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Let's Start!

An Inquiry into Universal Design and Accessibility for Ambulatory Disabilities in Commercial Spaces of DHA Neighborhood of Lahore

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An Inquiry into Universal Design and Accessibility for Ambulatory Disabilities in Commercial Spaces of DHA Neighborhood of Lahore

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Abstract

Pakistan is a country where approximately 31 million people live with disabilities, yet majority of built environment continues to be designed on the assumption of an "ideal normal body" of Vitruvius' "Vitruvian Man" and Le Corbusier's "Modular Man". Diversity and flexibility in design are the key for the success of any public area. If diversity of experience does not accommodate any group, it creates a sense of exclusion and inferiority. The study focuses on commercial buildings in DHA Lahore, a prominent housing authority known for enforcing construction by-laws that aim to promote accessibility. By examining how well these buildings adhere to universal design principles and international accessibility standards, such as the Americans with Disabilities Act (ADA), the research assesses the extent of inclusivity of people with ambulatory disability in this high-end development zone. The methodology includes qualitative research, with interviews of building owners and designers, and surveys of 27 commercial buildings, assessing key accessibility features such as parking, ramps, doorways, vertical circulation, and restrooms. Findings reveal significant variations in accessibility across different building types, highlighting both compliance gaps and areas for improvement in ensuring full participation of people with ambulatory disabilities.

Keywords: Universal Design, Accessibility, DHA Lahore, Disabled Access, ADA Guidelines, Inclusive Architecture

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Introduction

Universal design is a transformative framework focused on making the built environment accessible and usable for all, regardless of physical ability. In Pakistan, the principles of universal design remain largely under-recognized across both public and private sectors, including in the design of residential and commercial spaces. This oversight is significant, especially considering that approximately 31 million people in Pakistan live with some form of disability, as estimated by the British Council (British Council, 2019). Various organizations working in this regard have suggested that the exclusion of these people from main social and physical setup is not because of their disability but because the physical infrastructure does not allow them to participate (UNDP, 2015; UNICEF, 2021; World Humanitarian Summit, 2015) Unfortunately, the built environment is being designed based upon a preconceived understanding of abled human body. This results in creation of rigid and stagnant spaces that fit only for a certain user group and cause barriers for all those who do not qualify on this delusion of able bodies (Heylighen & Leuven, 2012).. In order for a space to be comfortable and personalized for all users, it should accommodate the diversity of experiences of different user groups and if it does not accommodate any group, it creates a sense of exclusion and inferiority.

Historically, architectural standards have been based on the notion of an "ideal normal body," leading to spaces that fit certain users well but present significant barriers to others. This model of the human body, reflected in iconic standards like Vitruvius' "Vitruvian Man" and Le Corbusier's "Modular Man," has traditionally ignored diversity in physical needs, age, and mobility. Consequently, architectural design has remained largely insensitive to the needs of people with ambulatory disabilities, the elderly, and others with unique physical requirements (Yang et al., 2012). As a result, many spaces designed under such principles lack flexibility and fail to accommodate the diversity of human experience (Ghafoor et al., 2024) . When these spaces do not allow for the participation of all users, they inadvertently create a sense of exclusion and inferiority among those left un-accommodated.

It is importance to consider the diverse needs of a wider range of users and encourage flexible ways for participation of users while designing and managing public infrastructure. In context of Pakistan, there are numerous poorly designed spaces that are unavailable to the people with disabilities and elderly, which limit their participation in society. DHA Lahore is one of the most reputed housing authorities in terms of enforcement of construction by-laws to maintain the quality and safety of its infrastructure. These regulations not only maintain high standards of construction but also include specific provisions to promote accessibility. (Sarwar et al., 2023). This research paper aim to evaluate how well DHA Lahore's commercial buildings

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Vol. 2 No. 4 ,(Fall-2024)

adhere to universal design principles and the extent to which these spaces align with accessibility standards, such as those proposed by the ADA.

Literature Review

Provision of disabled human body in architecture

Throughout the history of architecture, the architects and researchers has been working with certain sets of dimensions and standards based upon their conception of human body. This conception primarily represents an "ideal normal body" (Liebergesell et al., 2018) . They have unconsciously attached certain characteristics with the normal being to be able-bodied, logical-minded, independent, socially appropriate and so on. Interestingly the standards of normal vary from place from place, or example in North America the normal might socially referred to middle to upper class, white, preferably American, male, heterosexual, right bodily dimensions, etc. (Jay Dolmage, 2015).

