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# Influence of Child-friendly Hospital Built Environment on Pediatric Patients' Satisfaction: A Case Study of Federal Medical Centre Keffi, Nasarawa State, Nigeria

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**Abstract:-** Organizations aiming to sustain client loyalty and satisfaction must prioritize the maintenance and enhancement of service quality. In healthcare settings, the built environment, a tangible aspect of physical evidence and one of the marketing mix 7Ps, has been shown to influence patients' perceptions of the quality of care and overall satisfaction. This study investigates the impact of a child-friendly hospital built environment on pediatric patients' satisfaction at Federal Medical Centre Keffi. While previous research has highlighted the significance of service quality and physical environment in enhancing positive healthcare experiences, empirical studies specifically examining the influence of child-friendly hospital built environments on pediatric patients' satisfaction in Nigerian healthcare settings are lacking. Using a survey-based cross-sectional research design, data was collected through structured questionnaires focusing on pediatric patients' perception of the hospital's child-friendly features and overall experience. The study findings reveal a significant association between the child-friendly hospital environment and pediatric patients' satisfaction. The study hypothesized five elements of the hospital built environment against Federal Medical Centre Keffi's pediatric patients' satisfaction, with all elements proposed to have a significant relationship with pediatric patients' satisfaction. The results of the multiple regression analysis of the relationships support four hypotheses, confirming a significant positive relationship between the child-friendly hospital built environment and pediatric patients' satisfaction. However, one hypothesis showed an insignificant positive association with pediatric patients' satisfaction, contrary to expectations. This study underscores the importance of overall child-friendly hospital design quality and performance in improving pediatric patients' satisfaction in Nigeria. By highlighting the impact of a child-friendly built environment on pediatric patients' satisfaction, this research contributes to addressing the deficient practice of pediatrics in Nigerian healthcare facilities. It emphasizes the need for healthcare providers to consider and prioritize child-

**friendly elements in their built environments to enhance the overall healthcare experience for pediatric patients.**

**Keywords:-** Hospital, Built Environment, Pediatrics, Patients' Satisfaction, Child-friendly, Service Quality.

## I. INTRODUCTION

The healthcare industry is experiencing a surge in demand for top-notch services, leading to intensified competition on a global scale (Muhammad et al., 2014). According to Chao et al. (2015), service quality is determined by how well an organization meets the expectations of its customers (in this case, patients) with the services it provides. Similarly, AbdulAziz (2016) defined consumer satisfaction as the extent to which an organization's services fulfill or exceed the needs and expectations of its consumers. Given the distinctive nature of the healthcare sector, healthcare providers must excel in both medical expertise and healthcare management. Patient satisfaction is of paramount importance and cannot be underestimated. It remains a critical factor in the healthcare industry, significantly influencing patients' decisions (Wooldridge & Camp, 2019).

In today's fiercely competitive landscape, organizations must possess competitive advantages and employ effective marketing strategies to distinguish themselves from their rivals. Moreover, the healthcare sector's unpredictable nature necessitates innovation and strategic preparation to adapt to ever-changing circumstances and uncertainties (Grădinaru et al., 2016).

In marketing mix, physical evidence pertains to various elements such as equipment, pharmaceuticals, and the overall ambiance and tangible environment (Wooldridge & Camp, 2019). It encompasses the healthcare facility's infrastructure, the appearance of the staff, as well as factors like personal hygiene and uniformity. However, for the purpose of this study, the focus will be on the built environment. Ibok and Etuk (2013) noted that while the healthcare industry caters to the citizens' healthcare needs in

Nigeria, a significant challenge it faces is the outdated and poorly maintained facilities, particularly the lack of child-friendly amenities within the healthcare built environment. Many hospitals in Nigeria, including those in Nasarawa State, were constructed during the 1960s, prioritizing functionality over patients' experience, regardless of whether they were adults or children (Wagenaar, 2006). However, the perspective has shifted in recent times, and hospital construction or renovation increasingly starts with considering patients' viewpoints (Annemans et al, 2014).

