

An Appraisal of Universal Design Compliance in Residential Care Centres for the Elderly: A Comparative Study

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Abstract. The growing elderly population has intensified the need for residential care environments that promote independence, safety, and well-being through universal design. This study appraises the level of universal design compliance in residential care centres for the elderly using a comparative case study approach. Drawing from relevant literature on universal design and age-friendly environments, the study identifies key appraisal parameters, namely approachability and entry experience, accessibility and mobility support, usability and daily living support, and sensory comfort and psychosocial well-being. Five case studies were examined, comprising three purpose-built international facilities in China, Belgium, and Spain, and two adapted facilities in Nigeria. Data were obtained through field observation, photographic documentation, and comparative appraisal. Findings reveal that the purpose-built facilities demonstrated high compliance across all parameters, reflecting the effectiveness of early design integration and strong regulatory frameworks. In contrast, the Nigerian facilities exhibited partial and uneven compliance, with significant deficiencies in accessibility and ergonomic detailing, despite incorporating culturally responsive elements that supported psychosocial well-being. The study concludes that the effectiveness of elderly care facilities is strongly influenced by intentional design planning and policy enforcement. It recommends the adoption of mandatory universal design guidelines, structured retrofitting of existing facilities, and the integration of culturally meaningful features within accessible spatial configurations to enhance inclusive and dignified aging environments.

Keywords: Universal design, elderly care facilities, accessibility, inclusive built environments, sustainable environments.

1. Introduction

The rapid global increase in the elderly population has generated significant challenges for architectural design, particularly in healthcare and residential environments (Van Hoof *et al.*, 2021; Khan *et al.*, 2020; Fang *et al.*, 2020). Globally, individuals aged 60 years and above constitute over 11% of the population, a figure projected to nearly double by 2050, reaching approximately 22% (World Health Organization [WHO], 2024). This demographic transition is not confined to high-income countries, low- and middle-income nations, including Nigeria, are increasingly confronted with the implications of population ageing, particularly in relation to healthcare provision and the adequacy of living environments (Jakovljevic *et al.*, 2021; Van Hoof *et al.*, 2021). Elderly individuals often require environments that prioritise safety, accessibility, and supportive features to sustain independence and quality of life (Wang *et al.*, 2022; Chau & Jamei, 2021). Consequently, architectural responses must address age-related physical, sensory, and cognitive changes through inclusive principles of accessibility, mobility, and comfort (Yang *et al.*, 2024).

In Nigeria, the elderly population is expanding rapidly, increasing from approximately 9.4 million in 2020 to an estimated 16 million by 2030, with projections indicating a rise to about 47 million by 2060 (UN DESA Population Division, 2024; Statista, 2024; Ogunyemi *et al.*, 2023). Despite this growth, elderly care remains largely family-based, a traditional support system increasingly strained by urbanisation, reduced household sizes, and the migration of younger populations to urban centres or abroad (Jolselt, 2020; Okeke, 2017). As a result, many

elderly Nigerians experience social isolation, heightened vulnerability, and reduced quality of life (National Academies of Sciences, 2020; Freedman & Nicolle, 2020). These socio-cultural transformations underscore the growing need for purpose-built residential care facilities for the elderly. However, the availability of such facilities remains limited, and many existing centres exhibit deficiencies in accessibility, safety, and environmental support (Medale & Ezeokoli, 2024; Adewale & Fasae, 2019).

Universal design (UD) provides a robust framework for addressing these challenges by promoting inclusive, accessible, and functional environments for users of all ages and abilities (Ko & Bae, 2024; Sanford & Remillard, 2021). UD refers to the design of environments, products, and services that can be used by the widest possible range of people without the need for adaptation or specialised solutions (Busby, 2024). Originating from the work of Ron Mace in the 1980s, the concept emphasises independence, equity, and usability, particularly for persons with disabilities and ageing populations (Busby, 2024; Ellassal & Ahmed, 2024). Over time, UD has expanded to incorporate considerations of cultural context, social inclusion, and psychosocial well-being (Steinfeld & Maisel, 2012). Within elderly care environments, UD is especially critical for addressing mobility limitations, sensory impairments, and cognitive decline, thereby supporting lifelong usability and dignity in living environments (Fisk *et al.*, 2020; Ko & Bae, 2024).