This conception has been strengthened by various models and theories about human body developed throughout the history. These theories repeatedly idealized the proportions of human body and related it to geometric forms and proportions. Pythagoras, for instance, stated that "man is the measure of all things", which indicates that dimension of human body is the basis of design (Imrie, 2003). The roots of these theories dates back to "the Vitruvian man" depicting the proportion and scale of the human body as the expression of God (Yang et al., 2012)

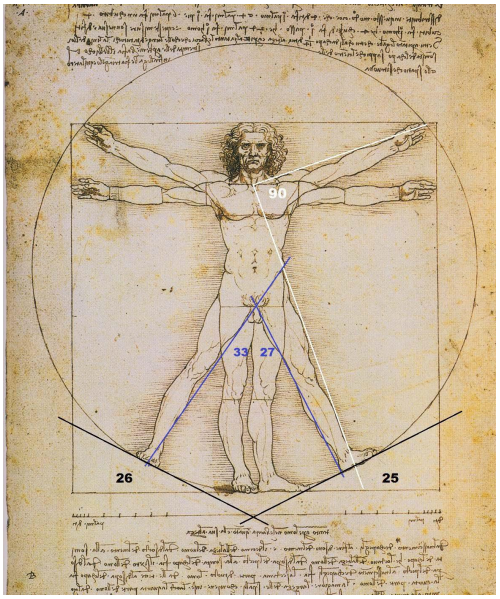

Figure 1. The Vitruvian Man by Leonardo da Vinci (Yang et al., 2012)

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https://journalofsocialsciencereview.com/index.php/PJSSR
Vol. 2 No. 4 ,(Fall-2024)

In 1950, Le Corbusier published his iconic “Modular Man” symbolizing an ideal six-foot tall man drawn according to the golden ratio and mathematical proportions. For him, this model was stating basic anthropometric standards that he used to develop the ergonomics and spatial requirements (Lorenzo-Palomera et al., 2022)

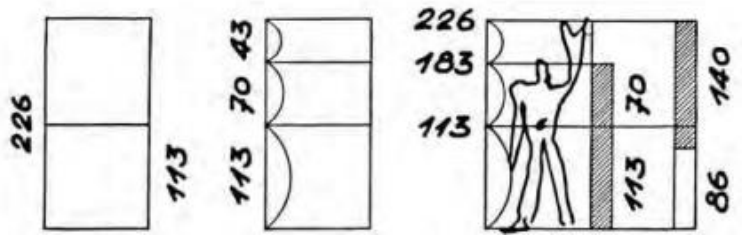

Figure 2. The Modular by Le Corbusier (Steyn, 2012)

The exploration of architects’ conception of human body illustrates that no one identifies the diseased, old aged, impaired or ill bodies while referring to human body. They are not even considered while setting up the ranges of suitable ergonomics. A separate set of standards labelling special provisions for people with impairments is provided that is considered as a burden, highly technical system and a barrier for creativity by the architects (Liebergesell et al., 2018)

In inclusive building design, the preconceived understanding of human scale as a standard module for designing spaces creates rigid and stagnant spaces (Heylighen & Leuven, 2012) . The ideal human form conceived by Leonardo da Vinci just represent a physically ideal human being and does not represent wide variety of human forms. In order to overcome this flawed approach, the designers need a new analysis of human form that is representative of every gender, race, culture, physical needs, size and age (Imrie & Luck, 2014) This concept can be well understood by acknowledging the fact that there is a difference between equality and equity. It should be considered that the equal is not always fair and vice versa. We must strive for equity to ensure that everybody gets same opportunity for an experience regardless of their dissimilarities.

The disabling design practices and emergence of non-inclusive built environment

The built environment has potential to either hinder the participation of people with disabilities or foster it. Much the same as a wheelchair can empower an individual with mobility impairment to independently move around, a space can empower someone to perform different activities that are fundamental for his daily life (WHO, 2011) In such case the building becomes a silent background component in the person’s perception. However, if it impedes his activities, it becomes an element that consciously reminds him about his insecurities and bring

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Vol. 2 No. 4 ,(Fall-2024)

them at forefront of his perception, in the same way as a wheelchair that is difficult to use and causes additional pain.