Babbu and Haque (2021) emphasized that there is a lack of research on the physical environment in developing countries, and guidelines proposed from studies conducted in developed nations may not be feasible in low-income countries. For instance, recommendations for single-family rooms in developed countries to enhance patients' satisfaction might be perceived as a luxury in low-income countries where basic needs are the primary focus. Geographical, cultural, and socioeconomic differences between countries can render recommendations from one context unsuitable for another. The economic status of a country significantly influences the infrastructure of its healthcare environment, warranting further investigation into healthcare settings' design worldwide.

MacAllister et al. (2016) and Ulrich et al. (2008) also highlighted the limited research in this area, where the focus has been primarily on general hospital service quality and the ambient and sensory aspects of the built environment. For example, studies have shown that patients are more satisfied when rooms and wards are clean and quiet. However, research related to child-friendly built environments and pediatric patients' satisfaction has been relatively scarce and mostly conducted in settings unrelated to this specific aspect of healthcare facilities.

To this end, this study aims to investigate how the child-friendly hospital built environment at Federal Medical Centre Keffi influences the satisfaction of pediatric patients. The study intends to identify evidence-based interventions that can enhance the hospital's child-friendly facilities and overall healthcare experience for young patients. Drawing insights from previous studies and literature review (Olds, 1979; Akinluyi et al., 2019; Pinhao, 2016; Lambert et al. 2013); and (Barahona, 2001), specific architectural features were selected as key elements with significant impacts on children's experiences in the hospital. These elements include: Playful Interactive Spaces; Proximity within Physical Facilities; Social Family Accommodation; Privacy within Physical Facilities; and Child-centric Decor. Based on these metrics, the main objective of this study is to investigate the influence of child-friendly hospital built environment on pediatric patients' satisfaction in Federal Medical Center Keffi, Nassarawa State, while the specific objectives are to: (i) determine the influence of Playful Interactive Spaces on pediatric patients' satisfaction in Federal Medical Centre Keffi; (ii) investigate the effect of Proximity within Physical Facilities on pediatric patients' satisfaction in Federal Medical Centre Keffi; (iii) determine the influence of Social Family Accommodation on pediatric patients' satisfaction in Federal Medical Centre Keffi; (iv)

examine the influence of Privacy within Physical Facilities on pediatric patients' satisfaction in Federal Medical Centre Keffi; and (v) determine the effect of Child-centric Decor on pediatric patients' satisfaction in Federal Medical Centre Keffi.

Basically, the study adopted five research questions that link child-friendly built environment with patients' satisfaction in the hospital, they are; (i) to what extent does Playful Interactive Spaces affect pediatric patients' satisfaction in Federal Medical Centre Keffi?; (ii) to what extent does Proximity within Physical Facilities affect pediatric patients' satisfaction in Federal Medical Centre Keffi?; (iii) to what extent does Social Family Accommodation affect pediatric patients' satisfaction in Federal Medical Centre Keffi?; (iv) to what extent does Privacy within Physical Facilities affect pediatric patients' satisfaction in Federal Medical Centre Keffi?; (v) to what extent does Child-centric Décor affect pediatric patients' satisfaction in Federal Medical Centre Keffi?.

In line with the specific objectives of this study, the following hypotheses were formulated in null form subject to acceptance or rejection based on the result of the analysis: Ho1: Playful Interactive Spaces does not have significant effect on pediatric patients' satisfaction in Federal Medical Centre Keffi; Ho2: Proximity within Physical Facilities does not have significant effect on pediatric patients' satisfaction in Federal Medical Centre Keffi; Ho3: Social Family Accommodation does not have significant effect on pediatric patients' satisfaction in Federal Medical Centre Keffi; Ho4: Privacy Within Physical Facilities does not have significant effect on pediatric patients' satisfaction in Federal Medical Centre Keffi; and Ho5: Child-centric Decor does not have significant effect on pediatric patients' satisfaction in Federal Medical Centre Keffi.

## II. LITERATURE REVIEW

This section discussed relative literature to the variables of this study.

