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Child Care Centers: Designing Spaces for Wellness and Development of Children

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Abstract

Hospital design has changed and evolved since the Modern Movement in architecture to meet the demands of the times. It is now believed to be dependent on several variables. An architect should design a space that promotes security and is advantageous to the patient. An inpatient's hospitalisation procedure is unavoidably stressful for them. For adults, the atmosphere of healthcare facilities matters a lot, but for paediatric patients, it matters much more. During a child's visit or stay, the architecture of healthcare facilities has a profound impact on their developing mind and body. Since youngsters want to investigate things up close and rely more on touch than adults do, great consideration should be paid to the kinds of materials utilised. Thus, at this stage, one of the most important variables is the materials utilised and how they are applied. The young patients have a variety of needs that must be met (psychological, physical, social, etc.), but the ultimate selection of these materials is also based on a set of priorities. The selection of materials and hues, which must also uphold the space's functionality and consistently support the patients' psychology, determines the space's ability to heal. This paper's goal is to list the cutting-edge materials utilised in contemporary children's healthcare facilities and assess how well they can meet the needs of the younger patients.

Keywords: Children's healthcare, children's healthcare technologies, materials and colours, family centric approach, design elements

INTRODUCTION

Designing for children brings in the added benefit of captivating and entertaining visually appealing areas in addition to the "functional" element of a traditional medical facility. Child care centres provide paediatrics services, care and counselling for groups of children [1]. Children's perspectives on life are shaped by their experiences in paediatric facilities and the interactions they have with staff members. It is noteworthy because kids are continuously watching and gaining knowledge from their surroundings. Therefore, the space might not be focussing only on healing but also on the child's general growth and well-being. Bernard van Leer Foundation once stated "Children are our future. The early years of a child's existence have a profound impact on not only their own growth but also the development of our society and the entire world [2]." A child-centered approach can illustrate how society's values are shaped while also influencing children's experiences and quality of life. Due to their small size, stage of development, behaviour, and overall childhood, children are susceptible. Their anxieties about getting sick and being admitted to a medical centre make it hard for them to accept the odd and foreign treatment environment. They are highly susceptible to stressful and frightful settings, which makes them feel insecure, nervous, and threatened. As a result, design of a child care centre should provide cosy comforts while integrating external amenities [3, 4].

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RESEARCH STATEMENT

Implementation and demonstration of design strategies to create an ideal module for paediatric facility, which facilitates a user-centric approach to enhance user experiences in a fixed environment contributing to the healthcare processes.

OBJECTIVES

The objectives of a report on child care centre design focuses on creating a safe, stimulating, and developmentally appropriate environment for children, to develop design guidelines for child care centres that prioritize child safety, well-being, and development, to identify key design elements and spatial requirements for different age groups of children, to explore the integration of indoor and outdoor spaces for optimal child development, to investigate sustainable design principles applicable to child care Centerstone analyse cost-effective design strategies for child care facilities.

SIGNIFICANCE AND NEED OF THE STUDY

In paediatric facilities, the environments shape the way children look at life and reflect upon it from the interactions they get in these facilities [5]. It's crucial to remember that kids are continuously monitoring and taking in information from their surroundings. Hence, the space may not be looking at a singular function of healing but overall well-being and growth of the child too. The study is conducted to essentially provide: Developmental Support, safety and security, comfort and well-being, health and hygiene, inclusivity and accessibility.

METHODOLOGY

This study combines quantitative and qualitative methods in a mixed-methods approach. The qualitative aspect involves case studies, literature studies and interviews, while the quantitative aspect includes surveys to gather broader data on public perceptions and effectiveness of interior design in Pediatric care facilities. The case study helped in understanding the current scenario of the paediatric centres while the chosen literature reviews were studied to understand how interiors of Pediatric care facilities can be enhanced.

LITERATURE REVIEW

Chirayu Paediatric Centre, Bhopal, Madhya Pradesh, India is a renowned Children's hospital in Bhopal as shown in Figure 1, Chirayu conveys the universal human desire for longevity. The site's location plays an important role as it attracts people in and around Bhopal.

Figure 1. Site Pictures of Chirayu Paediatric Centre.
Source: https://cmchbhopal.com/college/department/

Child and Adolescent Center, National Institute for Child and development, St. Alexandria, USA was architected by Nicha Chudthong and has the area of 955 sq m as shown in Figure 2. The Child and Adolescent Clinic is a part of the National Institute for Child and Family Development. Under the supervision of Mahidol University. Otectves are to treat and help children, so that they can live on their own and to give advice to their parents for a better understanding of children.

