

Factors Influencing Healing Space Design for the Enhanced Well-Being of Occupants: A Systematic Literature Review

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Abstract: Healing space design can promote healing, foster a positive atmosphere, influence health-related outcomes, reduce stress, decrease healthcare expenditures and enhance well-being. However, a systematic literature review that identifies factors influencing healing space design for the enhanced well-being of occupants is lacking. The influencing factors in healing spaces play a crucial role in the healing process. Therefore, this study aimed to bridge the existing research gap by conducting a systematic literature review that comprehensively identifies and analyses the factors influencing healing space design for the enhanced well-being of occupants. This review synthesised research evidence from Google Scholar, ResearchGate, ScienceDirect, Web of Science and Scopus (studies published between 2013 and 2023). Several critical influencing factors were identified, including nature, lighting, colour, social support, sense of control, privacy, safety, spatial layout, noise control, art and home-like environment. This study provides valuable guidance and insights for designers, environmental planners, architects and policymakers to improve people's well-being through effective healing space design.

Keywords: Healing space, Healing space design, Factors influencing healing space design, Well-being, Healthcare environment

INTRODUCTION

Space can elicit various emotional responses and profoundly impact an individual's emotional state (Tuszyńska-Bogucka et al., 2020). However, negative environments can be detrimental to a person's mental, physical and spiritual health and can hinder their ability to lead a fulfilling life (Blom, 2013). Accordingly, environmental interventions can be a valuable tool for improving quality of life (Huelat, 2023). Numerous studies have demonstrated that a well-designed healing space can positively influence health-related outcomes, foster a positive atmosphere, reduce stress, decrease healthcare expenditures and enhance well-being (Alt, 2017; Gupta, Choudhary and Humaira, 2019; Gushée, 2018; Montefiore, 2023; Pragati et al., 2021; Sabar and Djimantoro, 2020).

Since Ulrich's groundbreaking study in 1984, which demonstrated that hospital rooms with natural scenery could expedite the recovery of surgical patients and reduce their hospital stays, additional studies have emphasised the importance of natural environments in promoting relaxation and attention restoration (Kaplan and Kaplan, 1989). Building on these early findings, numerous studies have explored

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the impact of space on healing perceptions and human health. A significant body of research has thus focused on designing healing spaces. However, a significant knowledge gap remains in the current studies on healing space design.

The predominant focus of the current studies lies in examining natural elements and evaluating the importance of healing spaces within healthcare environments, particularly concerning patients. Nonetheless, few comprehensive studies have aimed to systematically identify and analyse the influencing factors in healing space design that can significantly enhance the well-being of its occupants via a systematic literature review (e.g., Gupta, Choudhary and Humaira, 2019; Hastuti and Lorica, 2020; MacAllister, Bellanti and Sakallaris, 2016; Nijhuis and Wentink, 2017; Pragati et al., 2021), though influencing factors in healing spaces play a crucial role in the healing process (Iyendo, Uwajeh and Ikenna, 2016; Kim, 2021; Mahmood and Tayib, 2020; Timmermann, Uhrenfeldt and Birkelund, 2015). Therefore, this study aimed to bridge the existing research gap by conducting a systematic literature review to comprehensively identify and analyse the factors influencing healing space design for the enhanced well-being of occupants. This study would provide valuable guidance and insights for designers, environmental planners, architects and policymakers to improve people's well-being through an effective healing space design.

To achieve this aim, this study developed a research question: What are the influencing factors in healing space design that contribute to enhancing the well-being of occupants? By investigating the research question, this study could gain a comprehensive understanding of the factors that play a crucial role in healing space design and their effects on well-being enhancement. The study findings will contribute to the existing body of knowledge and provide practical implications for professionals involved in the design and planning of healing spaces.

Descriptions of Healing and Healing Space

Healing, as a concept, transcends the mere absence or presence of disease and encompasses a comprehensive and transformative process that involves the repair and recovery of the mind, body and spirit (DuBose et al., 2018). This leads to positive changes (DuBose et al., 2018). Unlike the term "cure", which implies the elimination of all evidence of a disease, "healing" denotes the achievement of wholeness, not only physically but also mentally and spiritually (Firth et al., 2015). Healing involves restoring balance in the body and creating opportunities for recovery. Even when a physical cure is unattainable, healing can significantly enhance overall well-being (Singh, Sabahat and Qamrudiin, 2021).

