

Awaiting Recovery: The Role of Outdoor Healthcare Spaces in Patient Self-Care in Ljubljana

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Abstract

Outdoor spaces in public healthcare institutions play a vital role in reducing patient stress and supporting healing. This study investigates their impact on patient self-care practices across primary, secondary, and tertiary healthcare facilities in Ljubljana, Slovenia, using a two-phase mixed-methods approach grounded in Ulrich’s theory of supportive design. The first phase, conducted at the Vodmat Medical Area (Slovenia’s largest hospital complex), involved spatial interventions, workshops, and patient-led walks to analyze utilization of outdoor spaces and inform the development of a patient experience questionnaire. The second phase employed this questionnaire to assess patient experiences across five selected primary healthcare facilities in Ljubljana. The results highlighted the importance of accessibility, well-maintained spaces, and comfortable waiting areas, with notable differences in utilization patterns. Primary care patients prioritized accessibility and upkeep, and secondary and tertiary care patients engaged in a broader range of self-care activities, including relaxation, social interaction, and rehabilitation. These findings underscore the significance of outdoor healthcare spaces, particularly hospital grounds, as critical urban care-related infrastructures that support patients across the self-care continuum from health maintenance to rehabilitation. Amid challenges facing Slovenia’s public healthcare system, strategic investment in the design and management of these spaces can improve patient well-being and transform them into vital sites of institutional and urban care practices.

Keywords

infrastructures of care; outdoor healthcare space; patient experience; patient self-care; supportive design

1. Introduction

Healthcare institutions and their surrounding outdoor spaces are often perceived as intimidating institutions, cognitively disconnected from the urban fabric, and typically visited only in emergencies or when absolutely necessary (Nedučín et al., 2010). The inherent complexity of urban medical centers often reinforces this detachment from their immediate surroundings. This separation excludes outdoor healthcare spaces from the broader system of urban green spaces that could otherwise contribute to patient recovery and improve the daily experiences of families and medical staff (Jiang & Verderber, 2016). Despite these challenges, these spaces have significant potential to mitigate such negative perceptions. By providing accessible, restorative, and engaging environments, outdoor healthcare spaces can alleviate stress (Ulrich, 1999), promote healing (Tseung et al., 2022), and increase healthcare institutions' resilience against unpredictable challenges, such as infectious diseases (Ma et al., 2021).

1.1. Outdoor Healthcare Spaces as Infrastructures of (Self-)Care

Outdoor spaces, such as parks, courtyards, entry plazas, patios and paths, present an important part of a built environment. These spaces not only provide aesthetic and ecological value but also serve essential social, psychological, and functional roles in urban lives. They are composed of a range of urban elements (e.g., seating, pathways, lighting) that support diverse activities, such as relaxing, walking, socialising. Outdoor healthcare spaces can be reconceptualized as an integral yet often overlooked system of public and semi-public spaces where care is intensively practiced. Collectively, these urban spaces should form an “environment of care,” facilitating daily practices that promote active movement, disease prevention, and overall health, while simultaneously granting citizens access to restorative services and resources (Marchigiani, 2021). Power and Mee (2019) describe “infrastructures of care” as socio-material systems shaped by the interplay of architecture, governance systems, and discourse. Outdoor healthcare spaces embody these infrastructures of care, combining natural and built environments with human and non-human actors, specific practices and behaviors and the emotions tied to them, all within a regulated framework that governs their management.

This study shifts the focus from the planned functions, ownership, and management of healthcare outdoors spaces in Ljubljana to the lived experiences of patients who interact with these areas as both recipients and practitioners of care. The critical importance of these outdoor spaces became particularly evident during the Covid-19 pandemic, when outdoor environments were increasingly recognized as safer and healthier alternatives to indoor settings by users of healthcare services (Ma et al., 2021). Outdoor healthcare spaces have since emerged as critical care infrastructures, exposing broader socio-spatial inequalities that divide communities into “urban haves and have-nots” (Cohen & Knierbein, 2021).

While healthcare institutions primarily represent spaces of institutionalized care relationships between patients and healthcare professionals, their outdoor spaces occupy a transitional or “liminal” position in the care continuum, where patients engage in varying degrees of self-care. Self-care encompasses activities aimed at maintaining physical, mental, and emotional health, whether performed individually, collaboratively with healthcare professionals, or for others (e.g., families or communities; Godfrey et al., 2011).

These practices ensure continuity of care beyond the formal healthcare system, enabling individuals to manage and maintain their well-being. By examining the environmental factors of outdoor healthcare spaces (e.g., greenery, waiting area) through patients' experiences, this study seeks to understand their contribution to self-care practices.

1.2. Supportive Design of Outdoor Environments

Power and Williams (2019) emphasize the importance of investigating the conditions that enable care—a perspective we extend to outdoor healthcare spaces and their role in facilitating (self-)care.

The theory of supportive design provides a valuable framework for creating outdoor healthcare spaces that mitigate stress and enhance well-being. Patient stress in healthcare environments most often stems from illness and adverse physical-social conditions, such as noise, lack of privacy, or insufficient social support (Ulrich, 1991). Ulrich's (1991) framework emphasizes three key strategies to mitigate this stress: fostering a sense of control over surroundings, facilitating social support, and offering positive distractions. Healthcare gardens exemplify this approach, providing spaces that promote (a) actual and perceived control, including access to privacy, (b) social interaction and support among patients, visitors, and staff, (c) opportunities for physical activity, and (d) exposure to restorative natural elements like plants, water, and soothing sounds (Ulrich, 1999).

Accessible design is critical to ensuring that healthcare gardens are inclusive, particularly for individuals with disabilities, thereby enhancing opportunities for self-care and fostering independence (Ulrich, 1999). Additionally, these spaces should promote emotional and material support through activities like socializing, people-watching, or simply observing nature (Brannon & Feist, 1997, as cited in Ulrich, 1999). Finally, gardens offer natural distractions. Positive distractions—such as trees, water features, and wildlife—can evoke calming emotions and reduce stress (Malenbaum et al., 2008; Ulrich, 1991), while negative elements such as urban noise, smoking, or insufficient shade may detract from these benefits (Ulrich, 1999). Thoughtfully designed outdoor spaces thus have the potential to transform healthcare environments into supportive ecosystems that address physical, emotional, and social well-being.

