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Analysis and Evaluation of Visual Components in Environmental Graphic Design of the Hospital (Case Study: Children's Ward of Emam Jafar Sadegh Hospital, Meybod

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ABSTRACT

Objective: The purpose of writing this thesis is to analyze and evaluate the visual components in the environmental graphic design of Imam Jafar Sadegh Meybod Children's Hospital. The standards and criteria of the system defined in the design of the hospital have created difficulties in communicating between the elements in the space and human factors.

Methods: In this research, with the overall goal of removing visual additions and focusing on visual components and other factors related to environmental graphics, such as facilitating communication and information, we will create a safe and relaxing environment not only for children but also for hospital staff and companions. The research method is descriptive and analytical. The method of field research is in the form of library studies, and the collection tools are direct observation of the hospital environment, interviews with children, companions and hospital personnel, and the preparation of questionnaires.

Results: According to the findings and results, it can be said that a graphic designer can try to create a visual element by keeping in mind the useful visual components and their performance in the space and precision in establishing the proportion, coordination and composition of the visual elements. The graphic effect provides an ideal environment to provide a pleasant and helpful environment for all those who use the hospital space.

Conclusion: With the help of graphic science and its superior components, the sensory richness of the environment can be increased. Due to the sufficient understanding of the child's developmental characteristics and the upcoming capabilities and limitations, it is possible to design an environment that matches the child's conditions.

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Introduction

The emergence of store and organizational design in the mid-1980s marked a turning point in the evolution of wayfinding systems. In 1984, Romedi Passini—a figure distinguished by his dual expertise in architecture and environmental psychology—published Wayfinding: People, Signs, and Architecture, a work that introduced new dimensions to spatial planning by incorporating elements such as logical spatial structuring, sensory cues, and auditory components. This novel architectural design philosophy gave rise to a distinct layer of graphic design that not only underscored the functionality of spaces but also contributed to a unique and coherent visual identity (Dargahi and Rajabnejad, 2015). Today, environmental graphic design has become deeply embedded in urban life, encompassing key features of the urban landscape such as traffic signs, directional maps in public venues, warning signage, and advertising billboards. While environmental graphics intersect significantly with visual arts, urban planning, and architecture, they remain a field with distinctive characteristics and scope (Eslami, 2015).

Environmental graphic design serves a communicative function across numerous urban contexts, particularly in high-traffic environments such as hospitals. Hospitals are complex spaces marked by high volumes of visitors and elevated emotional and psychological stress, especially among pediatric patients, who represent a particularly vulnerable demographic. The emotional sensitivities associated with illness in children heighten the negative impact of inadequately designed, purely functional healthcare settings. Consequently, contemporary design efforts emphasize creating visually appropriate environments tailored to pediatric patients (Reshvand and Hamidi, 2013). Integrating environmental quality with technological and patient-centered considerations enables the development of therapeutic spaces that respond to children's psychological and physical needs. The spatial environment shapes human behavior, and well-designed spaces may enhance resilience and reduce treatment-related anxiety (Taslimi, 2021).

Professionals across disciplines—including architecture, medicine, nursing, and psychology—acknowledge the environment’s critical role in the healing process. Existing research underscores how healthcare environments directly influence patient recovery and psychological well-being, a factor that holds particular significance in pediatric contexts. For children, hospitalization in unfamiliar settings often generates fear and emotional distress, constituting a prominent source of stress during illness (Sattari and Eghbali, 2014). Against this backdrop, the present study explores environmental design factors that affect pediatric patients' treatment and hospitalization experiences in Meybod Hospital. It aims to propose a graphic design model compatible with children's emotional needs and conducive to a therapeutic environment. The study includes a comprehensive review of prior research and an analytical assessment of the environmental graphic element of the hospital in Meybod, culminating in key findings and actionable recommendations.

Theoretical Framework

Environmental graphic design represents a multifaceted discipline that interweaves aesthetic sensibility with functional utility in the built environment. Through the strategic and thoughtful application of visual components, it can elevate both the identity and sensory experience of a space. Designing pediatric healthcare environments necessitates a comprehensive understanding of children's cognitive and developmental attributes, which serve as the foundation for spatial planning in hospital settings. The realization of effective design outcomes is contingent on the graphic designer’s capacity to employ inventive and context-sensitive strategies, informed by a nuanced grasp of children's physiological and psychological states, and guided by stimuli recognizable to the human senses. Conversely, a mismanaged design process in healthcare environments may result in adverse effects, surpassing the intended functional benefits (Sedigh Akbari and Nouri, 2013).

Environmental graphic design acts as a medium of interaction among healthcare personnel, patients, and caregivers. Yet, hospital environments, due to their often overstimulating and chaotic nature, may inadvertently hinder the healing process. A significant number of pediatric patients are treated in spaces not tailored to their needs—conditions that contribute to elevated anxiety levels, negative emotional responses, and diminished satisfaction with both the care experience and the physical environment (Gorji Mahlabani and Saleh Ahangar, 2013). The imperative to integrate effective visual stimuli in fostering the well-being and recovery of pediatric patients is therefore undeniable. Due to the sensitive nature of this design context, graphic designers must engage in rigorous inquiry concerning graphical expressions, visual aesthetics, and the environmental health parameters that shape children's spatial experiences (Fallahi, 2015).

