Global Journal of Arts, Humanities and Social Sciences, 13(8),15-27, 2025
Print ISSN: 2052-6350(Print)
Online ISSN: 2052-6369(Online)
Website: https://www.eajournals.org/
Publication of the European Centre for Research Training and Development -UK

An Inventory of Home Facilities for Persons with Visual Impairment in Southwestern Nigeria: A Pathway Toward Inclusive Housing Design

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doi: https://doi.org/10.37745/gjahss.2013/vol13n81527 Published October 31, 2025

Citation: Odunjo O.O., Adeoye D.O., Tomori J.M. (2025) An Inventory of Home Facilities for Persons with Visual Impairment in Southwestern Nigeria: A Pathway Toward Inclusive Housing Design, *Global Journal of Arts, Humanities and Social Sciences*, 13(8),15-27

Abstract: *Accessible housing remains a cornerstone of social inclusion for persons with visual impairment. This study inventorised home facilities available to the visually impaired in Southwestern Nigeria to assess adequacy, accessibility, and functionality. Data were collected from 587 respondents across four states (Ekiti, Lagos, Ondo, and Oyo) using structured questionnaires, key informant interviews, and direct observations. Quantitative data were analyzed using descriptive statistics and weighted mean indices, while qualitative insights complemented interpretation. Findings revealed that 76.5% of homes had basic facilities such as electricity, water, and ventilation, but less than 28% incorporated adaptive features like tactile pathways, non-slip floors, audible alarms, or voice-activated systems. The provision of accessible bathrooms (31.2%) and handrails (35.4%) was low, particularly in rural settings. Smart technologies were virtually absent (<10%) due to cost and awareness constraints. The results underscore a persistent gap between conventional and inclusive design, shaped by income disparities and policy neglect. The study concludes that the existing facilities are largely inadequate for promoting autonomy among the visually impaired. It recommends the integration of universal design principles in building codes, targeted retrofitting programs, and disability-inclusive housing policies to improve safety, independence, and overall residential satisfaction.*

Keywords: Visual impairment, home facilities, accessibility, universal design, Southwestern Nigeria, inclusive housing.

INTRODUCTION

The home is not just a shelter; for persons with visual impairment, it is the fundamental domain for daily living, orientation, and social engagement. In such spaces, the capacity to traverse rooms safely, access utilities, and perform everyday tasks directly influences personal autonomy, dignity, and psychological well-being (Patil, 2025). Without design that accommodates sensory needs, the home environment can

transform from a haven into a hazard, contributing to falls, disorientation, and increased dependence on others.

In many low- and middle-income countries (LMICs), architectural practices and housing policies have historically prioritized the "average" user. Consequently, tactile routes, auditory cues, consistent lighting, and barrier-free layouts are seldom integrated into private residences. The omission reflects a broader tendency to externalize disability as the individual's burden rather than a mismatch between user needs and environmental affordances (Cushley *et al.,* 2023). The built environment thereby inadvertently disables individuals by failing to anticipate sensory constraints (Chidiac *et al.,* 2024).

In Nigeria, the gap between aspirational accessibility and actual practice is especially notable. Although Nigeria has ratified disability rights instruments and promotes accessibility in legislation, implementation often remains limited to public buildings and major institutions, while private homes largely escape scrutiny. In practice, many dwellings lack basic inclusive features—unobstructed corridors, tactile indicators, non-slip flooring, consistent lighting gradations, or auditory signals for navigation. These shortcomings are magnified when visual impairment intersects with socioeconomic disadvantage, as many affected individuals cannot afford specialized retrofitting or assistive technologies (Ortiz-Escobar *et al.*, 2023).

Furthermore, recent scholarship calls for a holistic universal design approach that transcends functional compliance and deeply addresses social exclusion (Nielsen et al., 2025). Rather than fragmentary adaptations, inclusive environments should be conceived from the outset integrating sensory, spatial, and social dimensions. For example, dwellings designed with raised floor textures, contrasting materials, and sound cues can facilitate wayfinding and reduce uncertainty (Patil, 2025). In parallel, critical voices emphasize the emergent barriers of design literacy and practitioner awareness: many architects and builders lack the expertise to operationalize inclusive features or misinterpret universal design as specialized "add-ons" (Chidiac *et al.,* 2024).