1.3. Healthcare Spaces of Ljubljana

Ljubljana covers Slovenia's largest network of primary, secondary, and tertiary public healthcare facilities, with the Vodmat Medical Area serving as the city's largest cluster of secondary and tertiary clinics. This hospital complex has gradually evolved since 1786, with the main University Medical Centre Ljubljana building completed in 1978 and additional clinics added during the 2000s (Univerzitetni klinični center Ljubljana, n.d.). Due to the gradual expansions of the city's central urban district, outdoor space is predominantly limited to roads, paved service areas, and minimal green spaces. This falls short (Kikelj et al., 2022) of the 25% green space share recommended for hospital plots by the National Spatial Order of the Republic of Slovenia (Šuklje Erjavec et al., 2020). Within the Vodmat Medical Area, approximately 13% of the land owned by the Ministry of Health (the legal founder of all public hospitals) consists of green space, with no notable green spaces on municipal and privately owned land (Kikelj et al., 2022).

Systemic underinvestment, spatial constraints, and changing mobility habits have profoundly impacted public hospitals and their outdoor spaces. Following global trends of “welfare residualisation shaped through neoliberal politics and austerity cuts” (Power & Williams, 2019, p. 7), Slovenia’s public healthcare system faces numerous challenges, including staff shortages, strikes, privatization of services, and long waiting lists (OECD & European Observatory on Health Systems and Policies, 2019). The Covid-19 pandemic exacerbated these challenges, with the media highlighting “waiting lines and dilapidated buildings” as symbols of the sector’s struggles (Masten, 2024). It seems the pandemic has reshaped public perceptions of healthcare institutions, emphasizing the growing need for well-maintained outdoor spaces (Ma et al., 2021).

1.4. Research Objectives

This study explores how outdoor spaces in Ljubljana’s public healthcare institutions are currently utilized and experienced by patients, with a focus on their role in supporting self-care. Grounded in Ulrich’s (1991) theory of supportive design, it investigates whether these environments align with the principles of the theory, which emphasizes design features that promote stress reduction and enhance well-being. In addition, it identifies the key conditions that enable outdoor healthcare spaces to function as restorative environments. By examining outdoor spaces of public healthcare facilities across various levels and locations, the research aims to investigate what these outdoor spaces should offer to serve effectively as infrastructures of care on an urban scale in the future.

2. Methods

2.1. Study Design and Study Area

This two-phase study employed a mixed-methods exploratory sequential design. It was part of a broader research project exploring how outdoor spaces within several healthcare institutions in Ljubljana, Slovenia, were experienced by patients, visitors, and medical staff (see Figure 1).

The first phase involved qualitative data collection using spatial interventions, workshops, and a patient-led walk at Ljubljana’s largest hospital complex. Findings from this phase guided the development of a patient questionnaire administered in the second, quantitative phase. This sequential design enabled the integration of patient-centered insights into the survey instrument, ensuring it reflected the patients’ perceptions, needs, and priorities revealed in the initial phase.

While in this study we focused specifically on patients’ experiences and included only patient-specific information, the broader project also encompassed architectural analysis and stakeholder engagement, aiming to inform more inclusive urban health infrastructure planning.

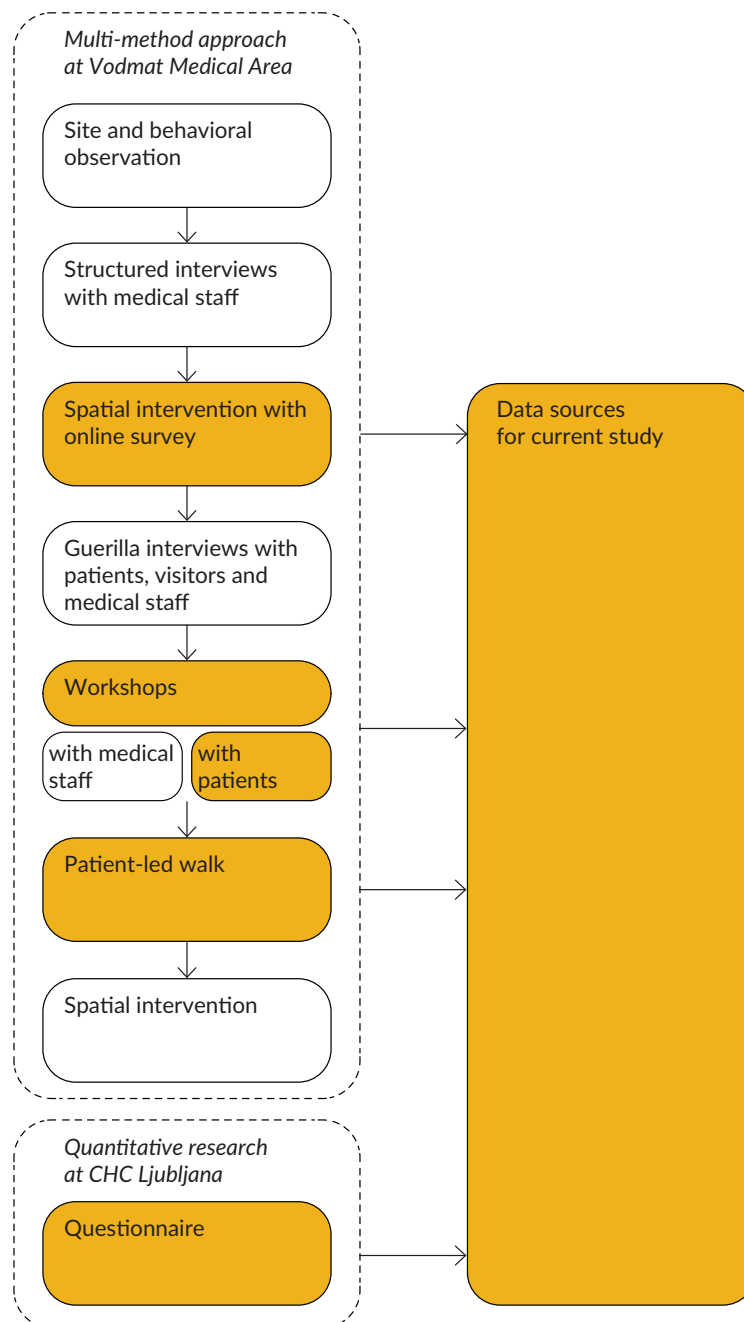


Figure 1. Overview of data sources used in the current study, derived from a larger research project conducted on healthcare institutions in Ljubljana. Note: Community Health Center (CHC) Ljubljana = Five units of CHC Ljubljana.

