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Formulation of A Conceptual Framework for Healing Architecture with A Life-Hope Approach in Prostate Cancer Treatment Centers: A Case Study in Tonekabon City

Samaneh Hoseinpourian Chabok[1], **Akbar Lachini**[1,*]

[1] Department of Architecture, Qazvin Branch, Islamic Azad University, Qazvin, Iran; s_poorian@yahoo.com; Akbarlachini@gmail.com.

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Abstract

In recent studies on therapeutic architecture, the physical environment plays a decisive role in enhancing the healing process and strengthening patients' hope for life. Prostate cancer, as one of the most prevalent diseases among men, requires spaces that, beyond fulfilling functional requirements, also address the psychological and emotional dimensions of treatment. This study aims to formulate a conceptual framework of Healing Architecture with a Life-Hope orientation in prostate cancer treatment centers of Tonekabon City. The research adopts a qualitative–analytical methodology based on documentary studies conducted between 2019 and 2025, and the data are analyzed through the Environment–Perception–Behavior (EPB) model. The findings reveal a significant relationship between environmental elements (such as natural light and native vegetation), spatial perception (including homelike character and personal control), and patients' adaptive behaviors, which ultimately lead to the emergence of the concept of Spatial Hope. The proposed model has been structured around eight localized quantitative design indicators adapted to the climate and culture of Tonekabon and demonstrates the potential for Post-Occupancy Evaluation (POE) in real healthcare settings. This framework provides a scientific foundation for the localization of healing architectural principles and the enhancement of treatment quality within Iran's healthcare system.

Keywords: Healing architecture, Life hope, Prostate cancer, Spatial hope, Environment–perception–behavior model, Homelike space.

1 | Introduction

The growing prevalence of cancer in recent years has underscored the necessity of improving the quality of healthcare environments and their role in reducing anxiety and enhancing patients' hope for life. Among different types of cancer, prostate cancer, due to its long treatment process and pervasive psychological stress,

Corresponding Author: Akbarlachini@gmail.com

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requires spaces that not only satisfy technical and functional criteria but also strengthen patients' sense of calm, control, and hope.

International research demonstrates that environmental factors such as natural light, views of nature, spatial legibility, and homelike characteristics play a pivotal role in reducing stress and improving patients' overall experience, and are therefore recognized as key components in the Healing Architecture approach. Despite this body of knowledge, in Iran, particularly in the city of Tonekabon, with its exceptional climatic and natural landscape potentials, healthcare facilities have remained largely focused on engineering and structural requirements, paying limited attention to perceptual–psychological dimensions of space. Domestic studies reveal that no localized model has yet been developed to explain the relationship between environment, perception, and behavior in therapeutic settings, and that the concept of hope as an environmental variable has been scarcely addressed in the design of clinics and hospitals.

In response to this gap, the present study employs a qualitative–analytical approach based on documentary comparative studies. A review of scholarly literature (2019–2025) revealed a major research gap, the absence of an integrated framework explaining the role of environmental components in shaping hope within the climatic–cultural context of Tonekabon. Accordingly, the conceptual analysis was conducted using the Environment–Perception–Behavior (EPB) model to explore how the physical and sensory elements of space can activate perceptual mechanisms of hope and enhance the healing experience of patients with prostate cancer.