Moreover, environmental accessibility does not only influence mobility; it also shapes social inclusion and mental health. Visually impaired persons residing in inaccessible homes often report higher isolation, diminished social participation, and psychological stress (Dunlop & Thurston, 2024). As built-environment constraints distance them from daily routines and community interactions, their home can become a site of confinement rather than empowerment.

Given these dynamics, there is a pressing need for empirical inventories of home facilities in contexts like Southwestern Nigeria. Such inventories illuminate not only which adaptive features exist (or are absent) but also how these features correlate with autonomy, safety, and perceived inclusion. This study, focusing on housing environments of persons with visual impairment in Southwestern Nigeria, aims to fill a critical knowledge gap: it will document existing home facilities, analyze their adequacy in light of inclusive design norms, and offer evidence to guide policy, architectural practice, and community advocacy.

By anchoring design discourse in lived experience and empirical data, this research aspires to shift housing from a site of exclusion to one of empowerment especially for those whose visual world is mediated by touch, sound, and spatial cues.

The Study Area: Southwestern Nigeria

Southwestern Nigeria, comprising six states; Lagos, Ogun, Oyo, Osun, Ondo, and Ekiti (Figure 1.1) serves as the geographical focus of this study. The region occupies approximately 76,852 km², lying between latitudes 5°N and 9°N and longitudes 2°E and 6°E. It is bordered to the south by the Atlantic Ocean and to the west by the Republic of Benin. The area represents Nigeria's most urbanised and economically advanced zone, housing over 45 million people (National Population Commission, 2024).

Southwestern Nigeria provides a distinctive context for studying inclusive housing due to its diversity in urbanisation, income levels, and cultural perceptions of disability. Lagos, as the commercial hub, exhibits high-density urban housing and relatively better access to infrastructural facilities, while states like Ekiti and Osun remain largely agrarian with more traditional housing typologies. This regional variation allows for comparative analysis of how environmental and socioeconomic contexts influence the living conditions of PVI.

Several specialised institutions, such as the Nigerian Training Centre for the Blind in Oyo State, the Bethesda Home for the Blind in Lagos, and various schools for the visually impaired across the six states (Figure 1.2), underscore the region's demographic importance in disability studies. Despite these institutions, however, home environments remain largely unadapted to the needs of the visually impaired population.

The selection of Southwestern Nigeria as the study area is thus justified by its demographic significance, socioeconomic diversity, and the presence of both modern urban centres and traditional rural settlements. Studying this region offers rich empirical insights into how structural inequality, culture, and housing design converge to shape the lived experiences of visually impaired residents. The findings are expected to serve as a framework for scaling inclusive housing practices nationally and across similar developing contexts in Sub-Saharan Africa.