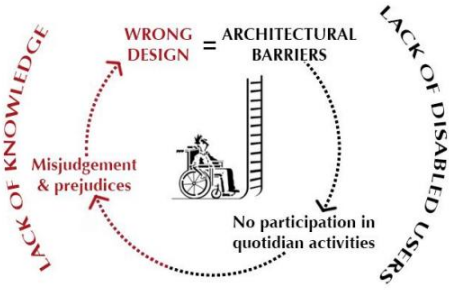

Figure 3. Marta Bordas Eddy's endless loop (Liebergesell et al., 2018)

The architecture that disables the activities and participation of users or highlights their limitations, reflects the disablist attitude of designer. Some of the disabling practices are subtle such as poor lighting and acoustic design that might result from lack of technical knowledge and support to the designers. On the other hand, some disabling aspects seems intentional like inadequate rotating doors, circular door knob, minimal staircase without railing, absence of ramp or elevator, etc. (Imrie & Luck, 2014)

Situation of Inclusivity In Pakistan

The table provided below outlines disability inclusion guidelines provided by three major building control regulatory authorities in Lahore: the Lahore Development Authority (LDA), the DHA Construction & Development Regulations, and the Cantonment Board Lahore. It highlights key provisions and variations in requirements for ensuring accessibility in buildings. This comparison underscores the varying approaches to adopted by these authorities for disability inclusion in building design and highlights gaps that could impact the uniformity and effectiveness of accessibility measures across different jurisdictions.

Table 1. Guidelines about disability inclusion by major building control regulatory authorities

Sr. No.	Description	Lahore Development Authority Building and Zoning Regulations	DHA Construction & Development Regulations	Cantonment Board Lahore

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Vol. 2 No. 4 ,(Fall-2024)

1	**Building type**	All buildings other than residential buildings	Commercial building	All commercial and apartment buildings
2	**Area**	-	4500 sft or above	-
3	**Provision of accessible entrance**	Mandatory	At least one access/exit	-
4	**Signage**	-	Entrance/ exit indicated with proper signage indicated with proper signage	-
5	**Ramp details**	-	-	
i	Ramp width	Minimum 4 feet	-	Minimum 6 feet
ii	Ramp gradient	Maximum 1:6	Ramp slope not more than 25 degrees	Maximum 1:12
iii	Handrail	-	Handrail shall be provided with the ramp if the numbers of steps are more than four.	-
iv	Material/ Finishing	-	Non-slip surface	-

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Vol. 2 No. 4 ,(Fall-2024)

6	**Accessible toilet**	At least one accessible toilet	-	At least one accessible toilet
7	**Vertical Circulation**	Access to each floor through lift or ramp for buildings with plot size more than 7 Marla.	-	Each floor must be accessible through lifts or a 6’ wide ramp with maximum gradient of 1:12.
8	**Parking**	-	One car at road level near the main entrance with maximum travel distance of 20 feet to the main entrance and one in the basement parking (if provided).	Number of parking spaces as per ADA standards with 5’ access aisle and signage.

Methodology

This study adopts a qualitative research approach to examine the interplay between building by-laws and accessibility considerations in commercial buildings. The focus is on understanding how design decisions align with or diverge from universal design principles, especially regarding inclusivity for disabled individuals. Interviews were conducted with two key stakeholders for each of the selected building: the owner and the designer. The purpose of these interviews was to investigate their perspectives on the decision-making process, including compliance with by-laws and sensitivity to accessibility considerations. Discussions with the owner provided insight into the operational and commercial factors influencing design, while interviews with the designer highlighted technical and regulatory compliance challenges, along with creative

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Vol. 2 No. 4 ,(Fall-2024)

constraints. The study was conducted within the Defence Housing Authority (DHA) in Lahore, chosen for its status as a prime location known for high-end economic activities and advanced infrastructure compared to other areas of the city. DHA's stringent by-law implementation and adoption of accessibility guidelines make it a fitting area for assessing the interaction between regulatory compliance and universal design standards in commercial spaces.

The selected buildings adhered to specific criteria:

- **Location and Area**: Located in commercial zones with high foot traffic, ensuring relevance to universal design due to diverse user needs.
- **Lot Typology**: The study included a range of lot typologies to assess how accessibility considerations vary across different layouts and lot sizes.
- **Plan Availability**: Availability of building plans for in-depth observation was preferred. However, buildings with restricted access were included if they contributed to a diverse sample.

