Accessibility of Wheelchair to Public Buildings in Maiduguri, Nigeria.

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Abstract

Accessibility of wheelchair to public buildings can be used as a gauge of the level of societal accommodation and consideration for the needs of persons living with disability. This descriptive study was aimed at determining the accessibility of wheelchair to public buildings in Maiduguri, Nigeria. Government and private buildings were randomly selected and their connecting routes, doorways and ramps were measured and compared to the standard as prescribed by the American with Disability Act guidelines. Each building that had at least a doorway and one or more linking route(s) that allow a wheelchair easy access to the building's ground floor was qualified as accessible. Descriptive statistics of frequency counts and percentages summarised the data. A total of 57 public buildings, 45 (78.9%) of which were government, 12 (21.1%) were private proprietary, and 10 were multi-story buildings, only 10 (17.5%) were accessible, while 140 of 165 doorways (84.6%), 15 of 19 routes (78.9%) and 7 of 13 ramps (53.8%) did not meet accessibility standard. Few (20%) of the 10 multi-story buildings had accessible ramps, and other than one non-functioning elevator in one of the storey buildings, no elevator facility existed in any of the other storey buildings. The study suggests that persons who are wheelchair bound may be experiencing difficulty and may have to be dependent on others in accessing educational, social and recreational services, suggesting that structural barriers to free living by the physically challenged is still rampant in this North-eastern Nigerian city.

Keywords: *Wheelchair accessibility; Public buildings; Doorways; Routes and Ramps.*

Introduction

Following rehabilitation, individuals may return to the communities and may need to function using mobility aids such as wheelchairs which are generally presumed to enhance ambulation in persons living with mobility impairments. This ambulatory device may be used either temporarily or permanently, depending on the type, cause or extent of disability. Apart from mobility, wheelchair also provides the user with other benefits such as access to community and social activities, preservation of energy and augmentation of quality of life (Trail, Nelson, Van, Appel & Lai, 2001). Benefits of a suitable and well-fitted wheelchair may not be maximised if there is lack of necessary

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accessories or facilities in built environments. It may even be wearisome to the wheelchair users who need to access buildings and environments meant for employment, education, health, social and recreational services.

Clinicians and rehabilitation experts are in position to understand the needs of persons living with disabilities and may be able to identify inaccessible public buildings. While concerned health care professionals, in the midst of limited resources (especially in developing countries) put in their best to help clients achieve optimum independence. Martins (1987) posited that it is quite disturbing to realise that these clients are often discharged to a built-environment filled with barriers that limit freedom and right to access required services.

A previous study by Hamzat and Dada (2005) highlighted the need to incorporate wheelchair accessibility in the interior and exterior of public buildings in Nigeria so that wheelchair users may fit in and be able to move around without restriction in any society they dwell in. Nigeria, with an estimated 19 million persons living with disabilities as at 2008, has no clearly defined accessibility building code and road signs and symbols for the benefit of wheelchair users are often not in place (Michailakis, 1997). With this lack of defined accessibility building code, persons living with disabilities in Nigeria face insurmountable challenges and barriers in their quest to acquire education, health and other services which are accommodated in built environments solely designed for the physically able individuals.

Several countries of the world have enacted disability acts that mandate public building designers and contractors to incorporate ramps and lifts with specific requirements and measurements that allow access for wheelchair users. For instance, in the United States of America (USA), the Americans with Disability Act ([ADA], 1990) provides civil right protections for individuals living with disabilities. These civil right protections include building codes for accessibility requirements into public facilities. This enactment was intended to facilitate the use of such buildings by persons living with physical disabilities or impairments that warrant the use of wheelchairs (ADA, 1990). The wheelchair ramp requirements in North Carolina and most developed countries of the world also follow the ADA (1990). These building guidelines in addition provide a design manual on accessibility for persons living with disabilities and acts as a design guide for architects and engineers in constructing a barrier-free environment for people on wheelchairs.