### A. Child-Friendly Hospital Environments

According to the Council of Europe (2011:6), child-friendly healthcare refers to a healthcare approach that prioritizes children's rights, needs, characteristics, strengths, and their evolving abilities, while also taking into account their opinions. This concept emphasizes the importance of providing high-quality medical care while respecting the rights of children to be informed, consulted, and heard in a manner appropriate to their age group. Additionally, it emphasized the right of children not to be separated from their families. The notion of family-friendly healthcare is also considered to be encompassed within this approach.

Ensuring the safety of children, encompassing their physical, psychological, and mental well-being, is of paramount importance within the hospital environment. According to existing literature, providing children with support and a stable environment can mitigate the potential debilitating effects of fear (Rutter, 1981). The notion that hospital architecture contributes to patients' overall well-being has been recognized since the 18th century and

continues to influence the design of healthcare facilities (Wagenaar, 2006). In recent decades, this concept has garnered renewed attention from researchers exploring concepts such as the 'healing environment' or the more rigorous 'evidence-based design' (EBD) (Mens & Wagenaar, 2009). A pioneering EBD study, conducted by Ulrich in 1984, demonstrated that patients experienced improved recovery after surgery when their hospital rooms provided a view of green spaces.

Eriksen (2001) identified several essential factors and trends related to hospital design that are crucial in caring for young patients:

- Hospital stays are becoming shorter, with a focus on ambulatory treatment for children whenever possible.
- Hospitals should carefully consider and plan for spaces that allow for both quiet and active play, catering to individual and group activities.
- Recognizing the vital role of parents in their child's healing process, hospitals should prioritize safeguarding their well-being during the treatment journey.
- Medical, nursing staff, and psychologists should possess the necessary skills to address the diverse needs of patients and their parents effectively.

Coyne's research in 2006 highlighted the significant concerns and fears experienced by children when admitted to the hospital. She identified four common types of fear that children across different age groups share: fear of being separated from family and friends, fear of staying in an unfamiliar and unpleasant environment, fear of undergoing examinations and treatments, and fear of losing their self-determination. While the second fear directly relates to the hospital environment, the others can also be indirectly linked to it. For example, a hospital environment that allows ample room for visitors can reduce the feeling of separation from family and friends, and a space with various activities gives patients more autonomy in deciding what they want to do. These observations suggest that the hospital environment indeed plays a crucial role in creating a more child-friendly hospital stay.

Additionally, Bishop (2008) drew attention to children's coping strategies in difficult situations, encompassing emotional, mental, and active coping mechanisms. When children are taken away from their familiar environment and lose control over their situation, they adopt specific strategies to cope. These strategies may include engaging in relaxing activities like taking a walk or watching television to replace negative feelings with positive ones, expressing emotions through drawings, or surrounding themselves with personal and recognizable items to create a sense of home. Here again, the environment's versatility can prove essential, as a varied environment offers children more opportunities to cope with their situation effectively.

### B. Concept of Patients' Satisfaction

Patients' satisfaction with a healthcare service is achieved when their expectations are met or surpassed during their interaction with the health facility (D'Cunha & Suresh, 2015). It is essential to note that satisfaction is a relative concept, as it is measured in relation to an individual's expectations, wants, or desires. What may satisfy one consumer might not meet the expectations of another.

In the healthcare sector, patient satisfaction is a crucial tool for evaluating the effectiveness of services provided by healthcare facilities (Etuk et al., 2022). Although patients are the primary focus of healthcare institutions, administrators in developing countries often pay less attention to their needs. Patient satisfaction serves as a significant outcome of marketing efforts and acts as a link between different stages of consumer buying behavior (Jamal and Nasser, 2002).

### C. Patients' Satisfaction and the Physical Environment

Patients' satisfaction is an essential aspect of their overall healthcare experience (Berkowitz, 2016), and it can be influenced by various environmental factors, either directly or indirectly. Through a systematic literature review, MacAllister et al. (2016) identified two primary categories contributing to patients' satisfaction: the physical ambient environment and the interpersonal aspects of the care environment.