Table. 2 Process of sample selection

Identification	———	**Initial Sample Set** Number of buildings: 50
Screening stage I	———	**Assessment for Plan Availability**: Excluded buildings based upon unavailability of floor plans.
Screening stage I	———	**Designer Participation Exclusion**: Excluded buildings where designers were unavailable or unwilling to participate.
Final selection	———	**Final sample set** Number of buildings = 27

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Vol. 2 No. 4 ,(Fall-2024)

The research team conducted a thorough survey of 27 commercial buildings spread across various phases of DHA Lahore. The buildings were selected to represent a cross-section of 4, 6, and 8 Marla commercial structures. The survey evaluated key accessibility features derived from ADAAG checklist for existing facilities, such as:

- Accessible Parking
- Curb Ramp
- Ramp
- Low Profile Door Handles
- Wide Doorways
- Accessible Vertical Circulation
- Signage
- Accessible Restrooms

Photographic documentation and mental mapping were used to identify barriers, while post occupancy analysis were conducted to understand the functional issues faced by people with disabilities.

Results and Analysis

Table 3. Accessibility score of sample buildings

Sample Buildings	Accessible Parking	Curb Accessibility	Ramp	Low Profile Door Handles	Wide Doorways	Accessible Vertical Circulation	Signage	Accessible Restrooms	Accessibility Score
4 MARLA BUILDINGS									
BRIM BURGERS	■								1
MEIKONG						■			1
NY 212					■				1
TATTLE TEAHOUSE	■					■			2
FLOWER GALLERIA AND	■				■	■			3

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ISSN (Print): 3006-4627
https://journalofsocialsciencereview.com/index.php/PJSSR
Vol. 2 No. 4 ,(Fall-2024)

BOB ARCHITECTS	■				■	■			
BOVINOES STEAK HOUSE									0
CBTL	■				■	■			3
GLORIA JEANS	■					■			2
OKAY BEANS X Okay Pizzaeria	■					■			2
Total Accessibility Score									**15**
6 MARLA BUILDINGS									
CHEEZIOUS	■			■	■	■			4
DAJAJ BROAST	■					■			2
TEMPER					■	■			2
CANDY SHOP					■	■			2
WEHSHI LAB	■					■			2
VETERANS TOWER	■					■			2
DIGNOSCO						■			1
THE HOTSPOT CAFE	■				■				2
NOSHAKH	■			■		■			3
Total Accessibility Score									**20**
8 MARLA BUILDINGS									
DAILY DELI CO						■			1
ZORO BURGER	■					■			2
GOURMET FOODS	■								1
FORKS N KNIVES					■	■			2
NISA SULTAN	■								1
AL-FATAH	■					■	■		3
MAS ARCHITECTS	■		■		■	■	■		5
READINGS						■			1
111 FAIRWAYS RAYA	■		■		■	■			4
Total Accessibility Score									**20**

The table above was used to calculate the mean accessibility score for buildings of different sizes. The total accessibility score for each category of buildings was divided by the number of buildings within that category to derive the average accessibility score:

Average Accessibility Score of 4 Marla buildings = Total Accessibility Score

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Vol. 2 No. 4 ,(Fall-2024)

Number of buildings

- **4 Marla Buildings**: Total score = 15, Number of buildings = 9, Mean score = 15/9 ≈ 1.67
- **6 Marla Buildings**: Total score = 20, Number of buildings = 9, Mean score = 20/9 ≈ 2.22
- **8 Marla Buildings**: Total score = 20, Number of buildings = 9, Mean score = 20/9 ≈ 2.22

The analysis of accessibility scores across different building sizes reveals notable variations. For 4 marla buildings, with a total accessibility score of 15 across 9 buildings, the mean accessibility score is approximately 1.67. This relatively lower average suggests that smaller buildings may face more challenges in incorporating accessibility features. In contrast, both 6 marla and 8 marla buildings achieved a higher total accessibility score of 20 each, resulting in an average score of approximately 2.22 across 9 buildings per category. None of the 4 marla buildings managed to achieve even fifty percent of the maximum accessibility score. In the 6 marla category, only one building reached this milestone, and in the 8 marla category, just two buildings achieved it. Notably, only one 8 marla building from the entire sample scored five out of the total eight accessibility features, underscoring significant room for improvement across all categories in meeting accessibility standards. Overall, this data suggests that as buildings increase in size, they may better accommodate accessibility features, enhancing usability for individuals with mobility.