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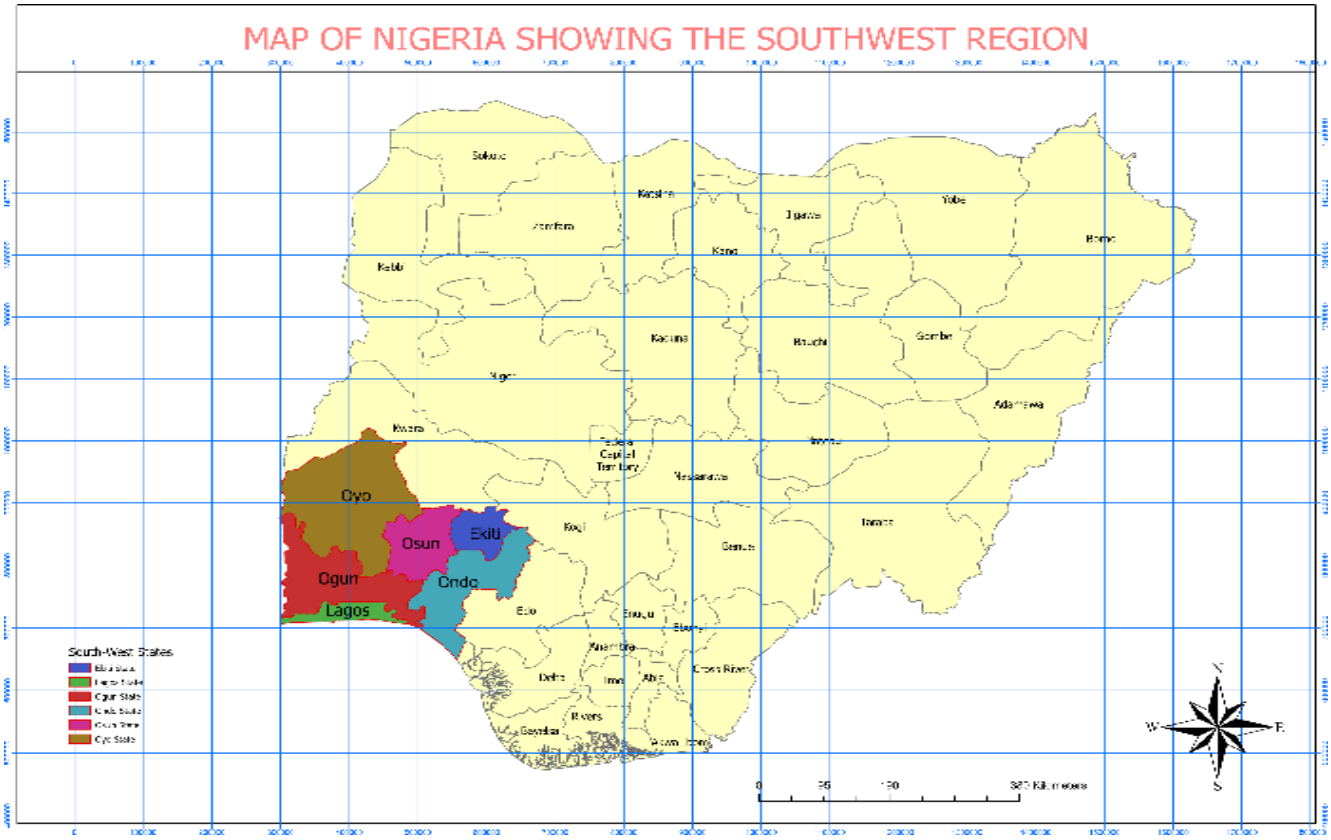

Figure 1.1*: *Southwestern Region within the context of Nigeria
Source: Urban and Regional planning Department, LAUTECH (2024)

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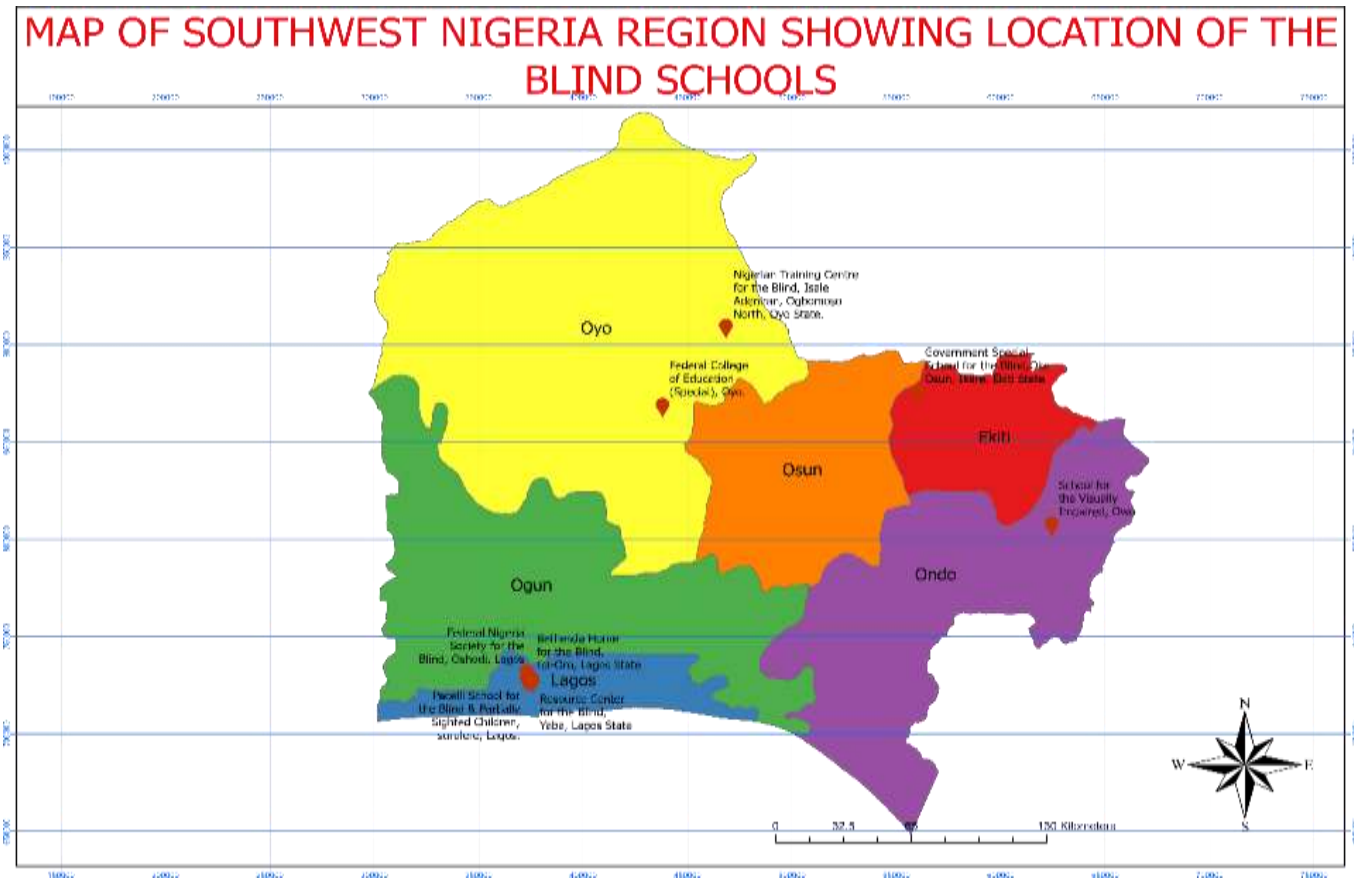

