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User's satisfaction with Universal Design Strategies implementation in Urology Hospitals in Abuja, Nigeria

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Abstract

The goal of universal design is to create spaces that are inclusive and accessible to everyone, regardless of age, ability, or disability. In order to provide fair access to healthcare services and improve the patient experience overall, healthcare facilities must implement universal design principles. This study explores the implementation and effectiveness of Universal Design (UD) principles in three urology hospitals in Abuja: Zenith Urology Hospital, Kelina Urology Hospital, and the National Hospital Urology Clinic. Through user satisfaction data from 110 participants, it assessed the success of these hospitals in providing accessible, inclusive environments. The research methodology employed was the quantitative approach, this was done through the use of questionnaires to be able to get the full perspective when carrying out field work. The findings reveal that 52.7% of users reported high satisfaction with the design, indicating that key UD elements, such as ease of movement, accessibility to entrances, and the availability of public conveniences, were generally well-received. Zenith Urology Hospital, in particular, scored highest in ease of entrance access and public convenience locations. However, 43.6% of users rated their experience as moderate, identifying areas for improvement, such as general accessible vertical navigation at Kelina Urology Hospital and more intuitive signage. A smaller portion of users (6.3%) expressed dissatisfaction, highlighting specific challenges for those with more complex accessibility needs. This suggests that while the design implementation is largely effective, there is room to enhance user experience by addressing remaining barriers in all the selected hospitals. The study underscores the importance of refining design elements. The study achieved useful data that can serve as a user satisfaction consideration checklist for universally designed hospitals and other public buildings.

Keywords: *Universal design strategies, user satisfaction, Urology Hospital, accessible, usable, patients.*

1.0 Introduction

Universal Design (UD) is a design philosophy that is well-known worldwide. Its goal is to create places, services, and products that are accessible to everyone, regardless of background, age, or ability. The mission of Universal Design is to design environments, goods, and services that the largest possible number of people may use without the need for customization or specialist design. This approach is often applied to the design of buildings, websites, and other products and environments, and it is based on the principles of accessibility, usability, and inclusivity. Given the established significance of universal design (UD) in buildings, research indicates that several UD techniques exist depending on the geographic location in which they have been implemented (Mosca, 2022), as well its implementation in buildings, most especially health care facilities such as hospitals. The design of healthcare facilities that are inclusive and accessible to all people, especially those with disabilities or mobility impairments, has received more attention in recent years. The goal of universal design (UD) is to create spaces that are useable and accessible to everyone, regardless of age, ability, or status. In healthcare settings, UD principles are particularly important, as they can help to improve patient outcomes and promote the overall quality of care (Figueiredo, 2021).

In Abuja, the capital city of Nigeria, there are several urology hospitals that provide healthcare services to patients with urological conditions. However, it is not clear whether these hospitals have strategically and effectively implemented UD strategies to create accessible and inclusive environments for their patients, staff, and visitors. Thus, the purpose of this study was to evaluate the degree of satisfaction with UD techniques in Nigerian urological facilities located in Abuja. The study's goals were as follows:

i. To identify the UD strategies that have been implemented in urology hospitals in Abuja.

ii. To assess the level of satisfaction with UD strategies among patients, staff, and visitors of urology hospitals in Abuja.

iii. To identify the barriers to the implementation of UD strategies in urology hospitals in Abuja.

The importance of this research project lies in ensuring that all building users, irrespective of their abilities, are catered for and not discriminated against. The study evaluated the extent to which implemented Universal Design (UD) strategies, have met user satisfaction through the evaluation of selected hospitals within the

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study area. This study focused on urology hospitals in Abuja, Nigeria. The target population included patients, staff, and visitors of these hospitals. In order to gather data from the demographic in question that is both quantitative and qualitative, the study utilized a mixed-methods research design.

1.1 Specialist Hospitals

(van Hoof, 2019), defined a specialist hospital as any facility that focuses on offering specialized care and treatment to patients with long-term or chronic illnesses, injuries, or disabilities. This research is concerned with defining and articulating the technical requirements necessary for the successful implementation of Universal Design, in the design of these facilities. These hospitals are often staffed by highly trained medical professionals who have extensive knowledge and experience in treating particular medical conditions. Specialist hospitals are designed to have an efficient layout that facilitates patient flow, minimizes waiting times, and maximizes patient privacy. The design of such buildings often ensure that patients are not disturbed by noise or other distractions, and they have a comfortable and welcoming environment (Butler, 2019). The building should have adequate lighting and ventilation to create a comfortable and healthy environment for patients and staff, (Reiling, 2008). Other important points of consideration for a specialist hospital are functionality to support the provision of quality care to all users of the facility.