In general, the term "healing space" carries a comforting connotation (Huelat, 2003). It refers to a physical environment capable of positively influencing individuals, evoking feelings of comfort, relaxation and calm (Huisman et al., 2012; MacAllister, Bellanti and Sakallaris, 2016). A healing space is also defined as a comprehensive environment that encompasses both physical and non-physical aspects meticulously designed to facilitate the recovery process (Ghazali and Abbas, 2012). A well-designed healing environment can significantly enhance the healing process because the elements surrounding an individual can actively support their innate healing capabilities (DuBose et al., 2018). Therefore, it is not only beneficial but also imperative to conduct research on the factors influencing healing space design, as it can significantly enhance the effectiveness of such spaces (Iyendo, Uwajeh and Ikenna, 2016; Kim, 2021).

Current Studies on Healing Space

Figure 1 shows studies related to healing spaces or healing environments, which are primarily associated with biophilic design, healing gardens and therapeutic landscapes as well as hospital and healthcare settings. Additionally, related studies are linked with diverse topics, such as self-healing, well-being, mental health, COVID-19, cancer and stress.

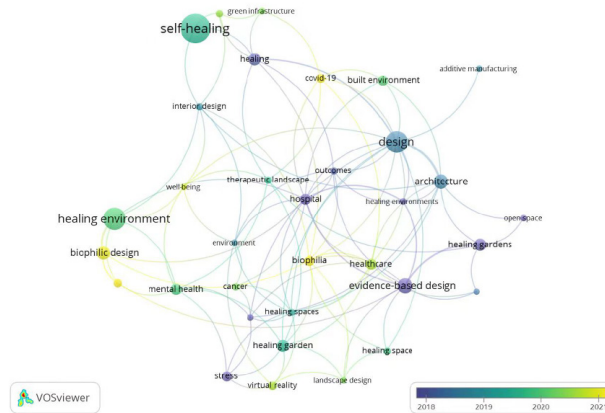


Figure 1. VOSviewer output of studies related to healing space design

Table 1 complements the insights from Figure 1 and corresponds to the VOSviewer output of studies related to healing space design. The studies (as shown in Table 1) aimed to evaluate the significance of healing spaces within healthcare environments and to identify the factors that influence the design of such spaces. These studies provide valuable guidance and references for designing healing spaces, and they offer approaches to creating such environments.

Table 1. Related studies on healing space design

Source	Aim	Method
Gupta, Choudhary and Humaira (2019)	Creating healing spaces in healthcare	Qualitative
Nijhuis and Wentink (2017)	Investigating factors of the healing environment in hospitals	Quantitative
Timmermann, Uhrenfeldt and Birkelund (2015)	Investigating factors of healing space in patient rooms	Qualitative
Mahmood and Tayib (2020)	Assessing the impact of factors on creating healing spaces	Quantitative
Pragati et al. (2021)	Examining the role of creating a healing environment	Systematic literature review

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Table 1. *Continued*

Source	Aim	Method
Kim (2021)	Understanding the role of open spaces contributing to social healing	Qualitative
MacAllister, Bellanti and Sakallaris (2016)	Understanding the healing experience of patients within the hospital	Mixed
Rafeeq and Mustafa (2021)	Exploring the impact of inpatient layout on creating a healing environment	Mixed
Liu, Chen and Jiang (2022)	Analysing factors impacting healing space's environmental identifiability	Quantitative
Sharghi and Kousalari (2017)	Examining cognitive and social factors' role in elderly nursing residence healing	Quantitative
Alt (2017)	Examining the healing function of sacred spaces	Qualitative
Cleveland (2014)	Designing healing space through nature and environment integration	Mixed
Hastuti and Lorica (2020)	Determining the advantages of healing gardens	Systematic literature review
Zhang et al. (2022)	Exploring how healing perception, place attachment and environment design influence visitor loyalty	Quantitative
He et al. (2022)	Exploring the healing benefits of plant landscapes	Qualitative
Lotfi et al. (2020)	Using vertical gardens to promote restoration in urban environments	Quantitative
Bansi (2017)	Exploring the role of biophilic design in promoting healing	Mixed
Belčáková, Galbavá and Majorošová (2018)	Creating a healing environment for patients and employees	Quantitative
Daelemans (2020)	Illustrating church architecture's healing and spiritual impact	Qualitative
Marques, McIntosh and Kershaw (2019)	Researching therapeutic landscape design for older individuals' well-being	Literature review
Gashoot (2022)	Evaluating the influence of interior design features in hospital settings	Qualitative
Fisher et al. (2021)	Examining the role of green/blue spaces	Quantitative

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Table 1. *Continued*

Source	Aim	Method
Cooley et al. (2020)	Creating a framework for outdoor nature therapy	Systematic literature review
Finlay et al. (2015)	Studying the impact of green and blue spaces on older adults' well-being	Qualitative
Twedt, Rainey and Proffitt (2016)	Exploring the role of gardens	Quantitative
Nagib and Williams (2018)	Exploring the role of the therapeutic landscape at home	Quantitative
Van der Linden, Annemans and Heylighen (2016)	Examining the concept of healing environments	Qualitative
Uwajeh, Iyendo and Polay (2019)	Studying the role of therapeutic gardens	Literature review