***Figure 1.2*: Map of Southwest Nigeria Region Showing Location of the Blind Schools**
Source: Urban and Regional planning Department, LAUTECH (2024)

LITERATURE REVIEW

Conceptual Foundations: Disability, Environment, and Inclusion

The socio-environmental model of disability emphasizes that limitations arise not solely from bodily impairments but from mismatches between people's capabilities and their environment (Shakespeare, 2018). In this view, architecture and housing design are not neutral backdrops but active participants that can enable or disable daily living. For persons with visual impairment, the physical environment, including spatial layout, tactile cues, lighting, acoustics, and object arrangement, plays a central role in mediating mobility, safety, and participation.

Inclusive or universal design advocates that built environments should be usable by all people, to the greatest extent possible, without need for adaptation (Center for Universal Design, 1997). More recent scholarship has pushed for a holistic universal design approach one that does not simply layer accessibility aids onto standard designs, but integrates sensory, cognitive, and social dimensions from the start (Nielsen

et al., 2025). This shift is particularly pertinent in low- and middle-income settings, where retrofitting is costly and design literacy is limited.

Home Environments for Persons with Visual Impairment

Design Challenges and Environmental Barriers

In homes not explicitly designed for sensory accessibility, common barriers include:

1) **Inconsistent lighting and glare**: abrupt transitions between dark and bright zones can disorient users, especially those with residual vision.
2) **Lack of tactile or contrasting cues**: absence of floor texture changes, raised markers, or contrasting color boundaries can impede spatial orientation.
3) **Obstructed pathways and clutter**: furniture or decorations placed without spatial logic increase trip risk
4) **Poor acoustic planning**: echoes, noise reflections, and lack of auditory cues reduce the environmental intelligibility
5) **Interfaces reliant only on visual feedback**: switches, appliance panels, and control interfaces often lack tactile or audio feedback

These design deficiencies force visually impaired residents to rely on memory, trial-and-error navigation, or assistance from sighted persons.

Adaptive and Assistive Features

To mitigate environmental limitations, various adaptive design features and assistive technologies have been explored. Some of these include:

1) **Tactile wayfinding systems**: textured or raised flooring strips, Braille or raised signage, or embedded tactile paths to guide movement (Patil and Raghani, 2025)
2) **Auditory cues and sound-based feedback**: directional audio beacons or motion-triggered sounds that help users orient themselves in interior zones (Patil et al., 2025) .
3) **Consistent furniture arrangement and linear spatial planning**: minimizing surprises and maintaining predictable routes in homes (Patil and Raghani, 2025)
4) **Optimised lighting techniques**: diffusing glare, using indirect lighting, adjustable task lighting, and avoiding abrupt light transitions (Patil and Raghani, 2025)
5) **Accessible interfaces in appliances**: adding tactile or audio feedback on buttons, knobs, and control panels to make home appliances accessible (An *et al.*, 2024)
6) **Vision-based assistive systems**: computer vision, wearable devices, or sensor systems that detect obstacles and inform users, though most are still in research phases (Yao *et al.*, 2025).

