

Child-Centered Hospital Design: EKH Children Hospital

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Abstract –Hospital structures consist of spaces that are complex for all users. Even for adult users, hospital environments can be challenging and intricate to navigate. When considered for children, experiencing hospital spaces becomes even more daunting. The complexity is heightened especially when the designs of hospital structures do not primarily take child users into account. In recent years, child-focused hospital designs have come to the forefront. The emphasis on this topic has been driven by the need to ensure that children are not adversely affected during their treatments in hospitals designed with their needs in mind, and that their experiences are more positive for the future. In this context, the subject of the study is children's hospitals. The EKH Children's Hospital in Thailand, an important example in the realm of children's hospitals, has been identified as the area of examination for the study. The aim of the study is to analyze the EKH Children's Hospital, a significant example in the field of children's hospitals, in a spatial context. It is believed that examining the criteria necessary for child-centered hospital design through a notable example and the conclusions reached in this context will serve as a model for various applications within the subject scope.

Keywords –Health Facilities, Hospitals, Children's Hospitals, Interior Design, Design Criteria.

I. INTRODUCTION

From the dawn of their existence, humans have engaged in various endeavors to lead a healthy life. As a result of these endeavors throughout the historical process, medical science has evolved. With the advancement of medical science, a need for space has emerged. Consequently, healthcare structures have taken shape, culminating in their contemporary form. Modern hospital infrastructures have transformed into complex entities, comprising spaces that address diverse patient needs, reflecting discovered treatment methods and evolving technology. Hospital structures are spaces where intricate and acute services are provided, and where the continuity of these services is maintained without interruption [1].

The complexity of hospital structures can be perceived by all their users. Various operations taking place in every unit of the building, combined with the differing states and needs of incoming patients, make experiencing hospital structures challenging for users. Especially when considering pediatric users, experiencing a hospital as a space becomes particularly daunting. For children, transitioning from being ordinary individuals to patient users, especially after an abrupt illness or accident, and leaving their safe and comfort zones to enter hospitals exacerbates this experience. Leaving familiar environments to undergo treatment within the regimented system of hospital structures, or to stay as inpatients, can be an intimidating experience [2].

The inherent complexity of hospital structures can adversely affect pediatric patients who require treatment. Especially in cases necessitating long-term care, children staying in hospital structures that haven't been designed with their needs in mind can lead to negative outcomes. Therefore, the duration a child, especially one requiring prolonged treatment, will spend in a hospital setting should be carefully considered. Incorporating

design elements within the space that facilitate social interaction and support normal development is crucial in creating suitable hospital environments for children. By doing so, it is possible to prevent potential disruptions a child might experience during their illness [3]. Hence, hospital structures must possess a design that is specifically tailored for pediatric users.

Given the state of the hospital experience for children and the multitude of sub-specialties within pediatric medicine, the design of children's hospitals becomes highly significant. The first pediatric hospital ever designed worldwide is the "Hospital Des Enfants" located in Paris, opened in 1802. In Turkey, it is the "Hamidiye Etfal Hospital" [4], [5]. While the earliest examples of children's hospitals date back to long ago, the practice of specialized children's hospitals is not very prevalent in Turkey.

However, in recent years, the psychological impact of hospital environments on children has been taken into consideration. Studies on this topic emphasize the need for child-centered hospital settings [6]. For this reason, children's hospitals have been chosen as the subject of the study. An important example within the scope of children's hospitals is the EKH Children's Hospital in Thailand, which opened in 2019, and it constitutes the examination area of the study. The aim of the study is to examine the EKH Children's Hospital, one of the significant examples in the field of children's hospitals, in a spatial context.

II. MATERIALS AND METHOD

Within the scope of the study, a literature review on the design of children's hospitals was conducted initially. In these literature scans, criteria that need attention in child-centered hospital designs were identified. Subsequently, the EKH Children's Hospital, which forms the study area, was

introduced. During this introduction, various spaces of the structure were tabulated and conveyed. In the evaluation phase of the study, the criteria identified in the literature review regarding child-centered hospital design were compared with the spaces of the EKH Children’s Hospital that make up the study area.