The studies in Table 1 primarily employed a single research method (either quantitative or qualitative) and focused mainly on medical settings, with patients as the primary research subjects. This methodological bias could potentially limit the comprehensive understanding of healing space design, as each research method brings unique insights. Moreover, the exclusive focus on medical settings and patients may restrict the generalisability of the findings to other environments and occupant groups. Limited attention has been paid to evaluating the influencing factors in healing space design for the enhanced well-being of occupants using a systematic literature review. This literature gap suggests that while existing studies provide valuable insights, there remains a need for a more holistic exploration of the diverse factors that contribute to the effectiveness of healing space design.

Recognising the crucial role of influencing factors in the healing process, this study aimed to bridge the existing research gap by conducting a systematic literature review that comprehensively identifies and analyses the factors influencing healing space design for the enhanced well-being of occupants. By explicitly addressing these limitations and undertaking a thorough analysis of influencing factors, this study sought to contribute valuable insights to the evolving field of healing space design.

METHODOLOGY

This study employed systematic methods to collect secondary data from various existing studies, including quantitative, qualitative and experimental studies and randomised controlled trials. The primary objective was to qualitatively and quantitatively analyse and synthesise the gathered findings in order to identify the factors that influence the design of healing spaces with the aim of enhancing the well-being of occupants. The study's systematic review adhered to the guidelines outlined in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2009 to ensure proper reporting and rigorous methodology throughout the review process (Moher et al., 2009).

Search Strategies and Study Selection

The researchers conducted a comprehensive search across various academic databases, including Google Scholar, ResearchGate, ScienceDirect, Web of Science and Scopus, with the aim of identifying relevant articles about healing space design and the factors influencing it. The search was conducted using keywords such as “Healing space” or “Healing environment”, “Healing space design” and “Factors affecting healing space design”. These keywords were chosen to target articles specifically addressing the design of spaces intended to promote healing and well-being, as well as those discussing the various factors that shape spaces.

The database search yielded 514 articles related to the topic of healing space design. Subsequently, these articles underwent a rigorous screening and eligibility assessment following the predefined inclusion and exclusion criteria (as shown in Table 2). The selection process involved two screenings. In the initial screening, the three authors independently evaluated the articles based on their titles and abstracts. Following this, articles deemed potentially eligible were identified. In the second screening, eligible articles were assessed independently via a thorough examination of the full text by the three authors. Any discrepancies in the selection of articles were resolved through discussion and consensus among the authors regarding the application of the inclusion and exclusion criteria.

Table 2. Inclusion and exclusion criteria for articles

Criteria	Inclusion Criteria	Exclusion Criteria
Study topic	Exploration of healing space design	Studies unrelated to the exploration of healing space design
Study type	Both qualitative and quantitative studies, including empirical research, case studies, literature reviews, theoretical analyses, systematic reviews and meta-analyses	Non-peer-reviewed sources, such as newspaper articles, magazines, blogs and non-academic websites
Study language	Articles written in English	Non-English studies
Type of subject	Studies involving individuals interacting with or residing in healing spaces	Studies not involving individuals interacting with or residing in healing spaces
Intervention	Design factors enhancing well-being in healing spaces	Studies that do not specifically examine design factors aimed at enhancing well-being in healing spaces
Content	Studies focus on exploring the design factors enhancing well-being in healing spaces	Studies that do not focus on exploring the design factors enhancing well-being in healing spaces

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Table 2. Continued

Criteria	Inclusion Criteria	Exclusion Criteria
Outcome measure	Enhanced well-being	Studies that do not measure or assess enhanced well-being as an outcome
Full-text articles	Only full-text articles can be considered for inclusion	Articles that are not available in full text
Publication timeframe	Studies published between 2013 and 2023	Studies published before 2013

Figure 2 provides an overview of the search process. Through this meticulous screening process, a total of 24 full-text articles were identified as meeting the criteria for inclusion in the systematic review. These selected articles primarily focused on examining factors influencing healing space design. The systematic review synthesised the findings from these 24 articles, providing valuable insights into the pivotal factors shaping healing spaces to enhance occupants' well-being.