The physical ambient environment encompasses elements that patients can sense and perceive. Factors within this category that enhance patients' satisfaction include outside views of nature (Ulrich, 1984), the use of specific colors (Gray et al., 2012; Ulrich et al., 2008), implementation of full-spectrum lighting (Gray et al., 2012), and attention to aesthetics and decor (Becker et al., 2008; Siddiqui et al., 2015). Additionally, noise levels, which relate to the auditory senses, play a significant role, and reducing noise has been shown to improve patient satisfaction (Hagerman et al., 2005).

Conversely, the interpersonal aspects of the care environment, as identified by MacAllister et al. (2016), focus on supporting patients by providing adequate space for different caregivers. This includes considerations such as unit layouts and the provision of accommodation for families, which have been found to influence patients' satisfaction (Siddiqui et al., 2015).

Children's perspectives on their healthcare experiences also have a significant impact on their satisfaction levels, and these experiences can be categorized based on three distinct age bands: young children (0–5 years), middle childhood (5–11 years), and young people. Table 1 presents these different perspectives and influences on their satisfaction within healthcare environments.



Table 1: Perspectives of children regarding their experiences of healthcare environments.

User group	Positive environmental features	Negative environmental features
Early years (0–5 years)		Night time disturbances due to nursing activity and increased noise levels (Herbert et al 2014)
Primary – Middle childhood (5–11 years)	Can make children feel safe (NHS Estates 2004b) Allows children to remain close to people they love, especially their parents (Livesley and Long 2013, Ekra and Gjengedal 2012, Roberts 2010, NHS Estates 2004b) Arrangements for eating (Ekra and Gjengedal 2012, NHS Estates 2004b) Provide nice areas to play (Weil 2013, NHS Estates 2004b) Want opportunities to do things while waiting for things to happen (Ekra and Gjengedal 2012, NHS Estates 2004b) Aquariums (Ekra and Gjengedal 2012)	Too much noise and light at night (Herbert et al 2014, Linder and Christian 2011, NHS Estates 2004b) Feeling too hot (NHS Estates 2004b) Unpleasant smells (NHS Estates 2004b) Seeing and hearing other children who are sick (Ekra and Gjengedal 2012) Crying babies (Gibson et al 2010) Caught between early years and young people facilities (Lambert et al 2013) Children perceive hospital spaces only meet the needs of younger children (Coyne and Kirwan 2012, Curtis 2007, James et al 2007)
Young people (12–18 years)	Dedicated adolescent facilities (Kovacs Silvis 2013a, Farjou et al 2013, Norton-Westwood 2012, NHS Estates 2004b) Need for privacy (Kennedy 2010) Feel something in common with other patients (Farjou et al 2013, Gibson et al 2010, NHS England 2004b) Welcoming and peaceful (Farjou et al 2013) Comfort for family members (Farjou et al 2013)	Feeling embarrassed Being on a ward with much younger children or much older people (Kennedy 2010, NHS Estates 2004b) Too much noise and light at night (Herbert et al 2014, Linder and Christian 2011) Multiple occupancy rooming (Farjou et al 2013) Absence of windows or brightness (Farjou et al 2013) Rooms being too small (Farjou et al 2013, Coyne and Kirwan 2012) Lack of entertainment (Farjou et al 2013) Hospital spaces only meet the needs of younger children (McKenzie et al 2010)

Source: Hubbuck (2009).

*D. Pediatric Patients' Satisfaction*

Hospitalization can be an extremely distressing and frightening experience for children, as it involves not only a change in their health condition but also disrupts their familiar environmental routine. Many children lack the coping skills to deal with such situations, leading to responses like regression, anger, fear, depression, and anxiety (Deitch & Rutan, 2001). The simple act of entering a hospital can trigger feelings of anxiety and a loss of control among children. To address this, Olds (1979) suggested adapting hospital spaces and features to enable children to meet their basic personal needs independently, without requiring assistance. Creating an environment that minimizes negative responses and allows children to recover with dignity and develop in accordance with their age should be a fundamental goal of hospital design.