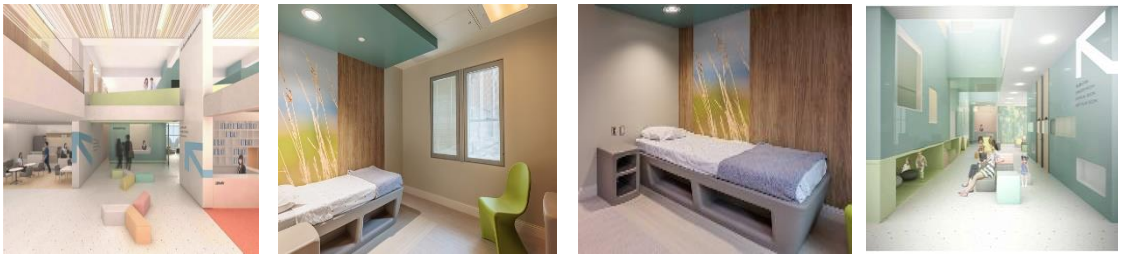

Figure 2. Site pictures: Wards and Waiting Area.
Source: https://in.pinterest.com/ideas/

IMPORTANCE OF HEALING ENVIRONMENTS IN CHILD CARE CENTERS: A DESIGN PERSPECTIVE

Childhood and adolescence are defined by the WHO as the years between conception and the age of nineteen. According to Simonelli, Majer, and José Caldés Pinilla (2007), "particularly sensitive phase of life for the adoption of healthy lifestyles and the acquisition of coping mechanisms that could be of help in adulthood and old age" [6]. A child's character can be greatly shaped at that time of life by a variety of environmental influences, as well as physical and mental experiences. In any case, the role of the paediatric facilities is essential, because after all "children are our investment in tomorrow's society". The environment is very important to the healing process; it helps patients feel less scared and anxious, meets their requirements, and even restores their ability to maintain relationships with friends and family. A welcoming atmosphere, comprehensible orientation, and a safe, secure, and stress-free setting would all contribute to the healing process by providing the child with care, protection, and respect for their body and mind. Thus, in terms of the healthcare setting, the integration of architecture, design, art and technology can produce unique conditions that facilitate a child's recovery and enhance its overall wellbeing [7]. Children's spaces should be designed to go beyond the mundane and include stimulating elements that can spark their imagination and creativity. With the right details and design, a warm and inviting environment can be created that will appeal to all five senses and help the child feel more at ease.

DESIGN ELEMENTS IN CHILD CARE CENTER

In light of their special requirements and delicate psychological balance, paediatric medical facilities have more complex systems than adult healthcare facilities. As to Cleper-Borkovi (2009), an ideal children's hospital ought to provide a feeling of exploration and intricacy, arouse the senses, promote mobility, and incorporate whimsical, humorous, and varied features. As was previously said, there are specific needs that children have, which present two challenges for architects: first, they affect the design and make the children's healthcare facilities unique from the others. According to James Robertson's essay (1958) "hospitalization constitutes a trauma for a child, the separation of young patients from their parents during hospitalization provokes grave mental suffering" (Filippazzi, 2009). As Newman C. also states: "Children are highly depended upon adults for comfort, guidance, and support"; therefore, during their hospitalization they need "the presence of caring and attentive caregivers as well as their own parents" (Newman, 2009). Subsequent to this, some of the biggest problems that arise have to do with the patient's private room's layout or how to provide constructive diversion that can divert the child's and parent's attention from their discomfort or anxiety. The child and family members should be able to feel at ease and have the emotional needs of the youngster met in the private room. Furthermore, the unique requirements, routines, and preferences that each age group during childhood and adolescence has an impact on the design of healthcare for children.

Some of the most important elements of design are:

- The interiors (e.g. lobby–reception and patient rooms)
- The relationship of the building with the natural environment
- The lighting (both natural and artificial)
- The Colours and the Materials used
- The scale

The Interior Environment

A seamless transition from an outdoor environment to an interior and vice versa is essential in healthcare facility design because it can impact both patients and visitors as shown in Figure 3 and Figure 4. Healthcare facilities' spatial organisation depends on the continuity of spaces. To encourage recovery, a patient's room should include features that suggest security and tranquilly. Positive diversions that can stimulate the senses should be included in a child's room to help them feel comfortable and relieved of pain. According to McElroy-Anshen and Allen (2009), the design must therefore "...respond to all the child's needs, those of the body, mind, and soul."