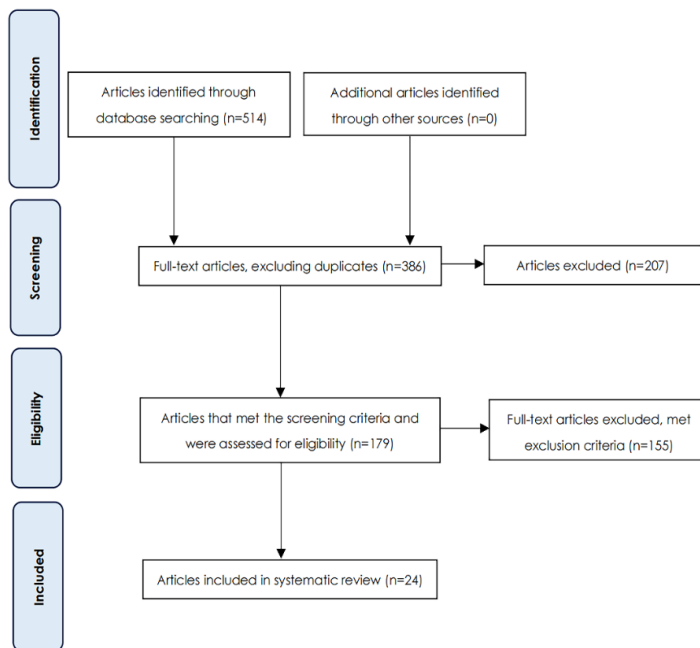


Figure 2. Flow chart of screening

Quality Assessment

The quality assessment process within this systematic literature review was designed to assess the reliability and validity of the 24 full-text articles. Each study's quality was evaluated based on five key criteria: research design, data collection instruments, sample size, outcome measures and interpretation of major findings. These criteria aligned with the PRISMA 2009 checklist and flow diagram, ensuring a rigorous and comprehensive evaluation process. A total of three researchers independently evaluated the quality of the studies, followed by a comparison of their scores. Any disagreements were resolved through discussion until a consensus was reached. The studies exhibited variations in meeting the quality criteria and none were excluded throughout the appraisal process.

Data Extraction

The data extraction process entailed the organisation of pertinent information from 24 selected full-text articles. An Excel spreadsheet was utilised to record key information extracted from each study, encompassing study details, research design, investigated factors, research findings and conclusions. This data extraction process was undertaken with the objective of gathering comprehensive information from each study, thereby facilitating a comprehensive analysis of the factors that influence healing space design to enhance the well-being of occupants.

RESULTS

After thoroughly examining and synthesising the findings related to influencing factors of the 24 selected articles (as shown in Table 3), the researchers identified 11 factors influencing healing space design for the enhanced well-being of occupants: nature, lighting, colour, social support, sense of control, privacy, safety, spatial layout, noise control, art and home-like environment (as shown in Table 4). Each influencing factor was individually examined, providing in-depth insights into its significance in healing space design for the enhanced well-being of occupants.

Table 3. Factors influencing healing space design

Source	Identified Influencing Factors
Alhsainat (2018)	Sense of control, social support, positive distractions (playing, education, arts and nature), sensory dimension (sense of touch, vision and acoustics), age-appropriate environment and security
Gupta, Choudhary and Humaira (2019)	Colour, natural light, landscape, water, material and open space
DuBose et al. (2018)	Home-like environment, access to view and nature, light, noise control, barrier-free environment and room layout
Nijhuis and Wentink (2017)	Presence of nature, art, sense of control and ambient conditions

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Table 3. *Continued*

Source	Identified Influencing Factors
Meng, Zhu and Wen (2020)	Social/spatial support, eliminating the stress factors in the environment, distracting positive things, controllability and positive feelings
Uwajeh and Ezennia (2019)	Comfortable furniture, social support, nature elements, privacy, lighting, sense of control, artwork, proper signage/wayfinding and colour
Singh, Sabahat and Qamruddin (2021)	Social support, access to nature, light, colour, art, gardens and indoor air quality
Blom (2013)	Connected with nature, thermal comfort, natural materials, sunlight and natural ventilation
Sarjani, Saragih and Soebiyani (2020)	Social support, sense of control and access to nature
Hesselink et al. (2020)	Sense of control, positive distractions (personalised room, connection to nature and the outside, undertaking activities) and social support
Timmermann, Uhrenfeldt and Birkelund (2015)	A view of nature and sunlight
Mahmood and Tayib (2020)	Interior appearance (artificial lighting, colours, art and plants and interesting ceiling designs), privacy, comfort and control
Beemer et al. (2021)	Connection to nature (viewing, incidental contact and interacting with nature), sense of control (direct control and indirect control), social interaction, noise exposure, presence or absence of natural lighting and overall building quality and indoor air quality
Schreuder et al. (2016)	Spatial comfort (interior design, views and access to nature), safety, sense of control and privacy
Rafeeq and Mustafa (2021)	Layout typology
Pragati et al. (2021)	View to the outside and social support
MacAllister, Bellanti and Sakallaris (2016)	Home-like environment, positive distraction (television), soft furnishings and social support
Sabar and Djimantoro (2020)	Home-like environment, sunlight, room layout, noise control, access to nature and barrier-free design
Sarapultseva et al. (2022)	Views, nature, comfort and control, privacy, interior appearance, facility and dignity
Gaminiesfahani, Lozanovska and Tucker (2020)	Noise, music, lighting, nature, crowding, colour, spatial needs (comfort, safety and privacy) and positive distraction (play and art)