III. CHILD-CENTERED HOSPITAL DESIGN

In recent years, there have been numerous studies on child-centered hospital design. One such study was conducted in Ireland, involving a study group of 55 children ranging in age from five to eight years, across three pediatric hospitals. The study revealed the needs and requirements of the users concerning personal space, the physical environment, and accessibility. The research emphasized that in hospital designs, considerations should be given to children's privacy, family support, and rights to self-control [7].

In another study, 21 children were observed throughout their hospital stay. As a result of this observation, the needs of the children were identified and categorized. The needs arising in situations where the children did not feel discomfort or pain during their treatments include: the need for new experiences, activity, information, recognition and praise, and participation. During times when they felt discomfort or pain from their treatments, the identified needs are: the need for familiarity, honesty, control, and the presence of their parents nearby [8].

In a different study, design criteria to alleviate anxiety in children's use of hospitals were examined. Within the scope of this study, various parameters for the design of hospitals for children were compiled from the literature, and a survey was conducted to determine the children's preferences. According to the survey conducted, children found hospital interior visuals designed with organic forms to be more positive [3].

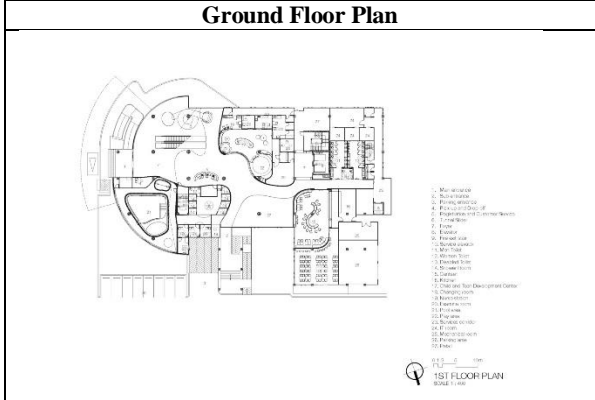
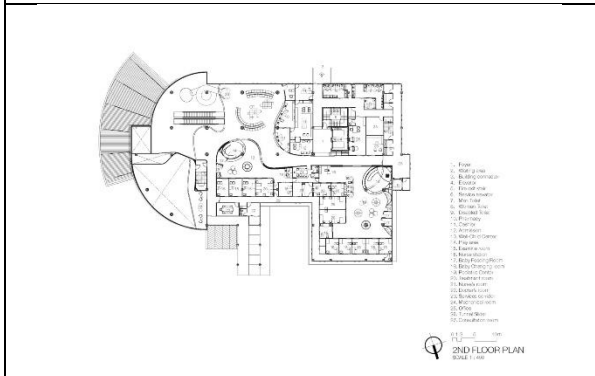
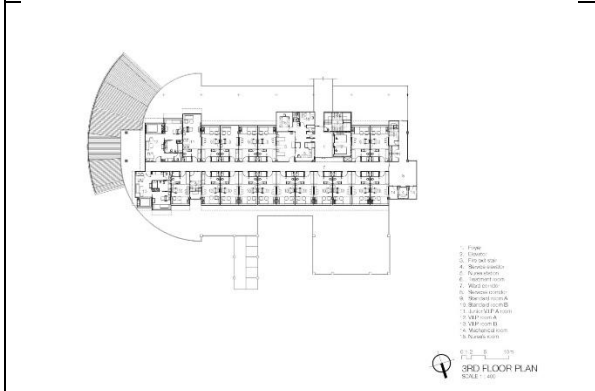
In another study [5], design decisions to be considered in the construction of hospitals tailored for children were identified. These include:

- Using furnishings that consider child ergonomics within spaces,
- Diversifying fun and educational spaces for children,
- Incorporating play areas for children within the space,
- Establishing connections between semi-open and open areas within the structure,
- Organizing spaces that will also allow children to be alone,
- Constructing the overall atmosphere of the hospital to be perceived as an enjoyable place.

