gardens can begin with small plots near hospitals or rehabilitation centers, gradually extending their presence into the broader urban context. This approach allows for the creation of a systematic framework to restore public health and support the emotional well-being of citizens [1].

Particularly relevant is the development of therapeutic gardens aimed at treating common diseases that arise or worsen as a result of the war:

•**Cardiovascular diseases caused by stress**, changes in living conditions, and emotional burdens.

•**Oncological diseases**, the risk of which increases due to weakened immunity and chronic stress.

•**Post-traumatic stress disorder (PTSD),** depression, and anxiety disorders triggered by traumatic experiences and constant emotional pressure.

Let us consider the specific configurations of therapeutic gardens and their key elements designed to support and restore the health of patients with these conditions

FEATURES OF DESIGNING LANDSCAPE ELEMENTS

Therapeutic gardens for individuals with cardiovascular diseases should aim to reduce stress levels, improve circulation through light physical activity, and provide a calming environment for recovery and restoration.

Plants that promote relaxation	• Green plantings with soft colors (lavender, lemon balm, mint, conifers). • Absence of plants with strong scents or bright colors that may increase arousal. • A neutral color palette helps to reduce heart rate.
Spatial solutions	• Circular or winding paths for leisurely walks that encourage moderate physical activity. • Resting areas with comfortable benches or lounge chairs.
Water elements	• Small fountains that create a soothing sound of water to reduce stress.
Sensory accents	• Calm tactile stimulation through smooth materials (wood, pebbles). • Soft rustling of leaves or the sound of wind chimes for relaxation.

Therapeutic gardens for individuals with oncological diseases should focus on supporting emotional well-being and reducing anxiety levels, fostering a positive perception of the world, and strengthening the immune system by alleviating stress.

Multicolored flower compositions	• Plants that symbolize hope and life (roses, daisies, marigolds). Using bright and positive sensory stimuli to create a sense of optimism. • Seasonal variation of plants to highlight the cyclical nature of life.
Spatial solutions	• Enclosed corners for solitude, created with living hedges or vertical greenery. Solitude in a therapeutic garden provides an opportunity for emotional release. • Areas for group therapy or meditation.
Aromatherapy zones	• Herb sections with rosemary, mint, and basil. • The use of plants with light, pleasant scents that promote relaxation.
Water elements	• Calm water features, such as ponds or decorative fountains.
Sensory accents	• Areas for interacting with natural materials (gravel, wood).

Therapeutic gardens for individuals with PTSD, depression, and anxiety disorders should aim to enhance feelings of safety and stability, promote sensory calming, and support mindfulness by encouraging focus on the present moment.

Vegetation for comfort	• Tall trees that provide a sense of protection (oaks, maples). • Low-growing plants with neutral colors (ferns, moss).
Spatial solutions	• Clearly defined boundaries of the garden to create a sense of control and security. • Open spaces with gentle transitions.
Sensory accents	• Tactile zones with smooth pebbles or sand, where one can create patterns (e.g., Japanese rock garden). • Soft lighting (solar lamps or candles).
Water elements	• Slow-moving water that symbolizes tranquility (stream or cascading fountain).
Sound background	• Birdsong or gentle wind chimes that help bring attention to the present moment.

Each therapeutic focus has distinct sensory characteristics. For individuals with cardiovascular diseases, the calming effect of water features and neutral colors is predominant. For oncology patients, optimistic colors and scents that provide emotional support are essential. For those with PTSD, the primary goal is to create a sense of safety and calm through tactile and acoustic elements.

Cardiovascular gardens emphasize light physical activity to support circulation and stress relief. Oncology gardens include secluded areas for solitude and contemplation, fostering emotional recovery. Gardens for individuals with mental disorders prioritize clear and structured spatial organization to provide stability and reduce anxiety.

INTERNATIONAL EXPERIENCE

These characteristics and therapeutic methods are supported by international practices, offering valuable insights for cultivating a culture of therapeutic gardens and parks in Ukraine.

One notable example is the "Enabling Garden" at Bryn Mawr Rehabilitation Hospital, designed as an outdoor therapeutic space to enhance horticultural therapy programs (Fig.1). The hospital provides care for patients with a wide range of conditions and injuries, including brain trauma, strokes, spinal cord injuries, and other orthopedic and neurological disorders [2].

Horticultural therapy in the Enabling Garden is used to develop skills needed for maximum

functionality, as well as to restore leisure and recreational interests. The garden is fully wheelchair-accessible, featuring raised beds of varying heights to accommodate patients comfortably. Its pathways have diverse surfaces, allowing patients to practice mobility on different textures.

During the growing season, patients actively participate in designing, planting, and maintaining beds and containers, achieving their therapeutic goals in the process. The garden is open to the public, as well as to families, visitors, and hospital staff, fostering an inclusive and healing environment.

Figure 1. Horticultural therapy, [2]

WE Sensory Garden – Boston MMA. From the book "Therapeutic Landscapes: Healing Outdoor Environments" (McGraw Hill, 1998) (Fig.2) [3].

The design of this sensory garden revolves around an infinity-shaped path that leads visitors to various zones. Walking among tall, undulating grasses, visitors can observe, listen to, and touch cascading water flowing from a decorative urn. Seasonal flowers and herbs provide a delightful array of scents, while berries and vegetables are available for harvesting.

