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Creating a Child Friendly Environment for Children's Health and Wellness

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Abstract: ***The thought of spending time in a hospital as a patient or visitor is stressful and scary for anyone, and more so for children. Children's hospital should be child friendly and safe, thus creating a "small world in itself". The aim of this paper is to understand how children's hospitals can be designed to make the hospital experience for children less stressful, while attempting to accomplish a building more pleasant and child-friendly. The research explores ways to integrate elements and principles in children's hospitals by studying child psychology to create a child friendly environment where the children will forget their pain and will not be scared of hospitalization. The first part of the research is based on literature review, exploring the Children psychology according to age and their perspective towards built environment. In second stage, a set of guidelines were compiled addressing the factors that influence healing environments. In a third stage, three case studies are being done.Survey has been done of Primary users (children between 6 to 18 years) Secondary users (Parents of children below 6 years), as this age group are unable to express or answer and understand the questions. Data collected has been analyzed and parameters found, sense of control, social support, positive distractions, sensorial dimensions and age appropriate environment to determine the elements and spaces for children's hospital environments that can be used to strengthen the designs.***
Keywords: Children Friendly Environment, Health, Child Psychology, Wellness, Healing Environment.

I. INTRODUCTION

Children are our future .Children's development affects the development of the society which in turn affects the development of our world. Childhood is the most important period of human life and it is the childhood that moulds the character of the child. Our future depends on our children. Hence children are most important. Children deserves the environment which makes them feel safe and secure and this in return give rise to healthy and mentally fit well being, provides stability and supports child development. Hence giving a child-friendly environment is essential for the development of a child at various stages. They have a positive impact on the child's growth and development process. Children who are suffering from illness are often restricted in their activities and therefore feel different, and socially isolated. According to research from Queen Mary University of London children will likely experience mental illness in their early adolescence than healthy children, if they are suffering from long-term health conditions. Children shows mental illness at 10 years who have chronic health problems, and such children continues to show poor mental health at the ages of 13 and 15.Children's development and wellbeing is affected by illness as it disrupts their normal lives. As development and illness goes hand in hand. Therefore for our children's health and well being hospitals are essential. Not only hospitals are essential but they are of utmost importance of all the infrastructures and it has been even proved during COVID-19 period, when everything was under lockdown the only operational building was hospital. Hence it is important to manage two most important things children and hospital and CREATING A CHILD FRIENDLY ENVIRONMENT FOR CHILDREN'S HEALTH AND WELLNESS. Children staying in hospital can be a poignant experience because hospitals are generally associated with being ill and suffering from pain. Already a child may not be feeling well and then also has to deal with sad, gloomy and exchange their familiar environment with the structured hospital system. Medicine alone is considered sufficient for cure of diseases. According to WHO constitution merely the absence of disease does not mean that a person is healthy but health means it is a condition when a person attains physical ,mental and social well being, which can be achieved through the hospital design and environment which can add to the healing process. In case of Children's hospital, its design becomes important because children are under process of learning by interacting with the world around. To make any space more responsive and interactive it is very essential to understand user perspective. Adolescents and various age groups have different perceptions. Particularly stays in the hospital require specific activities for a normal development. Hence for making hospitals stay pleasant and enjoyable architecture can play a great role. Therefore for designing any built environment for children it is necessary to design with respect to psychology of the children for their positive development.

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II. LITERATURE

A. Origin And Evolution of Hospitals

The hospital has always been a space to care and cure people but it has not always been housed in a healthcare setting, as we know now a days. In the beginning of the Greek civilization (460-360 BC), the Asklepieion introduced the idea of spiritual health , recovery through nature, such as natural light, ventilation and outside views. Romans (27 BC– 410 AD) used the same methods and added the military hospital and sanitary systems. In the medieval times the Catholic Church provided the Healthcare support but there was lack of light , ventilation and thermal comfort in the chapels Nature benefits were not considered at all. Although the models assumed different approaches but they all symbolizes social exclusion. In the 18th century as a result of the progress of medicine and new understanding of the contagion process, the pavilion model came, as a 'ventilation machine'. By the end of the 19th century, importance was given to medicines and technology ignoring the therapeutic effects of hospital environment. In the 20th century the discovery of bacteria and the x-ray machine happened. The hospitals were started to build as compact structures and block type planning started due to increased land prices and limited land.After this technological boom, in order to return healthcare facilities to their users, a counter culture emerged. In order to offer psychological and emotional support to patients and improve their well being architectural quality became required besides in providing medical benefits. Pediatric Hospitals are a quite recent with a and lesser is known about their evolution.

B. Child Psychology

One of the branches of the psychology is Child psychology. The main focus is the study of behavior and mind of children from infant to adolescence. Child psychology deals not only with physical growth of children but also emphasis on their mental, emotional, and social development. As per Britannica Child psychology is also called child development. It is the study of the psychological process of children and, how these differ from those of adults. From birth to two years of age (Sensory motor stage), the child begins to develop reflexes, habits, hand-eye coordination, object permanence (Knowing something exists, even though it cannot be seen), trial and error experiments. At this stage children depend upon their parents. Family and home environment effects the child's behavior and character. Between these ages Children also start walking. Between three and six years (Pre operational Stage) the child begins to develop ability to represent objects with images and words, language skills, imagination. During this stage children learn through imitation and play. They begin to use reasoning but instead of logical it is intuitive. Their dependency upon their parents decreases. They enjoy freedom. At this age children can represent their feelings only symbolically as they possess only the basic graphic and language skill. At 6 to 13 years of age (Concrete operational stage) the child begins to develop the fundamentals of logic ability to sort objects, ability to classify objects. Children start to go to school and learn through activities. Children command over skills of graphics and language. They have increased interactions with friends and the environment, and can explore places in their neighborhood. Children aged between 14 and 18 years-adolescence stage (Formal operational stage) begin to develop ability to hypothesize, test and reevaluate hypotheses. Children begin thinking in a formal systematic way. At this age children develop command over cognitive, emotional, and language skills. They start interacting with nature and environment as their movement area increases.