The seven principles of universal design, equitable use, flexibility in use, simple and intuitive use, perceptible information, tolerance for error, low physical effort, and appropriate size and space for approach and use, provide a comprehensive framework for assessing the inclusivity of built environments (The Center for Universal Design, 1997). Design features such as non-slip flooring, handrails, adequate lighting, and generous circulation spaces have been shown to significantly enhance safety, ease of movement, and social interaction among elderly users (Ko & Bae, 2024; Sanford & Remillard, 2021). Despite these well-documented benefits, the application of UD principles within Nigerian residential care centres for the elderly remains limited and insufficiently appraised. Existing studies largely identify general accessibility challenges but lack systematic and comparative evaluation against international benchmarks (Odetola *et al.*, 2020; Adewale & Fasae, 2019).

In response to this gap, this study appraises the level of universal design compliance in residential care centres for the elderly through a comparative analysis of five facilities, three purpose-built centres located in China, Belgium, and Spain, and two adapted facilities in Nigeria. The appraisal focuses on four key parameters derived from universal design and age-friendly design literature: approachability and entry experience, accessibility and mobility support, usability and daily living support, and sensory comfort and psychosocial well-being. The primary objective is to identify critical gaps in UD compliance within Nigerian elderly care facilities and to propose context-sensitive retrofitting and policy recommendations by benchmarking them against international best practices. By doing so, the study contributes to the discourse on age-friendly architecture and offers actionable insights for architects, planners, and policymakers committed to creating inclusive and dignified living environments for ageing populations.

1.1 Study Location

This study appraised five residential care centres for the elderly, selected to enable a comparative evaluation of universal design application across different regulatory, economic, and cultural contexts. The sample comprises three purpose-built facilities from international

settings and two adapted facilities from Nigeria, reflecting the prevailing local practice of modifying existing buildings for elderly care. The selected case studies are:

1. Yiyuan Service Centre for the Elderly (Tianjin, China)
2. Mortsel Elderly Care Campus (Mortsel, Belgium)
3. Pòrtol Elderly Residence (Pòrtol, Spain)
4. Rockgarden Homes for Senior Citizens (Ikorodu, Lagos, Nigeria)
5. Divine Senior Citizens Palace (Akobo, Ibadan, Nigeria)

The facilities were selected based on accessibility of data and their representation of contrasting design approaches, ranging from purpose-built models operating within robust regulatory frameworks to adapted solutions in resource-constrained contexts. Figure 1 illustrates the geographical distribution of the selected case study locations.

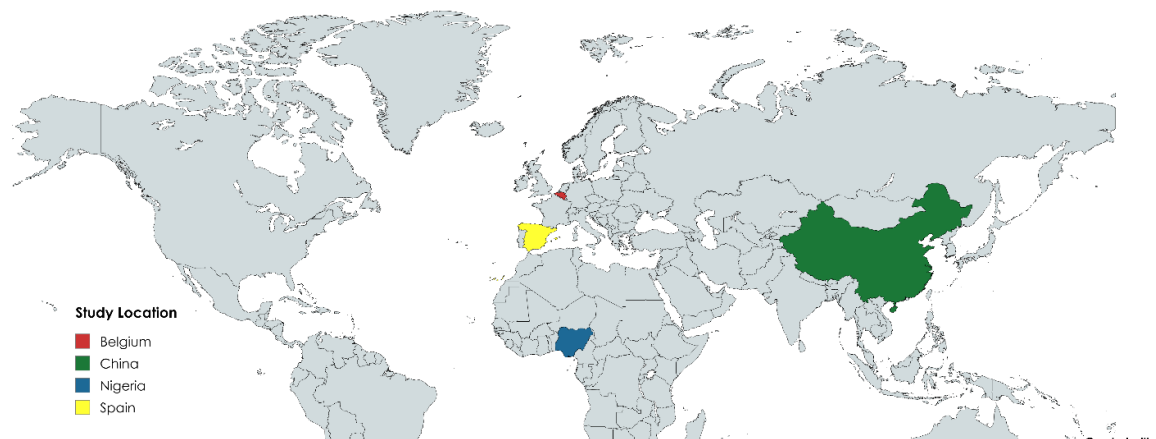


Figure 2: Geographical Distribution Map of Case Study Locations

Source: Researcher's Field Work, 2025

2. Methodology

This research adopted a multiple case study approach to appraise the compliance of residential care centres with universal design principles. As Hunziker and Blankenagel (2024) note, case study methodology is suitable for investigating how questions arise in real-world contexts where the researcher has minimal control over events. This approach enables in-depth exploration of complex phenomena within natural settings, making it appropriate for evaluating built environments across socio-cultural contexts.