According to policies governing the medical body the standards for a general hospital must be met by a specialist hospital (Insider, 2022). The proposed Specialist Hospital this research intends to focus on is a Urology specialist hospital, which offers comprehensive and advanced care for patients with urologic conditions i.e. (colon cancer, urinary tract infection, kidney disease, ureter diseases, bladder infections, etc. Foundation, 2022). In Nigeria, available literature on UD has highlighted a significant6 gap in awareness and implementation of UD in healthcare facilities. This is particularly true in urology hospitals in Abuja, where there are limited UD informative resources and infrastructure guidelines to support its strategic implementation in these types of specialist hospital facilities. However, recent studies have shown that a guided approach to the implementation of UD strategies in healthcare facilities can lead to improved patient outcomes and satisfaction.

1.2 Principles of Universal Design

The Centre for Universal Design at North Carolina State created the seven UD tenets which offer guidelines for creating inclusive and accessible products, services, and environments. An overview of the principles is provided as follows:

i. Equitable Inclusion: The design must be inclusive and accessible to individuals with a variety of abilities.
ii. Adaptive Versatility: The design should cater to a wide array of preferences and capabilities.
iii. Simplicity and Intuitive Usage: The design ought to be easily comprehensible, regardless of the user's familiarity or expertise.
iv. Noticeable Information: The design must convey information in a manner readily perceivable by all users.
v. Forgiving of Errors: The design should reduce risks and the undesirable outcomes of inadvertent or unintended actions.
vi. Minimal Physical Exertion: The design should be efficient and user-friendly, demanding minimal physical strain.
vii. Adequate Size and Space for Approach and Utilization: The design should supply sufficient room for users to approach and utilize the product or environment, irrespective of their abilities. (Nurdiani, 2020)

1.3 Strategies for achieving Universal Design in Hospitals

Accessible Design Principles

As stated by (Persson, 2015) by guaranteeing equitable use, flexibility in use, simple and intuitive use, perceptible information, tolerance for error, low physical effort, and providing appropriate size and space for approach and use, accessible design principles in architecture focus on creating inclusive spaces usable by everyone, regardless of abilities or age. This eliminates barriers and promotes inclusivity for all. Creating entry points is only one aspect of designing for accessibility; another is making it easier for people to move about buildings and other spaces. The aim is to empower every person, irrespective of their capabilities, to move around areas and utilize amenities on their own, without help or hindrance. Usability, in contrast, is concerned with users' effectiveness in utilizing a structure and its amenities, emphasizing meeting users' needs and ensuring comfort when designing a building, accessibility and usability must be taken into account.

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Implementation of Accessibility in Specialist Hospitals

According to (Baida, 2019) a spacious lobby and hallways encourage mobility and accessibility for all visitors; waiting areas are customized to the needs of various clients in accordance with Principle 1: Equitable Use and Principle 7: Size and Space for Approach and Use. It was stated that a low reception promotes Principle 1: Equitable Use, creating equal conditions for all clients, including children, those of low height, or persons using wheelchairs. These instances were stated to have improved the satisfaction of users in the hospital.

In urology hospitals, the implementation of UD strategies has been shown to improve patient satisfaction and outcomes. In a study conducted by (Ahmed, 2019), the authors evaluated the implementation of UD strategies in a urology hospital in Saudi Arabia. They found that the implementation of UD strategies led to improved patient satisfaction and quality of care. Similarly, in a study conducted by (Al-Hussaini, 2020), the authors evaluated the implementation of UD strategies in a urology hospital in Kuwait. They found that the implementation of UD strategies led to improved patient satisfaction and healthcare outcomes. UD strategies in healthcare have been shown to improve patient outcomes and satisfaction. In urology hospitals in Abuja, Nigeria, the implementation of UD strategies is limited but has the potential to improve patient outcomes and satisfaction.

In a study conducted by (Okonkwo, 2019), the authors evaluated the implementation of UD strategies in General hospital Odan in Lagos, Nigeria. They found that the implementation of UD strategies led to improved patient satisfaction and healthcare outcomes, particularly for patients with disabilities. Similarly, observations carried out have pointed, that, the implementation of UD strategies in a rehabilitation centre in Nigeria. They found that the implementation of UD strategies led to improved patient outcomes and satisfaction as well. In Nigeria, existing literature indicates that awareness and implementation of Universal Design (UD) in healthcare facilities remain limited and require systematic improvement. There is a clear need for context-specific literature and guidelines on UD strategies for specialist healthcare facilities. Previous studies have consistently demonstrated that effective implementation of UD strategies in healthcare environments contributes to improved patient outcomes and higher levels of patient satisfaction.