C. Child Friendly Environment

A child-friendly environment is one where children feel comfortable and experience a sense of belonging, children are able to participate without worrying of being judged about what is shared and who is watching them, appropriate language is used by adults, get them engage with tools and games they understand and environment that is predictable and engaging, there are spaces where children can have fun and experience positivity and are free from any challenges they are experiencing. Children perceive environment differently than adults. Nowadays the cities are growing without considering the social needs especially that of the children as a result the children are suffering from lack of physical activities and as a result lack of social relationship. Therefore for children growth and social interactions there is need of improvement of these spaces. Children and adolescents are important for society. How children perceives their environment must be understood and should be considered while planning. In the recent years, most of the children spent their free time watching TV and doing non-physical activities. In order to prevent children idleness, loss of awareness and lack of interaction with the environment there is need of creating more recreational spaces. Unfortunately, mostly children's spaces are designed without considering their psychological needs and their liking of color andshape. It is essential to pay attention to the spaces designed for children in order to enhance children's creative abilities. The buildings designed for children must make them feel comfortable and relax and should not create fear. In order to ignite feelings like kindness, sense of emotion the spaces created for children should have spirited and light color and shapes with abstract form.

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Perception of space is difficult. Feelings of privacy, control and security can be provided through places. Place where children can feel relax, comfortable and clam are considered their favourite place. These places and such environment provide emotional support and restorative experiences and make forget the worries. The children physical and mental growth as well as their personality is greatly affected by the environment in which the children stay. According to Piaget theory the children perspective to see the world is totally different from the adults therefore for the child's physical and mental growth it is essential to take into consideration by designers to create comfortable, secure, accessible, attractive and creative spaces.

III. INFLUENCING FACTORS AND DESIGN PARAMETERS

From the studies it is analyzed that how design outcome can improve hospitalized children's well-being. The result is being separated in different areas and influencing factors:

A. Sense Of Control

Generally there is a lack of it in hospitals. When one is dependent on others and experiencing unusual and uncontrollable events, the stress increases and the most effective way to suppress it is to provide the patient(in our case children) with choice. The development of children is possible in an environment that is responsive to their needs.

1) Way finding: It allows users to easily identify where they are, avoiding the sensation of confusion or being lost. The design of clear pathways, with areas distinguished by different materials, colours and specific landmarks and with proper signage.
2) Privacy: By designing single bedrooms and other rooms for private activities, allows users to be alone or to have a private conversations in privacy.
3) Personalization: Feel closer to the loved ones by the inclusion of picture boards, lockable storage and shelves, allow patients to keep their personal belongings and set their rooms to some extent according to their choice and feel home like.
4) Scale: The human scale is the right fit between the size and quality of spaces and perceptual capabilities and the physiological characteristics of man. Design spaces according to the scale of the children, allowing patients to feel that they belong to the place.
5) Form: Physical forms influences once learning and his senses; therefore, it is possible to express certain information and concepts through a certain form .Designing form as per the child psychology, curve, abstract, and circular form interest's children more than the regular forms.

B. Social support

Itis one of the most important parameter for children. The deprivation ofsocialization, especially from parents, can effect children emotionally. For this reason parents should be allowed to stay with their children all the time, providing adequate facilities for them to fulfill their everyday needs. Other social rooms are also important for children to interact with other children or adults.

C. Positive Distractions

As day time is long and difficult to pass, therefore during the day it is necessary to distract children from negative thinking about patient's struggling and disease.

1) Play: the design of different playrooms let children explore and interact with various things adding to their knowledge and enjoyment.
2) Art: does not have proven positive health outcomes in children yet;
3) Nature: Providing a natural space nearby allows children to feel free and active. For different activities and options, gardens should be well equipped.

D. Sensorial Dimensions

In hospitals these are essential to be taken care of whether visual , acoustic, smell, taste,feel(texture)

1) Light: Light is necessary for any visual perception. Light is important for humans not only physically but also have psychological effect. Daylight increases melatonin levels and generates positive mood. Therefore the building orientation and windows provision is really important. Not only natural light but also artificial light should be considered as it is controllable and can be used as a distraction for children.
2) Colour:Differentcolours have different psychological effect in moods of each person. It has also been proved that children have a preference for mid blue-green tones. children have a preference for mid blue-green tones.

3) Acoustic dimensions: Sense of hearing defines experience and understanding of space. Noise increases stress and sleep thus increases blood pressure. By providing single bed wards, using high absorbing materials and eliminating noise sources can produce effective results.
4) Smell: Providing green area, plants ,flowers create good atmosphere and improves air quality as medicine smell causes discomfort and even adds to the sickness. Medicine smell causes discomfort and even adds to the sickness.

E. Age Appropriate Environments

To correctly answer the different levels of cognition age appropriate environments are needed. Different activities and spaces are demand of various age group to improve socialization and integration. Children are more comfortable and interact with same age group and level of cognition.A children hospital designed according to child psychology can effect patients mind positively and help in the healing process.