Figure 3. Examples of well-designed lobbies.
Source: https://in.pinterest.com/ideas/

Figure 4. Example of well-designed child rooms.
Source: https://in.pinterest.com/ideas/

Relationship with the Nature

The relationship between the natural environment and health is not new. Since the earliest societies, it has been known. Small parks, healing gardens, atriums, and other well-designed outdoor areas are likely to promote social contact. Its goal is to get rid of or lessen discomfort and emotions of loneliness. Incorporating biophilic design principles by bringing nature into the hospital through indoor gardens, green walls, and large windows with views of nature as shown in Figure 5. It has been shown that spending time in nature lowers stress and promotes recovery.

The Lighting

Whether natural or artificial, lighting has the ability to significantly change a space's appearance, tone, and circulation pattern. It is a very strong component of design. Research has indicated that by synchronising with natural light shifts, artificial lighting within an indoor space can also help with spatial orientation as shown in Figure 6. However, light can also be a useful characteristic for the patient because it is a potent regulator of the body's everyday processes. A patient's emotional and physical condition can be positively impacted by the quality of their illumination, which can also promote wellbeing and speed up healing. Light, in any case, is the source of all visual effects.

Figure 5. Indoor Gardens.
Source: https://in.pinterest.com/ideas/

Figure 6. Lighting in different areas.
Source: https://in.pinterest.com/ideas/

Hospitalised youngsters can amuse themselves and decompress in areas like waiting rooms, lobbies, and corridors by using fun lighting and video projections on the walls and floors. An intriguing illustration of this can be found in Jason Bruges' (2013) "Nature Trail" piece as shown in Figure 7. This interactive initiative was created especially to make children's trips to the operating room more enjoyable for those who visit Great Ormond Street Hospital. There are two main parts to it, integrated LED panels and personalized graphic wallpaper. In order to accommodate patients' eye levels and positions as they go along the hallways, the LED panels are set into the wall surface at different heights.

Figure 7. Interactive wall at Great Ormond Street Hospital by Jason Bruges Studio (2013)
Source: https://www.archilovers.com/stories/2092/the-nature-trail-and-the-light-modulator.html

Colours and Materials

The people who will be using the area and the materials and colours chosen for the interior are always taken into consideration. Colour and material selection determine healing properties. Making the right decision might have a positive influence on the patient or guest. "Colours should be warm and varied without becoming overpowering or offensive. To encourage youngsters to touch and learn about objects, textures should be varied. However, materials and colours must always support the patients and reinforce the space's functionality. To be more precise, bright colours should be avoided in the neonates' department because newborns are sensitive to light; however, playful colours and plush carpeting add a warm touch to the paediatric walkway as shown in Figure 8.

Figure 8. Different colours and materials.
Source: https://in.pinterest.com/ideas/

The Scale

In children's healthcare facilities, scale plays a significant role in design. As previously said, the design must accommodate every demand of the child and be flexible enough to accommodate changes during childhood and puberty. Children are kept from feeling "imprisoned" in their hospital room, for instance, by low windows that can provide enticing vistas of trees without requiring them to sit on a chair or be scooped up by an adult [8]. Children feel more secure when their surroundings are within their grasp because they may explore, learn from, and take control of unfamiliar and odd environments. Furthermore, according to Platte, Gabel, and Clements (2005), "it is very important to introduce elements scaled to children of different ages and cultures, offering positive distractions."

PATIENT-CENTERED DESIGN AND FAMILY-CENTRIC SPACES

Designing spaces that are welcoming and comforting for children, with bright colours, playful themes, and engaging artwork. Including items that pique young patients' curiosity and creativity can help them feel less anxious and have a better overall experience. Allowing patients to personalize their rooms with adjustable lighting, colour schemes, and entertainment options as shown in Figure 9. This provides youngsters in an otherwise stressful environment with a sense of control and calm. Integrating family-friendly spaces within the hospital, including comfortable sleeping areas in patient rooms, family lounges, and play areas for siblings. These spaces support family involvement in care, which is crucial for the emotional well-being of both the child and their family. Transform waiting rooms into engaging, stress-relieving environments with interactive displays, games, and comfortable seating. These areas can provide distraction and relaxation for both children and their families during long waits.