IV. EKH CHILDREN’S HOSPITAL

The structure is located in the city of Samut Sakhon in Thailand. It was opened for service in the year 2019. The hospital, constructed on an area of 6000 square meters, was designed by the firm Integrated Field [9], [10], [11]. The floor plans of the structure are presented in Table 1.

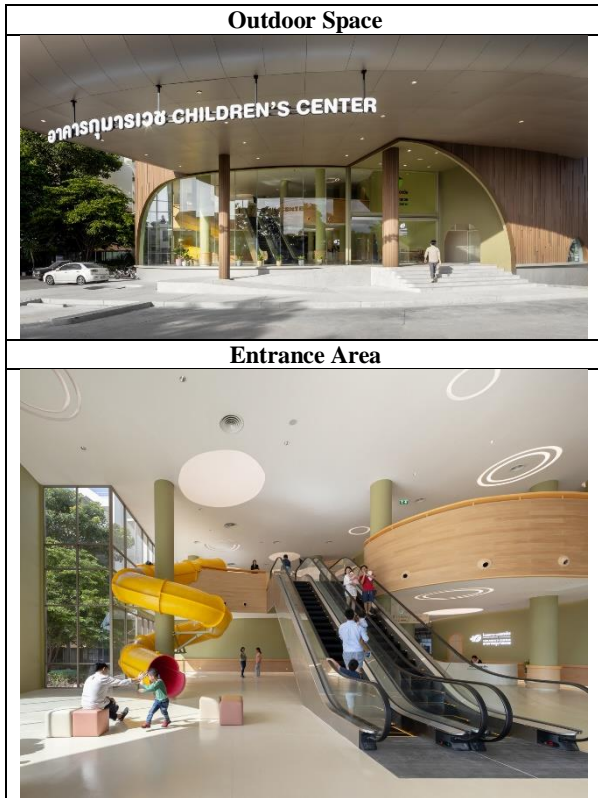
Table 1. Plans of Ekh Children’s Hospital [9], [10].

Ground Floor Plan

First Floor Plan

Second Floor Plan


The firm has stated that the design of the structure was significantly influenced by the notion that what children instinctively seek is fun. They have considered fun as the focal point of the design. By defining what fun means from the perspective of children, they have created a structure that integrates space and entertainment. The design firm has stated that it employs a design language composed of organic and perfectly geometric forms, taking into account child ergonomics. Furthermore, they have opted for pastel color tones which they believe encourage the imagination of children. As a result, they assert that they have crafted a space offering a personalized experience, incorporating facilities and features suited to the ergonomics of their users [9], [10], [11].

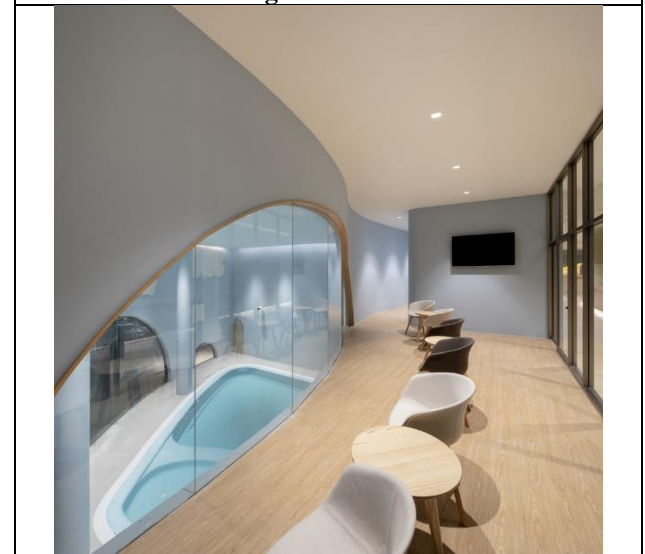
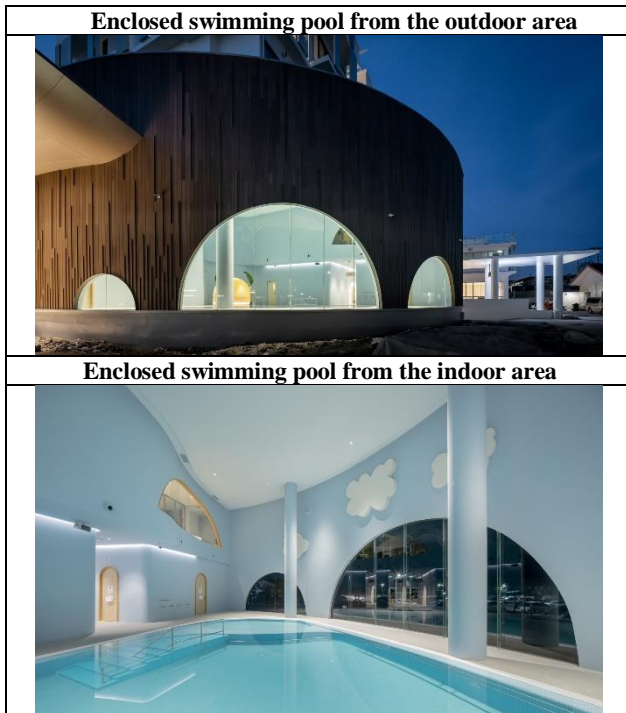
To mitigate the children's fear upon entering the hospital and to demonstrate the space's playful nature, a giant slide, perceptible from the exterior, they had placed in front of the entrance area. The entrance area is depicted in Table 2.