The first phase focused on the outdoor spaces within the Vodmat Medical Area (see Figure 2, 1), Slovenia's largest hospital complex offering both secondary and tertiary care. It spans 10,431 m², including several secondary and tertiary clinics, educational and research facilities associated with the University Medical Center Ljubljana, the Institute of Oncology Ljubljana, and the Faculty of Medicine at the University of Ljubljana. The key features of these outdoor spaces include green spaces, public infrastructure, and transportation facilities. Specifically, two parks, multiple entry plazas and landscaping adjacent to the clinics, public roads (one running along the Ljubljanica river), streets with limited traffic, pedestrian pathways, two

bus stops, and several smaller parking lots. In this phase, we employed a mixed-methods approach, collecting both qualitative and quantitative data in order to analyze how patients, visitors, and medical staff interact with and perceive these spaces. Insights gained from patients' experiences in the Vodmat Medical Area informed the development of a comprehensive questionnaire designed for broader application in primary healthcare settings.

The second phase extended to the outside spaces surrounding primary healthcare facilities in Ljubljana, examining the diverse ways in which outdoor spaces are utilized and valued by patients in various primary care environments. First, behavioral and site observations were conducted across all 14 units of the

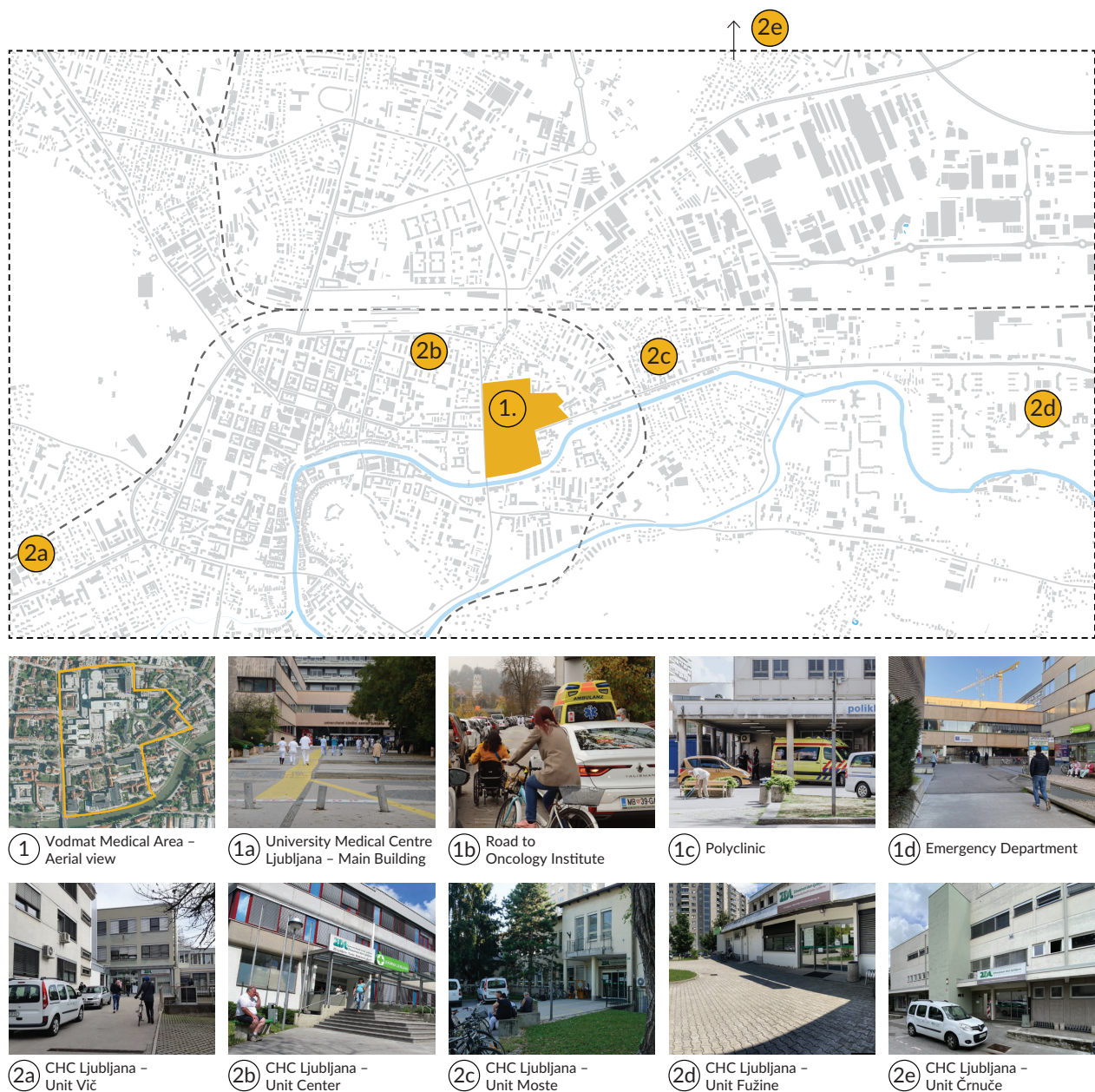


Figure 2. Aerial view of Vodmat Medical Area (1), photographs of its selected facilities (1a–1d), and five units of CHC–Vič, Center, Moste, Fužine, and Črnuče (2a–2e).

Community Health Centre Ljubljana, assessing variations in spatial amenities, navigation and wayfinding, green space availability, traffic and mobility patterns, and patient behaviors. Based on these initial evaluations, five units (Center, Črnuče, Fužine, Moste, and Vič) were selected for further exploration and in-depth analysis (see Figure 2, 2a–2e). The selection ensured diversity across key criteria, such as spatial characteristics, accessibility, and patterns of use, providing a comprehensive representation of the broader healthcare landscape. Second, a questionnaire was employed to investigate patients' experiences of outside spaces across five selected CHC's units, all of which are founded and managed by the Municipality of Ljubljana.

2.2. Study Sample

Participants included in this study were patients from various secondary and tertiary clinics located within the Vodmat Medical Area and the five selected primary CHC institutions in Ljubljana. All participants included in the analysis provided informed verbal and/or written consent and participated voluntarily. In adherence to ethical guidelines, 15 questionnaire responses from individuals aged 17 years or younger were excluded (including 7 from patients) due to uncertainty regarding whether the respondents were at least 16 years old (required age of consent). Table 1 presents an overview of the total number of participants and the distribution of patients across the two distinct study phases and four research methods included in the current dataset.