Several key factors play a significant role in determining pediatric patients' satisfaction with the hospital environment. These include noise levels, lighting, color schemes, privacy, distractions, age-appropriate settings, and spaces that support family involvement. By addressing these factors, the hospital environment can contribute to a more positive and satisfying experience for young patients.

The United Nations Convention on the Rights of the Child (CRC) is an international legal framework that outlines the rights of children, defining them as individuals under the age of 18. Nigeria ratified the Convention in 1991, obligating the government, under Article 4, to take necessary measures to promote, protect, and fulfill the rights of children (Committee on the Rights of the Child, General Comment No. 15, 2013: 71). The Convention is a comprehensive document that includes Article 24, recognizing the child's entitlement to the highest attainable standard of healthcare and access to facilities for the

treatment of illnesses and health rehabilitation. According to the Committee on the Rights of the Child, this entails providing children with "quality health services" that are sufficient in quantity and quality at the primary level, accessible to all sections of the child population, and acceptable to everyone involved.

The significance of the healthcare setting lies in its role as a place where children's rights to safe and quality healthcare are respected, considering that all children will encounter the healthcare system at some point in their lives. Children interact with healthcare professionals, who form a diverse group, in various settings when seeking primary, secondary, and tertiary care. Throughout this process, children may be accompanied by their parents, caregivers, or sometimes on their own (General Comment No. 15, 2013: 25). In addition to upholding the child's right to healthcare, it is equally crucial to ensure that the healthcare process and environment are child-friendly, addressing pediatric patients' satisfaction.

Pediatric patients' satisfaction is determined by comparing their expectations with their perceptions of the quality attributes and outcomes of the healthcare services they receive. When there is a positive correlation between their expectations and the actual experience, pediatric patients tend to be satisfied. Conversely, dissatisfaction arises when there is a significant difference between their expectations and the perceived quality of care provided by the healthcare organization (D'cunha & Suresh, 2015).

*E. Research Framework*

The conceptual framework shows the interplay of the primary variables of the study. The conceptual framework exemplifies the association of dependent and explanatory variables.

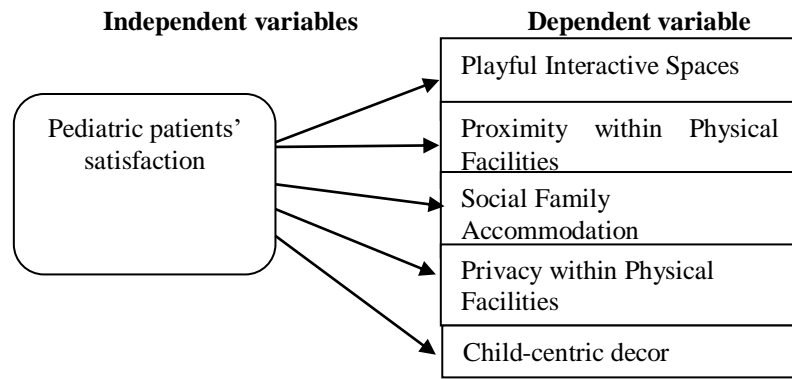


Fig. 1: Frame work

**III. METHODOLOGY**

*A. Study Area*

The study was conducted at the Federal Medical Center Keffi, Nasarawa State, North Central Nigeria. The center is a tertiary medical facility and a referral hospital serving a large catchment area of Nasarawa State and parts of neighboring states of Plateau, Kaduna, Kogi, Benue and parts of the Federal Capital Territory Abuja. The hospital gives referral and non-referral services for more than 3 million people within the catchment area and has a busy pediatric department due to easy accessibility to the center and subsidized medical bills by the Federal Government of Nigeria.

*B. Study Design*

This study adopted survey and cross-sectional research design to collect information from respondents in Federal Medical Center Keffi, Nasarawa State. The study adopted cross-sectional study because it collects data at one point without any timeframe. The population of the study was 427 registered in-patient and out-patient pediatric patients in the hospital (aged between 0 and 18) at the time of the study. The sample size of 207 was determined using Taro Yamane’s formula for sample size determination, assuming a margin error of 5% and confidence level of 95%. However, out of 207 copies of questionnaire administered, 200 copies were retrieved, representing a valid response rate was 96.6%.