The World Health Organization (2011) estimated that more than one billion people live with disabilities worldwide with about 75% living in the developing countries (Lang & Upah, 2008). Despite these reports, there is a general paucity of published empirical data on wheelchair accessibility of public buildings to enhance mobility among vulnerable population in low income countries. The few available literatures (Rose, 1999; Useh, Moyo & Munyonga, 2001; Mckay & Langworthy, 2011) on this subject were conducted in countries other than Nigeria. One published study in Nigeria by Hamzat and Dada (2005) was carried out in Ibadan, a city situated in the South-west of Nigeria. From literature search, this study has not been replicated in any other part of the country. This dearth of literature on wheelchair accessibility of public buildings as

well as the insurmountable hardship faced by the population on wheelchairs prompted the authors to conceive and design this present study in Maiduguri, a city situated in the North-eastern Nigeria. This city is presently under siege by insurgents, and given the havoc being wrecked by these insurgents, the number of wheelchair users may be expected to rise in this city and by extension in Nigeria.

Methods

Before the commencement of the study, cover letters explaining the purpose of the study as well as assurance that the information obtained would be highly confidential and used strictly for research purposes were made available to the appropriate authorities in charge of the buildings. The facilities investigated were both government and private buildings. "Public building" connotes houses where services are rendered to the people, and not limited to government-owned institutions or facilities alone. Nigeria operates three tiers of government: the federal, state and local governments. Buildings owned by each of these levels of government were considered, so also were those owned by private operators. Structures built exclusively for persons with one form of disability or the other, such as homes for the handicapped and leprosarium were excluded from this study. Each identified study site accommodating each building was observed, and required measurements in such buildings were taken and recorded by one of the authors (MGM). Measurement of doorways and connecting routes were carried out in any building that had many entrances. The measurements taken and recorded to the nearest 0.1 centimetre were the horizontal distance across the door frame (the doorway width); the vertical distance from the floor to the top of an elevated surface located at the doorway (height of threshold); the vertical distance from the bottom to the top of a step or any elevated surface located along the route of entry (height of steps); the horizontal distance between the edges of a corridor, passage, and passageway (width of route); the vertical distance from the bottom to the top of the ramp at the highest point (height of ramp); the distance between the beginning and the end of the base of a ramp (length of ramp); the distance between the beginning and the end of the slope (length of slope of ramp). The grade of ramp was deduced by finding the ratio of the height and the length of the ramp, hence,

Grade of ramp = height of ramp/length of ramp (Lysack *et al*., 1999).

Table 1: *Summary of required dimensions for wheelchair accessibility using an abridged form of the Americans with Disabilities Act (1990)*

Parameters	Accessibility Requirements	Remarks
Height steps/threshold	Maximum of 0.5 inch (1.25 cm)	Inaccessible if above 0.5 inch (1.25 cm) without threshold being beveled or provision of a ramp.
Doorway width	Minimum of 32 inches (80.0 cm)	Inaccessible if below 32 inches (80.0 cm)
Grade of ramp i.e. height/ length	Maximum 1:12 with slope length less than 9 m	Inaccessible if steeper than 1:12 or if slope of 1:12 is longer than 9 m
Width of route	Minimum of 36 inches (90.0 cm)	Inaccessible if below 36 inches (90.0 cm)

Each of the building surveyed was considered accessible or inaccessible by comparing the measurements taken with the required dimensions as described by a short form of the ADA (1990) as depicted in Table 1. Each building that had at least a doorway and one or more linking route(s) through which a wheelchair could pass easily was described as accessible in this study.
Data collected were summarised in tables using descriptive statistics of frequency counts and percentages.