Table 1. Total number of participants in the broader study and corresponding patient-specific data included in the current study.

| Phase | Data collection method | No. of all participants | No. of patients (≤ 18 years old) |
|--------------|---|-------------------------|--------------------------------------|
| First phase | Spatial intervention with online survey | 373 | 60 |
| | Workshops | 26 | 14 |
| | Patient-led walk | 15 | 15 |
| Second phase | Questionnaire (overall) | 382 | 224 |
| | CHC Center | 83 | 46 |
| | CHC Črnuče | 28 | 5 |
| | CHC Fužine | 74 | 46 |
| | CHC Moste | 99 | 63 |
| | CHC Vič | 98 | 64 |

2.3. Recruitment and Data Collection

A mixed-methods approach was adopted to ensure comprehensive data collection (Figure 1), with recruitment conducted through multiple channels tailored to each method. Recruitment and data collection for the first phase (Sections 2.3.1–2.3.3) were conducted between August and November 2022, while the second phase (Section 2.3.4) took place from September 5 to September 22, 2023.

2.3.1. Spatial Intervention With an Online Survey

We installed 16 new benches in selected outdoor spaces of the Vodmat Medical Area as a spatial intervention. Everyone using the benches was invited to participate in an online survey by scanning a QR code placed on

each bench. The survey included questions about satisfaction with the intervention and open-ended questions for providing recommendations to optimize the outside spaces. For this study, only the patients' responses to the open-ended questions were analyzed.

2.3.2. Workshops

We facilitated two workshops with representatives of various patient associations to identify challenges in the hospital clinics' outdoor spaces and brainstorm solutions. Given the significant stress experienced by hospitalized patients, we chose to involve representatives rather than patients who are currently hospitalized. Invitations to participate were distributed through posters displayed at study sites, social media platforms, and direct email outreach. Workshop 1 included representatives from an oncology patient association, while Workshop 2 involved representatives from various patient associations, including those supporting individuals who are deaf, tetraplegic, or living with conditions such as dementia and fibromyalgia.

2.3.3. Patient-Led Walk

We organized a guided walk around the outdoor spaces of the Vodmat Medical Area with visually impaired or blind individuals. Participants were invited through direct e-mail outreach to the Association of the Blind and Visually Impaired. This hands-on approach allowed us to gather first-hand and real-time insights into challenges within the environment encountered by these patients.

2.3.4. Questionnaire

Visitors of the five selected units of CHC had the option to complete a printed questionnaire on-site or access the online version via a QR code on flyers. Six students took turns at all five locations, inviting patients to fill out the questionnaire at a survey stand and aiding participants as needed. In addition to survey stands, posters with QR codes were displayed at the entrances of the five units, and participants could also access the survey through media posts and social networks.

This questionnaire was designed based on the thematic analysis conducted in the first phase of our research at the Vodmat Medical Area, specifically for a broader application in primary healthcare settings. Key themes from the thematic analysis were translated into structured items, addressing spatial accessibility, environmental quality, emotional comfort (e.g., privacy), and physical infrastructure. Although no formal pilot study was conducted, the instrument was informally tested with seven individuals (non-study participants) for clarity and timing, leading to minor adjustments in wording and layout. Themes specific to hospitalization or inpatient visits were excluded to ensure relevance for primary care environments.

The questionnaire consisted of five sections of questions, in alignment with patient-identified priorities such as accessibility, comfort, and privacy:

1. Addressing how patients use and engage with their primary healthcare institution and its outside spaces: Which institution they visit, frequency of visits, duration of time spent in outdoor spaces, method of arrival (mode of transportation), activities performed in outdoor spaces (participants were able to give multiple answers), reason for the visit as a control question (i.e., patient, visitor, medical staff).

2. Identifying important features of the outdoor spaces around healthcare facilities: Questions aimed at identifying which features participants consider essential in outdoor primary healthcare environments, irrespective of their specific institution. Respondents were instructed to select up to five features from a provided list or to suggest additional ones of their own.
3. Collecting demographic data: Gender, age, self-reported levels of health and well-being, special life circumstances, and disabilities.
4. Assessing the quality of the open spaces: 21 questions using a 5-point Likert scale to evaluate the quality of the selected open spaces.
5. Gathering open-ended feedback: The best and the worst elements of the selected outdoor space, along with suggested improvements.

2.4. Data Analysis

Data collected through workshops and a patient-led walk were first transcribed and then analyzed alongside responses to the online survey following the six phases of thematic analysis (Braun & Clarke, 2006). After familiarization with the dataset (reading and re-reading the transcripts and survey entries), one of the authors (NKŠ) used an inductive approach to coding. This allowed a deeper exploration of the patients' own perception of their experiences with the outdoor spaces of the Vodmat Medical Area. Similar codes were then collated into descriptive categories, followed by initial theme development, revision, and further theme development. Themes and subthemes were then refined, defined, and named collaboratively through multiple iterations between authors.

Descriptive statistics were calculated using the questionnaire data in R (version 4.2.2) on RStudio (version 2023.06.1+524). Responses related to open-ended feedback on the best and the worst aspects of the specific outdoor space, as well as data from the 21 questions addressing the quality of the outdoor spaces, were excluded from the analysis as they focused on the specific spatial analysis rather than general preferences.

3. Results

3.1. Qualitative Results: Thematic Map

Following the analysis of data gathered on the outside spaces in the Vodmat Medical Area (online survey, workshops, and patient-led walk), four main themes emerged: (a) interaction with environment and natural distractions, (b) activities in outdoor space, (c) supportive urban furniture, and (d) user-friendly and accessible outdoor spaces.

These themes then directly informed the development of the patient experience questionnaire used in the second phase. Items assessing accessibility and navigation, mobility and infrastructure, comfort and waiting amenities, and environmental and aesthetic qualities were developed from the qualitative insights summarized below. As shown in Figure 3, each theme comprised several subthemes, collectively capturing the range of experiences, needs, and preferences voiced by patients.