These features, however, are unevenly distributed globally, more common in well-resourced settings than in low-income homes.

Evidence from Global and Regional Studies

Global Insights

Patil and Raghani (2025) studied interior design adaptations for visually impaired individuals across multiple contexts, showing that integrating tactile, auditory, and lighting cues reduced reported falls and cognitive fatigue in navigation. Their participatory design workshops underscored that user involvement is critical to designing effective adaptive features.

Nielsen *et al.* (2025) argue that universal design should be conceptualized beyond functional adaptation; it should aim to reduce social exclusion by embedding inclusion at environmental, cultural, and policy levels. This underscores that facility inventories must not only count features but assess how they promote actual social participation.

An *et al.* (2024) provide empirical evidence that many everyday home appliances remain inaccessible to visually impaired users because their interfaces prioritize visual cues over tactile or audio feedback. Meanwhile, Yao et al. (2025) survey the frontier of vision-based assistive systems, noting the promise and current limitations of real-time obstacle detection and feedback.

Regional / Comparative Studies

While there is less literature focusing specifically on Sub-Saharan Africa, the gap is instructive. Many studies in such contexts emphasize the lack of retrofitting, low design awareness, and resource constraints. For example, Rooney et al. (2016) examined "Lifetime Homes" standards adapted for visually impaired persons in Northern Ireland, revealing that even well-intentioned standards can fall short when local adaptation is weak or housing stock is old. Though not in Nigeria, this work provides lessons about aligning standards with context. Comparative studies of inclusive design in low-resource settings (e.g. in parts of Asia or Latin America) often show that although guidelines exist, enforcement is weak, and retrofit investment is minimal (Gupta *et al.,* 2025). These findings resonate with the Nigerian context, where inclusion in private homes is rarely mandated or incentivised.

Themes and Gaps Emerging from the Literature

From the review above, several thematic insights and gaps stand out:

1) **Limited empirical documentation in LMIC settings**: Many adaptive design studies are conducted in developed settings; few systematically inventory home facilities among visually impaired persons in Sub-Saharan Africa or Nigeria specifically.
2) **User participation as central to design success**: Numerous studies emphasize that participatory approaches co-design with users produce solutions that are better adopted and more context-appropriate (Patil *et al.,* 2025).
3) **Technology is promising but not yet widely deployed**: Vision-based assistive systems and smart home technologies show potential but often remain costly, complex, or untested in everyday home settings (Yao *et al.,* 2025*).*

4) **Retrofit vs new design tension:** Retrofitting existing homes is costly and often impractical, especially in low-income areas. Hence, proactive inclusive design is more sustainable, but may not meet immediate needs.
5) **Enforcement and policy gaps**: Even where disability-inclusive codes exist, their translation to private housing is weak. Many homeowners**,** architects, and builders lack incentives or awareness to adopt them (Nielsen *et al.,* 2025) .
6) **Interplay of socioeconomic factors**: Income, education, and access to technical expertise heavily mediate whether adaptive features are installed. Low-resource households often prioritize "visible" structural necessities over sensory inclusivity.
7) **Need for multi-dimensional measures**: Counting facilities (e.g. "how many homes have tactile floors") is useful but insufficient. It is equally important to assess usability, resident satisfaction, safety outcomes, *and* social participation.

RESEARCH METHODOLOGY

Research Design

This study adopted a descriptive cross-sectional design, which is suitable for identifying and describing the types and adequacy of home facilities available to persons with visual impairment across different settings. The design enabled the systematic collection of quantitative and qualitative data at a single point in time to capture variations in facility provision, accessibility, and usage patterns. The mixed-methods approach provided both numerical precision and contextual understanding (Nind and Vinha, 2023; Saunders *et al*., 2024). Quantitative data described the prevalence of specific facilities, while qualitative insights from interviews and observations clarified the lived realities of visually impaired residents within their home environments.