1.4 Strategic Elements of Accessibility

Ramps: The placement of exterior ramps in a smart manner becomes imperative when dealing with elevation variations on a site. From the site's entry to the building entrance, an accessible route that is acceptable, practical, and understandable should connect different buildings and outside elements like (Imrie, 2012)

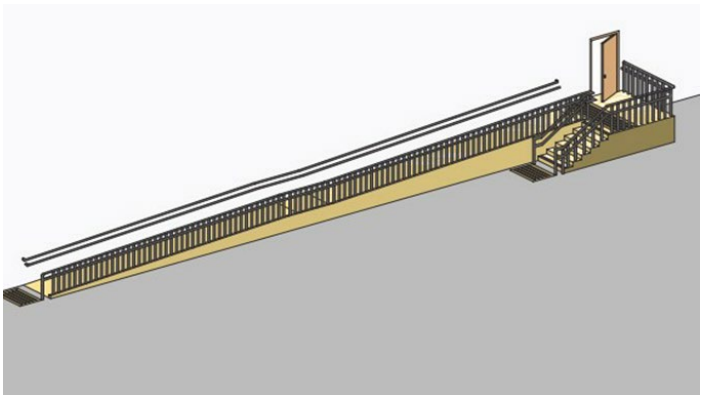

Figure 1: Ramp Placed Side by Side with Stairs

For two wheelchairs to fit side by side, ramps must have a minimum width of 1500 mm and a maximum slope of 1:16. If an access route's inclination is more than one in twenty-five, it ought to be considered an exterior ramp. Specific requirements must be met by external ramps: the maximum rise between each landing is 450 mm, and the gradient cannot be greater than 1 in 20. Furthermore, the ramp's length shouldn't be more than 9000 mm. Each slope between landings on a ramp with many slopes should keep a constant grade.

Stairs Design and Handrails:

As stated by (Nurdiani, 2020) It is advised that stairs have a depth of 300 mm and heights of 125- and 150-mm. Handrails should have two unobstructed heights (865 mm and no more than 965 mm) and contrast with the colour of the wall. A horizontal handrail ought to be added at the end of the ramp as well (Kurniawan, 2022), stated that stairs must adhere to consistent dimensions regarding the width of each step and the angle of inclination.

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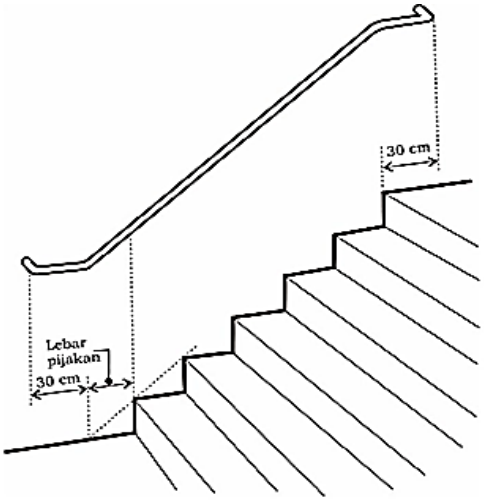
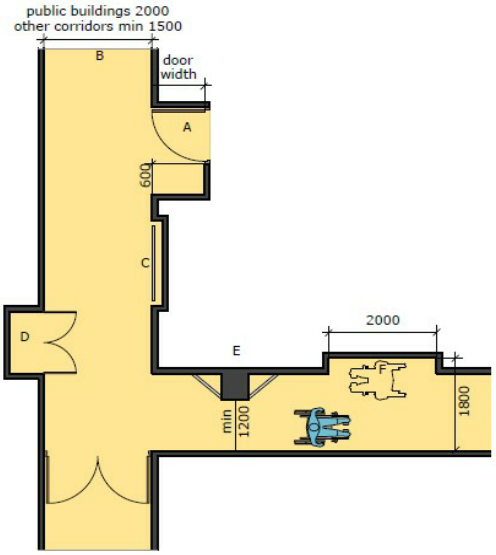


Figure 2: Specifications for Recommended Staircase Design

Walkway/Corridor:

It's important to have wide hallways for people who use mobility assistance like walkers, crutches, or wheelchairs. Sidewalks in suburban areas should be at least 5 feet (1.5 meters) broad, whereas sidewalks in downtown areas should be at least 14 feet (4.2 meters) wide, according to the Congress for New Urbanism. Strategic passing zones should be located at corridor intersections, the upper ends of ramps, and corridor terminations to provide turning spaces for those using mobility aids. Combining tactile, visual, and auditory design features, such as detectable warning surfaces, contrasting colours, and clear signage, helps guide people of all abilities, especially those with visual impairments, within the corridor environment. Adjusting the curvature and height of wall corners is a cost-effective method to facilitate easier navigation and behavioural changes for individuals with mobility challenges (Davis, 2016).