Given that medical treatment constitutes an integral part of a child’s life trajectory, and considering that children may spend prolonged periods in unfamiliar, isolating hospital environments—separated from family, familiar faces, and personal belongings—the emotional consequences of hospitalization often outweigh the clinical challenges of the illness itself. This underscores the necessity of employing well-considered visual components to enhance environmental quality and bolster satisfaction among both patients and clinical staff. Holistically, environmental graphic design in hospitals offers the potential to improve the visual and emotional landscape for all users while contributing to the overall reduction of environmental stress (Motallebi and Vejdanzadeh, 2015).

Positioned within a regional research context, this study focuses on the city of Meybod, where no pediatric hospital has yet been developed with environmental graphic design principles at its core. The research aspires to be a pioneering effort in this regard. The study specifically explores the perceptual and experiential needs of children in hospital environments, emphasizing the role

of creative engagement and pictographic communication. Drawing on existing literature on pediatric spatial design, pictograms, and the psychological effects of creative activities, the study conducts a visual analysis of the environmental graphic strategies employed in Emam Jafar Sadegh Children's Hospital in Meybod. The research is driven by the following central questions:

1. What visual design elements constitute the environmental graphics of a pediatric hospital?
2. How are these elements implemented within Emam Jafar Sadegh Hospital in Meybod?

Materials and Methods

This study is categorized as applied research in terms of its primary objective, as it aims to identify, analyze, and assess visual elements and graphic symbols within the pediatric hospital context in Meybod. Methodologically, the research aligns with a descriptive-analytical approach. In such frameworks, the researcher engages in a systematic description of the current state while gathering and evaluating the views of the study population concerning the characteristics under investigation.

The study population encompasses various units within the hospital, including pediatric inpatients, their families, medical personnel, and administrative staff. Due to the open-ended nature of the population, it is considered unlimited. Given the descriptive-analytical orientation of the study, the sample is composed of twenty visual instances of environmental graphic design taken from Emam Jafar Sadegh Children's Hospital in Meybod.

Data collection in this research was executed through a dual strategy combining fieldwork and library-based investigation. Field research instruments included direct observation of the hospital environment, structured questionnaires, and interviews with child patients and their accompanying family members. For the library research component, data were gathered from specialized texts, peer-reviewed scholarly articles, and authoritative digital sources. This integrative methodology facilitated a comprehensive understanding of the needs, lived experiences, and expectations of children and other stakeholders within the hospital setting, thereby contributing to the creation of a safer and more responsive environment.

The analytical process employed both quantitative and qualitative methods, supported by statistical analysis, to examine the environmental design aspects of the pediatric hospital setting.

Results

User Perception and Comprehension

The subject of this investigation centers on the pediatric unit of Emam Jafar Sadegh Hospital in Meybod. Recognized for its notable scientific and operational achievements, the hospital has consistently ranked as a first-grade medical institution over the past five years, based on periodic

evaluations conducted by the Ministry of Health's Supervision and Accreditation Center. This commendable status has earned it formal recognition from national health authorities.

The primary objective of the hospital is to cultivate a safe and tranquil environment for patients and their companions throughout the course of treatment, thereby allowing them to focus solely on recovery. Simultaneously, the hospital endeavors to foster a vibrant and healthy workplace for its staff.

A set of questions was formulated to evaluate the extent of user awareness and comprehension of environmental graphic design elements:

1. How familiar are you with environmental wayfinding signs?

2. Have you observed environmental graphic signs within the hospital?

3. To what extent do such signs assist you in navigating the hospital environment?

4. To what extent do these graphic signs contribute to maintaining spatial organization?

As illustrated in Table 1, the initial four questions of the survey collectively assess the respondents' general awareness and understanding of environmental graphic communication. The next phase of the study addresses responses to more technically focused questions, specifically analyzing and evaluating the visual design elements employed in the environmental graphic system of Emam Jafar Sadegh Hospital in Meybod.

Table 1. Number and Percentage of Respondents' Perception of Environmental Graphics.

User Perception Level	Number	Percentage
Very Low	49	12.8
Low	97	25.2
Moderate	103	26.8
High	105	30.3
Very High	19	4.9
Total	384	100

Has graphic signage been implemented in Emam Jafar Sadegh Hospital, Meybod?

Based on the data presented in Table 2, the findings indicate that out of the 384 surveyed participants, none consider that the use of graphic signage in Emam Jafar Sadegh Hospital, Meybod, is very limited.

Table 2. Number and Percentage of Respondents' Opinions Regarding the Compliance with Graphic Signage in Emam Jafar Sadegh Hospital, Meybod.