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Table 3. *Continued*

Source	Identified Influencing Factors
Bansi (2017)	Natural elements (sunlight, colour, raw materials, fresh air), sounds, colour, texture, light, shadows, materials and smells
Gashoot (2022)	Flexibility and mobility, pleasant artwork, window views, technology, bright colours and a sense of control
Nejati et al. (2016)	Visual and access to the outdoors, additional amenities, privacy and tranquillity, sunlight, access to nature and fresh air
Iyendo, Uwajeh and Ikenna (2016)	Natural surfaces, natural lighting and natural views, landscaped gardens, fascinating colours, access to personal control, privacy, social support and positive distraction (art, music, television)

Table 4. Summary of the factors influencing healing space design

Influencing Factors	Sources
Nature: Natural light, natural material, natural sound, water, natural air, access to nature, view of nature	Alhsainat (2018); Gupta, Choudhary and Humaira (2019); DuBose et al. (2018); Nijhuis and Wentink (2017); Uwajeh and Ezennia (2019); Singh, Sabahat and Qamrudiin (2021); Blom (2013); Sarjani, Saragih and Soebiyani (2020); Hesselink et al. (2020); Timmermann, Uhrenfeldt and Birkelund (2015); Mahmood and Tayib (2020); Beemer et al. (2021); Schreuder et al. (2016); Pragati et al. (2022); Sabar and Djimantoro (2020); Sarapultseva et al. (2022); Gaminiesfahani, Lozanovska and Tucker (2020); Bansi (2017); Gashoot (2022); Nejati et al. (2016); Iyendo, Uwajeh and Ikenna (2016)
Lighting	DuBose et al. (2018); Uwajeh and Ezennia (2019); Singh, Sabahat and Qamrudiin (2021); Gaminiesfahani, Lozanovska and Tucker (2020); Bansi (2017)
Colour	Gupta, Choudhary and Humaira (2019); Uwajeh and Ezennia (2019); Singh, Sabahat and Qamrudiin (2021); Mahmood and Tayib (2020); Gaminiesfahani, Lozanovska and Tucker (2020); Bansi (2017); Gashoot (2022); Iyendo, Uwajeh and Ikenna (2016)
Social support	Alhsainat (2018); Meng, Zhu and Wen (2020); Uwajeh and Ezennia (2019); Singh, Sabahat and Qamrudiin (2021); Sarjani, Saragih and Soebiyani (2020); Hesselink et al. (2020); Beemer et al. (2021); Pragati et al. (2022); MacAllister, Bellanti and Sakallaris (2016); Iyendo, Uwajeh and Ikenna (2016)

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Table 4. *Continued*

Influencing Factors	Sources
Sense of control	Alhsainat (2018); Nijhuis and Wentink (2017); Meng, Zhu and Wen (2020); Uwajeh and Ezennia (2019); Sarjani, Saragih and Soebiyani (2020); Hesselink et al. (2020); Mahmood and Tayib (2020); Beemer et al. (2021); Schreuder et al. (2016); Sarapultseva et al. (2022); Gashoot (2022); Iyendo, Uwajeh and Ikenna (2016)
Privacy	Uwajeh and Ezennia (2019); Mahmood and Tayib (2020); Schreuder et al. (2016); Sarapultseva et al. (2022); Gaminiesfahani, Lozanovska and Tucker (2020); Nejati et al. (2016); Iyendo, Uwajeh and Ikenna (2016)
Safety	Alhsainat (2018); Schreuder et al. (2016); Gaminiesfahani, Lozanovska and Tucker (2020)
Spatial layout	DuBose et al. (2018); Rafeeq and Mustafa (2021); Sabar and Djimantoro (2020)
Noise control	Alhsainat (2018); DuBose et al. (2018); Gaminiesfahani, Lozanovska and Tucker (2020)
Art	Alhsainat (2018); Nijhuis and Wentink (2017); Uwajeh and Ezennia (2019); Mahmood and Tayib (2020); Gaminiesfahani, Lozanovska and Tucker (2020); Singh, Sabahat and Qamrudiin (2021); Gashoot (2022); Iyendo, Uwajeh and Ikenna (2016)
Home-like environment	DuBose et al. (2018); MacAllister, Bellanti and Sakallaris (2016); Sabar and Djimantoro (2020)

Nature

Nature emerged as an influencing factor in designing healing spaces for the enhanced well-being of occupants due to its profound healing effects (Blom, 2013). Upon meticulous examination of the 24 studies included in this systematic review, a number of natural elements were recognised as influencing factors within the category of nature, namely natural light, natural materials, natural sound, water features, natural air, access to natural environments and views of nature (as shown in Table 4).