For added interaction, visitors can approach a flower bed divided into six rainbowcolored sections. By pressing a corresponding button, they can release a cooling mist of water onto the plants, enhancing the sensory experience and engagement with the environment [3].

Figure 2. Planning and implementation of a garden WE Sensory Garden – Boston MMA, [3]

Joel Schnaper Memorial Garden is located on the rooftop of the Terence Cardinal Cooke Health Care Center in New York City, the Joel Schnaper Memorial Garden (Fig.3) was opened in 1995 as a sanctuary of tranquility and recovery for patients, visitors, and hospital staff [4].

The garden is divided into several zones, offering varying levels of privacy and opportunities for socialization, allowing visitors to interact with nature according to their preferences and needs. Its design prioritizes accessibility, ensuring ease of movement and inclusion for people with disabilities.

Featuring a diverse array of plants, the garden provides changing colors and fragrances throughout the year, enhancing sensory experiences and emotional wellbeing. It supports the rehabilitation of patients with chronic conditions such as HIV/AIDS, cancer,

spinal cord injuries, and mental health disorders.

By reducing stress, improving emotional resilience, supporting physical rehabilitation, and fostering social integration, the garden serves as a therapeutic space. Its accessibility and emphasis on sensory engagement and connection with nature make it an ideal environment for healing and recovery [4].

Figure 3. Horticultural therapy Joel Schapner Memorial Garden, Cardinal Cook Hospital, New York City, [4]

Garden at the Santa Rita Social and Healthcare Center for the Elderly / Manuel Ocaña, Spain (Fig.4) is an integral part of the rehabilitation environment for senior patients. It promotes stress reduction, emotional well-being, and physical activity while ensuring accessibility and comfort for all users [5].

The garden features distinct sensory elements, including diverse vegetation that stimulates visual and tactile senses, the soothing sounds of water, and fragrant flowers that help alleviate stress and enhance patients' emotional states.

The space is designed to encourage physical activity while providing a comfortable and relaxing environment for rest, making it an essential therapeutic tool for supporting the health and well-being of elderly patients [5].

Figure 4. Rehabilitation space Gardens at Centro Sociosanitario eriatricatrico Santa Rita, [5]

Therapeutic The Therapeutic Garden at HortPark in Singapore (Fig.5) is specifically designed to support the mental and physical well-being of visitors, particularly the elderly and individuals with dementia [6]. Key Sensory Features:

- Diverse plant textures and colors stimulate visual and tactile senses.
- Waterfalls and fountains produce calming sounds, promoting relaxation.
- Fragrant flowers and herbs engage the sense of smell, enhancing mood.
- Wind chimes add melodic sounds, fostering emotional comfort.
- Cozy benches and shaded areas provide comfortable spots for rest and social interaction.

These elements collectively create an environment that reduces stress, boosts mood, and enhances the overall well-being of visitors [6].

Figure 5. The Therapeutic Garden Hort Park, [6]

CONCLUSIONS

Therapeutic gardens within hospital premises significantly enhance the physical and psychological well-being of patients, accelerate recovery, and reduce stress levels. They are effective in managing cardiovascular, mental, and oncological conditions, while also benefiting medical staff by reducing burnout risks. In the context of Ukraine, such gardens

can become a vital tool for integrating nature into medical infrastructure, improving the quality of care and comfort for both patients and healthcare personnel.

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Принципи проєктування та особливості формування терапевтичного саду для лікування та реабілітації пацієнтів з різними видами захворювань

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Анотація. У статті досліджується роль терапевтичних садів, як інструменту реабілітації в Україні, яка три роки перебуває у стані повномасштабної війни. Постійний стрес, психологічні травми та обмежений доступ до медичних послуг спричинили зростання захворювань, зокрема серцево-судинних і онкологічних хвороб, а також посттравматичного стресового розладу (ПТСР). Статистика свідчить, що хронічні захворювання загострюються через стрес, ослаблення імунітету та зменшення доступу до обстежень, що підсилює потребу у нових методах реабілітації.

Методи дослідження включають аналіз міжнародного досвіду, зокрема прикладу "Enabling Garden" у Bryn Mawr Rehabilitation Hospital, та розробку рекомендацій щодо адаптації таких просторів в Україні. Визначено ключові елементи терапевтичних садів: вибір рослинності, яка враховує специфіку захворювань (наприклад, м'ята і лаванда для зниження стресу чи троянди для емоційного відновлення), просторові рішення (звивисті доріжки для легкої фізичної активності), сенсорні акценти (гладкі матеріали, приємні звуки) та водні елементи (фонтанчики для заспокоєння).

Результати дослідження показують, що терапевтичні сади сприяють зменшенню рівня стресу, покращенню емоційного стану та прискоренню процесу реабілітації. Зокрема, сади для пацієнтів із серцево-судинними захворюваннями допомагають стабілізувати серцевий ритм, для онкохворих — підтримують позитивне сприйняття життя, а для людей із ПТСР — створюють відчуття безпеки. Пропонується поступова інтеграція терапевтичних садів в урбаністичний контекст, починаючи з невеликих ділянок біля лікарень чи реабілітаційних центрів, із перспективою системного розширення.

Ключові слова: терапевтичний ландшафт, садовий дизайн, садово-паркова терапія, функція ландшафту, проєктування ландшафтів.

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