Level of Compliance with Graphic Signage	Number	Percentage
Very Low	0	0
Low	44	11
Moderate	194	51
High	127	33

Very High	19	5
Total	384	100

To what extent have graphic signs facilitated your navigation within Emam Jafar Sadegh Hospital, Meybod?

As indicated in Table 3, out of the 384 participants surveyed, 2% perceive that graphic signage contributes very little to the guidance of individuals within the hospital environment.

Table 3. Number and Percentage of Respondents Regarding the Impact of Graphic Signs on Audience Guidance.

Level of Impact of Signs on Guidance	Number	Percentage
Very Low	8	2
Low	54	14
Moderate	65	17
High	150	39
Very High	107	28
Total	384	100

The placement of the outdoor wayfinding signage in the hospital setting, currently positioned behind natural obstructions such as trees and rendered as a printed banner, compromises the legibility of its content and graphic symbols. Such inadequate visibility can contribute to disorientation, elevated anxiety, and psychological discomfort among hospital visitors. Implementing effective location-based signage equipped with route maps at the main entrance can significantly enhance spatial orientation and facilitate access to various hospital departments. From a design optimization perspective, relocating the signage closer to the apex of the triangular traffic island (as illustrated in Figure 1) would improve its visibility and overall communicative function.

Figure 1. Illegibility of the Wayfinding Sign at the Hospital Entrance.

To what extent have the developmental and psychological attributes of children been considered in the design of the spatial environment and graphic signage within the pediatric ward?

As shown in Table 4, out of the 384 respondents surveyed, 2% perceive that the design of the hospital's space and graphic signage has paid very limited attention to the developmental and psychological needs of children.

Table 4. Number and Percentage of Attention to the Developmental and Psychological Characteristics of Children in the Design of Space and Graphic Signs in the Children's Ward.

Level of Attention to the Developmental and Psychological Characteristics of Children	Number	Percentage
Very Low	8	2
Low	167	44
Moderate	140	37
High	53	14
Very High	12	3
Total	384	100

Hospital Façade

The architectural composition of the façade at Emam Jafar Sadegh Hospital in Meybod reveals a lack of systematic design, particularly in the inconsistent sizing and placement of windows and the varied opening mechanisms of doors. The irregularity in window forms, each outfitted with distinct curtains corresponding to specific departments, disrupts visual cohesion and fails to project a sense of organizational order or maintenance in both daytime and nighttime visual perspectives. Furthermore, the absence of aesthetic nighttime illumination—limited merely to two floodlights aimed at the exterior grounds—results in a dim, uninviting appearance after dark, contributing to a perception of neglect and unease within the surrounding urban environment.

Hospital Lobby

The lobby of the hospital comprises a relatively confined space, bordered by key functional areas such as the emergency unit, injection station, terminal points of the admissions hallway, discharge area, and entryways to various departments. Amenities within this area include an automated teller machine and several waiting chairs. The use of automatic glass doors is functionally appropriate for facilitating smooth access and egress. However, the interior design lacks engagement elements, with cream-colored walls devoid of visual illustrations or child-oriented motifs. Illumination is entirely reliant on artificial fluorescent lighting. Notably, there is an absence of comprehensive directional signage at the lobby entrance. Instead, communication is mediated through small, double-sided overhead signs, suspended from the ceiling via two wires. These signs, composed of white flex material with formal text rendered in white and blue, are inadequate for delivering effective navigational information (Figure 2).

Figure 2. Information boards installed on the ceiling of the hospital corridors.

To what extent has the hospital environment contributed to fostering a sense of belonging and psychological comfort in children?

As indicated in Table 5, among the 384 respondents surveyed, 75 participants, representing 19%, perceive that the hospital environment has had a very limited impact on establishing a sense of belonging and tranquility in children.

Table 5. Number and Percentage of the Impact of Space on Creating a Sense of Belonging and Peace of Mind in Sick Children.

Level of Impact of Space on Creating a Sense of Belonging and Peace of Mind in Children	Number	Percentage
Very Low	75	19
Low	150	39
Moderate	83	22
High	47	12
Very High	29	8
Total	384	100

The lobby of Emam Jafar Sadegh Hospital primarily functions as a continuation of the adjoining corridors that lead to other hospital departments, thereby limiting its capacity to accommodate the full range of functions typically required in a hospital lobby. Expanding the allocated space for this area is recommended to enhance its functional adequacy. Moreover, the installation of tinted glass barriers between reception personnel and patients disrupts the clarity and efficiency of interpersonal communication (Figure 3).

Figure 3. View of the Reception and Waiting Area for Visitors.

To what extent have the design elements, specifically form and color, employed in the hospital lobby contributed to alleviating stress in children?

As presented in Table 6, among the 383 respondents surveyed, 83 participants, representing 22%, perceive that the form and color utilized within the hospital lobby space exert a very limited influence on mitigating stress in children.

Table 6. Number and Percentage of the Impact of Form and Color Used in the Lobby of Emam Jafar Sadegh Hospital on Reducing Stress in Children.

