

Principles of Artistic Design for Pediatric Medical Facilities Based on Survey Results

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DOI: <https://doi.org/10.52340/building.2025.71.14>

Abstract The article discusses the importance of color in medical facilities. Modern architects, in collaboration with psychologists, carefully and thoughtfully make color-related decisions, a practice that is well-established abroad. However, in our local context, this aspect receives considerably less attention.

In foreign practice, especially in the planning of pediatric medical spaces, the needs of children are taken into account. Calm colors and lighting are selected to help children adapt to the environment and gain their trust during an already challenging psycho-emotional period.

Our research aimed to determine the significance of interior design for patients who have to spend a certain amount of time in a clinic. To achieve this, we identified several target groups and conducted surveys at the Tbilisi State Children's Infectious Disease Clinic, involving patients, their parents, and medical staff. Additionally, research was carried out on social networks among parents of young children. Following these efforts, interviews with child psychologists proved to be particularly interesting and noteworthy.

The research confirmed that environmental factors significantly influence the mood and emotions of both patients and their guardians, as well as the productivity and attitude of medical staff. A well-designed interior and carefully chosen colors can help build children's trust and minimize their anxiety.

Keywords: medical facility, design, color solutions, color psychology, pediatric clinics.

Introduction:

Color and lighting are among the most essential components in architecture and design. They are closely tied to the psychology of perception and aesthetics. In general, the color palette for projects is selected based on various factors such as the purpose of the object, its geographical location, culture, religion, and many others.

Our goal is to provide recommendations for the proper planning of pediatric medical facilities, with a focus on the appropriate design of their interiors, particularly emphasizing color and lighting. The main objective is to develop recommendations in this field that will form the basis for the development of so-called project standards and regulations, as there is currently a lack of such documents at the national level. It will assist architects in designing not only clinics equipped with modern technologies and in line with the latest standards but also clinics that simultaneously create a comfortable, "familiar" environment for patients. This will make the examination and treatment periods less stressful for both children and parents, helping to prevent additional feelings of fear for the ill children.

Main Body:

Our research on pediatric medical facilities was based on a variety of activities surrounding this topic. We reviewed both international and local literature, examined the practices of leading countries abroad, and analyzed the current situation both outside our borders and within our own country. To achieve the objectives of the research, one of the methods we selected was a survey-based study. In line with the goal, the content and number of survey questions were determined, target groups were selected, and it was decided to conduct the research in two directions: at the Children's Infection Hospital of Tbilisi, involving both patients and their parents, as well as doctors. Surveys were also conducted with parents of young children on social media platforms. After all of this, interviews with pediatric psychologists, in particular, proved to be especially interesting and noteworthy.

A total of 150 respondents were surveyed in both directions. Of these, 50 were from the Children's Infection Hospital — 20 were staff members, and 30 were parents of patients. The remaining 100 respondents were surveyed via

social media platforms.

It was essential to understand the perspectives of both sides — the patients and their parents, regarding the type of clinic in which they would like to receive services, as well as the medical staff, in terms of what kind of working environment would allow them to feel comfortable and perform at their best.

The research object was the Children's Infection Hospital located on Simon Chikovani Street. With its location, territory, recreational area, and buildings, it stands out from others due to its potential. However, it undoubtedly requires reconstruction to meet modern standards and create a more comfortable and positive environment for children. Just like in the case of this particular clinic, the general survey also revealed that the majority of parents and doctors prefer a simple interior in light colors, decorated with colorful designs and painted with beloved cartoon characters or animals for children. They request more greenery and natural materials.

Based on the conducted survey interviews, we can say that the environment is a very important factor for parents when choosing a clinic. We asked them to name a children's clinic in Tbilisi that they preferred over others. The most frequently mentioned was the 'American Clinic,' which is a new, modern hospital tailored to current standards, where patients feel comfortable and hopeful.