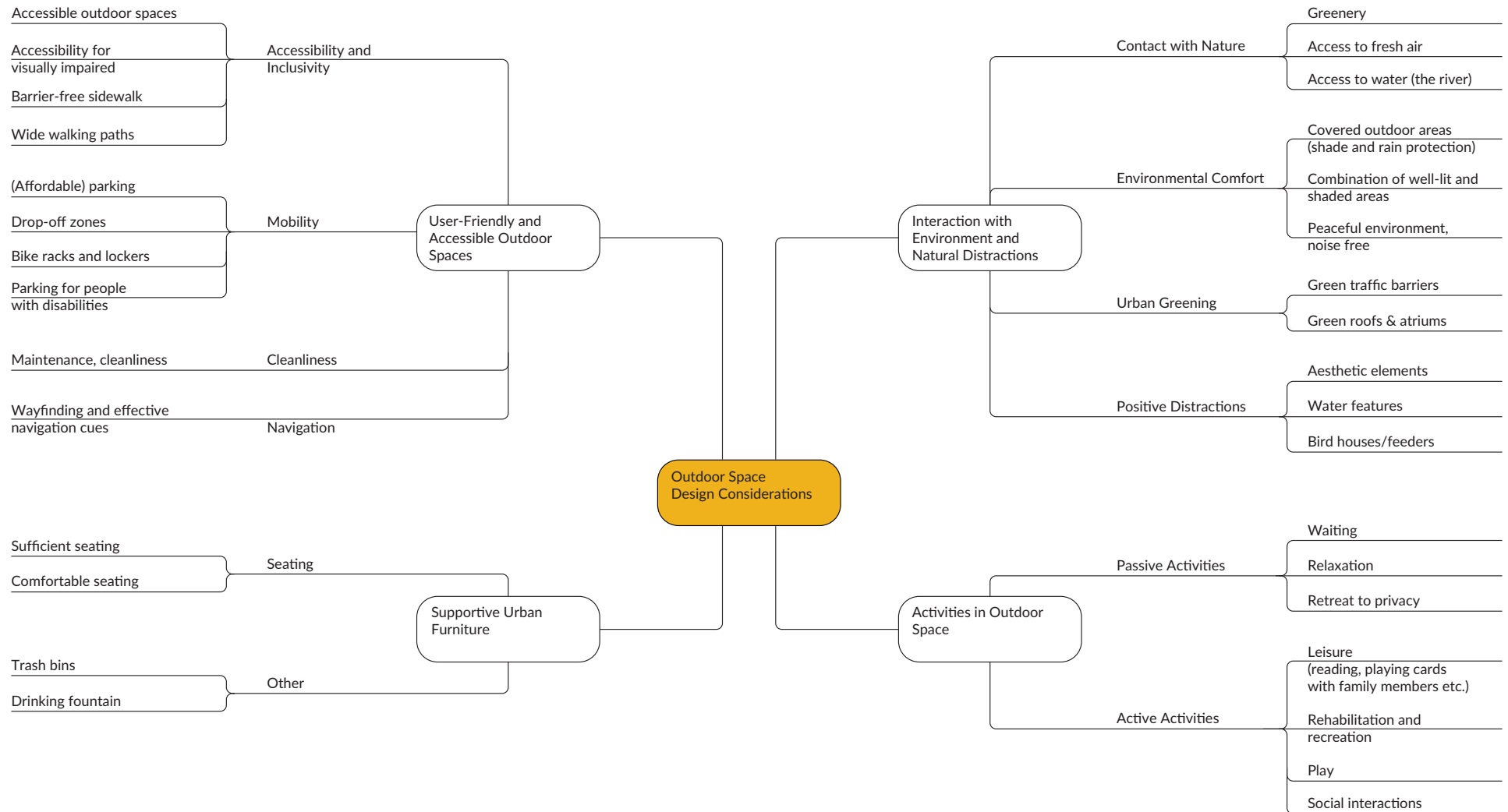


Figure 3. Thematic map consisting of themes, subthemes, and higher-level codes.

3.1.1. Theme 1: Interaction With Environment and Natural Distractions

The presence of greenery emerged as a crucial element in shaping a positive experience in hospital outdoor spaces. Patients consistently envisioned additional trees to foster connection with nature and provide much-needed shade. In addition to trees, participants called for more plants and flowers to create a welcoming atmosphere, as per this example from the survey: “Please plant some additional flowers around the benches!” (Online survey participant). The calming effect of greenery was further emphasized by another workshop participant who highlighted the multisensory benefits of plants, scents, and sounds when asked what they envision in outdoor space:

Planting a variety of colorful flowers for visual stimulation because it has a calming effect. Also incorporating scents with aromatic plants and sounds from e.g., birds and birdhouses. This is often used for patients with dementia....Display boards for showcasing patients’ work help reassure us that, even though they are there, they remain creative, and not everything is sad or bleak. (Workshop 2 participant)

These elements (e.g., flowers, trees) were viewed as positive distractions that help patients and visitors temporarily escape the stressors of the hospital environment. In addition to greenery, participants proposed water features (e.g., fountains), birdhouses, aesthetic elements (e.g., decorations and graffiti), and opportunities to observe public life, such as orienting benches away from drab views: “Maybe it would be better to have the bench facing the road, so I don’t look at the wall of the University Medical Center building” (Online survey participant).

Contact with nature was highly important to patients—participants highlighted the significance of access to fresh air and waterfront areas, both of which had a calming effect. They envisioned access to outdoor spaces under all weather conditions, which includes features such as covered walkways and seating, as well as the availability of both well-lit and shaded areas.

A peaceful, noise-free environment was also identified as critical for reducing stress and fostering a sense of calm, while traffic noise emerged as a particular concern: “There is too much traffic around the bench (in front and behind), which is why people mostly don’t sit on it” (Online survey participant). Consequently, many suggested installing noise and sight barriers—such as hedges—to block views of the road and mitigate disturbance. They also suggested green/living roofs and atriums to extend accessible outdoor areas and mitigate the high summer temperatures at the Vodmat Medical Area.

3.1.2. Theme 2: Activities in Outdoor Space

Participants expressed a range of desired activities and functions that hospital outdoor spaces should accommodate. The most prominent of them was the need for a sheltered waiting area, particularly for those waiting for transport. One participant explained: “There’s no proper area for patients to wait. There is a small space by the waterfront at the Oncology Institute, but it’s not covered” (Workshop 2 participant).

Due to the lack of covered seating, family members often resort to waiting in cars or standing in the rain: “Family members are waiting for us outside—they don’t sit down because it’s wet, everyone has umbrellas” (Workshop 1 participant).

Alongside practical considerations, participants emphasized the importance of social spaces that would facilitate quality time with family and loved ones. Benches placed opposite each other and tables for communal activities like playing cards were suggested to foster connection during family visits: “Benches don’t allow for quality time—there aren’t enough tables for socializing, and the benches oriented along the path don’t facilitate that” (Workshop 1 participant).