Key

A. Outward opening doors such as doors to accessible toiltets to be recessed. The door recess to equal to the width of the door
B. Corridors in public buildings to be 2000mm wide. Other corridors to be minimum 1500mm wide with passing places
C. Radiators and other wall mounted items to be recessed
D. Duct or store; doors that are normally locked may open outwards, but should be clearly signed and protected when in use
E. Projections such as column or pipe ducts should be permanently guarded
F. Passing places to be provided to corridors less than 1800mm wide and to be minimum 2000mm long and 1800mm wide

Note: All dimensions in millimetres

Figure 3: Clear Space Requirements of a Corridor

Entrance Doors:

Adequate clear space should be provided on both sides of a door to allow it to swing open freely. Additionally, more space is needed on the pull side of swing doors, ensuring people can pull the door open without obstructing its movement. Entrance and entrance lobby doors should incorporate vision panels, allowing individuals to see others approaching from the opposite side and assess the size of the space they are about to enter. Good visibility enhances people's orientation and helps them confirm the safety of the new

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area they are entering. The specified zone of visibility should be positioned between 400 mm and 1600 mm above floor level, with a width of at least 150 mm. It should not exceed 200 mm from the leading edge of the door (Davis, 2016).

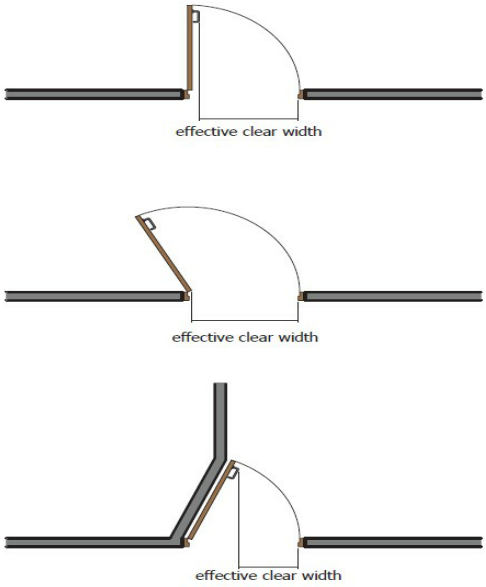

Figure 4: How Clear Widths of Doors Are Measured

Parking Facilities:

Consistent with (Rhoads, 2013), parking lots need to ensure that everyone can access them. Spaces inside designated zones should be clearly indicated and customized to meet the needs of various individuals. A parallel space is 2400mm wide by 6100mm long, whereas a conventional perpendicular parking space is usually 2400mm wide by 4800mm long. Several larger places than the typical size should be included. This method serves people who have bigger cars or who require more space in order to get in and out of their cars easily.

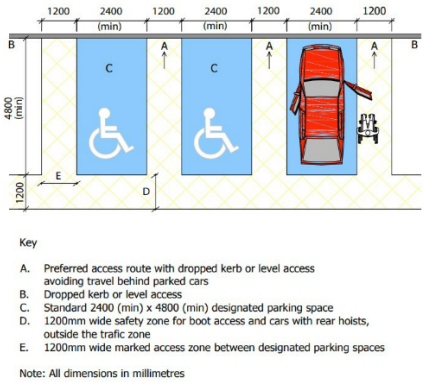

Figure 5: Parking Arrangement for Designated Car parks

2.0 Materials and Methods

2.1 Materials

In order to assess the effectiveness of Universal methodology (UD) initiatives in urology hospitals in Abuja, Nigeria, this study employed a cross-sectional research methodology. The study collected data from patients and healthcare providers to assess their satisfaction with UD strategies implemented in the hospital. The sample size for this study was a 100 patients and 10 healthcare providers from urology hospitals in Abuja, Nigeria. The patients were selected using a convenience sampling technique, while healthcare providers were selected using a purposive sampling technique (Bartlett J.E., 2001).

2.2 Methods

Data was collected using a self-administered diagnostic questionnaire for patients and healthcare providers. The questionnaire consists of questions related to patients' satisfaction with UD strategies in the hospital, their accessibility and ease of use, and their impact on patient outcomes.

To identify the existing user satisfaction with Universal Design (UD) design strategies used in Urology Hospitals and examine the extent to which Universal design strategies are used in Urology Hospital in the study area, an observation guide was developed and used to gather data. Tables and photographs

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were also used to analyse the case studies of specialist hospitals, which were presented in themes using a descriptive approach in accordance with qualitative research methodology.

The study population is a subset of the intended population upon which the sample is legitimately chosen. It is more extensive than the ideal sample frame. It is possible to define the sample frame as an operationalized version of the research population. The study population for this research consists of two groups derived from the users of the Urology Hospitals in the Nigerian context. The total study population comprised of medical patients and practitioners shown in Table 1.

2.3 Sampling Technique

In this research a census survey was adopted for the questionnaire distribution and stratified random sampling approach was used for the interview/ observation of facilities. This method was used to provide the variables for the analysis with a guaranteed comparable representation. It is based on public and private specialist hospital in Abuja F.C.T Nigeria. Simple random sampling was sued in the selection of users within each category.