Data were gathered from both primary and secondary sources to ensure a comprehensive appraisal. For the two Nigerian case studies, primary data collection involved site visits conducted between October and December 2025, observational schedules documenting architectural features, and photographic surveys capturing spatial configurations and design elements. For the three international case studies, where physical access was not feasible, data were obtained from architectural documentation, published project reports, peer-reviewed post-occupancy evaluations, and verified photographic materials from reputable architectural platforms such as ArchDaily.

Secondary data included analysis of universal design frameworks, particularly the seven principles established by The Center for Universal Design (1997), and relevant accessibility

guidelines including the Smithsonian Accessibility Guidelines and the World Health Organization's age-friendly cities checklist.

The appraisal of the selected residential care centres was structured around four interrelated parameters: approachability and entry experience, accessibility and mobility support, usability and daily living support, and sensory comfort and psychosocial well-being. These parameters, derived from established universal design principles and age-friendly design frameworks, emphasize safe access, independent movement, functional usability, and supportive sensory environments for elderly populations (Steinfeld & Maisel, 2012; Adewale & Fasae, 2019; Fisk *et al.*, 2020; Sanford & Remillard, 2021; Van Hoof *et al.*, 2021; Hasan, 2024). This framework allows a holistic evaluation by addressing both physical and psychosocial dimensions, ensuring design performance is assessed beyond barrier-free access to include quality of life and well-being outcomes.

Data analysis employed content analysis methodology, where observed features in each case study were systematically compared against established universal design benchmarks for each parameter. This qualitative approach enabled identification of compliance levels across different design contexts, documentation of best practices in purpose-built facilities, recognition of systemic gaps in adapted facilities, and development of context-sensitive recommendations. The comparative nature of this design allowed cross-contextual analysis while maintaining qualitative depth.

3. Results and Discussion

3.1 Case Study 1: Yiyuan Service Centre for the Elderly, Tianjin, China

a. Approachability and Entry Experience

The main entrance of Yiyuan Service Centre is clearly legible and welcoming, with wide, unobstructed pathways and visually distinct entry points that aid orientation (Figure 2). Landscaping and seating near the entrance create a comfortable, inviting experience for residents and visitors, encouraging social interaction even before entering the facility.



Figure 3: Front view of Yiyuan Service Centre for the Elderly

Source: <https://www.archdaily.com>

b. Accessibility and Mobility Support

The facility excels in supporting independent movement. Wide corridors and doorways (Figure 4) accommodate wheelchairs and walkers, while T-shaped layouts (Figure 3) minimize

disorientation and simplify circulation. Ramps, elevators, and level transitions are fully integrated, ensuring that all areas are accessible without assistance, demonstrating strong adherence to universal design principles for equitable and low-effort use.



Figure 4: T-shaped layouts for movement
Source: <https://www.archdaily.com>



Figure 5: Wide doors and corridor view
Source: <https://www.archdaily.com>

c. Usability and Daily Living Support

Internal spaces are designed for functional usability. Living rooms (Figure 5) offer flexible seating arrangements for social engagement, bedrooms (Figure 6) accommodate diverse mobility needs, and dining areas are strategically positioned to reduce travel distances and support supervision. Furniture, fixtures, and layouts are adaptable, promoting independence in daily routines and aligning with the principles of flexibility and simplicity.



Figure 6: Living Room view
Source: <https://www.archdaily.com>



Figure 7: Typical bedroom view
Source: <https://www.archdaily.com>

d. Sensory Comfort and Psychosocial Well-Being

The facility integrates sensory and psychosocial considerations effectively. Natural lighting, visual cues, and landscaped courtyard views contribute to a calming environment, while communal spaces encourage socialization and reduce isolation. Textural contrasts, acoustic management, and intuitive signage support residents with sensory impairments, enhancing orientation, comfort, and overall psychological well-being.