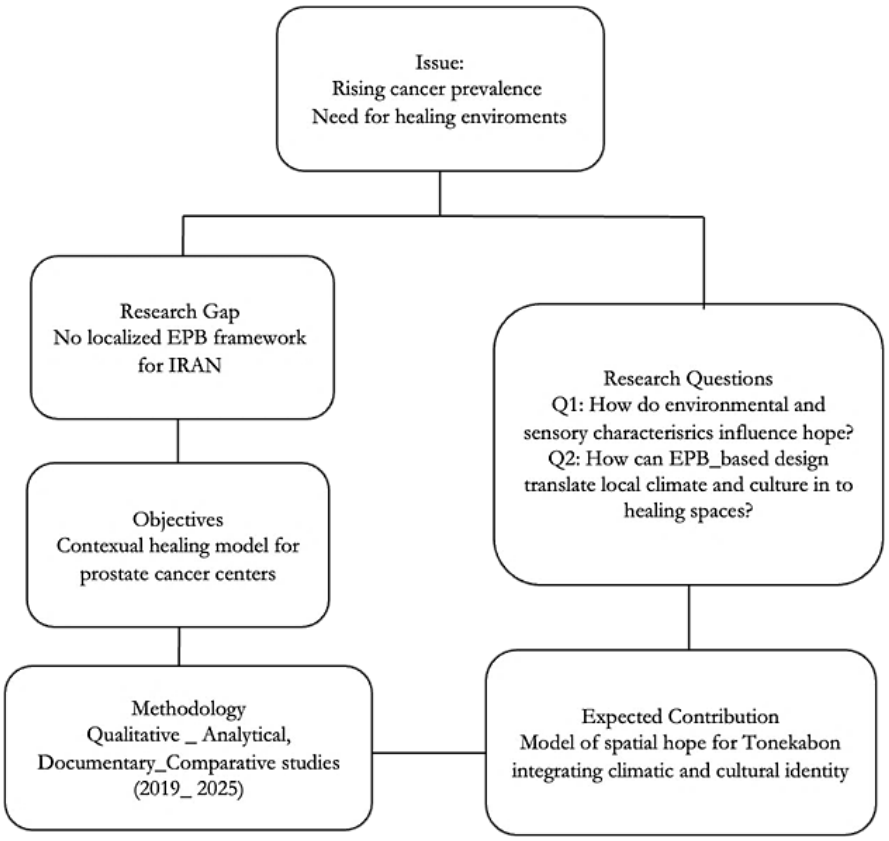

Fig. 1. Developing a conceptual EPB framework for healing environments in the prostate cancer center.

2 | Theoretical Foundations

2.1 | Theoretical Developments in Healing Architecture

The concept of Healing Architecture, as a modern approach to the design of care environments, derives from the integration of architectural knowledge, health psychology, and perceptual ecology. Studies conducted over

the past decade have shown that spatial quality can improve patients' physiological indicators and guide their psychological states toward adaptation to treatment [1]. Revisiting Ulrich's Classical theory [2] updated in Ulrich et al. [3] indicates that viewing natural landscapes reduces patients' heart rate and blood pressure, thereby accelerating the recovery process. These findings led the design of healthcare centers to shift from a purely functionalist perspective toward the idea of "meaningful space" [4]. According to Iranian studies, the incorporation of natural elements such as daylight, native colors, the sound of flowing water, and vegetation in therapeutic environments can effectively reduce anxiety [5]. Such results reveal that Healing Architecture is not merely a physical construct, but rather a perceptual and lived experience. Therefore, the theoretical foundation of the present paper conceptualizes Healing Architecture as an interdisciplinary system that, through perceptual environment and connection with nature, contributes to the restoration of hope and meaning in the lives of patients.

2.2 | Life Hope within the Therapeutic Environment

2.2.1 | Cognitive and emotional dimensions of hope in the healing process

In positive psychology theory, hope is understood as a dynamic process that connects belief, goal-orientation, and strategy [6]. Findings by Balen and Merluzzi [7] demonstrate that hope possesses a cognitive foundation, regulating patients' perception of control and meaning under critical conditions. Likewise, clinical studies by Rustøen et al. [8] indicate that patients with higher levels of hope not only show greater therapeutic acceptance but also report higher perceived quality of life. Based on these findings, hope can be conceptualized through three interrelated components:

I. Goal-directed thinking, which defines one's mental orientation and purpose.

II. Personal efficacy, enabling the individual to achieve therapeutic pathways.

III. Emotional coherence, sustaining biological motivation throughout treatment.

Within the healing environment, these components are activated by physical and perceptual cues of space. For instance, the presence of natural colors and warm light stimulates the calming emotional system and alleviates anxiety [7]. Consequently, hope emerges through the interaction between mind and environment, strengthening the patient's sense of future-orientation and promoting resilience during therapy.

2.2.2 | Mediation of the healing environment in the regeneration of hope

Qualitative studies by Feng et al. [4] revealed that in Healing Hospital Architecture, spaces endowed with green-view exposure and ordered daylight paths evoke a sense of therapeutic direction, whereas enclosed and uncontrolled environments enhance the feeling of therapeutic escape or avoidance. Similarly, the domestic study by Mohajerinia and Rahmani Qasbeh [9] reported that hospital rooms with direct views of greenery experienced an 18% increase in the Life-Hope index. Such empirical evidence confirms that the healthcare environment functions as an intermediary between the patient's physical and semantic experience, which is perceptually comprehended from the environment, and rationally sustains the continuity of mental hope. A space becomes effective when it strengthens three "mental pathways" of hope:

I. Clarity of therapeutic purpose through spatial legibility.

II. Traceability of movement through a clear circulation design.

III. Stabilization of meaning through a calming visual language, use of natural light, and the presence of vegetation.

2.3 | Space, Perception, and the Mechanism of Mental Health

2.3.1 | Perceptual mechanisms in experiencing healing spaces

In Gibson's "Affordance-Perception" theory [10], the environment is a carrier of interactable opportunities perceived through active sensory engagement. In therapeutic spaces, patients similarly construct perceptual

patterns through sensory experience that contribute to their psychological regulation. Visual capacities such as open outlooks, access to daylight, and materials with natural textures enhance perceptual opportunities for safety and predictability [11]. According to the Kaplan Model [12], environments with high perceptual clarity enable Cognitive Restoration, the recovery of mental focus, and the reduction of stress. Among oncology patients, such positive restoration elevates the sense of control, giving rise to a renewed perception of hope.