Natural light influences human health and performance by governing the body's circadian system, which manages the feelings of drowsiness and alertness throughout a 24-hour cycle (Gaminiesfahani, Lozanovska and Tucker, 2020). Furthermore, natural light has been shown to reduce depression, improve sleep, shorten healthcare facility stays, lower pain medication costs, foster a positive environment, alleviate stress, aid infection control and enhance recovery rates (Gaminiesfahani, Lozanovska and Tucker, 2020; Gupta, Choudhary and Humaira, 2019; Ulrich et al., 2004). For instance, sunlight triggers chemical reactions in the skin by activating molecules such as vitamin D, which plays a crucial role in calcium absorption and in strengthening the immune system (Singh, Sabahat and Qamrudiin,

2021). Thus, the incorporation of natural materials in healing environments reinforces one's connection to nature, enhances perception of the healing environment and expedites recovery, thereby promoting psychological and physiological well-being (Bansi, 2017; Najafi, Mitic and Zanic, 2019).

Various materials possess distinct textures that can be employed to evoke specific moods or messages in an environment (Alhsainat, 2018). Texture variations enable users to perceive smoothness, roughness, coldness or softness through touch. By utilising diverse textures, the attributes of a space can be defined, significantly impacting users' physical and visual experiences and influencing the overall mood and identity of the space (Alhsainat, 2018; Gupta, Choudhary and Humaira, 2019). Therefore, the greater the "naturalness" of the building material, the more positively individuals will perceive these environments (Blom, 2013). In addition, natural sounds can contribute to therapeutic effects and promote overall well-being (DuBose et al., 2018). For example, noise can induce direct physiological stress and strain on the heart muscles, whereas natural sounds have the potential to alleviate these effects (Blom, 2013).

Water symbolises the cycle of life, from birth to death and embodies spiritual purity, bringing positivity to mind, body and spirit. Its gentle sounds induce calm, peace, relaxation and tranquillity (Blom, 2013; Gupta, Choudhary and Humaira, 2019). As a result, incorporating a water element activates the sense of hearing. Meanwhile, fresh air is an indispensable element in building design, serving multiple essential purposes. It not only helps mitigate unpleasant odours but also ensures an adequate supply of oxygen to occupants. Fresh air also contributes to enhancing thermal comfort within indoor spaces and plays a crucial role in supporting the healing process, particularly in healthcare facilities (Jer and Ibrahim, 2014; Walker, 2016). Importantly, the quality of indoor air extends beyond the physical realm. It has a profound impact on human health, influencing behaviour, emotions and overall wellness (Blom, 2013).

In short, access to nature and views of nature have been shown to reduce stress levels, foster positive and hopeful thoughts and alleviate anxiety and fatigue, ultimately enhancing one's overall quality of life (Sabar and Djimantoro, 2020; Sakallaris et al., 2015). Additionally, views of nature, such as gardens, can promote harmony of the mind, body and spirit (Sakallaris et al., 2015). Accordingly, fostering a strong connection with nature can yield positive impacts, including improvements in physical health, mental well-being and cognitive function. As such, healing space design should prioritise the thoughtful incorporation of nature.

Lighting

Artificial light and natural light constitute the architectural lighting environment (Youssef, 2020). "Lighting" in this context refers to artificial light. Lighting can significantly impact mood, behaviour and even the immune system, which influences healing (Huelat, 2003; Sternberg, 2009). Furthermore, artificial lighting can enhance the visual appeal of an environment (Nijhuis and Wentink, 2017). Lighting, along with texture and colour, is crucial to prevent the creation of an ineffective and unsettling environment. For example, an abundance of natural daylight and the soothing use of light blue contribute to establishing a warm and

inviting atmosphere (Alhsainat, 2018). However, excessive exposure to artificial light can lead to adverse effects such as eye fatigue, headaches and visual impairment (Singh, Sabahat and Qamrudiin, 2021). Therefore, a proper lighting design is crucial in creating a healing space.

Colour

The power of colour in design lies in its ability to evoke emotions, influence physiology, affect moods and behaviours, stimulate the senses and even enhance calmness, relieve pain, reduce negative emotions and increase one's sense of comfort in the environment (Alhsainat, 2018; Gaminiesfahani, Lozanovska and Tucker, 2020; Nijhuis and Wentink, 2017; Singh, Sabahat and Qamrudiin, 2021). Colour can create a supportive environment in healthcare settings; careful colour selection can help reduce stress and promote serenity (Iyendo, Uwajeh and Ikenna, 2016). In various cultural settings and depending on the specific context, different colours have the potential to elicit either positive or negative effects on individuals (Gupta, Choudhary and Humaira, 2019). Hence, meticulous attention to colour is imperative when designing a healing environment.