Overall, the survey conducted in both directions revealed that the coloristic design of children's medical facilities in Tbilisi largely needs to be reconsidered.

The above-mentioned survey was not sufficiently informative for us; it was more general in nature. Therefore, interviews were planned and conducted with psychologists in the relevant field. These meetings turned out to be extremely interesting and informative for us. We prepared a few key questions and asked the child psychologists to share their opinions on these topics. The discussion was about both general child psychology and the recommendations provided specifically for medical institutions. Topics included how children feel calm in certain environments, which colors can reduce their anxiety and minimize stress, how to make them

feel in a cozy and homely atmosphere, and so on.

About ten psychologists participated in the interviews, including: PhDs in psychology, psychotherapists, university professors, and founders of rehabilitation centers. The majority of them spoke about calm, pastel, and neutral colors. As a result of a comprehensive analysis of the interviews with the psychologists, it was revealed that for a child, it is essential to create a familiar environment; they should have associations with home, school, kindergarten, and playgrounds. When entering the clinic's territory, even the yard should be properly arranged. When a patient has to spend several days in the clinic, they should not be restricted from going outside. The child should be able to use the hospital's yard, which will be adapted for any type of child. They should be given the opportunity to use swings, play in the sand, or simply walk in the greenery.

Primarily, when entering clinics, we encounter a stressful environment right from the first step—the registration area, where people in white coats sit, filling out the patient's history and then directing them to a specific doctor. Registrars are not doctors, and they can replace the white coat with a colorful uniform, which will not add stress to children as soon as they enter the clinic. In addition, it is possible to set up a play corner in the lobbies, where the child will have the opportunity to entertain themselves and shift their attention to playing while the parent completes the registration and waits for their turn.

Also, based on the psychologists' survey, we can conclude that it is better to use pastel colors in the vestibule, corridors, and waiting rooms. The main color recommended is blue, as it is associated with calmness, does not tire the eyes, and does not overstimulate. In the case of corridors, the main color can be complemented with applications, cartoon characters, installations, numbers, letters, and shapes, which, when observed by the child, will shift their primary focus and reduce their anxiety about the upcoming procedures and pain.

It is desirable to have bright lighting, plain walls, and some accent in the procedure rooms. Dominantly, an application can be placed in a

specific corner of the room, or there can be a screen, through which, during a specific procedure, the child will have an object of interest, and their attention will be focused on a single point.

We can confidently incorporate maximum imagination in the case of patient rooms, where the patient spends the most time during their stay at the clinic. The spaces should not be exhausting, monotonous, or boring, while also not being overloaded to avoid tiring or overstimulating the child. In addition to wall tones, it is advisable to introduce color through lighting, for example, a soft, calming lavender shade. Natural lighting should be maximized, utilizing skylights and as much sunlight as possible through windows. Children should always feel connected to nature, as this helps improve their mood and contributes to physical recovery, a fact supported by numerous scientific studies. The rooms can include small play areas, and the use of screens may also be considered, as watching cartoons helps pass the time and provides emotional uplift. In some cases, the use of red elements in the interior is acceptable. Although red is considered aggressive and is associated with anger and fire, children still like it, as it represents the color of love for them and their psyche processes it well. Often, children choose red among the primary color palette. This, of course, does not mean painting the walls red, but red accents on the walls will be pleasant for toddlers. Additionally, pink has a calming aura, alleviates chronic fatigue and tension, and is considered a color of relationships and friendship.

The design of doors leading to different rooms is very important. Ideally, every space should be engaging and appealing for children. If the door is glazed or has a window, children should be able to see what's happening behind it. This will prevent them from feeling anxious or scared and help them understand that they are not entering a dangerous space when they go through the door.

It is essential for clinics to have play and social rooms where children, who are allowed to interact with others, can meet, play, draw, sculpt, and spend time pleasantly with their peers. This not only enhances their social skills but also

positively impacts their psychological and emotional well-being.