Summary Appraisal: The Yiyuan Service Centre demonstrates strong compliance with UD principles across approachability, accessibility, and usability. The design ensures safe, independent movement, intuitive navigation, and functional living environments. While sensory enhancements such as tactile flooring and auditory cues are present, there is still room for refinement to further support residents with sensory impairments. Overall, this purpose-built facility exemplifies international best practice for elderly care design.

3.2 Case Study 2: Mortsel Elderly Care Campus, Mortsel, Belgium

a. Approachability and Entry Experience

Mortsel Elderly Care Campus features a clearly defined main entrance with ramps, handrails, and an unobstructed pathway that immediately communicates accessibility and safety (Figure

7 & 8). Landscaping, courtyard seating, and visually distinct entry features create a welcoming environment, fostering positive first impressions and ease of orientation for residents and visitors alike.



Figure 8: Front view
<https://www.archdaily.com>



Figure 9: Entrance with railings
<https://www.archdaily.com>

b. Accessibility and Mobility Support

The campus demonstrates strong accessibility throughout. Wide corridors (Figure 9), ramps connecting street level to basements (Figure 10), and level transitions enable seamless movement for residents using mobility aids. Elevators provide vertical circulation across multi-level areas, while clearly marked pathways and open layouts facilitate intuitive navigation.

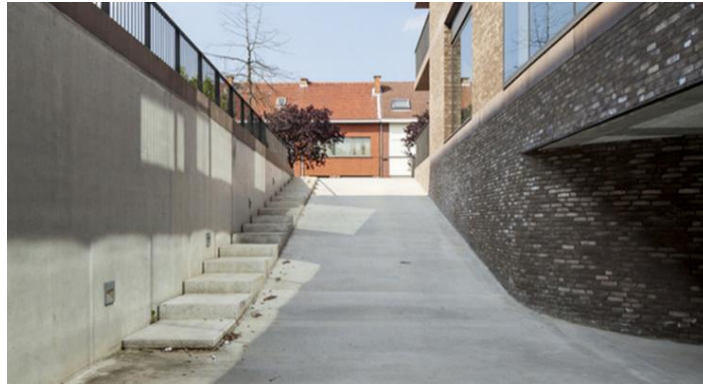


Figure 10: Ramp from street to basement

<https://www.archdaily.com>



Figure 11: Corridors of Mortsel Elderly Campus

<https://www.archdaily.com>

c. Usability and Daily Living Support

Interior spaces are designed to support functional daily routines. Typical bedrooms (Figure 12) are spacious and ergonomically arranged, communal lounges (Figure 11) encourage social engagement, and wide balconies provide outdoor access for leisure and recreation. Dining areas are positioned to reduce travel distances and allow supervision, aligning with principles of flexibility and simplicity of use.



Figure 12: Courtyard view

<https://www.archdaily.com>



Figure 13: Typical Toilet
<https://www.archdaily.com>

d. Sensory Comfort and Psychosocial Well-Being

Mortsel campus emphasizes environmental comfort and psychosocial well-being. Natural light permeates communal areas and corridors, reducing reliance on artificial lighting and enhancing orientation. Landscaped courtyards and gardens (Figure 13) provide visual stimulation and relaxation, while clear signage, color-coded paths, and low-glare surfaces (Figure 14) support residents with sensory impairments. Social spaces and activity areas foster interaction, reducing isolation and promoting mental health.



Figure 14: Landscaped courtyards and gardens
<https://www.archdaily.com>



Figure 15: Color-coded paths, and low-glare surfaces
<https://www.archdaily.com>

Summary Appraisal: Mortsel Elderly Care Campus exhibits high compliance with all four appraisal parameters. Its approachability, accessible circulation, functional usability, and integrated sensory/psychosocial considerations demonstrate best practices in purpose-built elderly care facilities. Small enhancements could include additional tactile and auditory cues for residents with more severe sensory limitations.

3.3 Case Study 3: Pòrtol Elderly Residence, Pòrtol, Spain

a. Approachability and Entry Experience

The Pòrtol Elderly Residence presents a clearly articulated and accessible entry sequence. The facility is well integrated with the surrounding street network, with a gently sloped ramp providing direct access from street level to the main entrance (Figure 16). The building frontage is visually legible and complemented by open transitional spaces that reduce anxiety and aid orientation for first-time users and elderly residents.