2.3.2 | Cognitive restoration and the sense of control in recreating mental well-being

Mizumoto et al. [13] demonstrated that direct visual connection to nature reduces heart rate and psychological pressure. Likewise, Boyce [14] confirmed that gradually fluctuating daylight and gentle natural sounds enhance autonomic neural regulation, thereby reinforcing the patient's sense of control during treatment. In Tonekabon, environmental features such as dense greenery, diffused light, and the sound of rainfall provide a local ecological context that naturally activates similar cognitive recovery mechanisms. A comparative analysis of environmental-perception theories reveals distinctive correlations between psychological components and spatial elements.

While Gibson's [10] theory emphasizes form and texture in fostering a sense of safety and interaction, Kaplan [12] defines spatial clarity as the key factor for restoring mental focus. In parallel, the environmental model of Mizumoto et al. [13] identifies direct contact with nature as the principal source of stress reduction and emotional balance. The synthesis of these perspectives indicates that mental health in healing environments operates within a perceptual cycle in which spatial features elicit a sense of safety, foster perceived control, and ultimately enhance Life-Hope.

Table 1. Comparison of key theories on perception and mental health in healing spaces. (source: author).

Theorist	Core Concept	Environmental Component	Psychological Outcome	Application in Healing Architecture
Gibson [10]	Affordance perception	Forms, pathways, tactile textures	Sense of interaction and safety	Design of predictable and open spaces
Kaplan [12]	Cognitive restoration	Visual clarity, defined routes	Reduction of mental fatigue	Day-lit corridors and clear spatial markers
Mizumoto et al. [13]	Nature–mind interaction	Daylight, green view exposure	Stress reduction and increased hope	Visual openness and use of natural materials

2.4 | Cultural and Climatic Context of Tonekabon

2.4.1 | Climatic characteristics and biotic capacities of the environment

The humid-temperate climate of Tonekabon, with an annual average temperature of 17–18 °C and humidity levels above 80%, has created a green, tree-rich environment with continuous natural ventilation (Meteorological Organization of Iran [15]). Data provided by Alvarsson et al. [16] further demonstrate that these natural conditions, particularly the constant sound of rainfall and gentle atmospheric humidity, play a soothing role in stabilizing patients' biological rhythm. From this viewpoint, spaces that facilitate sensory contact with natural elements can reduce the likelihood of psychological tension. Therefore, Healing Architecture in Tonekabon must rely on the synergy of natural ventilation, controlled daylight, and uninterrupted green views as its foundational triad.

Given the lower average hours of sunlight compared with central regions of Iran [15], the use of diffused light and shaded openings becomes essential in design. Under these conditions, healthcare architecture in northern Iran tends to emphasize indirect healing through visual perception and the soothing quality of light rather than direct exposure. The interlinked relationship between climate, sensory perception, and mental hope illustrates a continuous chain at three mutually dependent levels: bio-climatic, perceptual, and psychological, which is further represented in the study's conceptual model.

2.4.2 | Cultural layers and vernacular spatial patterns

The spatial culture of Tonekabon has evolved through a continuous coexistence between humans and the natural environment. In the region's traditional houses, semi-enclosed porches and verandas function as transitional spaces between interior and exterior zones, maintaining permanent visual connection and cross-ventilation with the surrounding landscape [17]. This spatial configuration serves as a model for designing social spaces in healthcare centers, as it recreates patients' sense of belonging and psychological security in clinical environments.

Research conducted by Lin et al. [18] indicates that identifiable vernacular symbols in northern Iranian healthcare environments strengthen the patients' feelings of cultural participation and belonging while reducing anxiety arising from placelessness. Moreover, the concept of the "threshold", deeply rooted in local architectural traditions defining the identity of entrances, reflects a gradual experiential passage from anxiety to tranquility [19]. Accordingly, reintegrating the "threshold concept" into the design of patient movement pathways facilitates a progressive transition from treatment-related anxiety to calmness, implicitly reinforcing Life-Hope through spatial perception. After reviewing both global and vernacular models of Healing Architecture, this section presents the data analysis based on the EPB model. The research focuses on demonstrating how spatial, sensory, and behavioral components can activate the mechanism of "Spatial Hope" in prostate cancer treatment centers. The findings, drawing upon key international references [20–22] and localized empirical data from Tonekabon City, form an integrative framework that supports subsequent analyses and the formulation of quantitative design indicators.