IV. METHODOLOGY

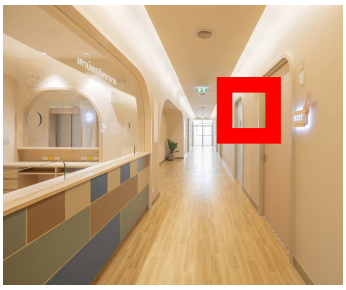
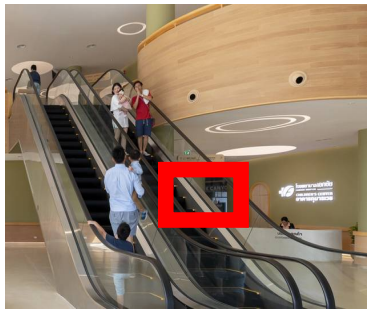
Methodology adopted for the exploration of the topic includes study of background and theoretical studies like of Jean Piaget's theory, study of child friendly environment and study of methods suitable for collecting data from the children directly. Collection of data relevant to the topic is done through internet, books, research papers, survey and drawings. Literature and case study done and analysis of literature studies and case studies is made through which inferences and further design considerations has been derived. As part of the surveys and interviews, an exercise was conducted wherein the children were given paper and colors, and were asked to draw their interpretations of a hospital as the way they would like it to be. Analysis of collected data is then done to formulate design language.

V. CASE STUDY

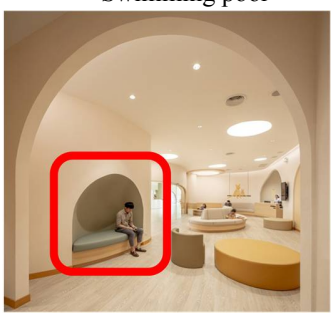
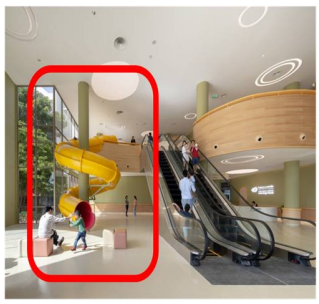
A. EKH Children's Hospital

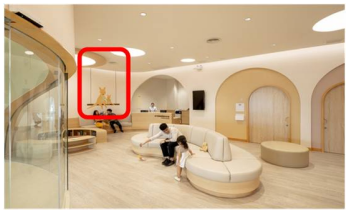
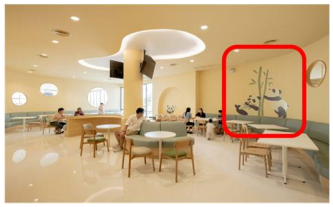
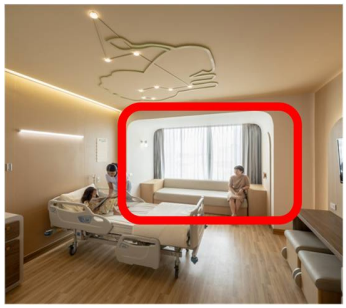
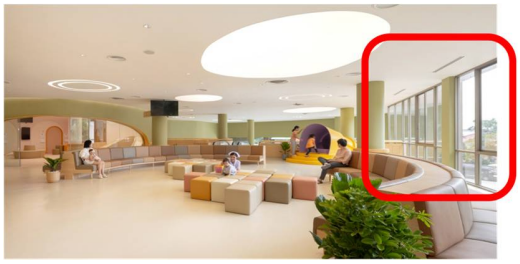
EKH children hospital is built with the design philosophy that playing is healing. The design approach is to make this hospital 'fun' place according to children's mindset and dimension so that a child can feel comfortable. It is a 5storey building having floor area of 7200sq.m. It is located in SamutSakorn, Thailand.

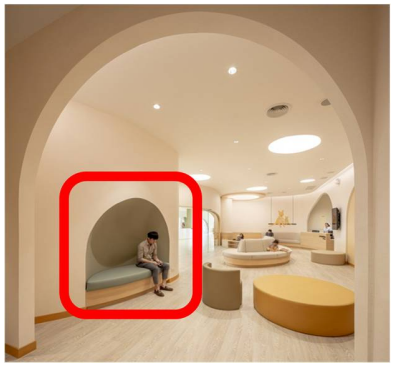
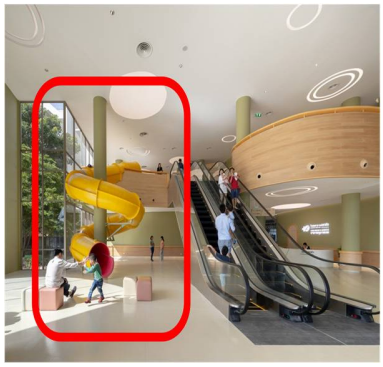
Table 1.EKH children's hospital case study as per parameters

Parameters According To Child Psychology		
Sense Of Control		
Way finding	YES Simple black font and cartoon figures on white	 

Privacy & Personalization	100% rooms are single bedded having illuminated ceilings with theme of four constellations – whale, rabbit, turtle and lion All rooms are provided on upper floors.	  Lion Rabbit   Turtle Whale
Scale	According to children's body proportion behaviors and preferences, Child friendly environment is created by providing arches above doorways and seating areas	 
Form	Freehand Curves are used	
Social Support		

Socialization spaces	Play area provided in the waiting area enabling interactions between parents and children.While children are playing adults can watch.	
Meeting moments	YES	
Family spots	YES	
Positive Distractions		
Play	At the front of the entrance hall a giant slider is situated transforming the waiting area into a playarea. It also includes indoor swimming pool and private place for sitting.	 Swimming pool  Play area  Reading area  Slide

Art	Cartoon murals on the wall	 Waiting area  Play area  Dining area
Nature – direct or indirect	For comfortable environment and healing indirect nature is provided.View and light from windows in every room.	  View to outside a) Ward b) Waiting and play area
Sensorial Dimensions		
Light	indirect light in all the hallways.	