Accessible Parking

In most of the studied buildings, parking was provided directly in front of the building arcades, aligning with DHA regulations. This layout makes parking relatively convenient for users, as they do not need to walk long distances to reach parking lots; the slots are typically within 20 feet of the buildings, making them accessible in terms of proximity. However, the lack of designated wheelchair parking spaces and the absence of clear signage for accessible parking significantly limit inclusivity. While the physical placement of parking slots meets general accessibility needs, the absence of such critical features fails to address the requirements of individuals with mobility challenges, highlighting a gap in adherence to universal design standards.

Feedback from designers and owners reflects a reliance on DHA to address accessible parking needs in the public parking lots. Many stakeholders stated that the parking spaces in commercial zones are designed and managed by DHA itself and they are not authorized to make any amendments in public infrastructure outside their building premises. Designers and owners argue that DHA's building control regulations could play a significant role in this area by mandating accessible parking as per international standards in designated public spaces.

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ISSN (Print): 3006-4627
https://journalofsocialsciencereview.com/index.php/PJSSR
Vol. 2 No. 4 ,(Fall-2024)

Curb Accessibility

Curb accessibility, such as curb cuts or ramps, is entirely absent around the selected buildings. This poses a significant barrier for the individuals with mobility issues to maneuver through the street and reach the building entrance. This serious shortcoming is a resultant from the lack of curb ramp provisions in DHA by-laws, which do not mandate these features as part of building requirements. According to owners and designers, curb modifications are beyond their control, as their responsibility is limited to areas within their property lines. They suggest that DHA should address this gap by incorporating curb accessibility standards in its broader urban planning and building control regulations, ensuring a more inclusive environment in commercial zones.

Ramps

The data shows absence of ramps across most buildings, with only two building in the 8 marla categories having it. Smaller buildings are particularly deficient in this feature due to space constraints. Even when ramps are included, they are quite steep and not following the recommended slope of 25 degree. The worse situation of accessible entrance in smaller buildings also results from the fact that the regulation of DHA do not bound any building with area less than 4500sft to comply with accessibility standards. Interviews with designers reveal that even when ramps are included, achieving the recommended gradient of 1:12 is a struggle. For some buildings, portable steel ramps are used as a temporary solution at the entrance to the front public verandah. While these portable ramps offer a level of accessibility without requiring structural modifications, they are often viewed as suboptimal by designers, as they amplify the sense of social exclusion for the people who have to use these. Designers working on smaller buildings, in particular, voiced frustration over the difficulty of incorporating accessible entrance features within the limited space available.

The owners, on the other hand, considered ramps to be non-essential to provide within tight spatial confines. They claimed that their buildings are rarely visited by people with wheelchairs therefore allocating plenty of space and budget for ramps is a wastage of resources. It was identified that the provision of accessibility features has been made mandatory by DHA just a year ago. Previously, even if the area of building is higher than 4500sft, the owner just had to provide an affidavit to the building control authority that the ramp is not required in his building and would get the NOC for construction. This feedback points to a systemic issue in the accessibility of commercial buildings, where absence and poor implementation of regulation leads to inaccessible infrastructure for users with any form of disability.

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https://journalofsocialsciencereview.com/index.php/PJSSR
Vol. 2 No. 4 ,(Fall-2024)

Low-Profile Door Handles

Low-profile door handles are rare in all building categories. This is an indicative of the limited awareness or the perceived insignificance of this minor feature compared to more visible modifications like ramps. In smaller buildings, budget constraints may further discourage the inclusion of low-profile doors, affecting the ease of entry for individuals with mobility impairments. Designers indicate that the lack of low-profile doors often stems from insufficient consideration during the planning phase and, notably, from client influence over the selection of building components. Clients, who may not be familiar with accessibility needs, often prioritize aesthetic or cost-saving choices over accessibility features. This perspective reveals that the decision-making process around accessibility often involves compromises, influenced by both limited awareness and the preferences of clients who may not fully understand the benefits of accessible design.