Figure 9. An Interactive patient's room.
Source: https://in.pinterest.com/ideas/

INNOVATIVE MATERIALS IN DESIGNING A CHILD CARE CENTRE

The design of a children's hospital requires careful consideration of materials that enhance safety, comfort, and healing while also being durable, sustainable, and engaging for young patients. For Example: Copper and Copper Alloys and Antimicrobial Coatings. These materials are naturally

antimicrobial and can be used for high-touch surfaces like door handles, bed rails, and countertops to reduce the spread of infections and such material are:

1. *Biophilic Materials:* Incorporating wood elements in design can bring a sense of warmth and connection to nature [9]. Engineered wood products, treated for durability and hygiene, can be used in flooring, wall panels, and furniture, living walls made from plants or preserved moss add a touch of nature indoors, improving air quality and creating a calming, aesthetically pleasing environment.
2. *Sustainable and Eco-Friendly Materials, Low-VOC (Volatile Organic Compounds) Paints:* Using recycled materials, such as flooring made from recycled rubber or plastic, helps reduce environmental impact while providing durable, easy-to-maintain surfaces. Eco-friendly paints reduce hazardous chemical emissions, enhancing indoor air quality and lowering children's health hazards, particularly for those with respiratory conditions.
3. *Resilient and Soft Flooring:* Soft, slip-resistant, and easy to clean, rubber flooring is ideal for areas where children play and move around as shown in Figure 10. It also provides cushioning, reducing the risk of injuries from falls, A natural, renewable material, cork provides a comfortable, resilient surface that is warm underfoot, sound-absorbing, and naturally antimicrobial.
4. *Acoustic Materials:* Made from materials like recycled polyester or natural fibres, these panels reduce noise levels, creating a quieter, more restful environment. They can be incorporated into furnishings as well as walls and ceilings. Laminated glass with soundproofing qualities can be used in windows and partitions to minimize noise transmission, providing a more serene atmosphere in patient rooms and common areas.
5. *Interactive and Adaptive Materials:* Electrochromic or switchable glass can be used in windows and partitions to control privacy and light levels, switching from clear to opaque with the flick of a switch, providing flexibility in how spaces are used. Magnetic or writable wall surfaces allow children to engage with their environment, turning walls into spaces for creativity and play without compromising on hygiene or cleanliness.
6. *Thermal and Sensory Comfort Materials:* In order to keep patients comfortable, Phase Change Materials (PCMs) can be incorporated into walls or ceilings to help control indoor temperatures by absorbing and releasing heat as needed. Use of soft, hypoallergenic textiles for bedding, upholstery, and curtains ensures that children feel comfortable and secure, contributing to a more soothing environment.

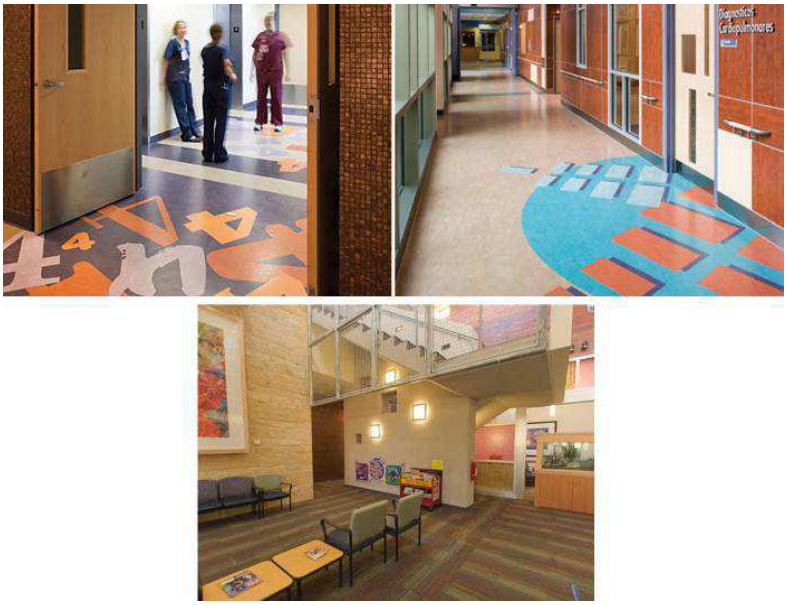

Figure 10. Linoleum and recycled carpet flooring at Dell Children's Medical Centre.
Source: https://www.robaid.com/tech/green-architecture-dell-children%E2%80%99s-medical-center.htm