Impact of Lobby Form and Color on Reducing Stress in Children	Number	Percentage
Very Low	83	22
Low	97	25
Moderate	106	27
High	68	18
Very High	30	8
Total	384	100

The signage utilized in the hospital lobby comprises suspended panels created using the flex-printing method, featuring blue text on a white background without integrated lighting. While appropriate for formal or administrative environments, this approach is incongruent with the intended function of a pediatric setting and may induce anxiety in children. Furthermore, the typographic style employed corresponds more closely with institutional rather than child-centered aesthetics. It is therefore advisable to incorporate flex-face printing techniques that offer a broader color spectrum and include stylized, simplified representations of animals, plants, and objects. Abstract and minimally detailed figures tend to resonate more effectively with children, facilitating visual engagement. Enhancing these signs with colorful lighting could further increase their visual appeal and suitability for a pediatric healthcare environment (Figure 4).

Figure 4. Identification and Directional Signs Guiding Individuals to Different Hospital Departments.

To what extent have the educational graphics employed at Emam Jafar Sadegh Hospital facilitated the progression of the child's treatment process?

As indicated in Table 7, among the 384 respondents surveyed, 38% perceive that the educational graphics provided by Emam Jafar Sadegh Hospital exert a very limited influence on the advancement of the treatment process.

Table 7. Number and Percentage of the Impact of Educational Graphics at Emam Jafar Sadegh Hospital on the Child's Treatment Process.

Impact of the Hospital's Educational Graphics on Completing the Child's Treatment Process	Number	Percentage
Very Low	144	38
Low	104	27
Moderate	47	12
High	58	15
Very High	31	8
Total	384	100

Hospital Corridors

Within the scope of environmental graphic design for hospital interiors, the preliminary design phase must prioritize the removal of extraneous components while focusing on elements that effectively facilitate communication with the intended audience. When design principles are neglected and visual elements are poorly structured on informational boards, the result is visual disorganization that impairs legibility and deters viewer engagement rather than encouraging interaction or information retention (Figure 5).

Figure 5. Visual Clutter on the Boards and Walls of the Hospital Corridors.

The hospital corridors are primarily illuminated through natural light sources, entering via windows and sliding doors that provide access to the central courtyards. In addition to daylight, direct fluorescent fixtures are mounted along the central axis of the ceiling to supplement the

lighting. However, this type of direct fluorescent illumination may induce discomfort for patients being transported on hospital beds. A recommended alternative involves installing linear fixtures that emit indirect light along both ceiling edges, thereby creating a more visually and physically soothing environment (Figure 6).

Figure 6. View of the corridors of Emam Jafar Sadegh Hospital, showing daylight and nighttime lighting conditions.

To what extent do the directional signs and pathway indicators at Emam Jafar Sadegh Hospital facilitate your navigation and successful arrival at the intended location?

As detailed in Table 8, out of 384 respondents surveyed, 31% perceive that the hospital's guide signs and pathway markings contribute very little to effectively guiding and directing individuals toward their objectives.

Table 8. Number and Percentage of the Impact of Guide Signs and Pathway Markings on User Navigation and Guidance in Reaching a Specific Destination.

Impact of Guide Signs and Pathway Markings on User Navigation and Guidance	Number	Percentage
Very Low	51	13
Low	173	45
Moderate	109	28
High	37	10
Very High	14	4
Total	384	100

The implementation of 5-centimeter colored guidance lines within the hospital's interior and interdepartmental pathways plays a critical role in wayfinding. These directional indicators,

applied to corridor floors and occasionally to walls, are intended to assist individuals in navigating toward designated units. Nonetheless, despite structural renovations and departmental relocations in recent years at Emam Jafar Sadegh Hospital, these visual cues have not been correspondingly updated. Notably, some sections, such as the infectious diseases unit, lack a dedicated color-coded path altogether. Such oversight reflects a disregard for the functional and communicative potential inherent in environmental graphic design (Figure 7).

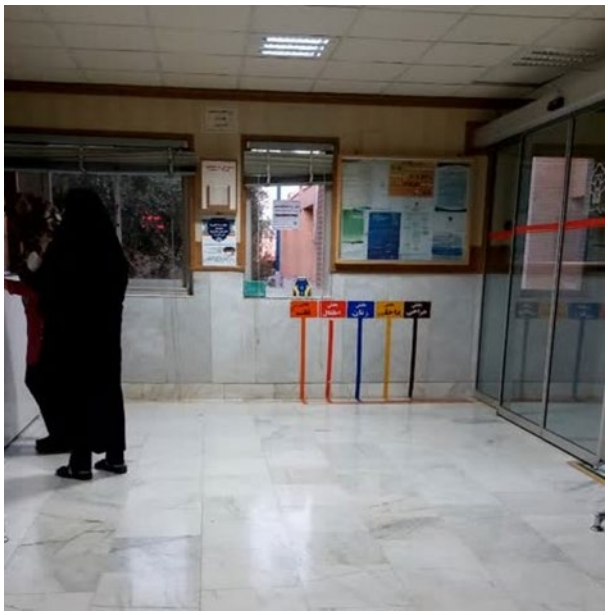

Figure 7. Colored pathway markings in the corridors of Emam Jafar Sadegh Hospital, Meybod.