Table 2. The entrance area [9], [10].



At the rear of the entrance area, there is an enclosed swimming pool. The ceiling design of the pool area incorporates artificial clouds, thereby stimulating the perception of being outdoors amongst the users. Images of the pool are presented in Table 3.

Table 3. The enclosed swimming pool [9], [10].



The waiting areas of each unit within the hospital structure have been designed to include spaces for children to engage in various activities. This arrangement ensures that, during waiting times, children can participate in activities while their parents have the opportunity to observe them. Images related to the waiting areas are presented in Table 4.

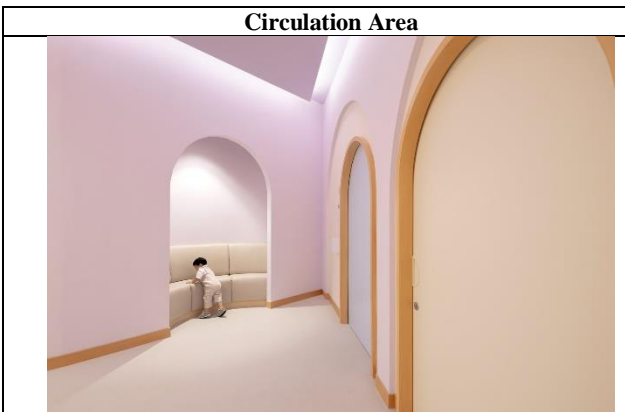
Table 4. Waiting areas [9], [10].





The circulation areas within the structure have been carefully crafted with attention to lighting design, incorporating indirect lighting. Furthermore, as specified by the design firm, the use of organic shapes and pastel colors has also been applied to the corridor designs. Visuals related to the corridor designs are located in Table 5.

Table 5. Circulation areas [9], [10].



The design of the wet areas has also been conceived with child ergonomics in mind. As with other areas, the use of pastel colors and the inclusion of organic forms have been maintained in the design of these spaces. Visuals related to the wet areas can be found in Table 6.

Table 6. Wet areas [9], [10].



One of the most important spaces within the structure are the inpatient rooms. In the layout planning of the inpatient rooms, two arrangements have been made: standard and VIP. For the standard rooms, two different layout types have been developed, and for the VIP rooms, another two distinct layout types have been created. The used layout types are presented in Table 7.

Table 7. Patient rooms plans [9], [10].

VIP Rooms Plans	Standard Room Plans
	
	

The structure features four different room concepts, named after animals: whale, turtle, lion, and rabbit. Each room concept is uniquely designed and customized with lighting fixtures placed over the beds. Visuals related to the inpatient rooms are located in Table 8.

Table 8. Patient Rooms [9], [10].