Furthermore, colour harmonies can create a vibrant and visually captivating environment with the right balance of complexity (Alhsainat, 2018). Marberry and Zagon (1995) stated that the most prevalent colour harmonies include analogue harmony, complementary harmony, split harmony and full spectrum (as shown in Figure 3). Their effective utilisation can greatly enhance the aesthetic appeal and emotional impact of visual creations. The careful selection of colours in healing space design is crucial for influencing emotions and promoting overall well-being. By thoughtfully incorporating colour harmonies, designers can create visually appealing environments that positively impact occupants' moods, contributing to a healing atmosphere.

Social Support

Receiving emotional support from loved ones and healthcare professionals is crucial in promoting positive healing outcomes (Hesselink et al., 2020). The presence of a supportive social environment is essential for psychological well-being, making it imperative to establish such an environment in any healing situation (Beemer et al., 2021; Singh, Sabahat and Qamrudiin, 2021). Numerous studies have shown that social support can reduce stress and improve recovery rates (Nijhuis and Wentink, 2017; Singh, Sabahat and Qamrudiin, 2021; Sternberg, 2009; Ulrich, 1991). Furthermore, social support can provide physical, psychological, social and cultural assistance, which is necessary for effective physical therapy (Kim, 2021). The significance of social support in healing space design is paramount because it plays a crucial role in promoting positive healing outcomes and psychological well-being.

Sense of Control

A lack of personal control within one's environment has been linked to cognitive impairments and decreased motivation (Beemer et al., 2021). In this context, control refers to the ability to make decisions about one's surroundings and interactions (Herweijer-van Gelder, 2016). A lack of sense of control often leads to negative outcomes, such as depression, passivity, weakened immune system function and elevated blood pressure, all contributing to heightened stress levels (Beemer et al., 2021; Nijhuis and Wentink, 2017; Ulrich, 1991). Research indicates that individuals with greater control over their environment, including factors such as furniture arrangement, lighting and temperature, tend to experience lower levels of mental stress (Beemer et al., 2021; DuBose et al., 2018; Schreuder et al., 2016). The profound impact of personal control on well-being underscores the importance of a sense of control in healing space design.

Privacy

Privacy encompasses the opportunity for individuals to be alone or in the company of others, the ability to withdraw from unwanted situations, both visually and audibly and the option to withhold personal information (Herweijer-van Gelder, 2016). It is a fundamental human need at the personal level (Alhsainat, 2018). Research has shown that maintaining privacy in healthcare settings can enhance patient satisfaction, improve sleep quality and reduce medical errors (Nijhuis and Wentink, 2017; Schweitzer, Gilpin and Frampton, 2004). Recognising and preserving privacy is crucial not only as a fundamental human need but also for its positive impacts on patient well-being and healthcare outcomes.

Safety

Safety is among the most fundamental humanitarian needs, encompassing the imperative task of safeguarding individuals from both physical and psychological harm (Joseph, Choi and Quan, 2016). This notion of safety extends beyond mere protection; it is intrinsically tied to the sense of security one experiences in a warm and welcoming environment, reminiscent of the comfort found at home (Alhsainat, 2018). Prioritising safety in healing space design allows for the creation of spaces that not only shield individuals from harm but also provide the reassuring ambience of security akin to the comfort of home.

Spatial Layout

Designing room layouts that alleviate stress and enhance overall quality of life is crucial (Sabar and Djimantoro, 2020). Interactions within a space are greatly influenced by its zoning, encompassing public, semi-public and private areas (Singh, Sabahat and Qamrudiin, 2021). Various aspects of spatial layout, such as the number of occupants in a room, shared bathrooms and the size of windows, can significantly impact an individual's health and emotional well-being (Nijhuis and Wentink, 2017). Thus, the meticulous design of room layouts is integral for alleviating stress and enhancing quality of life.

Noise Control

Noise, defined as unwanted sound (Nijhuis and Wentink, 2017), has both physical and psychological implications. One notable effect is its capacity to induce stress (Herweijer-van Gelder, 2016), leading to an increase in blood pressure and heart rate (Gaminiesfahani, Lozanovska and Tucker, 2020). Moreover, the impact of noise extends to healthcare settings, where it negatively affects patients' sleep and satisfaction (Nijhuis and Wentink, 2017; Ulrich et al., 2008). Therefore, recognising and addressing the impact of noise on both physical and psychological well-being is critical to healing space design.