The first sample size Sf was calculated using standard formula.

$Sf = t2 \times s2/d2$ (1)

The initial sample size Sf was calculated, using standard formula $Sf = t2 \times s2/d2$, where,

t = value of selection alpha level of .025 in each tail = 1.96 the alpha level of .05 shows the level of risk the researchers are willing to take that the true margin of error may exceed the acceptable

s = estimate of standard deviation in the population

= estimate of variance deviation for ten-point scale divided by nine (number of standard deviations in the range) = 10/9 = 1. 1111

d =acceptable margin of error for mean being estimated [number of points on primary scale (10) x acceptable margin of error (.03)] = 10 x .03 = .3

N = study population = 237

Thus, $Sf= t2 \times s2/d2= (1.96)2 \times (1. 1111)2 / (.3)2$

$= 3.8416 \times 1.2346/ 0.09$

$= 52.6982 \approx 53$

But since the Sf (=53) is greater than five per cent (5%) of the study population (237) in Table1, the second sample size correction formula (where, second sample size is Smin) was applied as follows:

$Smin = Sf / [1+ Sf /N] = 53/ [1+53/237] = 43.31 \approx 43$

Although the minimum calculated sample size Smin is 43, but in order to take care of the non-respondents and invalids, and the need to carry out some more complex analyses such as multiple regression, among others on the dataset requiring more cases, this was increased to 110, the total number of users in the sampling frame for the structured questionnaire.

To evaluate user satisfaction with the Universal design strategies provided, a survey was conducted using a structured questionnaire. The questionnaire was administered to a sample population of customers who had visited the Hospital within the past month. The questionnaire consisted of closed-ended questions with the option for customers to provide additional comments. The Urology Hospital in Abuja, Nigeria, was chosen as the study site using a purposive sample approach. The sample population for the survey was selected using a convenience sampling technique, which involved selecting individuals who were readily available and willing to participate in the study. The data for the study was collected through observation and a survey. The data collected through observation was analysed using tables and photographs, while the data collected through the survey was analysed using statistical tools such as frequency distribution, percentages, and mean scores. This research methodology has presented the methods and techniques used to collect data for the study on Universal design strategies and user satisfaction in Urology Hospital in Abuja, Nigeria. The research employed a hybrid methodology that included both qualitative and quantitative information. The information was gathered by survey and observation, and statistical tools, tables, and images were used in the analysis process. The sampling technique used was purposive sampling for selecting the research location and convenience sampling for selecting the sample population for the survey.

Table 1. Study population of users of urology hospitals in Abuja, Nigeria.

SN	Facility	No. of Users	Sampling Frame	Calculated Sample Size	Actual Sample Size	No. Retrieved
PATIENTS						
1	Alliance Hospital	12	12	5	12	

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2	Garki Hospital	24	24	11	24	12
3	Jean Louis Medical Center	18*	18*		18*	
4	Kelina Hospital	14	14	9	14	13
5	National Hospital Abuja	40	40	32	40	25
6	Nisa Premier Hospital	18*	18*		18*	
7	Primus Super Specialities Hospital	18*	18*		18*	
8	Sliver Fountain Medical Centre	18*	18*		18*	
9	The Limi Hospital	17	17	7	17	5
10	Zenith Medical & Kidney Centre	23	23	12	23	11
	Total/Selected	125*	125*	23	125*	66
PRACTITIONERS						
1	Alliance Hospital	12	12	5	12	8
2	Garki Hospital	21*	21*		21*	
3	Jean Louis Medical Center	16*	16*		16*	5
4	Kelina Hospital	8	8	6	8	7
5	National Hospital Abuja	8	8	5	8	5
6	Nisa Premier Hospital	16*	16*		16*	
7	Primus Super Specialities Hospital	16*	16*		16*	
8	Sliver Fountain Medical Centre	16*	16*		16*	
9	The Limi Hospital	15	15	6	15	9
10	Zenith Medical & Kidney Centre	12	12	5	12	8
	Total/Selected	112*	112*	20	112*	37
	TOTAL	237	237	43	237	103

3.0 Results and Discussion

Examining universal design techniques and their effects on user satisfaction in a particular urology hospital in Abuja, Nigeria, was the goal of the study. For the purpose of the study, a total of 110 questionnaires were given to patients at three different hospital centres. All three of the hospital centres had a 100% response rate. Gender, age group, marital status, and ability level were among the Table 2 presents the socioeconomic

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factors of hospital customers that were evaluated. According to the data, 39.2% of respondents were women and 60.8% of respondents were men. 54.9% of the age group fell between the ages of 18 and 30, 27.4% between the ages of 31 and 40, 16.8% between the ages of 41 and 50, and 0.9% over the age of 51. Furthermore, 58.4% of the respondents were married, and 41.6% were single.