Figure 16: Front view of Pòrtol Elderly Residence
<https://www.archdaily.com>



Figure 17: Ramp for access from street
<https://www.archdaily.com>

b. Accessibility and Mobility Support

Internal circulation within the facility demonstrates strong compliance with universal design principles. Wide doors and an open lobby layout (Figure 17) accommodate wheelchair users and walking aids, while barrier-free corridors ensure continuous movement without physical obstruction. Vertical and horizontal circulation systems are intuitively organized, reducing wayfinding difficulties and supporting independent mobility throughout the residence.



Figure 18: Wide doors and lobby view
<https://www.archdaily.com>

c. Usability and Daily Living Support

Residential and communal spaces are designed to support daily routines with minimal physical and cognitive effort. Typical bedroom lounges (Figure 19) provide flexible layouts that allow personalization and accommodate varying mobility needs. Reception and communal areas (Figure 19) are centrally positioned to encourage interaction and provide visual supervision, while dining and shared activity spaces are easily accessible from residential units, reinforcing functional usability and independence.



Figure 19: Reception area view
<https://www.archdaily.com>



Figure 20: Typical bedroom lounge view
<https://www.archdaily.com>

d. Sensory Comfort and Psychosocial Well-Being

The design strongly emphasizes sensory comfort and psychological well-being. Landscaped courtyards and garden areas (Figure 3.19) provide visual relief, opportunities for outdoor engagement, and connection to nature, which are known to support mental health among elderly populations (Fisk *et al.*, 2020; Van Hoof *et al.*, 2021). Abundant natural lighting, warm material palettes, and visual continuity between indoor and outdoor spaces create a calming environment that enhances orientation and reduces stress.



Figure 21: Courtyard and garden area
<https://www.archdaily.com>

Summary Appraisal: Pòrtol Elderly Residence demonstrates high compliance across all four appraisal parameters. The facility's clear approachability, barrier-free circulation, functional usability, and strong emphasis on sensory and psychosocial well-being position it as an exemplary model of universal design application in elderly residential care. Minor enhancements could include additional tactile or auditory cues to further support residents with advanced sensory impairments.

3.4 Case Study 4: Rockgarden Homes for Senior Citizens, Ikorodu, Lagos, Nigeria

a. Approachability and Entry Experience

Rockgarden Homes presents a modest and informal entry experience characteristic of adapted residential facilities in Nigeria. The main entrance is identifiable but lacks clear architectural emphasis and dedicated drop-off zones for elderly residents (Figure 21). While the compound layout is generally calm and non-intimidating, the absence of covered walkways and limited visual cues reduces ease of approach, particularly for residents with mobility or visual impairments.



Figure 22: Front view of Rockgarden Homes facility

Source: Researcher's Field Work, 2025

b. Accessibility and Mobility Support

Accessibility within the facility is moderate. Buildings are arranged in blocks with relatively short walking distances (Figure 22), which supports mobility to some extent. However, the absence of ramps, handrails, and continuous barrier-free pathways limits independent movement for residents using mobility aids. Internal circulation relies largely on level ground and informal pathways, which may become challenging during adverse weather conditions. These limitations reflect the constraints associated with retrofitting existing residential structures rather than purpose-built elderly care facilities.



Figure 23: Buildings arranged in blocks

Source: Researcher's Field Work, 2025

c. Usability and Daily Living Support

Communal and residential spaces support basic daily activities but with limited ergonomic consideration. Typical bedrooms (Figure 23) are adequately sized but lack adjustable fixtures and clear maneuvering spaces. Dining areas (Figure 24) and recreational spaces, including the games hut (Figure 25), encourage social interaction and routine engagement. However, the usability of these spaces is constrained by furniture arrangement and the absence of supportive features such as grab bars and slip-resistant finishes.