Art

Art is widely recognised for its capacity to offer positive distractions (Herweijer-van Gelder, 2016; Iyendo, Uwajeh and Ikenna, 2016; Singh, Sabahat and Qamruddin, 2021). Furthermore, art has the unique ability to elicit positive emotions and effortlessly capture the attention of patients, which can potentially reduce stress levels (Iyendo, Uwajeh and Ikenna, 2016; Nijhuis and Wentink, 2017; Ulrich, 1992).

Notably, artwork depicting natural scenes possesses a remarkable ability to reconnect patients with the outside world, thus expediting the healing process and facilitating their return to normality. Additionally, art can significantly enhance patients' satisfaction with their environment (Gashoot, 2022; Mahmood and Tayib, 2020). Art thus serves as a potent bridge connecting the human mind and soul (Singh, Sabahat and Qamruddin, 2021). The profound impact of art on positive distraction, emotional well-being and patient satisfaction underscores its significance in healing space design.

Home-like Environment

A home-like environment in healthcare settings has demonstrated significant potential to benefit patients. These environments not only reduce patients' emotional distress but also promote feelings of comfort and relaxation while instilling a sense of control and security (Sabar and Djimantoro, 2020). Furthermore, a home-like environment contributes to fostering intimacy, enhancing feelings of security and ultimately expediting the healing process (DuBose et al., 2018; MacAllister, Bellanti and Sakallaris, 2016). A home-like environment benefits occupants by reducing distress, enhancing comfort, instilling a sense of control and security, fostering intimacy and expediting the healing process.

DISCUSSION

The current study aimed at identifying and analysing influencing factors to provide profound insights into healing space design with the ultimate goal of enhancing the well-being and therapeutic outcomes of occupants. Accordingly, a comprehensive analysis of factors influencing healing space design was conducted. The study categorised the factors into 11 categories: nature, lighting, colour, social support, sense of control, privacy, safety, spatial layout, noise control, art and home-like environment. Among these 11 influencing factors, nature, sense of control and social

support emerged as the most influential in the design of healing spaces. Colour, art and privacy were also closely associated with successful healing space design. Conversely, safety, spatial layout, noise control and a home-like environment were found to exert comparatively less influence on the enhancement of occupants' well-being.

All 11 factors collectively underscore the critical role of healing space design in improving the well-being of occupants. Nature, for instance, could reduce stress, enhance cognitive function and improve both physical and mental health. Adequate artificial lighting not only influences mood and behaviour but also impacts the immune system, fostering healing and creating visually appealing, inviting environments. Colours evoke emotions, influence physiology, reduce stress and promote serenity. Social support contributes to stress reduction and improved recovery rates, while a sense of control reduces stress levels and enhances mental well-being. Privacy meets fundamental human needs, enhances satisfaction, improves sleep quality and reduces medical errors.

Prioritising safety not only protects individuals but also provides a sense of security akin to the comfort of home. Spatial layout alleviates stress and enhances health and emotional well-being. Noise control contributes to stress reduction, improved sleep quality and overall satisfaction. Art provides positive distractions, elicits positive emotions, reduces stress, enhances satisfaction with the environment and creates connections between the mind and the soul. Lastly, a home-like environment reduces emotional distress, promotes comfort and relaxation, instils a sense of control and security, fosters intimacy and enhances feelings of overall security.

Influencing factors play a pivotal role in healing space design for the enhanced well-being and therapeutic outcomes of occupants. Therefore, identifying and analysing the impact of the 11 influencing factors discussed in this study provides valuable methods for and insights into creating healing spaces for the enhanced well-being of occupants.

CONCLUSION

This study conducted a comprehensive exploration of the influencing factors that create a positive healing space for the enhanced well-being of occupants through a systematic literature review of 24 relevant studies. Drawing on the insights of the studies, a total of 11 pivotal influencing factors were identified, namely nature, lighting, colour, social support, sense of control, privacy, safety, spatial layout, noise control, art and home-like environment. The central aim of this investigation was to identify and analyse the profound impact of these factors on the well-being of occupants within healing spaces.

The findings provide compelling evidence that the integration of these influencing factors into healing space design has the potential to profoundly enhance the well-being of occupants. This enhancement encompasses a spectrum of positive experiences and emotions, including feelings of comfort, tranquillity and positivity. Moreover, the incorporation of these elements has demonstrated the capacity to mitigate stress levels and yield health outcomes.

The implications of this study extend beyond academics as they offer valuable insights for practitioners and professionals engaged in the design and planning of healing spaces. By recognising the pivotal role of these influencing factors, designers, architects and healthcare professionals can embark on a transformative journey, creating environments that not only heal but also enhance the human experience.

In conclusion, this study enriches the existing body of knowledge surrounding healing space design and underscores the indispensable significance of these influencing factors in the pursuit of enhancing the well-being and therapeutic outcomes of those who inhabit these spaces.

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