The frequency of visits to the selected Urology Hospital was also assessed. The results showed that a good number of users who filled the questionnaire were frequent users of the facility, and the information they provided was genuine. From the findings, it was observed that 23 respondents often visit the hospitals, while 49 respondents visit the hospital very often. This study's response rate of between 87% and 100% achieved in this study is considered adequate, according to (A. B. Sholanke A. B., 2016)three universities in Ogun State, Nigeria, participated in a study on the compliance of academic buildings with universal design parameters. The survey's response rate ranged from 87% to 88%.

Table 2. Analysis of the Socio-demographic characteristics of the respondents

Demographic	Respondents Characteristics	Frequency (110)	Percentage (%)
Gender	Male	67	60.8
	Female	43	39.2
Age	18-30	60	54.9
	31-40	30	27.4
	41-50	18	16.8
	51 and above	2	0.9
Marital Status	Married	64	58.4
	Single	36	41.6

UD strategies that have been implemented in urology hospitals in Abuja

i. Ease of Movement: The findings from showed that in general, the users of the selected Hospitals (Zenith Urology Hospital, Kelina Urology Hospital and National Hospital Urology Clinic department) can navigate around the facilities conveniently. However, the users of Kelina Hospital found it more complicated to navigate vertically to other floors, compared to the other Urology Hospitals in the study context. A total of 45.2% of the users of National Hospital Urology Clinic reported that they found it very easy to access spaces.

ii. Accessibility of the Hospital Main Entrance: The findings showed that the users of the three Urology hospitals found it easy to access the main entrance of the Hospital. However, the users of Zenith Urology Hospital recorded the highest percentage of users (58.1%) who found it very easy to access the facilities main entrance.

iii. Availability of Public Conveniences: From the findings the three hospitals visited have located their public toilets in areas where their users can easily locate them. The users of Zenith Urology hospital had a higher percentage of users who found it easy to locate the restrooms. The three Urology Hospitals made adequate provision of public restrooms. A greater percentage of users of the three hospitals reported that they did not have to queue before they could use the toilet.

iv. Level of Assistance Required in Accessing Different Floors: Findings also showed that users required little external assistance in accessing the various floors of the hospital. This indicates that the Universal design strategies provided, are effective in aiding people of various ages and abilities move across floors independently.

v. Legibility of Hospital Signs: Findings from the three Urology Hospital showed that adequate provision for signage were made and showed that a significant percentage of users found the Hospital signs to be effective or very effective in Zenith Urology Hospital (84.8%) and National Hospital Urology Clinic Department (63.9%).

Level of satisfaction with UD strategies in urology hospitals in Abuja

On a scale of 1 to 10, where 10 is the maximum level of satisfaction, Table 3 presents statistics on 110 building users in a urology hospital's overall satisfaction with universal design principles. The majority of users report a high level of satisfaction. A total of 52.7% of users rated their satisfaction between 8 and 10, 22.7% gave a rating of 8, 10.9% rated 9, and 13.7% rated 10. This indicates that over half of the users found the universal design implementation to be very effective and satisfying. 43.6% of users gave a satisfaction rating

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in the moderate range, between 4 and 7, 20.0% rated 6, 12.7% rated 5, 8.2% rated 4, and 5.5% rated 7. This suggests that nearly half the users feel the design is somewhat satisfactory but may still identify room for improvement. A small portion of users (6.3%) expressed dissatisfaction with the design, 2.7% gave the lowest score of 1, and 1.8% each rated 2 and 3. Although these numbers are low, they highlight that a small group of users may face significant barriers or issues in the hospital's design. The majority of users (nearly 53%) report high satisfaction, indicating that the universal design principles in the urology hospital are generally well-received. However, with over 43% rating their experience as moderate, the hospital may benefit from identifying areas where improvements can be made to raise satisfaction levels. The relatively low percentage of highly dissatisfied users (6.3%) suggests that, while the design is mostly effective, there may still be specific challenges for certain individuals, such as those with more complex accessibility needs. Improving the design elements that address these concerns, such as clearer way finding, better accessibility in certain areas, or enhanced user experience features, could elevate overall satisfaction.

Table 3. Overall satisfaction of Universal design principles among building users

Overall satisfaction of Universal design principles among building users					
		Frequency (110)	Percentage (%)	Valid Percentage (%)	Inference
Valid	1	3	2.7	2.7	Highly Unsatisfactory
	2	2	1.8	1.8	
	3	2	1.8	1.8	Unsatisfactory
	4	9	8.2	8.2	
	5	14	12.7	12.7	Moderately satisfactory
	6	22	20.0	20.0	
	7	6	5.5	5.5	Satisfactory
	8	25	22.7	22.7	
	9	12	10.9	10.9	Highly satisfactory
	10	15	13.7	13.7	
Total		110	100	100	

Barriers to the implementation of UD strategies in urology hospitals in Abuja

Several barriers were observed in the urology hospitals examined in this study, which impacted the successful implementation of Universal Design principles. These barriers included maintenance issues, time constraints during construction, regulatory and compliance challenges, and limited stakeholder involvement, each of which played a significant role in limiting the effectiveness of design strategies aimed at enhancing accessibility and user experience. These barriers—maintenance issues, time constraints during construction, regulatory and compliance challenges, and limited stakeholder involvement—played a crucial role in limiting the successful implementation of Universal Design principles in urology hospitals, highlighting the need for more comprehensive planning, inclusive design processes, and ongoing commitment to accessibility improvements.