To what extent have the graphic signage systems at Emam Jafar Sadegh Hospital in Meybod contributed to enhancing user performance?

As indicated in Table 9, among the 384 respondents surveyed, 12% perceive that the graphic signs at Emam Jafar Sadegh Hospital, Meybod, exert a very limited effect on the improvement of user performance.

Table 9. Number and Percentage of the Impact of Educational Graphics at Emam Jafar Sadegh Hospital, Meybod, on Improving User Performance.

Impact of Educational Graphics on User Performance	Number	Percentage
Very Low	46	12
Low	165	43
Moderate	98	25
High	61	16
Very High	14	4
Total	384	100

Corridors within inpatient units commonly serve as areas for positioning mobile furnishings and equipment, both near the nursing stations and outside patient rooms. To mitigate spatial

disorganization, a designated section of the corridor, differentiated through the use of distinctive color schemes and design, could be reserved for storing such auxiliary items. This intervention would reduce visual congestion and promote a sense of spatial clarity and openness throughout the hospital's circulation zones. While the primary corridors lack any form of illustrative decoration, minimal and sporadic imagery is present along the walls and nursing station within the pediatric ward (Figure 8).

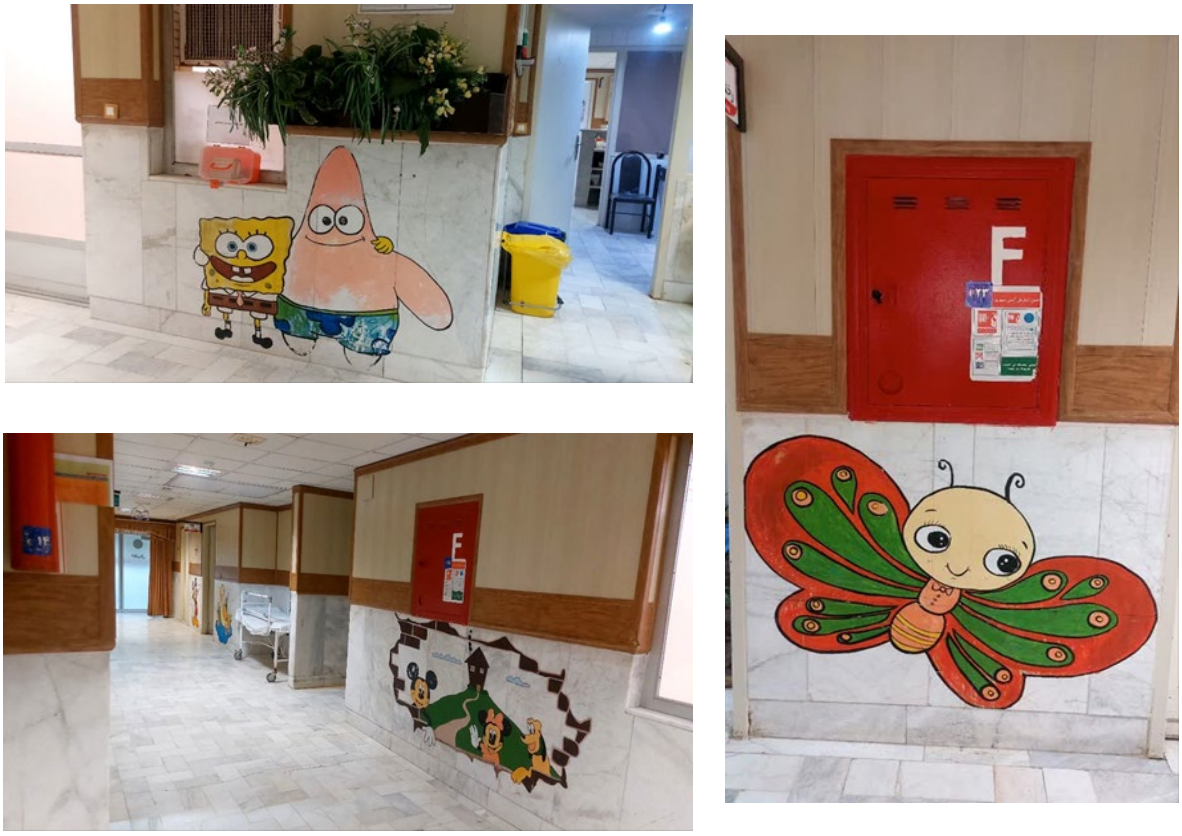

Figure 8. Illustrations related to the children's section of Emam Jafar Sadegh Hospital.