Purposive and random sampling techniques were used to select the respondents based on their ability and willingness to participate in the exercise. In terms of data collection, primary data was collected from the responses of the patients through administered questionnaire. The questionnaire used the Likert type scale of ‘1’ for Strongly Disagree ‘2’, for Disagree, ‘3’ for Not Sure, ‘4’ for Agree and ‘5’ for Strongly Agree.

*C. Data Analysis*

The analysis for the study was conducted using inferential analysis, where correlation analysis was employed to determine the strength and the direction of the relationship between the variables while multiple regression analysis was used for hypotheses testing. The analyses was done with the help of SPSS (version 23.0).

**IV. RESULT AND FINDINGS**

The results are discussed in accordance with the research questions and hypotheses while attempts were made to relate the findings to alternative or supportive views as stated in the literature review. This section started with presenting the response rate summary followed by the normality test, which comprised the multicollinearity test that was ascertained through Tolerance Value and Variance Inflation Factor (VIF). The next section presents the correlation analysis of the study. Correlation analysis shows the relationship between the dependent and independent variables. Multiple regression results which was used to test the direct hypotheses of the study ( $H_1 - H_5$ ) was also discussed.

*A. Correlation Matrix*

Correlation analysis is a statistical evaluation used by the researchers to determine the strength of a relationship between two numerically measured variables (Hair et al., 2010). Correlation matrix shows the relationship between all pairs of variables in the regression model; the relationship between all explanatory variables individually with explained variable and the relationship between all the independent variables themselves (Kothari, 2014). The strength of the relationship between variables is interpreted based on criteria popularized by Cohen (1988). According to Cohen (1988), correlation value between 0.1 and 0.29 is small, 0.3 to 0.49 medium and 0.5 to 1.0 is large correlations. Accordingly, the strength of the relationship between the variables could be said to be between the region of small and medium. This is because all the correlation indices ranges from 0.111 to 0.562. This suggests that there is relationship between all the independent and the dependent variables, as well as among themselves because there is no correlation value of 0.0000, and none of the correlation index has +/-1. Hence, there is no existence of a perfect relationship among the variables.

On this account, multicollinearity among variables does not pose a problem in this study. To this end, the results of the correlation analysis support the need to undertake a more powerful statistical analysis that will reveal predictors of pediatric patients’ satisfaction. In order to prove the findings of the correlation matrix, Variance Inflation Factor (VIF) test was conducted further to investigate the presence of multicollinearity in this study.

Table 1: Correlation matrix

	PER	FOR	CEN	COM	NHL
PER	1				
FOR	0.111	1			
CEN	0.125	0.428	1		
COM	0.189	0.432	0.443	1	
NHL	0.453	0.129	0.562	0.207	1

Source: Author’s computation (2023), SPSS 23 output.

**B. Coefficient of Determination (R-Square)**

This section discusses the coefficient of determination of the study where it shows the level and the extent of variations the independent variables have on the dependent variable through R-square (R<sup>2</sup>) analysis. The independent variables of this study include Playful Interactive Spaces; Proximity within Physical Facilities; Social Family Accommodation; Privacy within Physical Facilities; and Child-centric Decor. The extent to which these variables influence the dependent variable (pediatric patients’ satisfaction) is presented in table 2.

The regression result shows an R-value of 0.396, which means a positive correlation between child-friendly hospital environment and pediatric patients’ satisfaction. Accordingly, the R square showed a value of 0.462 which indicates that patients’ satisfaction is determined by Playful Interactive Spaces; Proximity within Physical Facilities; Social Family Accommodation; Privacy within Physical Facilities; and Child-centric Decor, to the tune of 46.2%, and is further reduced to 43.2% when the adjusted R square value of 0.432 is considered; leaving the rest to other factors not covered in the model. The significant value of 0.00 is below the 0.05 level of significance; which indicates that there is significant association between child-friendly hospital environment and pediatric patients’ satisfaction.