3 | Discussion and Findings

3.1 | Analysis of Healing Architectural Components with Emphasis on Environmental Semiotics of Hope

Analysis of recent data indicates that the role of environment in the therapeutic experience of cancer patients is not merely physical or functional, but rather governed by psychological mechanisms that lead to the regeneration of hope. Studies by HKS [20], SALUS [21], and Turner et al. [23] emphasize that space becomes truly healing when a perceptual balance is established among four principal environmental variables: light and transparency, connection with nature, sense of sociability, and freedom of choice.

Natural light and open vistas alleviate anxiety and enhance circadian rhythm, serving as the environment's first language of openness. A structured connection with nature, based on the Biophilic Design paradigm Ebaid [24], activates the emotional sense of life continuity. Small-scale social spaces strengthen the patient's feeling of belonging and self-worth, allowing the redefinition of the individual's social identity within the healing process. Finally, freedom of choice in movement, lighting, and layout stimulates the perception of agency, elevating hope from an emotional level to a behavioral dimension.

Hence, Healing Architecture is realized when synergy arises among the three interrelated layers of EPB. Spatial qualities through clear perception, calm emotion, and active engagement sustain the cyclic mechanism of hope within the healing environment.

3.2 | Influence of Environmental and Climatic Context of Tonekabon on the Design of Cancer Treatment Centers

The environmental analysis of Tonekabon reveals that therapeutic environments in this region cannot emulate the typologies of dry-climate or enclosed European clinics. Located along the Caspian coastal belt, Tonekabon features high humidity, moderate temperatures, dense vegetation, and the simultaneous proximity of sea and forest, a dual condition that constitutes both the main opportunity and the principal limitation for design. From a Healing Architecture perspective, key environmental opportunities include horizontal sea views, vertical forest perspectives, stable humid airflow, and the potential for creating open healing

gardens adjacent to therapeutic units. Findings from the Tonekabon Breast Cancer Center by Tahmasebi et al. [25] and the Pediatric Center of Babol [26] confirm that living landscape exposure and pedestrian accessibility through green cover significantly lower patient anxiety and activate the sense of life continuity. Conversely, the humid climate and high vapor concentration introduce design constraints, such as uncontrolled solar radiation and surface fungal growth. Therefore, controlled natural light and double-skin façades with ventilated cavities are crucial environmental solutions. Designing semi-open zones for waiting and movement preserves natural ventilation while dissolving the rigid boundary between interior and exterior, and simultaneously prevents excessive moisture infiltration.

On the socio-cultural level, given the region's family-oriented structure, the creation of small-scale social spaces such as shared courtyards, conversation pavilions, and seated pathways is essential so that collective hope becomes the underlying fabric of the healing experience. Accordingly, the Tonekabon context functions not merely as an environmental dataset but as an organizing factor in the Architecture of Hope, a coherent linkage between local nature, psychological tranquility, and human dignity within the therapeutic setting.

3.3|Proposed Conceptual Framework of Healing Architecture in Prostate Cancer Treatment Centers of Tonekabon

Based on the integration of previous findings and climatic data from Tonekabon, the proposed conceptual framework for this study is structured around three interconnected layers:

I. Environmental layer (ecological layer)-the physical and bioclimatic attributes.

II. Perceptual–sensory layer, spatial cognition, and emotional resonance of space.

III. Behavioral–psychological layer – patterns of adaptive and participatory behavior.

This structure is designed to reinforce the mechanism of "Spatial Hope" through the relational process of EPB Model.

Each design strategy within this framework responds not only to spatial quality but also to a specific psychological outcome that supports recovery. Drawing on research by HKS [20] and SALUS [21], four strategic thematic axes are identified as central to healing-focused oncology architecture:

I. Light and natural views.

II. Social connection and patient participation.

III. User choice and environmental control.

IV. Climatic and vernacular texture of local nature.

Integrating these axes with the local attributes of Tonekabon produces a three-tiered model in which the synergy between spatial and experiential components stimulates hope, agency, and life continuity among patients. A summary of this analytical framework is illustrated in *Table 2*.

Table 2. Proposed analytical framework of healing architecture in prostate cancer treatment centers of Tonekabon (source: author).

Layer	Design Strategy	Environmental/Perceptual Mechanism	Psycho–Behavioral Outcome	Source
Environmental	Controlled natural light along sea–forest views	Regulating light intensity for circadian balance and mental focus	Reduced anxiety and restoration of natural body rhythms	HKS [20]
Environmental	Layered vegetation in transitional spaces	Sensory stimulation and visual connection with nature	Enhanced sense of belonging and hope	Green [22]

Table 2. Continued.