Some envisioned a designated park area for individuals in serious conditions—including those receiving palliative care—where patients and family members could share supportive moments: “They’re hospitalized in a very serious condition. There’s also palliative care there, which is psychologically the hardest. This park could be designated for them and their family members, who would greatly benefit from these shared moments” (Workshop 1 participant).

Privacy further emerged as a crucial requirement, particularly for those coping with difficult emotions or news. Oncology patients, for instance, often need a space to process challenging information or grieve privately:

It would also be very sensible to arrange individual seating (like a separate chair) because oncology patients often need space to think and deal with their struggles. (Workshop 1 participant)

Private areas are crucial, as they often can’t cry in front of others. (Workshop 1 participant)

Beyond social and privacy considerations, participants stressed the importance of relaxation areas: “A relaxation space for patients and their family members—people already arrive in a poor emotional state, only to find a chaotic place with no peace” (Workshop 2 participant).

They also expressed a desire for outdoor spaces that support physical activity and rehabilitation, reflecting a broader interest in remaining active during hospitalization: “The space should ensure comfort so that patients can walk around and relax. There are no areas designated for rehabilitation” (Workshop 1 participant).

Participants emphasized the value of comfortable, well-equipped spaces where patients could walk, exercise, or simply unwind: “Experts advise oncology patients to stay as active as possible to reduce stress, and it would be great if this were already provided within the hospital and outdoor spaces!” (Workshop 1 participant).

Several also underscored the lack of play areas to accommodate pediatric patients:

Pediatrics is missing playground equipment. The (indoor) atrium is large and lovely, but it’s empty—no toys or play areas. We need at least something that will attract and distract children, like pictures to capture their interest. It’s too bare for kids! (Workshop 2 participant)

3.1.3. Theme 3: Supportive Urban Furniture

Participants consistently underscored the need for sufficient, comfortable seating options in outdoor hospital spaces. They noted a general shortage of benches, highlighting that existing seats are often fully occupied: “Along the waterfront, we need more benches, because the existing ones are always occupied” (Workshop 2 participant). Beyond increasing quantity, participants emphasized the importance of ergonomic design. Given

the physical discomfort many hospital patients experience, benches placed on uneven terrain or which were too low posed additional challenges: “The bench could be on even ground and slightly higher” (Online survey participant). Oncology patients, in particular, also expressed a desire for comfortable lounge chairs suitable for use after chemotherapy.

Participants also stressed a preference for flexibility in seating arrangements—ranging from benches oriented toward the road to see an approaching bus, to more secluded benches offering privacy and rest. One participant summed up these various needs: “Add another bench in the same place, right next to it, so I can see the bus. And put a roof on it” (Online survey participant).

In addition to seating, participants noted the need for drinking fountains, especially given the high summer temperatures in the city of Ljubljana. Drinking fountains were also very important for patients with various health conditions—a fibromyalgia patient for example offered: “How about drinking fountains? We need to arrange that. Some of us can’t carry water bottles, because even half a liter is too heavy for me” (Online survey 2 participant).

Lastly, participants mentioned a deficit of trash bins and ashtrays. They felt these amenities were essential to maintaining a clean environment and preventing litter, particularly cigarette butts: “Add more greenery and provide ashtrays for smokers, who currently discard cigarette butts on the lids of the existing trash cans and in the planters near the benches” (Online survey participant).

3.1.4. Theme 4: User-Friendly and Accessible Outdoor Spaces

Participants consistently underscored the importance of user-friendly navigation and wayfinding cues. Many described difficulties locating hospital entrances or green spaces, particularly on initial visits. As one participant remarked, “When I had my first breast exam, I had to put in as much effort to find the clinic as if I were writing a PhD” (Workshop 1 participant). Clear signage and visual cues were seen as critical for participants to facilitate easy navigation. Specific needs were identified for individuals with certain conditions. Individuals with dementia, for example, benefit from markers not only on their way to a destination but also on their return journey: “For people with dementia, signs are also needed on the way back (for instance, from the hospital exit to the bus stop). This allows them to orient themselves immediately, because those with dementia become confused quite easily” (Workshop 2 participant).

Deaf or hard-of-hearing participants further noted that, although physical infrastructure might not hinder them as much, poor visual communication and inadequate signage posed substantial navigational challenges: “From the point of view of the deaf, it’s a different situation. It’s not a physical handicap. Access to information is a bigger problem, in terms of space, if there isn’t enough clear signage” (Workshop 2 participant).

Participants emphasized obstacle-free sidewalks, noting that even small steps or inclines can be significant barriers for some. A tetraplegic participant reported four separate obstacles in a short distance on their way from the bus to their clinic, while blind or visually impaired individuals noted their challenges with ill-placed bollards:

Bollards are a big problem because they're placed in unpredictable locations. People who are blind or visually impaired need to detect the sidewalk with a cane, but the bollards are usually about 10 cm away, so they don't know where the road is. (Patient-led walk participant)

Obstacles on paths were also a problem for participants wanting to come to their clinic on foot: "I am very annoyed by the heavy traffic and parked cars, as those who come on foot often cannot reach the entrance because it is parked-in" (Workshop 1 participant).

Many participants also highlighted the importance of sufficiently wide walkways to accommodate both a wheelchair or cane user and an accompanying person. In accessing green areas, participants wanted multiple route choices rather than a single path, to accommodate different levels of mobility and to reduce the inconvenience of heavy traffic and illegally parked cars.

Convenient drop-off zones, affordable parking, and designated parking areas for people with disabilities were all highlighted as essential for improving access to hospital services. Tactile markings were recommended by blind or visually impaired individuals so that they could travel reliably between bus stops and hospital entrances. Some participants requested bicycle racks and lockers, explaining that the absence of secure bike storage forces them to leave their bikes against fences.

In addition to improving overall accessibility, participants emphasized the importance of maintaining clean and well-kept surroundings to create a welcoming and safe environment within healthcare facilities. They frequently pointed out that benches were often dirty or damaged, which discouraged people from using them, reduced comfort, and contributed to negative distractions and increased stress levels.

Participants also noted that trash bins were not strategically located, resulting in an excessive number being located near benches which are usually occupied by smokers. This placement led to unpleasant odors, further detracting from the usability and appeal of these spaces. The importance of well-maintained environments was highlighted by the need for regular cleaning and repair of amenities such as benches, as well as ensuring that pathways remain clean and unobstructed, which is vital to safe accessibility.