Colour	The pastel colours are used to encourage children's imagination.	
Acoustic dimensions (Noise)	Nothing specific	
Smell	Nothing specific	
Age Appropriate Environment	Spaces created for different age group	 Reading area  Playing area

Source: https://healthcaresnapshots.com/projects/6802/ekh-childrens-hospital/

B. Phoenix Children's Hospital

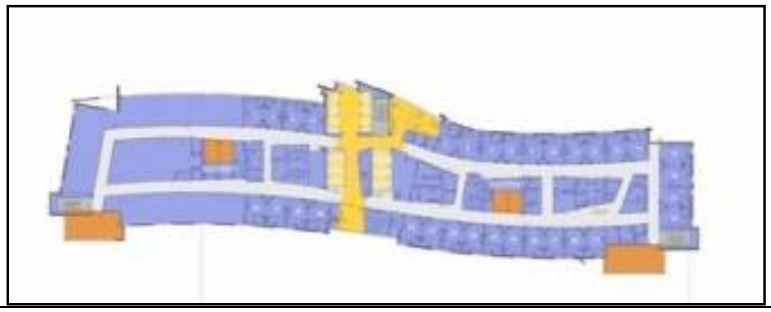
Phoenix children's hospital is located at Phoenix, Arizona,UnitedStates.The big idea for the 770000sq.feet campus is to create a welcoming oasis that provides shade and healing while at the same time emulates the natural beauty of the surrounding, mountains and desert.Phoenix Children's hospital is a 11 storey building having 457 beds for children care.

Table 2 Phoenix children's hospital case study as per parameters

Parameters According To Child Psychology		
Sense Of Control		
Way finding	Bright colours used	

Privacy & Personalization	Private ,single bedded rooms with amenities are provided. For family members sleeper sofa and seating are is provided in each room.IPD provided on upper floors.	
Scale	To reduce the impact of the building's scale the tower which reflects a night-blooming desert flower – is divided into three sections	
Form	Curve	
Social Support		
Socialization spaces	Family support lounge	

Meeting moments	YES	
Family spots	YES	
Positive Distractions		
Play	Play room in IPD section. A roof top play garden, dining, mediation gardens also provided.	
Art	Landscaping, brightly colored and playful sculptures, and plant life is provided.Also murals and sculptures are provided on the walls.	
Nature – direct or indirect	Both direct and indirect NATURE – View of nature from patient rooms and public spaces including elevators, play rooms and cafes, waiting areas and corridors.	 
Sensorial Dimensions		

Light	Day lightining in corridors	
Colour	Corridors shows the way to various facilities by adding aesthetic and uplifting atmosphere due to inclusion of color palettes, wall murals and sculptures.	 
Acoustic dimensions (Noise)	Wards on upper floors	
Smell	Nothing specific	-
Age Appropriate Environment	NO	-

Source: https://www.archdaily.com/220749/phoenix-childrens-hospital-hks-architects

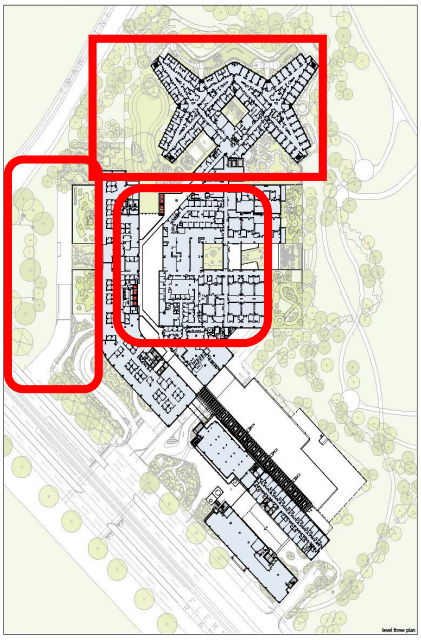
C. The Royal Children's Hospital

The Royal Children's hospital is located in Melbourne ,Australia having a floor area of 200000sq.m.. It ia s 6 storey building with 350 beds.The aim of the Royal Children's Hospital is to create a 'park in a hospital, and a hospital in a park'.The key concept being use of natural environments to inject a calm and inspiring atmosphere into various parts of the hospital.

Table 3 Case study of Royal children's hospital as per parameters

Parameters According To Child Psychology		
Sense Of Control		
Way finding	White colour font with few figures on bright coloured background	
Privacy & Personalization	85% of the bedroom are single occupancy with kid-friendly modern hotel ambiance and amenities, providing privacy and are designed to give children calm and comforting environment.Provided on upper floors.	
Scale	Atrium having grand scale. Disaggregated All the pieces of the building has been disaggregated, which resulted into lower scale of the building and making it more child-friendly.	
Form	Abstract and diagonal	  An abundance of light and soaring six-story concourse with a dynamic play of diagonal bridges functions as the primary organizational spine with axial focus on a landscaped garden mound and views to the Royal Park

Social Support		
Socialization spaces	Lounge for families	
Meeting moments		
Family spots		
POSITIVE DISTRACTIONS		
Play	The seats provided arein the shape of the boulders are coloured, shaped and textured so that childen can play.	
Art	A colorful multi-story sculpture and huge fish tank is provided.	
Nature – direct or indirect	Both direct and indirect NATURE-View of outside from all the rooms and corridors. Roof gardens provided. .NATURE IS THE MAIN CONCEPT	 
Sensorial Dimensions		
Light	Access to natural, direct light.	