Layer	Design Strategy	Environmental/Perceptual Mechanism	Psycho–Behavioral Outcome	Source
Perceptual	Open and legible pathways with calming color cues	Cognitive wayfinding and reduced disorientation	Sense of security and agency	SALUS [21]
Perceptual	Small communal spaces with choice opportunities	Increased perceptual control over the environment	Enhanced patient self-worth and self-efficacy	HKS [20]
Behavioral	Semi-open terraces and participatory garden spaces	Social interaction and emotional support from peers	Increased motivation and meaning in the treatment process	Tekin et al. [27]

Source	Scientific–Practical Description	Psycho–Spatial Outcome	EPB Model Layer	Proposed Quantitative Value/Range	Indicator Name

3.4 | Analytical Discussion and Comparison of Findings with Previous Studies

A comparative examination of the present study's findings against international and national research indicates that Healing Architecture with a Hope-Oriented approach operates through a direct connection among three fundamental components: environmental, perceptual, and behavioral. These three dimensions are consistently identified across major references HKS [20], SALUS [21], and the Green [22] as the architectural foundation of hope.

However, in the proposed Tonekabon model, these dimensions are reinterpreted through the lens of local climate and cultural identity of Northern Iran. In the HKS [20] study, four core design axes for cancer-care centers are introduced: light, nature, community, and choice. The present study empirically confirms the same axes within the humid climate and dual landscape context of Tonekabon, showing that controlled daylight, healing gardens, and participatory spaces can simultaneously reduce anxiety and restore patients' psychological agency. Thus, while the current results corroborate SALUS [21] findings, they add a crucial distinction: here, hope is interwoven with environment, culture, and climate.

In comparison, The Architecture of Hope HKS [20], which analyzes Tekin et al. [27] based on "domestic, semi-public and human-scaled" qualities, reveals behavioral correlations similar to those of the Tonekabon model. Yet, in the Iranian context, "domesticity of space" is not achieved through furniture or human scale alone but through vernacular imagery, natural materials, and cultural signifiers of the northern region. Accordingly, "Spatial Hope" within Tonekabon is reconstructed through the ecological memory of trees, forests, and diffuse luminous humidity. At the theoretical level, this study aligns with the Sustainable Built Environment Journal (2023), which introduces Biophilic Design as a determinant of stress reduction and user satisfaction [22]. In the proposed framework, Biophilia is conceived not as a stylistic approach but as a perceptual mechanism that links natural environment → sensory perception → hopeful emotional response. Regarding national sources, findings reveal common emphases on healing environments and the interrelation of therapy with psycho-perceptual experiences of patients.

Nevertheless, the current research advances beyond formal design approaches toward an explanatory cross-disciplinary framework, recognizing hope not merely as an emotion but as a qualitative spatial indicator emerging from the synergy of environmental conditions, user behavior, and social feedback. Therefore, the three-layered model proposed in this study (EPB) continues the trajectory of global research (2019–2024) while re-contextualizing the meaning of hope within the specific cultural and climatic domain of Tonekabon. In doing so, it contributes a novel step toward developing an Iranian theoretical framework of Healing Architecture within the paradigm of hope.

Table 3. Comparative analysis of global and indigenous approaches to healing architecture (source: author).

Analytical Axis	Findings from Global Studies (2022–2024)	Findings from Indigenous Iran (2017–2024)	Overlaps	Distinctions
Theoretical Basis of Hope	Hope as experiential healing HKS [20], SALUS [21] — emphasis on positive perception and empowerment.	Hope as 'return to everyday life	Both emphasize the role of environmental psychology in enhancing resilience	In Iran, hope is more interpreted in connection with the meaning of 'living' rather than 'treatment.'
Nature connection	Use of natural light, green views, water features, and seasonal rhythms (Ebaid [24], WHO [28])	Utilization of dual sea–forest views and natural ventilation	Presence of nature as a common stress-reducing factor	In Iran, climatic design and double-layered envelopes replace costly green technologies
Sociability and homeliness of space	Warm, domestic and participative spaces (Tekin et al. [27])	Attention to human scale, familiar and relatable spaces	Emphasis on the sense of belonging and human interaction	In Iran, homeliness carries a deeper cultural meaning, replacing a 'hospital-like' feel
Design strategies	Four HKS strategies: light, nature, community, choice (HKS [20])	Adjusted lighting, use of native materials, and choice-enabled pathways	Both enhance the user's choice and control.'	In Iran, emphasis on climate adaptation and contextual fit
Psycho–Behavioral outcome	Reduced anxiety, increased satisfaction, shorter patient stays (Turner et al. [23], Green [22])	Reduced stress and perceived security (indigenous studies in northern Iran)	Shared goal: enhance patient experience in the treatment process	In Iran, added focus on social and family connections