Figure 24: Typical bedroom view
Source: <https://rockgardenhomes.com>



Figure 25: Typical dining room
Source: Researcher's Field Work, 2025



Figure 26: Games hut view
Source: Researcher's Field Work, 2025

d. Sensory Comfort and Psychosocial Well-Being

Rockgarden Homes demonstrates notable strengths in supporting psychosocial well-being through culturally responsive environmental features. In addition to landscaped gardens and sit-out spaces (Figures 3.26 and 27), the facility incorporates a small domestic animal farm comprising hens, ducks, goats, and other light livestock. Elderly residents are subtly encouraged to interact with and feed these animals, fostering a sense of purpose, routine, and familiarity associated with traditional domestic life. Such interactions align with evidence that animal-assisted and nature-based activities enhance emotional well-being and reduce feelings of loneliness among older adults (Fisk *et al.*, 2020; Van Hoof *et al.*, 2021).

The presence of a water fountain within the outdoor environment further contributes to sensory comfort by providing auditory stimulation and a calming atmosphere, which supports relaxation and stress reduction. Group activities, including game sessions (Figure 28), reinforce social cohesion and community bonding. Despite these strengths, the absence of structured sensory design elements, such as tactile paving, high-contrast visual cues, and acoustic zoning, limits the facility's ability to fully support residents with sensory impairments.



Figure 27: Garden area

Source: Researcher's Field Work, 2025

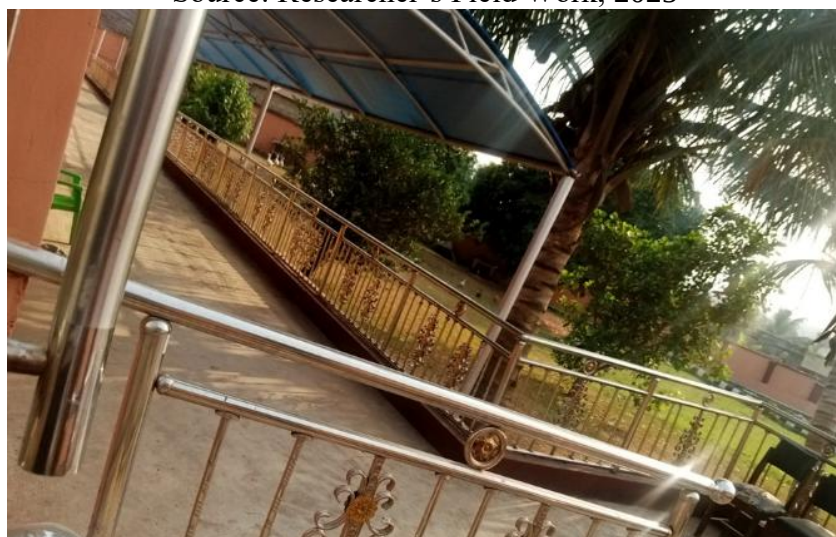


Figure 28: Sit-out view

Source: Researcher's Field Work, 2025



Figure 29: Games session

Source: <https://rockgardenhomes.com>

Summary Appraisal: Rockgarden Homes demonstrates moderate compliance with universal design principles, particularly in promoting psychosocial well-being through communal activities and outdoor spaces. However, significant gaps remain in approachability, accessibility, and functional usability due to limited mobility support and the absence of key universal design features. These findings underscore the challenges of adapting conventional residential buildings for elderly care in resource-constrained contexts and highlight the need for targeted retrofitting strategies and policy support.

3.5 Case Study 5: Divine Senior Citizens Palace, Akobo, Ibadan, Nigeria

a. Approachability and Entry Experience

Divine Senior Citizens Palace exhibits a limited level of approachability. The entrance gate is narrow and lacks a clearly defined drop-off zone or transitional space for elderly residents (Figure 29). Access into the facility is visually understated, with minimal architectural cues to aid orientation or convey a welcoming entry experience. The absence of covered walkways and signage further reduces ease of approach, particularly for residents with mobility or visual impairments.



Figure 30: Entrance gate of Divine Senior Citizens Palace

Source: Researcher's Field Work, 2025

b. Accessibility and Mobility Support

Accessibility within the facility is significantly constrained. Internal circulation spaces are narrow and lack ramps, handrails, or continuous barrier-free routes. Level differences are not clearly articulated, increasing the risk of trips and falls (Figure 30). Movement between functional spaces often requires assistance, indicating low compliance with universal design principles related to independent mobility and low physical effort.