3.2. Quantitative Results: Questionnaire

Out of 382 participants who completed the questionnaire, 231 were patients. The following results pertain exclusively to this group, additionally excluding patients younger than 18 years ($n = 7$). Most reported using their primary healthcare center (CHC Ljubljana) a few times per year (55.4%), while 14.7% of patients visit approximately once per year, and another 14.7% visit approximately once per month. Next is the 6.2% of patients who come every few years, 4.5% several times per month, 1.8% once per week, and 0.4% several times per week. Five patients (2.2%) did not provide an answer.

When visiting their primary healthcare center, most patients stay outside for only a couple of minutes (49.6%), followed by patients that do not use the center's outdoor space (22.3%), those who use it up to 30 minutes (16.1%), and those who use it for more than 30 minutes (9.8%). Five patients (2.2%) did not provide an answer.

Patients most commonly reported using the CHC's outdoor space to wait for their medical appointment or to collect a medical report (35.3%). Other reported uses included observing the surroundings (15.2%), talking on the phone (10.7%), taking a walk (10.7%), waiting for a relative visiting the healthcare center (when not being a patient themselves; 9.4%), waiting for a bus or other means of transport (8.0%), smoking (8.0%), engaging in conversation (7.6%), and reading (5.8%). Four patients (1.8%) reported using the outdoor space to park their vehicle or to relax. Additionally, 79 patients (35.3%) said they do not use outdoor spaces, and 14 people (6.3%) did not provide an answer.

Table 2 presents the percentage of patients (per healthcare center) who identified five of the listed features as among the top five most important elements for the outdoor spaces of health center's units.

Table 2. Overall percentages of the five most important outdoor space features at each CHC's unit for patients.

| Outdoor space features | CHC Center (n = 46) | CHC Črnuče (n = 5) | CHC Fužine (n = 46) | CHC Moste (n = 63) | CHC Vič (n = 64) | All participants (N = 224) |
|---|------------------------|-----------------------|------------------------|-----------------------|---------------------|-------------------------------|
| Accessibility and navigation | | | | | | |
| Maintained pedestrian paths without obstacles | 43.5% | 40.0% | 39.1% | 47.6% | 50.0% | 45.5% (n = 102) |
| Accessible for all forms of disabilities | 34.8% | 20.0% | 34.8% | 41.3% | 42.2% | 38.4% (n = 86) |
| Good public transportation connection | 26.1% | 0.0% | 28.3% | 27.0% | 32.8% | 28.1% (n = 63) |
| Mobility and infrastructure | | | | | | |
| Sufficient number of parking spaces | 39.1% | 40.0% | 34.8% | 41.3% | 42.2% | 39.7% (n = 89) |
| Enough bike racks | 45.7% | 20.0% | 15.2% | 49.2% | 45.3% | 39.7% (n = 89) |
| Designated drop-off point for patients | 21.7% | 40.0% | 23.9% | 23.8% | 31.3% | 25.9% (n = 58) |
| Playgrounds for children | 17.4% | 0.0% | 4.3% | 14.3% | 9.4% | 11.2% (n = 25) |
| Comfort and waiting amenities | | | | | | |
| Enough comfortable benches and other seating | 26.1% | 40.0% | 21.7% | 33.3% | 28.1% | 28.1% (n = 63) |
| Covered areas to shelter from rain or sun | 28.3% | 40.0% | 28.3% | 23.8% | 29.7% | 27.7% (n = 62) |
| Arranged outdoor waiting spaces (for check-ups/transport) | 21.7% | 20.0% | 8.7% | 19.0% | 26.6% | 19.6% (n = 44) |
| Drinking fountain near the entrance | 8.7% | 0.0% | 2.2% | 12.7% | 12.5% | 9.4% (n = 21) |
| Enough space for patient privacy | 4.3% | 0.0% | 6.5% | 15.9% | 6.3% | 8.5% (n = 19) |

Table 2. (Cont.) Overall percentages of the five most important outdoor space features at each CHC's unit for patients.

| Outdoor space features | CHC Center (n = 46) | CHC Črnuče (n = 5) | CHC Fužine (n = 46) | CHC Moste (n = 63) | CHC Vič (n = 64) | All participants (N = 224) |
|---|------------------------|-----------------------|------------------------|-----------------------|---------------------|-------------------------------|
| Environmental and aesthetic qualities | | | | | | |
| Clean and well-maintained outdoor spaces | 47.8% | 40.0% | 60.9% | 52.4% | 53.1% | 53.1% (n = 119) |
| Pleasant green areas | 8.7% | 40.0% | 28.3% | 28.6% | 28.1% | 24.6% (n = 55) |
| Pedestrian safety from traffic | 19.6% | 20.0% | 30.4% | 20.6% | 17.2% | 21.4% (n = 48) |
| Surrounding beautification elements (fountains, sculptures, flower beds, etc.) | 19.6% | 0.0% | 17.4% | 19.0% | 20.3% | 18.8% (n = 42) |
| Calming surroundings of the health center | 10.9% | 0.0% | 23.9% | 12.7% | 12.5% | 14.3% (n = 32) |

4. Discussion

This study examined the utilization of outdoor spaces in public healthcare institutions in Ljubljana to explore their impact on patients' self-care practices. Grounded in Ulrich's (1991) theory of supportive design, our research identified the specific environmental conditions that facilitate patient self-care across various levels and locations of public healthcare services within the city. To our knowledge, this is also the first study to apply this theoretical framework in primary healthcare settings.

We found that most patients at primary healthcare center's units engaged with outdoor spaces only briefly. Among those who did, over half used these areas primarily for waiting—whether for appointments, transportation, or waiting for relatives visiting the center. Besides well-maintained spaces, accessibility emerged as a key priority, emphasizing patients' preferences for ease of movement and entry. With regard to Ulrich's (1991) theory of supportive design, these results suggest that patients in primary healthcare predominantly seek features that enhance their sense of control and accessibility. Conversely, elements such as social support and positive distractions were considered less significant, suggesting that patients actually prioritize a sense of control over their environment rather than social engagement or positive distractions. This likely reflects the transient nature of visits to CHC's units, where efficient navigation and minimal time spent in and around the facilities are of greater importance. A consistent pattern of expectations and potential needs regarding the key features of outdoor spaces has been observed in all of Ljubljana's Community Healthcare Center units included in the study. These findings underscore the necessity to design outdoor spaces with inclusivity and accessibility as central considerations, ensuring they effectively support patient health and well-being.