3.5 | Proposed Quantitative Design Indicators for Prostate Cancer Treatment Centers in Tonekabon

Based on the findings obtained and the analyses presented in Section 4.4, a set of quantitative design indicators grounded in the conceptual framework of "EPB and Place-Based Hope" has been developed, aligned with the climatic and cultural conditions of the Tonekabon region. These indicators are applicable, measurable, and monitorable during the pre-occupancy, occupancy, and post-occupancy phases, and can shape the pathway through which the physical characteristics of the environment influence improved perception, enhanced quality of behavioral interactions, and ultimately an increase in patients' place-based hope.

Table 4. Quantitative design indicators and their relation to EPB model layers (source: author).

Source	Scientific–Practical Description	Psycho–Spatial Outcome	EPB Model Layer	Proposed Quantitative Value/Range	Indicator Name
HKS [20]	According to HKS [20], this lighting range promotes mental focus and patient calm. With Tonekabon's humid climate, shaded envelopes and north–south openings provide optimal light.	Reduced anxiety, regulation of circadian rhythms	Environmental	350–500 lux in main spaces, diffuse and controlled lighting	Natural light intensity
Green [22], SALUS [21]	This ratio allows continuous views of sea–forest landscapes while maintaining thermal control and appropriate lighting.	Increased sense of connection with nature, reduced feeling of confinement	Environmental	30–45%	Window-to-Wall Ratio (WWR)
WHO [28]	Use of native species like Angelica and Poplar provides cultural–ecological bonding and reduces maintenance costs.	Enhanced sense of belonging, reduced stress	Environmental	Minimum 30% of therapeutic space	Native vegetation coverage

Table 4. Continued.

Source	Scientific–Practical Description	Psycho–Spatial Outcome	EPB Model Layer	Proposed Quantitative Value/Range	Indicator Name
SALUS [21], Gibson [10]	Pathways with high spatial clarity and low-saturation colors enhance perceived safety and agency.	Improved wayfinding and reduced disorientation	Perceptual	Minimum width 1.8 m, calming color cues	Open and legible pathways
Tekin et al. [27], HKS [20]	These spaces enhance participation, social interaction, and personal choice, as observed in successful centers like Maggie's.	Increased perceptual control, sense of self-worth	Perceptual	Capacity 4–6 people, choice of seating	Small communal spaces
Turner et al. [23], OSHA [29] Standard	Noise control with sound-absorbing materials and separate pathways makes the therapeutic experience calmer.	Reduced psychological stress and improved focus	Behavioral	≤ 40 dB in therapeutic spaces	Permissible noise level
Tekin et al. [27]	Garden terraces with natural views allow informal social interaction between patients and companions.	Enhanced social interaction and treatment motivation	Behavioral	Minimum 10% of the total center area	Semi-open therapeutic terraces

4 | Conclusion

The findings of this research demonstrate that Healing Architecture in prostate cancer treatment centers becomes genuinely effective only when physical, perceptual, and behavioral components are integrated within a coherent, context-based framework adapted to the climatic and cultural identity of Tonekabon. Analysis of field data and an extensive literature review revealed that while many healthcare facilities in Iran, particularly in the northern region, tend to focus on technical efficiency, economic constraints, and organizational performance, the psychological quality of space, the sense of serenity, the experiential dimension, and the generation of hope remain under-addressed.

Conversely, international research and studies in health psychology emphasize that controlled natural light, visual access to greenery, landscape views, spatial legibility, and home-like experiences are among the most influential factors in reducing anxiety and enhancing hope in patients with chronic diseases. To respond to this gap, the present study indigenized the EPB framework (EPB) as the theoretical foundation for Healing Architecture and demonstrated how environmental features suited to the humid Caspian climate, such as diffuse daylight, layered vegetation, natural ventilation, vernacular materials, and semi-open compositions, can regulate emotional tension and strengthen the perception of safety, calmness, and control.

This positive perception produces adaptive and participatory behavior within the treatment process, a behavioral engagement directly associated with higher motivation, reduced psychological stress, and increased hope for life.

Comparison of the proposed Tonekabon model with internationally recognized patterns (Green [22], SALUS [21], HKS [20], Tekin et al. [27] reveals that the model aligns with global standards yet offers three distinctive advantages:

I. Reliance on diffused natural light instead of mechanical illumination systems.

II. Creation of home-like atmospheres through vernacular materials and cultural cues, which foster familiarity and psychological security.