Within the pediatric ward corridors of Emam Jafar Sadegh Hospital in Meybod, signage consists of suspended panels produced via the flexographic method in red and green hues, incorporating visual symbols and lacking any form of illumination. The pictograms utilized reflect conventions typically aligned with administrative or corporate environments and are ill-suited for child-centered spaces, potentially eliciting anxiety or fear among pediatric patients (Figure 9).

Figure 9. Guide signs in the children's department of Emam Jafar Sadegh Hospital.

To what extent has the implementation of a suitable and calming environment specifically for hospital personnel been achieved in this hospital?

As presented in Table 10, among the 384 respondents surveyed, 2% hold the view that the design of a tranquil space within the hospital has a very limited effect on the well-being and performance of the staff.

Table 10. Number and Percentage of the Impact of Relaxing Space Design on Hospital Staff.

Impact of Relaxing Space Design on Hospital Staff	Number	Percentage
Very Low	7	2
Low	35	9
Moderate	163	43
High	97	25
Very High	82	21
Total	384	100

Hospital Nursing Station

The application of white on the ceilings within the hospital's nursing stations is considered highly suitable, as it visually expands the spatial perception of the area. Employing a softly saturated, deep-toned wall can direct visual attention toward an opposing surface where specific functions may occur. Despite their inherent busyness, nursing stations should be environments that foster positivity and emotional comfort. Color schemes incorporating blue, yellow, or muted green hues mixed with white are recommended to enhance the ambiance. Comprehension of and familiarity with the environment cultivates a psychological sense of control and agency among users—an effect that significantly contributes to the alleviation of stress, anxiety, and fear, thereby supporting the body's healing process, especially in pediatric patients.

Figure 10. Nursing station in the children's department of Emam Jafar Sadegh Hospital.

Assessing the Suitability of Color and Form Choices in the Nursing Station Design from a Child-Centered Perspective

Based on the data presented in Table 11, 39% of the 384 surveyed individuals indicated that the current color schemes and structural forms of the nursing station decor exert minimal influence on children's perception. To improve communication and emotional resonance with young patients, the nursing station signage should adopt a playful and vibrant aesthetic, incorporating bright, cheerful hues and fonts that are both rounded and sufficiently bold to ensure readability.

The existing use of stone in wall and floor finishes contributes to excessive acoustic reverberation, disrupting the tranquil atmosphere needed for patient recovery. It is therefore advisable to install soft, resilient flooring materials to mitigate noise levels. Furthermore, the use of stone cladding on walls should be replaced with medium-density fiberboard or wooden materials coated with high-density plastic, positioned at a suitable height to serve as effective impact-absorbing surfaces.

Table 11. Number and Percentage of the Impact of Nursing Station Decor in Terms of Form and Color on Children's Perception at Emam Jafar Sadegh Hospital.

Extent of the Impact of Nursing Station Decor in Terms of Form and Color on Children's Perception	Number	Percentage
Very Low	150	39
Low	116	30
Moderate	66	17
High	43	11
Very High	9	3
Total	384	100

Inpatient Room Design Evaluation

The inpatient rooms are uniformly painted in a cream tone resembling light mustard yellow, with no variation or accent colors applied to the four surrounding walls. The absence of any visual imagery or artistic elements on both the walls and ceilings results in a sterile and unengaging atmosphere. Ceiling design is limited to a broad pink border encircling a white central field, without any illustrative or thematic features.

The inclusion of large windows plays a beneficial role in maximizing daylight penetration within the space. To moderate incoming light, the rooms are equipped with fabric curtains in cream shades adorned with pink floral motifs. The rooms utilize ceiling-mounted fluorescent fixtures that emit direct lighting, which may not provide optimal comfort for bedridden patients due to their harshness (Figure 11).

Figure 11. View of the pediatric inpatient rooms at Emam Jafar Sadegh Hospital.

To what extent can the stress and anxiety experienced by pediatric patients be mitigated through innovative design in the hospital's environmental graphics?

As shown in Table 12, among the 384 respondents surveyed, 8 participants (representing 2%) consider that creativity in environmental graphic design has a very limited impact on managing the fear and stress of children.

Table 12. Number and Percentage of the Impact of Creativity in Environmental Graphic Design on Controlling Fear and Stress in Sick Children.

Impact of Creativity on Children's Fear and Stress	Number	Percentage
Very Low	8	2
Low	6	2
Moderate	67	17
High	126	33
Very High	177	46
Total	384	100

Impact of Color and Form on Pediatric Patient Distraction in Inpatient and Corridor Spaces

According to Table 13, 35% of the 384 respondents (a total of 136 individuals) indicated that the form and color schemes utilized in the hospital's inpatient rooms and corridors exert minimal influence on distracting pediatric patients. However, the uniform application of a single color across all four walls within patient rooms has the potential to induce visual monotony and psychological fatigue in children.