Colour	For interior bright colours used like-yellow,green, blue, orange, pink etc.The external façade of the building is designed to reflect colours from the surrounding trees and nature.	
Acoustic dimensions (Noise)	Zoning done	
Smell	Nothing specific	
Age Appropriate Environment	NO	--

Source: https://architectureau.com/articles/new-royal-childrens-hospital/

VI. ANALYSIS

For research 30 children of age group 5 years to 18 years were surveyed.

Table 4 Sample size

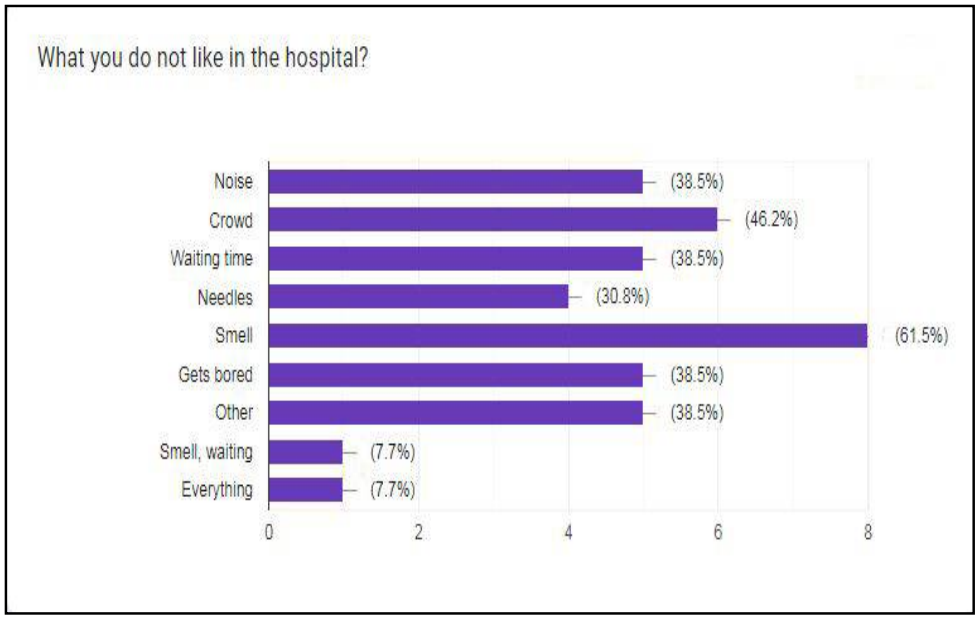
S.No.	Age of Children (In Years)	No. of Children
1	5 and 6	4
2	7 to 9	6
3	10 to 12	6
4	13 to 15	6
5	16 to 18	8

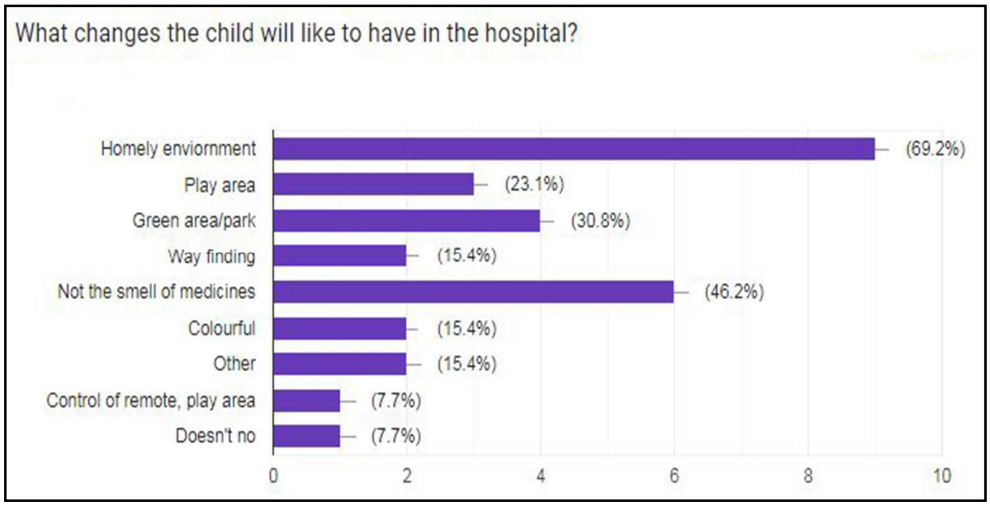
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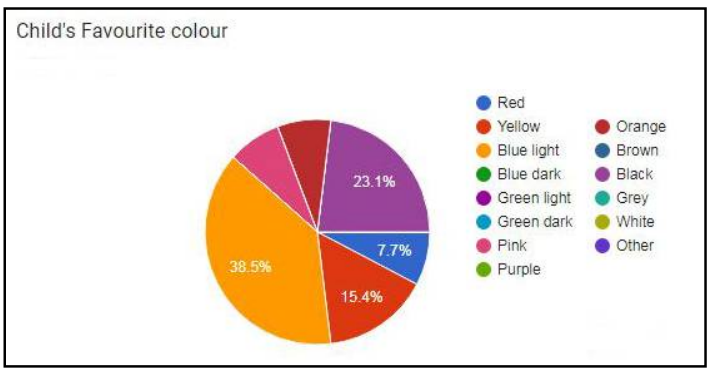
Total Number of children	30