At secondary and tertiary healthcare institutions in the Vodmat Medical Area, the utilization of outdoor space was notably more extensive, with patients engaging in a wider range of interactions with their physical environment. Consistent with the quantitative results, our qualitative findings strongly support Ulrich's (1991) theory of supportive design, as patients consistently emphasized the importance of maintaining a sense of control in outdoor spaces, particularly through accessibility features that facilitate independent

movement and flexibility to either seek privacy or participate in social interactions. Additionally, they sought environments that enable contact with nature and provide positive distractions (e.g., greenery). While these aspects may not be priorities for patients in primary healthcare settings, those in the Vodmat Medical Area expressed a preference for varied outdoor activities, including socializing with family and friends, engaging in physical activity, participating in recreational pursuits, undergoing rehabilitation, and relaxing. Consistent with previous research (e.g., Djukanović et al., 2017; Tseung et al., 2022), these preferences align with Ulrich's (1991) emphasis on physical movement and social support to mitigate stress. Furthermore, they correspond with Godfrey et al.'s (2011) definition of self-care, which encompasses a range of activities aimed at promoting physical, mental, and emotional well-being. These findings underscore the multifaceted role of outdoor spaces in secondary and tertiary healthcare settings, highlighting their potential to enhance patient experience, autonomy, and recovery.

Previous studies on supportive design in healthcare environments (e.g., Bertelli et al., 2024; Djukanović et al., 2017; Ma et al., 2021; Tseung et al., 2022) have primarily focused on secondary and tertiary healthcare facilities, overlooking the unique context of primary healthcare institutions. Our study addressed this gap by extending the scope of supportive design research to include not only hospitals and specialized clinics but also CHC's units. Findings highlighted a clear distinction between primary healthcare center's units and the Vodmat Medical Area, where clinics provide secondary and tertiary healthcare. In primary healthcare settings, patients prioritize features that are important during short-term use of space—most notably accessibility and maintenance. These preferences probably reflect the brevity of patients' visits, the relatively better health status of primary care patients compared to those in secondary or tertiary settings, and their greater access to alternative spaces for self-care at home or elsewhere in the city.

By contrast, secondary and tertiary clinics cater to patients with more severe health conditions who may face prolonged, intensive care and extended stays, and experience higher levels of stress. Consequently, outdoor spaces in these settings play a critical role in facilitating a broader range of self-care activities to support their physical, mental, and emotional well-being. Consistent with previous research (Tseung et al., 2022), our findings highlighted the heightened need for dedicated spaces for self-care activities, such as relaxation, social support, rehabilitation, and engagement with positive distractions in these environments.

Waiting, a common and often unavoidable experience across all healthcare settings, remains a critical, yet understudied, aspect of patient experience, particularly as it relates to outdoor healthcare spaces. While patients across primary, secondary, and tertiary care emphasized the need for designated waiting areas, research on the role of outdoor waiting areas within healthcare institutions is limited. For example, Ma et al. (2021) found that waiting and rest were the least satisfying functions of the outdoor hospital environment during the Covid-19 pandemic, underscoring the need for thoughtfully designed, accessible areas for waiting and rest areas around outpatient and emergency units equipped with shelter, seating, and drinking water. Additionally, patients across all healthcare levels stressed the importance of well-maintained and inclusive spaces in public health institutions, supporting Power and Williams's (2019) concept of individuals simultaneously acting as caregivers and care receivers. Both qualitative and quantitative findings showed that the patients prioritized "accessible space for all forms of disabilities," highlighting the critical role of inclusive design and a community-oriented focus on mutual care.

Our findings underscored the essential role of well-designed outdoor spaces in supporting self-care and enhancing patient well-being across primary, secondary, and tertiary healthcare settings. Amid broader

societal challenges, such as an aging population and growing healthcare access disparities, there is a strong need for these spaces to function as infrastructures of care at both city and healthcare system levels. Addressing core spatial elements recognized by patients—accessibility, good maintenance, the presence of nature and other positive distractions, opportunities for a range of social encounters, and comfortable waiting areas—can create more supportive and effective environments that enable self-care, foster healing, and reduce stress. This approach aligns with Ulrich's (1991) theoretical framework and directly responds to lived experiences of patients in Ljubljana.

These insights carry significant implications for urban planning and healthcare policy. Urban planners should ensure that outdoor healthcare spaces are designed to accommodate the diverse needs of all patients, fostering an environment that is navigable and accessible for individuals of all abilities. Such spaces should be recognized as essential self-care infrastructure requiring dedicated design, maintenance, and investment. As Cohen and Knierbein (2021) have noted, meaningful care requires sustained investment, material resources, and collective efforts. Given the concentration of vulnerable populations in these publicly owned spaces, their systematic design and management at the city level are critical. Outdoor healthcare spaces should be viewed as vital urban assets that support self-care across the “continuum of care” (Godfrey et al., 2011), from the promotion of good health to recovery. In light of the ongoing challenges in Slovenia's and Europe's healthcare systems (OECD & European Commission, 2024), our study is a call to planners and policymakers to reimagine healthcare environments as pivotal for enabling patient well-being. By addressing the needs of self-caring individuals in outdoor healthcare spaces, these environments can become transformative sites for institutional and urban care practices that serve to enhance public health at large.

While our findings highlight the importance of outdoor healthcare spaces in supporting self-care, several limitations must be acknowledged. First, our research focused on a broad definition of “patients” in primary, secondary, and tertiary healthcare without detailed information on their reasons for visiting the healthcare grounds. For example, patients visiting for routine check-ups might perceive outdoor spaces differently than those with acute conditions or chronic diseases. Given the likely differences in the health and well-being of our participants, future research should explore self-care behaviors and needs along the “self-care continuum” (Godfrey et al., 2011) of disease prevention and disease/injury recovery. Second, while the use of mixed methods contributed to a greater understanding of outdoor healthcare spaces as infrastructures of care, variations in methodology across primary, secondary, and tertiary healthcare institutions limit direct comparisons. Finally, our study focused predominantly on a needs-based analysis of patient behaviors, which may overlook the complex networks of caring relationships within healthcare institutions. Adopting a more holistic, asset-based approach, as recommended by the World Health Organization's Healthy Cities program (World Health Organization, n.d.), could provide deeper insights into these spaces and their role in fostering health and well-being.

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LLMs Disclosure

Grammarly and ChatGPT were used exclusively for grammar and style-related refinements and were not employed for data analysis, literature review, drawing conclusions, or idea generation.

Conflict of Interests

The authors declare no conflict of interests.

Data Availability

The data supporting the findings of this study are available from the corresponding author upon reasonable request by researchers.

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