When talking about children, it is crucial to consider all of them, especially in medical environments. There are both typical and atypical development children, and any of them can become ill, including children with special needs, such as those with autism spectrum disorders, ADHD syndrome, and others. In any case, these children require specialized attention, a comfortable and cozy environment tailored to their needs, so as not to cause irritation and to help maintain the balance of their psychological state.

A very interesting and extensive interview took place with Dr. Sofo Tsignadze, a psychologist with a medical center that specializes in children with behavioral disorders. Ms. Sofo spoke in detail about the needs of children with atypical development, the creation of the right environment for them, and the correct psychological approaches. What we discussed above is largely applicable to all developmental children, with a few exceptions. For example, if a child enters a vestibule and is immediately greeted by bright lighting and music, in most cases, this music could be a soundtrack from a cartoon or a piece of children's repertoire, which would surely appeal to the child and create a good mood. However, if we consider children with spectrum disorders, the music should be selected more carefully. It should be children's music, but played at a very low volume and be as calm as possible. Loud sounds and a colorful environment may irritate the child to the point where the parent cannot calm them down and may not even be able to get to the doctor's office.

In the vestibule, corridors, and common areas, designed in neutral, pastel, and calm colors, children with autism spectrum disorders will feel safe and comfortable. As for the patient rooms, separate spaces could be created for them, featuring cozy lighting, plain walls, and minimal decoration, to avoid the psychological irritation caused by bright colors and active lighting, and to create a peaceful atmosphere.

We discussed the red color, which, as mentioned, is highly favored by children with typical development. However, for children with

anxiety disorders, it can be psychologically damaging. For instance, a bright red drawing of a ladybug on the wall might be an appealing, vibrant element for a typical child, but it may cause agitation for a child with a disorder. Therefore, we can use red in any case, but it should be calm, not loud, pastel, and soft. The same applies to sunny shades, yellow, and orange tones.

Based on the overall analysis, we can conclude that the principles of inclusive design (Marzia Morena, 2011) should be considered in every clinic. An environment tailored for both typical and children with special needs is necessary. As mentioned, infectious diseases can affect anyone, including patients with cerebral palsy. Therefore, every detail must be taken into account for all types of children. There should be ramps, special elevators, properly arranged restrooms and rooms, and the color design should also be considered for all types of patients.

Interviews, along with international experience, have revealed the advisability of using chromotherapy in clinics (alternative medicine that helps doctors and psychologists manage patients' emotions and maintain balance through colors) (Viana, 2020). Color therapy belongs to the supplementary medical system; it is a well-established method and is often used in today's practice. It is one of the oldest practices, gradually gaining interest as an active and effective science. Using electromagnetic radiation, chromotherapy activates specific points in our bodies and has been found to alleviate various diseases.

In his book "Chromotherapy, The Power of Colors" (Valnet, 2014), Christian Valnet explains chromotherapy, discussing the significance of colors and the profound impact they can have. He examines each color individually and talks about their positive and negative attributes.

An interesting article on this topic is "Chromotherapy - A Useful Tool for Managing Anxiety in Children" (Aparna Jai Krishna, Jyothsna V. Setty, 2024). The authors conducted a study in a pediatric dental clinic, obtaining parental consent, and observing over a period of six months. They demonstrated the significant

impact colors can have on children's psychology. Dental clinics often cause anxiety in both children and adults. They fear the instruments, and the smells from the clinic can become deeply ingrained in their minds, leading to stress during future visits. The researchers turned to chromotherapy, using colors that children love in the interior design. They also provided pink and blue glasses for the children. As a result, they observed less stress and minimal anxiety, with heart rates often within normal ranges, and received positive feedback after the visits.

Chromotherapy can be integrated into the treatment process of any clinic, helping children overcome anxiety.