Figure 31: Entrance lack ramps, level differences are not clearly articulated

Source: Researcher's Field Work, 2025

c. Usability and Daily Living Support

Residential and communal spaces provide basic functionality but with limited ergonomic consideration. Living and dining areas (Figures 31 and 32) are modest in size and not optimally configured for wheelchair manoeuvrability or assisted movement. Bedrooms lack adaptive fixtures and flexible layouts, constraining residents' ability to independently perform daily activities. The absence of supportive bathroom fittings further limits usability for residents with reduced mobility.



Figure 32: Living room view

Source: Researcher's Field Work, 2025



Figure 33: Dining room view
Source: Researcher's Field Work, 2025

d. Sensory Comfort and Psychosocial Well-Being

The facility provides limited sensory stimulation and psychosocial support. While some landscaping and paved outdoor areas are present (Figure 33), these spaces are not intentionally designed to promote therapeutic engagement or prolonged outdoor use. Visual contrast, tactile cues, and auditory elements are largely absent, reducing environmental legibility and sensory comfort. Social interaction is primarily dependent on staff-led routines rather than spatial design, which limits opportunities for spontaneous engagement and community bonding among residents.



Figure 34: Paving and landscape view
Source: Researcher's Field Work, 2025

Summary Appraisal: Divine Senior Citizens Palace demonstrates low compliance across the four appraisal parameters. Limitations in approachability, accessibility, and usability highlight the challenges of converting conventional residential buildings into elderly care facilities without structured universal design interventions. While the presence of basic communal spaces provides minimal psychosocial support, the facility underscores the urgent need for policy-driven design standards, professional guidance, and targeted retrofitting strategies for elderly care environments in Nigeria.

3.6 Discussion

This section synthesizes findings from the five case studies by comparing their levels of compliance with universal design principles across four appraisal parameters: approachability and entry experience, accessibility and mobility support, usability and daily living support, and sensory comfort and psychosocial well-being. The comparison reveals clear contrasts between purpose-built international facilities and adapted Nigerian facilities, highlighting the influence of design intent, regulatory context, and socio-cultural factors on universal design outcomes.

Approachability and Entry Experience

The international case studies, namely Yiyuan Service Centre (China), Mortsel Elderly Care Campus (Belgium), and Pòrtol Elderly Residence (Spain), demonstrated strong compliance with universal design requirements related to approachability. These facilities provided clearly legible entrances, barrier-free access routes, covered walkways, and visual cues that enhance wayfinding and reduce entry-related stress for elderly users. Features such as ramps integrated into the primary approach routes and transitional spaces between outdoor and indoor environments reflect best practices in age-friendly design, as emphasized by Steinfeld and Maisel (2012) and Van Hoof *et al.* (2021).

In contrast, the Nigerian facilities, Rockgarden Homes and Divine Senior Citizens Palace, showed limited compliance. While Rockgarden Homes benefits from a campus-style layout with ground-level access, approach routes lack clear hierarchy, formal drop-off zones, and tactile guidance. Divine Senior Citizens Palace exhibits the weakest performance, with a narrow entrance, minimal signage, and no clearly articulated transition spaces. These findings align with earlier observations that many elderly care facilities in Nigeria prioritize functional accommodation over inclusive entry design (Adewale & Fasae, 2019).

Accessibility and Mobility Support

Accessibility and mobility support emerged as the most pronounced area of divergence between the two groups of facilities. The international facilities consistently incorporated ramps, elevators, wide corridors, continuous handrails, and level transitions, enabling independent movement for residents with varying mobility capacities. Internal circulation systems, including T-shaped layouts and looped corridors, minimized confusion and supported safe navigation, consistent with universal design principles of low physical effort and tolerance for error (The Center for Universal Design, 1997; Fisk *et al.*, 2020).

Conversely, both Nigerian facilities displayed substantial accessibility limitations. Although Rockgarden Homes benefits from predominantly single-storey buildings, the absence of handrails, ramps, and assistive mobility features restricts independent movement. Divine Senior Citizens Palace exhibits more severe constraints, including narrow corridors, level changes without support features, and reliance on staff assistance for basic mobility. These findings underscore the challenges associated with retrofitting existing residential structures for elderly care without adequate regulatory enforcement or design expertise.