III. Design of semi-private, adjustable spaces allowing personal choice, privacy regulation, and restoration of independence.

Together, these attributes form a contextual model of Spatial Hope, a place-based framework of healing design rooted in Iranian culture and climate. One of the most tangible achievements of the research is the extraction of eight quantitative design indicators for Prostate-Cancer centers in Tonekabon, including.

open-space ratio (≥ 30 %), minimum width of calm pathways (1.8 m), social-pause areas for 4–6 users, acoustic control ≤ 40 dB, therapeutic garden terraces for social interaction, and rapidly adjustable visual and acoustic privacy.

These parameters elevate the design from descriptive suggestions to a measurable, implementable, and scalable model at the national level. Ultimately, the study concludes that healthcare architecture, when combined with a psychological understanding of environment, perception, and behavior, can play a transformative role in re-establishing patients' emotional equilibrium and enhancing their hope for life. The proposed Tonekabon framework represents a significant step toward developing interdisciplinary knowledge of Architecture Health, providing a foundation for future national standards in the design of oncological treatment facilities.

5 | Recommendations

To advance the scientific and practical dimensions of this study, it is recommended that the EPB model be validated through field-based behavioral observation within real healthcare environments.

Such empirical testing can measure the actual influence of environmental variables on patients' motivation and hope levels. In the design domain, local adaptation of Biophilic Design indicators to the humid Caspian climate and the formulation of "home-like space guidelines" would effectively improve the functional and emotional quality of Iranian healthcare facilities.

Furthermore, integrating the academic course "psychology of healing spaces and hope" into architectural education and public health policy would institutionalize the Architecture of Hope approach as a future paradigm for healthcare architecture in Iran.

Authors' Contributions

All aspects of the research and manuscript preparation were carried out by the author. The author has read and approved the final version of the manuscript.

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Data Availability

All data are included in the text.

Conflict of Interest

The author declares that he does not have any conflict of interest.

Consent for Publication

The author has given consent for the publication of this manuscript.

Ethics Approval and Consent to Participate

This study does not involve any research conducted on human participants or animals.

References

[1] Folmer, M. B., Mullins, M., & Frandsen, A. K. (2012). Healing architecture: An explorative case study of 1 and 3 bed wards' significance for interaction between patients and relatives at two intensive-care units in Denmark. *ARCH12 conference: International conference ARCH12 and forum Vårdbyggnad Nordic conference*

2012 (pp. 1-18). Chalmers University of Technology. http://conferences.chalmers.se/index.php/ARCH/arch12/schedConf/presentations

[2] Ulrich, R. S. (1984). View through a window may influence recovery from surgery. *Science*, *224*(4647), 420-421. https://doi.org/10.1126/science.6143402

[3] Ulrich, R. S., Zimring, C., Zhu, X., DuBose, J., Seo, H. B., Choi, Y. S., ... & Joseph, A. (2008). A review of the research literature on evidence-based healthcare design. *HERD: Health environments research & design journal*, *1*(3), 61-125. https://doi.org/10.1177/193758670800100306

[4] Feng, H., Liu, Y., Liu, Z., Chi, Z., & Osmani, M. (2024). Sustainable healing and therapeutic design driven well-being in hospital environment. *Buildings*, *14*(9), 2731. https://doi.org/10.3390/buildings14092731

[5] Zare, G. (2021). Determination of biophilic design strategies that affecting the patients' health in hospitals. *Journal of Iranian architecture & urbanism*, *12*(1), 59-78. https://doi.org/10.30475/ISAU.2020.210114.1318

[6] Snyder, C. R. (1994). *The psychology of hope: You can get there from here*. Simon and Schuster. https://www.amazon.com/Psychology-Hope-You-Here-There/dp/002929715X

[7] Balen, N. S., & Merluzzi, T. V. (2021). Hope, uncertainty, and control: A theoretical integration in the context of serious illness. *Patient education and counseling*, *104*(11), 2622-2627. https://doi.org/10.1016/j.pec.2021.07.029

[8] Rustøen, T., Cooper, B. A., & Miaskowski, C. (2010). The importance of hope as a mediator of psychological distress and life satisfaction in a community sample of cancer patients. *Cancer nursing*, *33*(4), 258-267. https://doi.org/10.1097/ncc.0b013e3181d6fb61

[9] Mohajerinia, M. R., & Rahmani Qasbeh, M. (2023). The effect of light and green space on accelerating the treatment of cancer patients in hospitals. *The 6th international conference and the 7th national conference on civil engineering, architecture, art and urban design*. Tabriz, Iran. Civilica. (**In Persian**). https://civilica.com/doc/2043184/