**C. Regression Result of Child-friendly Hospital Built Environment and Pediatric Patients’ Satisfaction**

This section presents the result of the direct relationship between child-friendly elements (independent variables) of hospital built environment and pediatric patients’ satisfaction (dependent variable) in Federal Medical Center Keffi, Nasarawa State. Table 3 explains the direct effect and relationship between the variables. Accordingly, five elements of hospital built environment were hypothesized against FMC Keffi’s pediatric patients’ satisfaction. All the elements were proposed to have significant relationship with pediatric patients’ satisfaction. Evidently, from the result of multiple regression analysis of the relationships, four hypotheses (H<sub>1</sub>, H<sub>2</sub>, H<sub>3</sub>, & H<sub>5</sub>) affirmed the assumption of the study and revealed a significant positive relationship with pediatric patients’ satisfaction. On the other hand, one hypothesis (H<sub>4</sub>) showed an insignificant positive association with pediatric patients’ satisfaction against the expectation. Furthermore, the result showed that no multicollinearity exist as the test of VIF and tolerance were conducted also to check multicollinearity in the data set when the value of VIF is less than 10 and tolerance value is greater than 0.10.

Table 2: Coefficient of Determination

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.369 <sup>a</sup>	.462	.432	.80005	.016	1.735	4	323	.000

Predictors: (Constant), SIS, HSQ, PRV, CCD, PFC

Table 3: Effect of Child-friendly Hospital Environment on Pediatric Patients’ Satisfaction

Model	Unstandardized Coefficients		Standardized Coefficient	t	Sig.	Collinearity Statistics	
	B	Std. Error				Tolerance	VIF
(Constant)	2.762	.422	Beta	4.047	.000		
SIS	.161	.047	.112	1.957	.003	.742	1.214
HSQ	.219	.041	.377	2.003	.000	.874	1.711
PRV	.269	.048	.591	4.313	.000	.828	1.471
CCD	.029	.038	.030	.887	.113	.717	1.322
PFC	.220	.038	.163	2.371	.000	.642	1.647

Dependent Variable: PPS

## V. DISCUSSION OF FINDINGS

'Playful Interactive Spaces' was identified as an important aspect of the child-friendly hospital built environment. Thus, the study formulated hypotheses and expected the relationship between Playful Interactive Spaces and pediatric patients' satisfaction to be positive and significant. Accordingly, the expectation of the hypothesis was affirmed by having a positive relationship ( $\beta = 0.161$ ,  $t = 1.975$ ,  $p = .003$ ). Therefore, the null hypothesis, which stated that there is no significant relationship between Playful Interactive Spaces and pediatric patients' satisfaction, is rejected, and the alternate hypothesis is accepted. This finding is consistent with the study of Haiat et al. (2003), which revealed that playing can help to improve children's understanding and interpretation of hospital language, sights, and sounds. It is also consistent with the study of Armstrong and Aitken (2000), which found that playing is extremely important for children. It not only provides enjoyment but also leads to interaction and exploration of the environment. The finding is also in line with the study of Peterson (1989), which opined that playful interactive spaces in the hospital built environment develop children's social, intellectual, physical, and emotional growth, and also contribute to a decrease of stress and anxiety.

Similarly, Proximity within Physical Facilities is considered as the absolute travel distance between the hospital's physical facilities (Khan, 2012). The construct was measured as an important element of the child-friendly hospital built environment. The study hypothesized that the relationship between Proximity within Physical Facilities and pediatric patients' satisfaction would be positive and significant. In agreement, the expectation of the hypothesis was affirmed to have a positive relationship ( $\beta = 0.219$ ,  $t = 2.003$ ,  $p = .000$ ). Hence, the null hypothesis, which stated that there is no significant relationship between Proximity within Physical Facilities and pediatric patients' satisfaction, is rejected, and the alternate hypothesis is accepted. This finding is in line with the study of Steinke (2015), which regarded proximity as an important concept that determines the attributes of the physical setting of a healthcare layout environment. Similarly, Pitt et al. (2014) conducted a relationship between hospital services, physical facilities, and the level of satisfaction with services and facilities, showing that there was a significant relationship between the treatment rooms and lobby areas, which supports the argument that it is important for patients to have the two areas in close proximity.