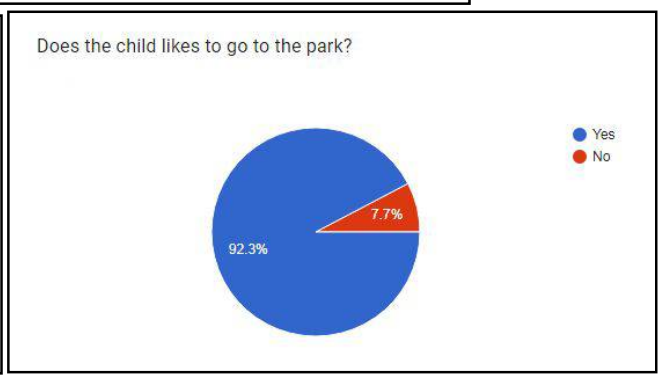
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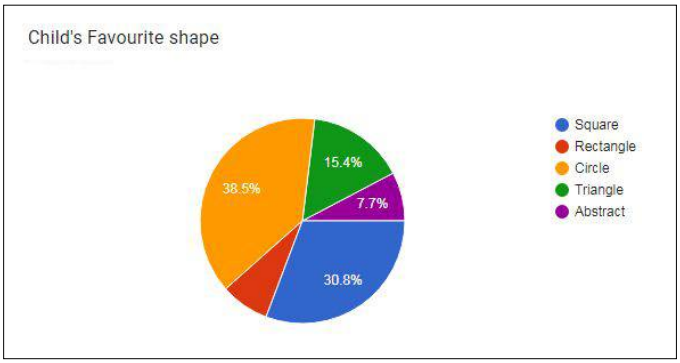
A. Survey

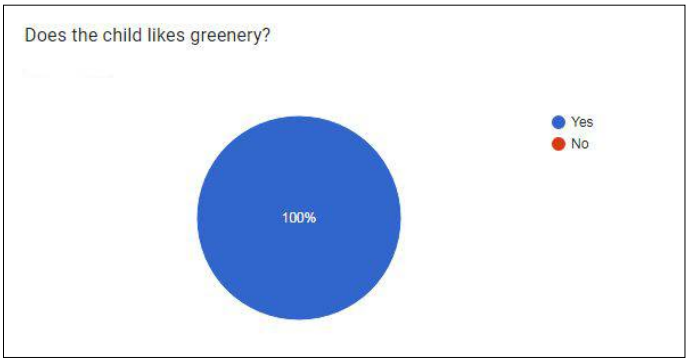


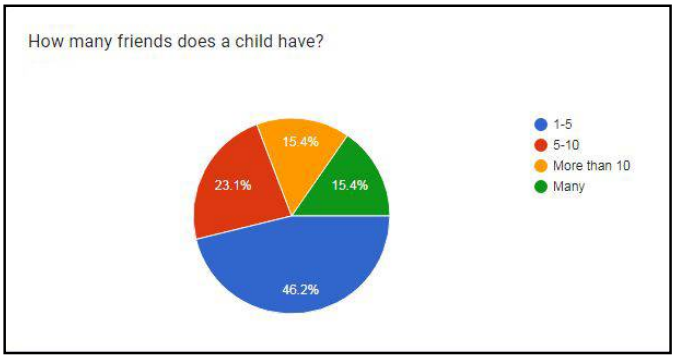


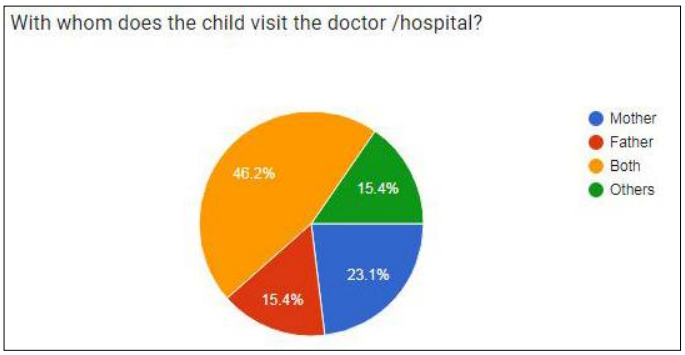


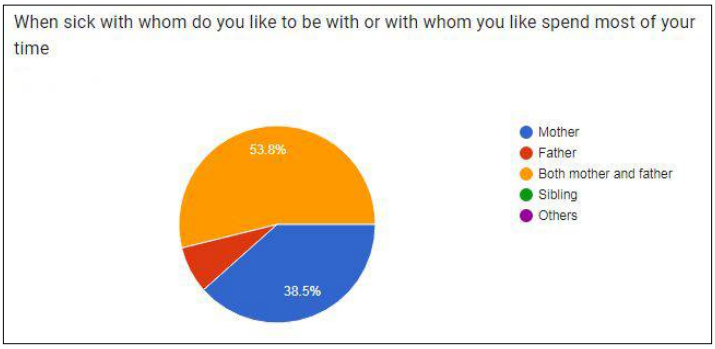












As it is very difficult to collect data from children. The best way to get the data from the primary source is through drawings as while doing it they enjoyed..Data was collected through primary source i.e. Children with age group 9-18 years and the secondary source i.e parents helped children from age group between 5 to 8 years in filling the form.