To mitigate this, it is advisable to implement a color scheme based on harmonious tonal variations within a consistent hue family, thereby maintaining visual coherence while avoiding dullness. Wall paint should ideally reflect 50% to 60% of light to maintain adequate brightness levels. Furthermore, particular attention must be paid to the chromatic treatment of walls containing windows: wall colors should be selected to minimize contrast with incoming daylight, as heightened contrast can cause these surfaces to appear disproportionately dark. In addition, walls directly opposite windows should remain light in color to prevent the absorption of natural light, thereby enhancing the room's overall illumination and atmosphere.

Table 13. Number and Percentage of the Impact of the Form and Color of the Inpatient Space and Hospital Corridor Walls on Child Distraction.

Impact of the Form and Color of the Inpatient Space and Corridors on Children's Distraction	Number	Percentage
Very Low	136	35
Low	33	9
Moderate	18	5
High	54	14
Very High	143	37
Total	384	100

To what extent has the designer considered the child's scale and point of view in designing the pediatric ward of the hospital?

As reported in Table 14, only 29% of the 384 surveyed participants (equating to 112 individuals) indicated that child-appropriate spatial scale and visual perspective have been minimally accounted for in the design of Emam Jafar Sadegh Hospital's pediatric ward.

The inpatient rooms accommodate between one to four beds, all of which are designed with adult-scale dimensions (220 cm in length, 100 cm in width, 57 cm in height, and a 39 cm high

guardrail). Constructed from metal with an electrostatic powder coating, these beds are fitted with low protective rails, rendering them ill-suited for pediatric patients. Furthermore, televisions in the rooms are positioned to suit the line of sight of a supine child but fail to consider the visibility requirements of caregivers or accompanying adults. While bedside cabinets measuring 56×55×92 cm in white-blue tones are provided, additional furniture, including storage units and seating, should be scaled to accommodate children's ergonomic needs and physical proportions, ensuring a more child-centered and accessible environment.

Table 14. Number and Percentage of the Extent to Which the Scale and Child's Point of View Are Observed at Emam Jafar Sadegh Hospital, Meybod.

Extent of Observance of Scale and Child's Point of View	Number	Percentage
Very Low	112	29
Low	139	36
Moderate	68	18
High	52	14
Very High	13	3
Total	384	100

To what extent does innovative design in the arrangement and furnishing of inpatient rooms alleviate the child's perception of the stressful atmosphere at Emam Jafar Sadegh Hospital?

As indicated in Table 15, out of 384 respondents surveyed, 188 participants (representing 49%) consider that creative design elements in the inpatient room layout exert a minimal influence on redirecting the child's attention away from the hospital's stressful environment.

Table 15. Impact of Creativity in Layout Design on Diverting the Child's Mind from the Stressful Hospital Environment.

Impact of Creativity in Layout Design on Redirecting the Child's Attention Away from the Stressful Hospital Environment	Number	Percentage
Very Low	188	49
Low	131	34
Moderate	37	10
High	21	5
Very High	7	2
Total	384	100

The inpatient room equipment in this hospital is characterized by sharp and bulky geometric forms. Besides the short cabinets currently utilized, it is recommended that child-sized wardrobes be integrated into the walls. Each hospital room is equipped with a handwashing sink, above which instructional posters illustrating and describing proper handwashing procedures are displayed. However, these sinks are notably shallow, and the high-pressure water flow from the faucets results in water splashing onto surrounding surfaces, thereby potentially facilitating the transmission of infections. To mitigate this risk, a protective barrier should be installed between the sink and the inpatient area to prevent water dispersion (Figure 12).

Figure 12. Handwashing sink in inpatient rooms.

To what extent can the treatment process be enhanced by fostering closer communication between the medical team and the child's active involvement in their care?

As indicated in Table 16, out of 384 respondents, 4% perceive that close interaction with the healthcare staff has a minimal effect on the child's engagement in the treatment process. The nursing station should be designed with consideration for the child's stature, thereby promoting a stronger sense of belonging. Fundamentally, this design strategy aims to facilitate meaningful interaction and collaboration between the child and medical personnel, thereby encouraging the child's participation in their treatment.

Table 16. Impact of Child Participation in Treatment through Closer Interaction with Medical Staff.

Impact of Child Participation in Treatment through Closer Interaction with Medical Staff	Number	Percentage
Very Low	16	4
Low	45	12
Moderate	89	23
High	108	28
Very High	126	33
Total	384	100

To what extent does the creativity demonstrated in the design and quality of the hospital's play area meet the needs of pediatric patients?

As shown in Table 17, out of 384 respondents surveyed, 176 participants (representing 46%) contend that the play area's layout and quality exhibit minimal creative consideration and are fundamentally unsuitable for hospitalized children.

Table 17. Level of Creativity and Quality of the Play Area at Emam Jafar Sadegh Hospital.