In addition, the relationship between Social Family Accommodation and pediatric patients' satisfaction was posited to be positive and significant. However, in line with the expectation, Social Family Accommodation was found to have a significant positive effect on pediatric patients' satisfaction in Federal Medical Center Keffi, Nasarawa State, with  $\beta = 0.269$ ,  $t = 4.313$ ,  $p = .000$ . Consequently, the null hypothesis, which stated that there is no significant relationship between Social Family Accommodation and pediatric patients' satisfaction, is rejected, and the alternate hypothesis is accepted. This finding is consistent with the

study of Siddiqui et al. (2015), which found that considerations such as the provision of accommodation for families in the hospital influence pediatric patients' satisfaction.

Furthermore, the study hypothesized that the relationship between Privacy within Physical Facilities and pediatric patients' satisfaction would be positive and significant. In contrast to the expectation of the hypothesis, the variable was found to have a positive insignificant result ( $\beta = 0.029$ ,  $t = .887$ ,  $p = .113$ ). Thus, the null hypothesis, which stated that there is no significant relationship between Privacy within Physical Facilities and pediatric patients' satisfaction, cannot be rejected, and the alternate hypothesis is therefore rejected. This finding is not entirely strange, especially as privacy has been found to interfere with social interactive spaces in some contexts. For example, Altman (1975) described privacy as a factor closely related to control, being defined as 'an interpersonal boundary process in which a person or group regulates interaction with others. Yet, the relationship between privacy within physical facilities and pediatric patients' satisfaction was found to be positive in line with Pinhão (2016), which concluded that both privacy and socialization are important factors and should be balanced in an effective way to offer a better hospital environment for pediatric patients.

Finally, the study posited that the relationship between Child-centric Decor and pediatric patients' satisfaction would be positive and significant. The variable was found to have a significant positive effect on pediatric patients' satisfaction in Federal Medical Center Keffi, Nasarawa State, with  $\beta = 0.220$ ,  $t = 4.371$ ,  $p = .000$ . Hence, the null hypothesis, which stated that there is no significant relationship between Child-centric Decor and pediatric patients' satisfaction, is rejected, and the alternate hypothesis is accepted. This finding is in consonance with the study of Becker et al. (2008) and Siddiqui et al. (2015), which found that the physical ambient environment encompasses elements that patients can sense and perceive, and factors within this category that enhance pediatric patients' satisfaction include the implementation of full-spectrum lighting and attention to aesthetics and décor.

## VI. CONCLUSION AND RECOMMENDATIONS

This research examined the impact of child-friendly hospital built environments on pediatric patients' satisfaction at the Federal Medical Centre Keffi, Nasarawa State. The study identified several essential elements of child-friendly hospital environment that contribute to enhancing pediatric patients' satisfaction in the healthcare sector. These elements, namely Playful Interactive Spaces; Proximity within Physical Facilities; Social Family Accommodation; Privacy within Physical Facilities; and Child-centric Decor, were considered as the independent variables for the study. The results indicated that all the mentioned independent variables significantly and positively influenced pediatric patients' satisfaction, with the exception of Privacy within Physical Facilities, which yielded a positive but insignificant result. These findings emphasize the crucial role of child-



friendly architectural and environmental features in promoting the overall well-being of pediatric patients.

To enhance patients' satisfaction and surpass their expectations, hospital management must continuously prioritize customer perceived value and strive to improve service quality. This can lead to increased patient satisfaction and encourage return visits for healthcare services. Consequently, healthcare facility management, architects, environmentalists, and healthcare professionals involved in designing healthcare plans should take these findings into account to enhance pediatric care both at the Federal Medical Centre Keffi and Nigeria. By doing so, they can contribute to the improvement of pediatric healthcare practices and ensure a more satisfactory experience for young patients.

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