Wide Doorways

Wide doorways are more commonly found in larger (8 marla) buildings, with smaller buildings generally lacking this feature. This disparity may be due to space constraints in smaller lots, where maximizing usable area can take priority over accommodating accessibility needs. The relatively higher presence of wide doorways in larger buildings reflects the additional space available, which allows for more inclusive design. The trend underscores a potential issue in smaller commercial properties where limited door widths restrict access for individuals using mobility aids.

Accessible Vertical Circulation

Vertical accessibility, specifically the presence of elevators, is a common feature across most of the surveyed buildings, with only a few exceptions. This trend remains consistent across different building sizes, including 4, 6, and 8 marla structures, indicating that elevator installation is a consideration regardless of the building's area. However, most of the elevators are very compact and insufficient to accommodate wheelchair users. According to designers, while DHA by-laws do not mandate elevators, they are often provided to enhance accessibility for all users, facilitate movement to upper floors, and support commercial activity. The availability of elevators also has a positive impact on the rental value of upper floors, making them more attractive to potential tenants which is a primary incentive for the owners. This shows that even in the absence of regulatory requirements, market-driven factors are motivating building owners to include elevators, contributing to a more accessible environment.

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ISSN (Print): 3006-4627
https://journalofsocialsciencereview.com/index.php/PJSSR
Vol. 2 No. 4 ,(Fall-2024)

Signage

Signage is moderately present but varies significantly across buildings, with a slight increase in larger buildings. The designers indicate that larger, more established businesses see value in wayfinding aids, due to a higher number of diverse users. Smaller buildings may neglect signage due to cost or because they expect customers to be familiar with the layout. The limited presence of signage across smaller buildings suggests a need for greater awareness about its role in accessibility, especially for people with visual impairments or cognitive disabilities.

Handicap-Accessible Restroom

Handicap-accessible restroom are not provided in any of sample buildings. The restroom provided for public use are too compact to accommodate easy movement of wheelchair and there is no consideration to handrails and accessible fixtures. This lack of accessible restroom highlights a significant barrier for disabled individuals seeking to use commercial facilities independently.

The designers have a perception that accessible restroom is optional rather than necessary. They suggested that larger buildings are more likely to incorporate these facilities, potentially due to greater spatial flexibility or stronger adherence to accessibility requirements. But most of them were persistent to avoid accessible restroom in smaller buildings due to spatial constraints.

Conclusion

The findings of this research identify a significant lack of accessibility features in the commercial buildings of DHA Lahore. The comparison of various buildings of different sizes reveal that smaller buildings exhibit a lower level of compliance with accessible design standards, whereas, the larger buildings offer slightly better level of accessibility. Even then, all of the sample buildings are inefficient to accommodate the needs of users with ambulatory disabilities and offer an inclusive experience. Key deficiencies identified in these buildings include the absence of ramps, low-profile door handles, and handicap-accessible restrooms. The provision of elevators as a primary mean of vertical circulation was quite common, but their compact size makes them unsuitable for wheelchair users. This poor state of accessibility is a reflection of systemic issues in the design practices, insufficient enforcement of accessibility regulations by the authorities, and a lack of awareness about universal design principles.

The research also emphasizes that architects frequently fail to prioritize accessibility in the built environment. The concerns like spatial constraints, aesthetic choices and the influence of clients on the design decisions often overshadows this crucial aspect. This, combined with a lack of accountability, results in environments that exclude rather than include marginalized groups. It is evident from the results that DHA Lahore, despite its reputation for strict

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ISSN (Print): 3006-4627
https://journalofsocialsciencereview.com/index.php/PJSSR
Vol. 2 No. 4 ,(Fall-2024)

construction standards, fails to adopt the principles of universal design to accommodate the needs of diverse users. This failure not only affects the quality of life for such individuals, it also amplifies social exclusion, restricting individuals' ability to participate fully in everyday activities and lowering their morale. The built environment is a powerful reflection of the norms and attitude of the society and such exclusions in the buildings indicates that the dominant groups of the society are prioritized whereas marginalized populations, such as individuals with disabilities and the elderly are often neglected. Architects, knowingly or not, contribute to this segregation by designing spaces that cater to the socially dominant while overlooking others. Therefore, they must strive to address these issues create infrastructure that is accessible, inclusive, and welcoming to all.

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Vol. 2 No. 4 ,(Fall-2024)

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