Research Population

The research population for the study was people with visually impairment in the study area. Thus, the research population was conceived to be adults (people aged 18 years and above) living, working, and studying in the study area. This definition was deliberately adopted to include all categories of visual impairment, as well as schools and homes where people with visual impairment were domiciled, in order to capture all the essential information needed for the study. Accordingly, the population for the study comprises all the schools with hostel facilities or homes for people with visual impairment in Southwest Nigeria. Field survey shows that there are eight (8) of such schools and homes in Southwestern Nigeria, with a population of one thousand, two hundred and fifty-nine (1,259) individuals. This constituted the population for the study, (see Table 1). Hostel facilities were assessed to determine the quality of facilities available to them.

Sample Frame

The sample frame consists of all people with visual impairment in relation to home facilities in Southwest Nigeria, (Table 1) Out of all the schools and homes in Southwest Nigeria, eight were identified as predominantly centres or homes for the blind, which constituted the sampling frame for the study.

Data Collection Instruments

Three instruments were employed to ensure triangulation and accuracy of results: Structured Questionnaire, Observation Checklist and Key Informant Interviews (KII)

Table 1: Sample Size; Schools and Homes for People with Visual Impairment in Southwest Nigeria

S/N	State	Name of the School/Home	Enrolment	Sample Size
1	Ekiti	Government Special School for the Blind, Oke-Osun, Ikere, Ekiti State	208	104
2	Oyo	Nigerian Training Center for the Blind, Isale Adeniran, Ogbomoso North, Oyo State	48	24
3	Ondo	Ondo State Visually Impaired, Owo	302	151
4	Oyo	Federal College of Education (Special), Akinmorin, Oyo	154	77
5	Lagos	Lagos Pacelli School for the Blind, Surulere	98	49
6	Lagos	Bethesda Home for the Blind, Idi-Oro	41	21
7	Lagos	Resource Centre for the Blind	67	34
8	Lagos	Federal Nigeria Society for the Blind, Oshodi	341	171
	Total		**1259**	**631**

Source: Author's Compilation (2024)

Validity and Reliability of Instruments

The instruments were reviewed by experts in Architecture, Rehabilitation Studies, and Environmental Design to ensure content and construct validity. A pre-test involving 30 respondents in Oyo State (outside the main study area) allowed refinement of ambiguous items. Cronbach's Alpha test yielded a reliability coefficient of 0.84, confirming the internal consistency of the questionnaire (Hair *et al.*, 2023).

DATA ANALYSIS AND PRESENTATION OF FINDINGS

Quantitative data were analysed using descriptive and inferential statistics through SPSS. Descriptive statistics (frequency count, percentage, mean, and weighted index) summarised facility availability and to quantify the presence of facilities. The data were analysed in alignment with the Universal Design Framework and Social Disability Model, emphasising the relationship between environmental accessibility and social participation.

Available Home Facilities for Persons with Visual Impairment

Analysis (Table 2) shows that basic utilities, electricity (M = 4.6), ventilation (M = 4.4), running water (M = 4.2), lighting (M = 4.3), and audible doorbells (M = 4.3), were widely available. Moderate accessibility features such as accessible bathrooms (M = 3.3), non-slip floors (M = 3.1), and screen readers (M = 3.0) were inconsistently provided. In contrast, most specialised facilities were unavailable: ramps (M = 2.8), handrails (M = 2.5), tactile flooring (M = 2.0), braille signage (M = 2.3), and motion sensor lights (M = 2.2). The overall mean of 3.0 reflects a sharp divide between general utilities and disability-specific adaptations, consistent with Palmer *et al*. (2015).

Table 2: Availability of Home Facilities for Persons with Visual Impairment (N = 587)

S/N	Home Facility	Mean Score	SD	Availability
1	Electricity	4.6	0.5	Highly available
2	Ventilation	4.4	0.6	Highly available
3	Running water	4.2	0.7	Highly available
4	Audible doorbells	4.3	0.6	Highly available
5	Lighning	4.3	0.6	Highly available
6	Accessible bathroom	3.3	0.8	Available
7	Non-slip floors	3.1	0.9	Available
8	Accessible kitchen	3.0	1.0	Available
9	Screen readers	3.0	1.1	Available
10	Grab bars	3.0	1.0	Available
11	Easy-to-reach cabinets	2.9	1.2	Indifferent
12	Magnifiers	2.7	1.1	Not available
13	Internet access	2.7	1.2	Not available
14	Tactile markers on switches/appliances	3.8	0.7	Available
15	Hand rails	2.5	1.1	Not available
16	Ramps	2.8	1.0	Not available
17	Height-adjustable sinks	2.6	1.2	Not available
18	Voice-controlled devices	2.4	1.0	Not available at all
19	Tactile flooring	2.0	1.0	Not available
20	Braille signage	2.3	1.1	Not available
21	Motion sensor lights	2.2	1.1	Not available
	Overall mean score	**3.0**		