[10] Gibson, J. (1979). *The ecological approach to visual perception*. Houghton Mifflin. https://cir.nii.ac.jp/crid/1573387449632699776

[11] Sommer, R. (1969). *Personal space: The behavioral basis of design*. Prentice-Hall. https://dokumen.pub/personal-space-the-behavioral-basis-of-design.html

[12] Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework. *Journal of environmental psychology*, *15*(3), 169-182. https://doi.org/10.1016/0272-4944(95)90001-2

[13] Mizumoto, T., Ikei, H., Hagiwara, K., Matsubara, T., Higuchi, F., Kobayashi, M., ... & Nakagawa, S. (2025). Physiological adjustment effects of viewing natural environment images on heart rate variability in individuals with depressive and anxiety disorders. *Scientific reports*, *15*(1), 16317. https://doi.org/10.1038/s41598-025-00681-4

[14] Boyce, P. R. (2003). *Human factors in lighting*. CRC Press. https://doi.org/10.1201/9780203426340

[15] Organization, N. M. (2022). *Tonekabon annual weather averages*. https://www.worldweatheronline.com/tonekabon-weather-averages/mazandaran/ir.aspx

[16] Alvarsson, J. J., Wiens, S., & Nilsson, M. E. (2010). Stress recovery during exposure to nature sound and environmental noise. *International journal of environmental research and public health*, *7*(3), 1036-1046. https://doi.org/10.3390/ijerph7031036

[17] Foroughi, R. (2017). Climate-responsive strategies in vernacular houses in Northern Iran. *The international journal of the constructed environment*, *8*(2), 15. https://doi.org/10.18848/2154-8587/CGP/v08i02/15-26

[18] Lin, Y., Chen, D., & Chen, W. (2006). The significance of mesopic visual performance and its use in developing a mesopic photometry system. *Building and environment*, *41*(2), 117-125. https://doi.org/10.1016/j.buildenv.2005.01.015

[19] Ghalehnoei, M. P., Massoud, M., & Yarmohammadian, M. H. (2022). Presenting a conceptual model for designing hospital architecture with a patient-centered approach based on the patient's lived experience of sense of place in the therapeutic space. *Journal of education and health promotion*, *11*(1), 188. https://doi.org/10.4103/jehp.jehp_629_21

[20] HKS, I. (2023). *Healthcare design insights.* https://www.hksinc.com/what-we-do/practices/health/?utm

[21] SALUS Global Knowledge Exchange. (2023). *European healthcare design congress & awards / healthy city design international congress: Conference materials and publications*. SALUS Global Knowledge Exchange. https://europeanhealthcaredesign2019.salus.global/uploads/media/conference_document/0001/34/9988a69bfb6d5baec0755fb2d8367b9335aebc57.pdf

[22] Green., T. B. (2023). *The economics of Biophilia (2nd ed.).* Terrapin Bright Green. https://www.terrapinbrightgreen.com/report/eob-2/

[23] Turner, C., Bhogadi, S., Walls, H., Surendran, S., Kulkarni, B., Kinra, S., & Kadiyala, S. (2022). Drivers of food acquisition practices in the food environment of peri-urban Hyderabad, India: A qualitative investigation. *Health & place*, *74*, 102763. https://doi.org/10.1016/j.healthplace.2022.102763

[24] Ebaid, M. A. (2023). A framework for implementing Biophilic design in cancer healthcare spaces to enhance patients' experience. *International journal of sustainable building technology and urban development*, *14*(2), 229-246. https://doi.org/10.22712/susb.20230018

[25] Tahmasebi, S., Tajali, M., Akrami, M., Arasteh, P., Zangouri, V., Nobandegani, A. S., ... & Talei, A. (2019). Chronological changes and trend of breast cancer clinics and pathology among Iranian women during 22 years from the largest breast cancer registry in Iran. *World journal of surgical oncology*, *17*(1), 207. https://doi.org/10.1186/s12957-019-1757-7

[26] Babol University of Medical Sciences, Amirkola Children's Hospital. (2023). *Pediatric clinical research reports and hospital-based studies*. https://en.mubabol.ac.ir/

[27] Tekin, B. H., Corcoran, R., & Gutiérrez, R. U. (2023). The impact of Biophilic design in Maggie's Centres: A meta-synthesis analysis. *Frontiers of architectural research*, *12*(1), 188-207. https://doi.org/10.1016/j.foar.2022.06.013

[28] World Health Organization (WHO). (2025). *Nature-based solutions and health* (No. WHO/EURO: 2025-12214-51986-79744 (PDF)). https://iris.who.int/handle/10665/381437

[29] Occupational Safety and Health Administration (OSHA). (2008). *1910.95 – Occupational noise exposure*. https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.95