Impact of Creativity in the Layout and Play Area in This Hospital	Number	Percentage
Very Low	176	46
Low	138	36
Moderate	54	14
High	11	3
Very High	5	1
Total	384	100

Hospital Playroom

The playroom serves as a distinct environment where children can momentarily detach from the clinical atmosphere of the hospital. It plays a crucial role in alleviating stress and facilitating the recovery process among pediatric patients. However, this hospital lacks a dedicated space designed for children's recreation. Additionally, the outdoor areas of the hospital are devoid of play equipment intended for children's amusement. Creating an environment that fosters psychological well-being by providing moments of happiness and joy-while accommodating the unique needs of hospitalized children an integral component of therapeutic care and is therefore indispensable. Employing soft furnishings with rounded edges, vibrant colors, and forms without sharp corners can establish a setting that promotes active movement and vitality along circulation paths. Such a design also enables effective supervision of children's physical activities.

Discussion

The present study, which focused on environmental graphic design in pediatric healthcare settings through the case of Emam Jafar Sadegh Hospital in Meybod, highlights the pivotal role of design elements in organizing the hospital's physical environment for young patients. Rather than concentrating solely on facilitating a calm and favorable atmosphere for children's treatment, the investigation emphasizes that enhancing the interior spatial quality significantly influences the operational efficiency and collaborative engagement of hospital staff and caregivers throughout the therapeutic process.

The findings identify light, form, and color as fundamental components within the framework of pediatric hospital environmental graphics. Each element substantially contributes to the spatial identity and sensory enrichment of the environment. When combined with other key organizational principles—such as balance, symmetry, harmony, unity, variety, emphasis, and texture—these elements enable the formation of hospital environments that not only perform effectively but also offer aesthetic and psychological comfort. Such integration ensures that pediatric hospitals, like other child-oriented spaces, are perceived as secure and welcoming by their intended users. Graphic designers achieve success when they intelligently orchestrate spatial elements to cultivate a positive emotional response in both patients and visitors. The efficacy of

their work depends on the thoughtful and harmonious integration of visual elements tailored to the specific context.

Effective environmental design relies on close interdisciplinary collaboration among architects, interior designers, lighting professionals, and environmental graphic specialists. Their unified objective is to create environments that are visually appealing while ensuring optimal functionality. Architectural planning in the absence of graphic and interior design input is either inefficient or falls short of its potential. While lighting designers may enhance visibility and spatial articulation, graphic designers, with creative insight, can synthesize their concepts with lighting to maximize artistic and communicative impact. Lighting, in particular, enhances environmental aesthetics and psychological comfort, underscoring its indispensable role in comprehensive design.

Ultimately, the role of an environmental graphic designer involves structuring space according to an intentional, functional plan. By employing form and color within the discipline of visual art principles, designers can facilitate rapid and effective communication. Color, when applied skillfully, evokes emotional responses and serves as a potent communicative medium. Additionally, pictograms used in signage and wayfinding systems considerably accelerate information transmission. These visual messages resonate with viewers beyond their aesthetic appeal, establishing deeper cognitive and emotional connections.

Design approaches that integrate the local and cultural identity of a community play a significant role in fostering effective and accelerated communication. It is evident that, based on the function, spatial characteristics, and institutional identity of any given environment, the selection of form and color is intentionally directed toward conveying specific messages to a target audience. In the context of Emam Jafar Sadegh Hospital, design strategies take into account the age and psychological sensitivities of pediatric patients. Consequently, the communicative elements are presented through child-oriented expressions—utilizing soft, rounded forms and a palette of vivid, cheerful colors—carefully applied throughout the physical setting.

Given that the human brain can process an image in approximately 13 milliseconds, the strategic use of imagery becomes crucial for the swift transmission of information. Factors such as font size and style, color selection, iconography, and the positioning of signage are all critical to effective communication. The influence of form and color extends to visual tools such as infographics and wayfinding maps, reinforcing their importance in environmental graphic design. When used appropriately in combination with lighting, these elements yield visually compelling and functionally coherent spatial experiences. A key consideration in their integration is the preservation of visual harmony across all spatial components.

Conclusion

The findings of this research indicate that environmental graphic design principles have not been adequately implemented across the hospital, not just within the pediatric unit but throughout its various departments. As such, the development of a well-engineered, systematic spatial environment necessitates the application of a structured design methodology. This approach should enable designers to propose concepts that are coherent, problem-oriented, and capable of reinforcing key messages and meanings in the minds of users.

Based on the empirical analysis of visual elements and associated data, it is evident that satisfaction with the environmental graphics at Emam Jafar Sadegh Hospital, Meybod, is limited. Accordingly, it is recommended that a thorough evaluation and critical analysis of the hospital's environmental graphic design be undertaken. Furthermore, it is advised that the interior design of the hospital incorporate insights derived from an in-depth study of Meybod's cultural identity.

Additionally, this study recommends the integration of visual components specifically suited to pediatric interior spaces and the implementation of color-coded systems to promote organizational clarity among staff. For instance, the use of multicolored wristbands can effectively communicate important patient-specific information, such as a yellow-coded band indicating a drug allergy, enabling medical personnel to exercise heightened caution during treatment.

Author Contributions

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Conflict of interest

The authors declare no conflict of interest.

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