B. Drawings



List of items found most in the drawings : Window,Clock,Air conditioner, Television, Curtains, Chair, Dustbin,Single bed, Double bed,Toilet,Shelves,IndoorPlants, Wall scenery,Telephone, Colours,Artifical Light.

VII. FINDINGS

The findings from the literature are complemented by the findings from the survey and the drawings.

1) *Sense of control:*Personalization of space and homelike environment came out as one of the important factors where the child and parents feel comfortable, less stressful and are at ease and are able to find commonality in hospital to their home environment as is evident from the drawings. In most of them single room is preferred and shelves kept according to the children. Circle is most preferred shape by children around 38.5% selected circle as their favourite shape in survey.As circle or curve gives the sense of coziness and comfort.
2) *Social Support:*Space for parents sleeping in the same room is provided in many drawings and also chairs for visitors are placed which shows that children do want privacy but also at the same time does not want to feel isolated and needs social support.
3) *Positive Distractions:*Television set needed and also few toys, indoor games and also outdoor games is the requirement by the children in the hospital as told by children in writing and also from the personal interview with them.

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The love of arts evident from the picturesor photos that can be seen hanging on the walls in the drawings.Love for nature and view of the outside world is also evident as windows is the key requirement by the children in their drawings.92.5% likes to go to park and 100% of children from the survey loves greenery. Along with pleasing indoors, Outdoor areas also play an important factor for relieving stress and healing for young patients. Connecting nature in hospitals is another way to provide opportunities for patients to move out in the lap of nature as nature is any ways healing and soothing for the mind and body. Whitehouse et al. (2001), suggested that integration of nature improves mood and hospital satisfaction

4) *Sensorial dimensions:*Finding from the survey shows that 38.5% does not like noise, 61.5% does not like smell, and 46.5% does not like crowd. Therefore while designing care has to be taken for smell and noise reduction. Ambience to be cheerful,bright and colorful. 38.5% likes light blue colour and 23.1% prefer light green colour. Color is also an important aspect of the healing environment and is an element of visual stimulus. Application of colors as per the children's age can help them feel happy and cheerful in the space. In a study conducted by Coad and Coad (2008), it was found that the most preferred color scheme was of the mid blue-green type.
5) *Age appropriate environment:*As the hospital will take care of patients up to the age of 16 or 18. Contemporary hospitals focus primarily on young children and less on adolescents psychology. As a result, adolescents may perceive the hospital environment as childish. In this respect, it is important not to use too specific themes. Themes can be used, but should be taken care and well thought of so that it does not looks childish.

Table 5 Content analysis of drawings and survey of children

Parameters	Sub- Categories	Drawing Details/Survey
Sense of Control	Way finding	Curtains
	Privacy & Personalization	Single Room,Attach Toilet
	Scale	Small,cozy area
	Form	Circle
Social Support	Socialization spaces	Chair Double bed
	Meeting moments	
	Family spots	
Positive Distractions	Play	Toys/ book Shelves
	Art	Wall Pictures
	Nature – direct or indirect	Window
Sensorial Dimensions	Light	Natural and Artificial
	Colour	Colourful most liked colour light blue followed by light green
	Acoustic dimensions (Noise)	Single room
	Smell	Dustbin
Age Appropriate Environment	Different ages	Video games
		TV
		Bookshelf
		Soft toys,Dolls,Cars

Source: Author

VIII. DISCUSSION

Our study tried to gain insight from young patients' perspective that what a child want for a child-friendly hospital and how architecture can contribute to it. Our findings suggest that for children, a child-friendly hospital environment means an environment in which they can continue their daily life without any major disruption. That means the environment should be supported both socially and spatially.

On a social level, it was observed that children want to stay in close with withtheir parents and their family.Children when not feeling well always wanttheir parentsnearby, they want to stay in contact with them. Apart from other family members, friends and peers, to maintain the homely environment siblings are very important too. but only if the hospital building can afford then only these interactions can take place. Sufficient space should be provided while designing it for social interactions, to give a pleasant environment to the children. Spatially it was found that children prefer to stay in a homelike atmosphere. However homelike atmosphere varies with every individual and is a very personal thing.In hospital design it can be can provided by giving children freedom to create their own space like arranging furnishings of their ward. In addition to this the hospital should radiate a welcoming atmosphere and not a gloomy and stressful environment. It is important to create a living room with cosy corners and seats in the children's ward. Children hospital deals with the children up to the age of 18, hence it is very important to turn its environment according to different age groups to make it a child friendly hospital. Generally hospitals focus primarily on young children and give less importance to the adolescents. As a result, adolescents may perceive the environment of the hospital childish. Therefore, it is important not to use too specific themes. Themes should be well thought before applyingso that they may not seem childish. To create a homelike environment for children of different ages, abstract theme can be used which every child can interpret in their own way.

Our findings also complement the viewsin literature. The Ulrich's (1984) study concludes that it is important for patients rooms to have a view on green. The children who participated in our survey also appreciated a view of nature. Other outcomes from our suvery of children also compliment various literatures studied like being able to play and relax (Vollmer, 2012), having parents around as much as possible (De Wilde &Muylle, 2012; Vollmer, 2012), and to go outside (Wagenaar, 2006), can be analysed as important to every child. However, the psychology of every child is unique in itself, therefore it is important for designers to keep this aspect in mind while designing.