Our survey results, along with interviews with psychologists, have shown how important not only the patient's but also their companion's (parent's, guardian's) psycho-emotional state is when entering a clinic. Our opinion is supported by the work of the Italian researcher Elena Commodari, published in 2010, (Commodari, 2010), where the psychological state of parents and guardians is discussed. Hospitalization of children is a highly stressful event for parents, and the emotional stability of adults, their expressed level of anxiety, and restraint play a significant role in the child's mental state. The researcher discusses the importance of properly created environments in hospitals, noting that the longer the stay in the clinic, the more difficult it becomes for the parents' mental health. To address this, she highlights the importance of recreational, educational, and entertaining spaces within the clinic, where children can spend their time pleasantly, while adults have the opportunity to relax. When they see their calm children, their anxiety levels decrease as well. Generally, there could be a school-like space on the clinic's premises for adolescents, where children will feel like they are in a familiar environment. Additionally, there could be "teachers," or tutors, who will assist them with various tasks and, most importantly, help redirect their attention from pain to something pleasant.

Reducing stress in the guardians of hospitalized children will contribute to more effective treatment planning and help children perceive their illness more lightly. As a recommendation, we believe it would be beneficial if hospitals provided children the opportunity to complete homework, prepare lessons, and this should apply to all children, including those confined to their beds, so that they feel life continues in its usual rhythm. They should feel they have

responsibilities and cannot stop or waste time.

The results of our surveys are supported by an article published in 2001 by a group of American psychologists, architects, and doctors (SANDRA WHITEHOUSE; JAMES W. VARNI, MICHAEL SEID; CLARE COOPER-MARCUS; MARY JANE ENSBERG; JENIFER R. JACOBS; ROBYN S. MEHLENBECK), which discusses the importance of the artistic design of a hospital environment for a child's psyche. The article cites as an example the children's hospital in San Diego, which features a well-equipped inner courtyard. The study was conducted to determine whether the idea of creating a garden in a hospital was justified in reducing stress and increasing customer satisfaction. According to the research results, the garden brought numerous benefits, being perceived not only as a therapeutic space but also as a relaxing public area. The children's hospital in San Diego, with its courtyard and interior design, is a great example of how a pediatric clinic should be. The vestibule is spacious, with a dominant use of blue and white colors on the walls. The reception area features accents of blue and orange, and an aquarium is mounted on the wall. The cafeteria is designed in cheerful colors. Each patient room has a window in the entrance door, allowing children to see what's happening beyond the wall. This detail emerged as an important component during the interviews we conducted with psychologists. The design of the patient rooms is thoughtfully executed, with each room featuring a decorative wall depicting themes like space, animals, and other imaginative visuals. The atmosphere of this hospital has a positive impact on children's psychology, and both patients and their parents consistently mention experiencing less anxiety during stressful days. This is attributed to the overall environment of the clinic and the quality of service provided.

Healthcare professionals have come to the conclusion that the artistic and aesthetic environment of a hospital can influence the patient's mood, reduce stress caused by illness, and that determining stress levels in both patients and their family members is crucial during the treatment process.

The conclusion drawn from our survey and in-person interviews, confirming that the artistic design of both the exterior and interior of pediatric medical facilities plays a significant role in the rapid recovery of patients, is supported by a 2023 study on environmental experiences in pediatric healthcare, published in the United States (Clarissa Yu, Mi Wong, Juliana Gigna, Meaghan Walker, Timothy Ross, 2023). The researchers conducted surveys in clinics to explore stressful environments and ways to

alleviate them. Architecture and interior design elements, such as walls, ceilings, floors, windows, colors, decor, and furniture, can all contribute to reducing stress. All of these factors influence the psyche and can impact anxiety levels. Reducing anxiety can speed up the recovery process. It is also important to consider the preferences of children, who often appreciate the use of blue and green colors in the interior, as these colors create a calm, trustworthy, and stable environment. The study also emphasizes the creation of a comfortable environment for guardians. In the surveys, guardians actively criticized the conditions for guardians, stating that they should be able to relax, eat, and take showers in the patient's room. This is because, in many cases, they spend several days with their children. Disorganized spaces negatively affect their emotional state, further complicating their psychological well-being and making it almost impossible to maintain emotional balance. A rested and calm guardian is, first and foremost, essential for the patients.