In conclusion, the study's findings indicate that Universal design strategies, namely the ease of movement, ease of accessibility, and circulation of the Hospital spaces and facilities, Accessibility of the Hospital main entrance, ease of locating conveniences, and ease of access to different floors and legibility of signage positively impact customer satisfaction in Urology Hospital in Abuja, Nigeria. The study's results provide valuable insight into the socio-economic characteristics of users of the selected Hospital facilities in Abuja, which can be used to inform future designs of Urology Hospital in the region. The study's response rate was considered adequate, according to previous research in the field, making the findings reliable and informative.

4.0 Conclusion

Several features of accessibility, convenience, and ease of movement for users are revealed by the study on the application of Universal Design (UD) principles in urology hospitals in Abuja, specifically at Zenith Urology Hospital, Kelina Urology Hospital, and the National Hospital Urology Clinic. These results provide insight on the use of UD principles and demonstrate their efficacy in fostering an inclusive setting for

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individuals with varying capacities. In conclusion, the three urology hospitals in Abuja—Zenith, Kelina, and the National Hospital—that have implemented Universal Design strategies have demonstrated generally positive outcomes in key areas like floor navigation, legibility of signage, public conveniences, ease of movement, and main entrance accessibility. While Zenith Urology Hospital often received the highest user satisfaction in these categories, indicating a particularly successful integration of UD principles, there were areas for improvement, especially in Kelina Urology Hospital's vertical navigation and signage effectiveness. These findings underscore the importance of thoughtful design in creating accessible and user-friendly healthcare environments, particularly in specialized medical facilities like urology hospitals, where patients may have a range of physical abilities and medical needs. The case study analysis revealed that the universal design solutions offered in the majority of these institutions are generally sufficient. Although they worked well for users who were able to move about and hear, they were ineffective for users who were blind or had speech or vision problems. The items that received a fairly effective rating included the lifts and signs.

The data on overall satisfaction with universal design principles among 110 building users in a urology hospital provides valuable insights into user experience. The fact that 52.7% of users rated their satisfaction between 8 and 10 indicates a strong positive reception of the design, with a significant portion of users finding the implementation of universal design both effective and satisfying. This high satisfaction level suggests that key elements like ease of movement, accessibility, and usability are functioning well for the majority of users. Specifically, the 22.7% who rated the design an 8, the 10.9% who gave it a 9, and the 13.7% who rated it a 10 reflect that these users are experiencing a high degree of comfort and convenience, likely due to features that facilitate seamless navigation, intuitive way finding, and adequate public conveniences. However, 43.6% of users rated their satisfaction in the moderate range, between 4 and 7, which suggests that while these users find the design satisfactory, they may still encounter challenges or areas for improvement. The fact that 20% rated their satisfaction a 6, 12.7% gave it a 5, and 8.2% gave it 4 shows that there is a significant portion of users whose experience is not fully optimal. This moderate satisfaction may point to specific design issues that, while not major obstacles, hinder the overall user experience. For example, these users might face occasional difficulties with vertical navigation, locating public conveniences, or interpreting signage, which detracts from their overall satisfaction. A small portion of users (6.3%) expressed dissatisfaction, with 2.7% rating their experience at the lowest score of 1 and 1.8% each giving a 2 or 3. Although this is a relatively small group, it highlights that there are specific design challenges or barriers that negatively impact these users' experience. These users could be encountering significant accessibility issues, such as difficulty in navigating certain areas or accessing necessary services without external assistance. For instance, they may face issues related to vertical movement or encounter areas of the hospital that are not as accessible or user-friendly as they should be. While the majority of users report high satisfaction, indicating that the universal design strategies are generally well-received, the fact that over 43% rate their experience as moderate suggests there is room for improvement. Addressing areas where users experience difficulty could elevate satisfaction levels further. By focusing on enhancing accessibility features, improving way finding, and ensuring a more intuitive and accommodating environment, the hospital could potentially increase the percentage of highly satisfied users. The low percentage of highly dissatisfied users (6.3%) also suggests that while the design is mostly effective, addressing the needs of this minority group—who may have more complex accessibility needs—could further improve the hospital's universal design implementation. This might involve refining specific design elements, such as clearer and more consistent signage, easier access to different floors, or more personalized assistance for users with specific mobility or sensory challenges.