A limitation of our study is that it focused mainly on the role of architecture, children psychology,and their point of view. Apart from parents and doctors important role is played by the nursing staff, they are in contact with the children all the time and they only can ensure that a child feels like home and feels comfortable. Therefore it will be interesting to design hospital environment such that it can also have a positive effect on the staff.Children's hospital involves lot of emotions, therefore a pleasant environment can support a difficult period. A friendly and pleasant environment cannot itself heal the diseases but it can be an important consideration for making the user experience pleasant, increase life expectancies and ultimately may aid recovery.

IX. CONCLUSION

As healthcare is one of the leading service industries today, with increasing number of children who require medical attention, it makes sense to examine ways to provide better facilities to this segment of the population. A child-friendly, pleasant and welcoming environment may not cure the illness of a child, but designing according to child psychology as its underlying component can work wonders for the healing process of patients. Being hospitalized brings many stressful and worrying thoughts in the psyche of the children, and this is also disruptive of their regular routines. The signal can be sent to the children that nothing big is going to happen to them and also nothing major changes are going to happen which can disturb their daily routine by providing hospitals with child friendly environment. Creating positive experiences in the hospital environment can transform an otherwise stressful and anxiety-ridden stay for children to an entertaining one. After conducting survey and literature study, it was found that Children's Hospitals are not designed according to child psychology and does not provide child friendly environment that cheer up and inspire children in hospitals. With a view to address this gap in the healthcare industry, this research has been done for the children's hospital that will not only offer medical facilities but will also offer an intimate and homely, cozy and playful healing environment both for patients and their family members, thus ensuring quick healing and positive recovery.

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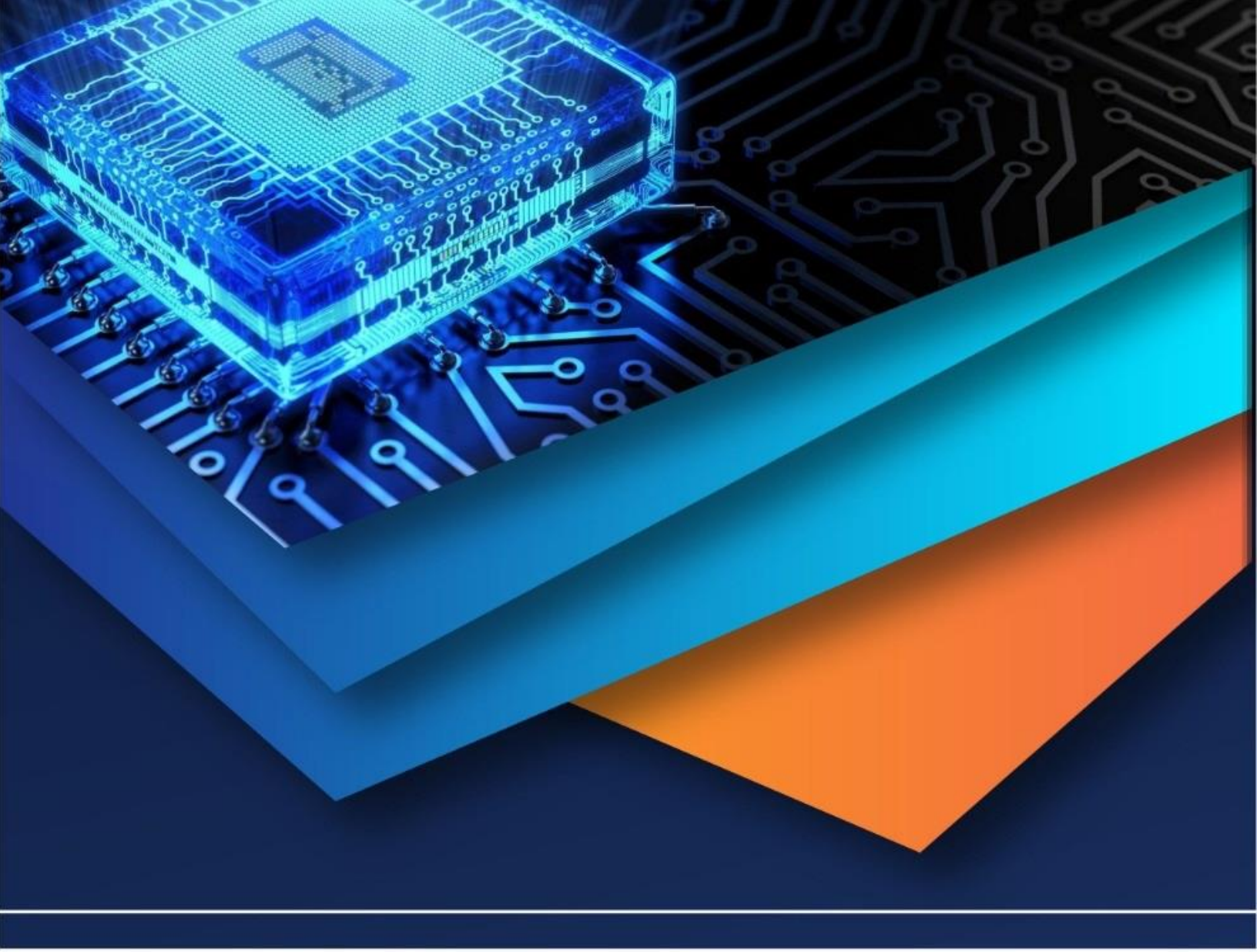
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