Usability and Daily Living Support

Usability of residential and communal spaces was closely tied to whether facilities were purpose-built or adapted. The international case studies demonstrated high usability through flexible room layouts, appropriately scaled furniture, accessible sanitary facilities, and well-defined communal areas that support daily routines and social interaction. Bedrooms, dining spaces, and lounges were designed to accommodate assistive devices while maintaining

residential comfort, reflecting the principles of equitable and flexible use (Sanford & Remillard, 2021).

In Nigerian facilities, usability was uneven. Rockgarden Homes provided functional communal spaces such as dining areas, gardens, and activity huts, which support social engagement. However, deficiencies in bathroom accessibility, adjustable fixtures, and ergonomic detailing limited independent use. Divine Senior Citizens Palace performed poorly in this parameter, with spatial configurations that constrain wheelchair manoeuvrability and lack adaptive design features. These limitations reflect broader systemic issues related to cost constraints and the absence of mandatory universal design standards in local building regulations.

Sensory Comfort and Psychosocial Well-Being

Sensory comfort and psychosocial well-being differentiated the facilities most clearly in terms of design philosophy. International facilities deliberately integrated natural lighting, courtyards, landscaped gardens, and visual connectivity to enhance emotional well-being and cognitive orientation. These environments support aging-in-place by fostering familiarity, autonomy, and social interaction, consistent with findings by Van Hoof *et al.* (2021) and Ko and Bae (2024).

Interestingly, Rockgarden Homes demonstrated contextually meaningful strengths in this parameter. The presence of landscaped gardens, a fountain, and a small domestic animal farm, including poultry, goats, and ducks, creates a familiar and culturally resonant environment that encourages interaction, routine, and a sense of purpose among residents. This aligns with evidence that engagement with nature and animals can enhance psychological well-being and reduce loneliness in elderly populations (Fisk *et al.*, 2020). However, these strengths are undermined by the absence of intentional sensory design elements such as tactile paving, auditory cues, and shaded seating areas.

Divine Senior Citizens Palace showed minimal engagement with sensory and psychosocial design strategies. Outdoor spaces lack therapeutic landscaping, and indoor environments provide limited sensory variation, reducing their potential to support mental stimulation and social cohesion.

Overall Implications

The comparative analysis demonstrates that purpose-built residential care centres consistently achieve higher levels of universal design compliance across all four appraisal parameters. In contrast, adapted facilities in Nigeria reveal partial and uneven compliance, shaped by structural constraints, limited resources, and weak regulatory frameworks. Nonetheless, the culturally grounded strategies observed at Rockgarden Homes suggest that context-sensitive approaches, when combined with universal design principles, can produce meaningful improvements in elderly care environments even in low-resource settings.

4. Conclusion

This study appraised universal design compliance in five residential care centres for the elderly through a comparative analysis of purpose-built international facilities and adapted Nigerian facilities. The findings indicate that compliance is strongly shaped by early design intent, regulatory enforcement, and contextual responsiveness. Purpose-built facilities in China, Belgium, and Spain consistently performed well across approachability, accessibility, usability, and sensory comfort, reinforcing the view that universal design is most effective when integrated from the initial design stages.

In contrast, the Nigerian facilities demonstrated partial and uneven compliance, with pronounced deficiencies in accessibility and mobility support. Rockgarden Homes showed relative strength in psychosocial well-being through culturally familiar features such as gardens, water elements, and interaction with domestic animals, yet these were not supported by adequate barrier-free circulation or ergonomic detailing. Divine Senior Citizens Palace recorded the lowest compliance across all appraisal parameters, highlighting the limitations of adapting conventional residential buildings for elderly care without structured universal design frameworks.

Overall, the study concludes that many elderly care facilities in Nigeria are inadequately equipped to support independent living, dignity, and inclusive participation among older adults. This shortfall has wider implications for social inclusion, public health outcomes, and sustainable urban development, particularly in light of Nigeria's steadily aging population.

Based on these findings, it is recommended that government agencies establish and enforce mandatory universal design guidelines for elderly care facilities, aligned with international frameworks such as the WHO age-friendly cities model and recognized accessibility standards. Architects and allied professionals should prioritize universal design from the conceptual stage, while existing facilities should undergo targeted retrofitting to improve mobility, safety, and usability. In addition, culturally resonant features should be intentionally integrated with universal design principles, as their psychosocial benefits are most effective when supported by accessible and inclusive spatial configurations.

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