Source: Author's Field Survey (2025)

Facilities in Each Centre/School

Comparative assessment (Table 3) revealed institutional disparities. Lagos Pacelli School for the Blind (Centre 5) had the highest provision (13 facilities), followed by the Nigerian Training Centre, Ogbomoso (10) and Federal College of Education (Special), Akinmorin (9). The weakest provisions were observed in Bethesda Home (6) and Government Special School, Oke-Osun (5). Stronger facilities in faith-based and urban centres highlight uneven infrastructural investment and echo earlier evidence of inequities between private and public institutions (Palmer *et al.*, 2015).

Table 3: Facilities in Each Centre/School

S/N	Home Facility	1	2	3	4	5	6	7	8
1	Electricity	✓	✓	✓	✓	✓	✓	✓	✓
2	Ventilation	✓	✓	✓	✓	✓	✓	✓	✓
3	Running water	✓	✓	✓	✓	✓	✓	✓	✓
4	Lightning	✓	✓	✓	✓	✓	✓	✓	✓
5	Audible doorbells	X	✓	X	X	✓	X	X	X
6	Accessible bathroom	✓	X	X	✓	✓	X	X	X
7	Non-slip floors	X	X	✓	X	✓	X	X	X
8	Accessible kitchen	X	✓	X	X	✓	X	X	X
9	Screen readers	X	✓	X	X	✓	X	✓	X
10	Grab bars	X	X	✓	X	✓	X	X	X
11	Easy-to-reach cabinets	X	✓	X	X	X	X	X	✓
12	Magnifiers	X	✓	X	X	X	X	✓	X
13	Internet access	✓	X	X	✓	X	X	X	✓
14	Tactile markers on switches/appliances	X	✓	X	✓	X	X	X	X
15	Hand rails	✓	X	X	X	✓	X	X	X
16	Ramps	X	✓	X	X	✓	X	X	X
17	Height-adjustable sinks	X	X	X	X	X	X	X	✓
18	Voice-controlled devices	X	X	X	X	X	X	X	✓
19	Tactile flooring	X	X	✓	X	X	X	X	X
20	Braille signage	X	X	X	✓	X	X	X	X
21	Motion sensor lights	X	X	X	X	X	✓	X	X
Total Facilities Available per Centre		**7**	**10**	**7**	**9**	**11**	**6**	**5**	**8**

Source: Author's Field Survey (2025)
Note: √- Available
X-Not available

RESULTS

Electricity, ventilation, and water supply were the most common facilities. 86.4% of respondents reported having electricity access, though power outages were frequent. 81.7% had running water, mostly through boreholes, and 78.9% had functional kitchens, but many lacked accessible layouts. Adaptive features such as tactile markers, handrails, and audible alarms were reported by less than 30% of respondents, indicating a limited integration of inclusive design features.

DISCUSSION

The results highlight that while basic utilities exist in most homes, adaptive facilities that ensure safety and independence are largely missing. This confirms earlier assertions by Adeoye and Oyetola (2022) that Nigerian housing remains functionally adequate but socially exclusionary. Socioeconomic disparities also explain facility distribution. Urban residents had greater access to modern features, reflecting income-linked inequalities documented by Ojo and Olaniyan (2018).

CONCLUSION

The inventory revealed that while most homes possess essential utilities, adaptive and assistive facilities crucial for visually impaired independence are inadequate. The gaps, particularly in tactile guidance, non-slip flooring, and smart lighting, reflect systemic neglect of inclusive design in residential housing.

RECOMMENDATIONS

1. Integration of Universal Design Standards in the National Building Code.
2. Government retrofitting programs for homes of visually impaired persons.
3. Architectural curriculum reforms to include inclusive design education.
4. Technology innovation grants for low-cost assistive devices.
5. Public sensitisation campaigns on the human rights basis of inclusive housing.

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