Several barriers were observed in the urology hospitals examined in this study, which impacted the successful implementation of Universal Design principles. These barriers included maintenance issues, time constraints during construction, regulatory and compliance challenges, and limited stakeholder involvement, each of which played a significant role in limiting the effectiveness of design strategies aimed at enhancing accessibility and user experience. Maintenance was a recurring issue, as accessible features such as elevators, automatic doors, and ramps require regular upkeep to remain functional. Hospitals often faced challenges in maintaining these critical elements, resulting in degraded accessibility over time. Without consistent maintenance protocols and resources, key accessibility features fell into disrepair, creating new obstacles for patients, particularly those with mobility impairments. This undermined the initial goals of universal design, which aim to ensure seamless accessibility for all users. Time constraints during construction also presented a significant barrier. Hospitals often operated under tight deadlines for completing renovations or new construction projects. As a result, critical Universal Design features were sometimes overlooked or inadequately implemented due to the rush to meet project completion dates. Key elements like tactile signage, proper lighting for patients with visual impairments, and adequate space for manoeuvrability may have been compromised or omitted altogether, limiting the effectiveness of the design

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in addressing accessibility needs. Regulatory and compliance challenges posed another obstacle. While hospitals are required to comply with basic accessibility standards such as those mandated by the Americans with Disabilities Act (ADA), Universal Design principles go beyond mere legal compliance. The complexity of healthcare regulations and building codes sometimes hindered hospitals from adopting a more comprehensive approach to accessibility. This often led to a focus on meeting minimum requirements rather than embracing holistic design strategies that would benefit a broader range of users, including those with complex or specific accessibility needs. Finally, limited stakeholder involvement was a significant barrier. In many cases, the design process lacked input from key stakeholders, such as patients with disabilities, healthcare staff, and caregivers. Their direct experiences and insights are vital for ensuring that the design meets the real-world needs of all users. Without this input, hospitals risked implementing design features that were not fully aligned with the accessibility requirements of their diverse patient populations. The absence of meaningful stakeholder engagement led to design decisions that were sometimes ineffective or incomplete in addressing the full spectrum of accessibility challenges in urology hospitals.

The majority of responders, according to the questionnaire's findings, were males between the ages of 18 and 30. The majority of them stated that they frequently visit these hospitals and have no trouble getting to or using the amenities. When the Universal provisions do not adequately address their requirements, people do use other options and seek help. The survey also showed that only a tiny proportion of people who attend Hospital centres have a handicap, and that universal design features in the chosen urology hospitals in Abuja are typically appropriate. It was determined that the elevators and the accessible restrooms were the most suitable and efficient Universal solutions for accessibility in the hospitals. This shows that not all forms of disabilities were taken into account when designing accessibility features, and that just general access within the facilities may have been taken into account when designing access measures. These findings are consistent with earlier studies by (A. B. Sholanke A. B., 2019), (Gladstone, 2015), (A. B. Sholanke A. B., 2016), and (Danso, 2011), which discovered that many public buildings lack adequate Universal provisions for people with disabilities and abilities. Although the provisions are generally adequate for healthy individuals, they don't accord with (Lau, 2016)'s findings, which claimed that enough accessibility and usability provisions exist for those with impairments. These results emphasize the value of applying Universal methods across the whole building process in urology institutions.

In summary, urology institutions in Abuja, Nigeria, must prioritize the implementation of universal design techniques in order to improve the calibre of medical care provided. In order to support the freedom, safety, and accessibility of patients with disabilities, hospitals must be designed and built using universal design principles. Based on the research, it appears that the satisfaction level with universal design techniques in Abuja's urology hospitals is relatively low. This suggests that hospital management has to take immediate action. Consequently, in order to improve patient and staff happiness in the hospital setting, hospital management must embrace and put into practice universal design ideas.

In light of the research's findings, this study suggests that:

- The FCDA, the development control agency in Abuja, should offer comprehensive guidelines and information to encourage and enforce the use of UDPs in the construction and restoration of healthcare facilities.
- The selected Hospital centre's management and developer should take into consideration the renovation of their facilities to comply with the Universal Design Strategies.
- It is also recommended that the hospital management should conduct regular evaluations to identify areas that require improvement and implement necessary changes to improve the satisfaction of universal design strategies in the hospital.
- To guarantee that the notion of accessibility may be understood and implemented appropriately, design professionals and other related professions should be properly sensitized about Universal design and its standards and techniques. Federal government organizations like the Architects Council of Nigeria (ARCON) and the Nigerian Institute of Architects (NIA) should hold seminars and workshops to train professionals on the application of accessible design methods and inclusion in society. The inclusion of Universal design and its applications in the built-environment departments' curricula at universities across the nation is another way to reach this education goal.

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