In 2024 and 2025, the Architecture Week was held in Tbilisi, where professors from the Polytechnic University of Milan were invited. They conducted lectures on healthy architecture, discussing the modern standards of hospital design and the necessity of incorporating greenery and natural environments into clinics. Stefano Copollo, the head of the Faculty of Architecture at the Polytechnic University of Milan and a full professor in architecture, gives public lectures and workshops worldwide on hospital design.

In the process of understanding the principles of artistic design for children's healthcare facilities, we found a noteworthy article published in 2021 by Prof. Stefano Copollo and his co-authors (Monica Botta, M.Arch, Anna Lisa D'Aniello, and Stefano Capolongo, PhD, M.Arch). The article discusses the importance of nature, particularly after the COVID pandemic, and how even a brief pause in nature can help reduce stress in individuals. Considering environmental factors, stress, routine life, polluted environments, and the accelerated pace of life, general mental health is currently in a rather challenging state. A study was conducted based on surveys of medical personnel to understand how contact with nature could help balance their emotions. The COVID pandemic caused significant disruptions in people's daily lives, which, in turn, affected their mood, especially during the lockdown period. It became clear how calmly people adapted to staying at

home when they had their own yard, terraces, or balconies, even if just small green spots with plants. During the study, several hospitals had therapeutic gardens in their designs, open and green spaces that were specifically created for therapeutic purposes, benefiting not only the patients but also their families and staff.

Our survey results analysis also shows the significant importance of the connection to nature in the artistic design process of children's medical institutions. Even a short break in green spaces has a strong impact on the psycho-emotional well-being of hospital staff, emphasizing the importance of green spaces in hospital architecture. Even a brief break in nature can aid in the regeneration of users, especially when health issues are accompanied by mental health challenges.

We have discussed the issues regarding the arrangement of hospitals in Tbilisi. In several currently operating clinics, their design has been somewhat considered, and the interiors are less standardized and monotonous. However, even in these cases, the requirements that would satisfy both the patients and the medical staff have not been fully met. As for the direction of children's hospitals, the situation here is much more challenging. It is true that some pediatric clinics, such as "Tsitsishvili Hospital," leave an overall positive impression. The facility is newly renovated, and the interior features details designed for children. A children's play area is arranged at the entrance, and there are also entertainment corners in the doctor's offices, where patients can enjoy themselves and shift their attention to other elements. Most pediatric hospitals in Tbilisi do not take into account the psycho-emotional impact of the environment, and there is no consideration for an overall color scheme. For example, the children's infectious disease hospital selected for our survey falls short of all standards. Its medical inventory is outdated and incompatible with modern times, and both the interior and exterior spaces are in need of repair. Significant changes are required from a color perspective, and both the equipment and furniture need to be replaced. The yard should also be organized, with the potential for proper development, making it a central focus of the clinic's improvement.

Conclusion

Based on the analysis of surveys from children, parents, doctors, and psychologists, it was determined that one of the decisive factors in the treatment process is the environmental conditions. When planning new clinics or during the restoration and rehabilitation of existing ones, we must consider not only high-standard equipment and tools but also pay

significant attention to the proper arrangement of the interior. This includes creating designated recreational spaces for children, incorporating natural elements through materials and landscaping, and ensuring the use of a proper color scheme. This means employing non-tiring, pastel, and calm colors, along with the introduction of soothing lighting. By considering all of these factors, we will achieve the well-being of children, maintain their psycho-emotional balance, reduce anxiety and fear regarding doctors and procedures, which in turn will ensure the satisfaction of the parents.

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