CONCEPT OF POSITIVE DISTRACTIONS

Positive distractions in the design of paediatric facilities play a crucial role in reducing anxiety, promoting healing, and enhancing the overall well-being of young patients [10]. These elements are intentionally integrated into the environment to engage children's senses, divert their attention from the clinical aspects of the hospital, and create a more comforting and less intimidating atmosphere. Key examples of positive distractions include interactive art installations, play areas, and technology-driven experiences such as virtual reality. Interactive art, such as murals that incorporate tactile elements or digital screens with changing images, provides visual and sensory stimulation that can captivate children's imaginations. Play areas, designed with age-appropriate toys, games, and spaces for physical activity, allow children to engage in normal, playful behaviour even while in the hospital. These areas not only serve as a mental and physical outlet but also encourage social interaction, which can alleviate feelings of isolation. Technology is another powerful tool in creating positive distractions. Virtual reality (VR) experiences can transport children to calming environments or engage them in interactive games during medical procedures, reducing perceived pain and anxiety [11]. Additionally, entertainment systems within patient rooms, offering access to movies, music, and educational content, give children control over their environment, making their stay more pleasant. Incorporating natural elements, such as views of gardens, water features, or indoor plants, also contributes to a soothing environment. Nature has been shown to reduce stress and promote a sense of tranquillity, which is particularly beneficial in a healthcare setting. Overall, positive distractions are an essential aspect of paediatric facility design, transforming the hospital experience from one of fear and discomfort to one of engagement, comfort, and healing as shown in Figure 11. By thoughtfully integrating these elements, healthcare environments can significantly improve the patient experience for children and their families.

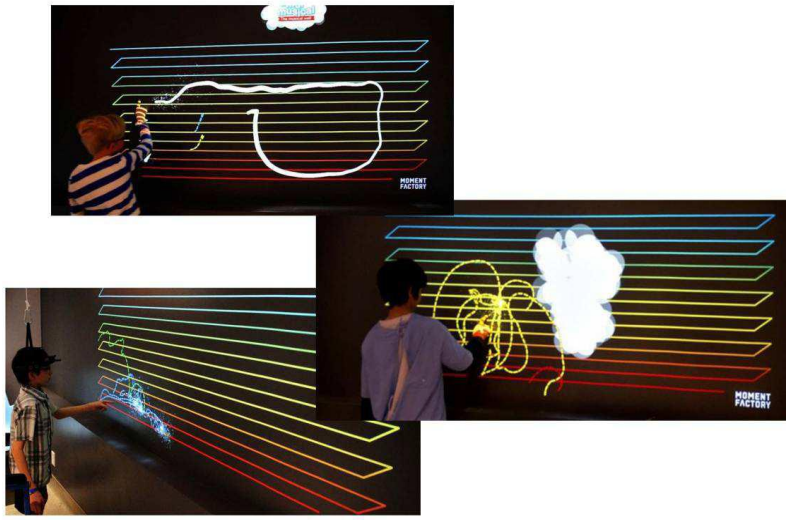

Figure 11. Interactive Musical Wall, at CHU Ste-Justine Children's Hospital in Montreal.
Source: https://www.designboom.com/art/moment-factory-interactive-musical-wall-for-saint-justine-hospital/

CONCLUSION

Collaboration between the fields of design and medicine is necessary to promote better healthcare design. Although it is hard to predict what the demands of the future will be, it is a truth that children's healthcare facilities can gradually improve in quality by creating pleasant and therapeutic settings with the use of technology. The never-ending advancements in medical research and technology make hospital design even more difficult for architects to tackle. Hopefully, children will benefit from innovative materials, new design elements, and creative concepts to the greatest extent possible, preventing feelings of pain, anxiety, and isolation from taking centre stage throughout their time in the medical facility. Lastly, it is important to acknowledge that the demand for health services is rising. As a result, a significant portion of contemporary architectural trends is hospital design. Children's hospitals are extremely special, intricate, and essential. The variety of their tasks presents a challenge

to every architect. This particular set of patients can receive more comprehensively safe medical care from a children's hospital. The best interests of a hospitalised child are the foundation of modern children's hospitals; certain standards and guidelines are implemented with regard to the particular problem of safety and health promotion for kids and teens in and by hospitals. The healing environment found in today's healthcare facilities incorporates elements of ecology, psychology, technology, and architecture. Collaborative experts from several epistemic domains aim to dispel children's anxieties about hospital visits and transform them into a secure and beneficial encounter. Care quality and value are impacted by design features. Patients and their families can be more comfortably accommodated by an efficient and adaptable design. There are numerous examples of modern design that provide protection and safety for kids while they're in the hospital.

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