Lion Patient Rooms

Whale Patient Rooms



Rabbit Patient Rooms



Turtle Patient Rooms



V. EVALUATION AND DISCUSSION

The study conducted a literature review to examine the design criteria that should be considered for children's hospitals. Various factors have been taken into account in numerous studies. However, the criteria set forth by Öymen Gür and Yalçinkaya [5] have been explained in a way that encompasses the entire literature. The evaluation phase of this study was also conducted considering Öymen Gür and Yalçinkaya's [5] criteria. These criteria include the consideration of child ergonomics, the design of fun and educational spaces, the connectivity between semi-open and open areas, providing opportunities for children to be alone,

and the overall atmosphere being resolved in an enjoyable manner.

The criteria derived from the literature review have been assessed within the context of the hospital's buildings, which includes the entrance area, waiting area, circulation area, wet spaces, and patient rooms. The assessment conducted is presented in the Table 9.

Table 9. Assessment table

	Entr. Area	Waiting Area	Circu. Area	Wet Area	Patient Rooms
Child Ergonomics	+	+	+	+	+
Fun and Educational Spaces	+	+	+	+	+
Play Area	+	+	-	-	-
Semi-Open and Open Area	+	-	-	-	-
Areas Where the Child Will Be Alone	+	+	+	-	+
Enjoyable Atmosphere	+	+	+	+	+

The first criterion, child ergonomics has been examined in all spaces of EKH Children Hospital. The furnishings used in the designs have been conceptualized with child ergonomics in mind. The second criterion, fun and educational spaces, has manifested itself as a design narrative throughout all spaces. Within this criterion, the presence of a pool and slide in the entrance area, the inclusion of elements that support activities such as book reading in waiting areas, the use of color and organic forms in circulation areas and wet spaces, and the personalization of patient's rooms are noted. The criterion for the resolution of play areas within the space has been particularly felt in the entrance and waiting areas. The connected design of semi-open and open areas has clearly found its place in the design due to the functions located in the entrance area. The criterion of spaces where children can be alone is somewhat more challenging to perceive. This is because, with the exception of the wet areas, nearly all spaces have been designed to allow children to be alone while still under supervision. However, if complete privacy is the issue, the structure needs to be experienced more closely. The last criterion, creating a fun atmosphere throughout the entire design, has become a point that is felt in all the spaces of the hospital structure and has actually directed the design.

VI. CONCLUSION

Hospital structures rank among the most challenging spaces for all users to experience. However, when the user is considered to be a child, the design of hospital structures becomes a critical point. This is especially true in cases where children require long-term treatment, as the time they spend within the hospital is significant. As numerous scientific studies have indicated, the emotions children experience and endure throughout this period influence their current treatment processes and can transform into negative feelings that manifest later in their lives.

In this context, the development and implementation of hospital designs for children have become a significant issue. The EKH Children's Hospital, considered within the scope of

this study, stands as one of the best examples on this subject. The evaluation conducted has determined that the hospital structure has addressed all the criteria deemed essential in children's hospitals. Although not all criteria have been applied equally in every space, many have been taken into account in the design. The hospital structure conveys a sense of fun atmosphere right from the exterior. Entertaining activities in the entrance area encourage children to enter the hospital. The design solutions for waiting areas, the inclusion of play areas, personalization within patient rooms, and the use of fun design elements in wet spaces and corridors are all conducive to ensuring that users spend time within the space with positive emotions.

The proliferation of such examples within the context of children's hospitals is of great importance. The structure discussed and analyzed within the scope of this study encompasses decisions that should be considered in the design of children's hospitals. The fact that criteria which should be taken into account in a scientific context for children's hospital designs have been implemented in the project execution makes it a significant example for subsequent children's hospital projects. Moreover, the conducted analysis is akin to the first step of many scientific studies. By expanding the sample to include global examples, analyzing, and comparing them with local ones, the criteria to be considered in the design of children's hospitals will be examined in a more standardized manner. Furthermore, the impact of different elements such as culture and climate on the designs of children's hospitals will also be revealed.

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