Results

A total of 57 public buildings were assessed. There was preponderance of buildings classified as bungalows (77.2%) while multi-storey (two or more floors) accounted for 17.5%, and facilities which render services in open spaces such as sports and recreational facilities were few (5.3%). Twenty-nine buildings (50.9%) were under the proprietorship of the Federal Government of Nigeria, with about 69% of these functioning as educational institutions. The total number of government (i.e. federal, state and local) buildings was 45 with only 15.6% found accessible to wheelchairs. Of the 57 buildings, only 10 (17.5%) were accessible and eight (24.2%) of the accessible entrances/doorways were under the proprietorship of the State Government. Three (37.5%) of the accessible routes were under the proprietorship of the Federal Government and all the seven routes under the private proprietorship were inaccessible. Finally, four (66.7%) out of the six ramps under the Federal Government proprietorship were accessible (Table 2). Overall, it appears that Federal Government buildings tend to meet the accessibility criteria in the areas of building itself, entrances/doorways and ramps in contrast to the State and local governments as well as private proprietorships.

On the functional category, 17 (89.5%) out of the 19 buildings under the commercial category were inaccessible, while 4 (19%) out of the 21 entrances/doorways under the government agencies were accessible. Two (50%) of the four routes under education category were accessible, while six (75%) out of eight under health category were accessible. One (33.3%) out of the three ramps under the education category was

accessible, while all four ramps under the commercial category were inaccessible (Table 3).

Table 2: *Frequency distribution of buildings by accessibility and structures based on functional categories*

Building and Structures	**Proprietorship**			
Building N(57)	Federal Govt.	State Govt.	Local Govt	Private
Accessible (n=10)	5(17.2)	2(22.2)	0(0.0)	3(25.0)
Inaccessible (n=47)	24(82.8)	7(77.8)	7(100.0)	9(75.0)
Total	29	9	7	12
Entrances/doorways (N=165)				
Accessible (n=25)	12(37.5)	8(24.2)	0(0.0)	5(21.7)
Inaccessible (n=140)	82(62.5)	25(75.8)	15(100.0)	18(78.3)
Total	94	33	15	23
Routes (N=19)				
Accessible (n=4)	3(37.5)	1(33.3)	0(0.0)	0(00.0)
Inaccessible (n=15)	5(62.5)	2(66.7)	0(100.0)	7(100.0)
Total	8	3	1	7
Ramp (N=13)				
Accessible (n=6)	4(66.7)	1(50.0)	0(0.0)	1(25.0)
Inaccessible (n=7)	2(33.3)	1(50.0)	0(100.0)	3(75.0)
Total	6	2	1	4

Table 3: *Frequency distribution of buildings by accessibility and structures based on functional categories*

Building and Structures	**Functional Categories**				
	Health n (%)	Education n (%)	Social Rec. n (%)	Govt. Parastatals n (%)	Commercial n (%)
Building N(57)					
Accessible (n=10)	2(66.7)	3(14.3)	1(14.3)	2(28.6)	2(10.5)
Inaccessible (n=47)	1(33.3)	18(85.7)	6(85.7)	5(71.4)	17(89.5)
Total	3	21	7	7	19
Entrances/doorways (N=165)					
Accessible (n=25)	12(75)	5(6.5)	1(5.9)	4(19)	3(9.7)
Inaccessible (n=140)	4(25)	75(93.7)	16(94.1)	17(81)	28(90.3)
Total	16	80	17	21	31
Routes (N=19)					
Accessible (n=11)	6(75.0)	2(50.0)	0(0.0)	2(50.0)	1(33.3)
Inaccessible (n=8)	2(25.0)	2(50.0)	0(0.0)	2(50.0)	2(67.7)
Total	8	4	0	4	3
Ramp (N=13)					
Accessible (n=6)	5(83.3)	1(33/3)	0(0.0)	0(0.0)	0(0.0)
Inaccessible (n=7)	1(16.7)	2(66.7)	0(0.0)	0(0.0)	0(0.0)
Total	6	3	0	0	4

Discussion

The purpose of this study was to determine the level of wheelchair accessibility of public buildings in Maiduguri, using an abridged form of the ADA (1990). This study showed that only 10 out of the 57 buildings surveyed were accessible to wheelchairs. In other words, persons with disabilities who depend on wheelchairs to move around can only gain access to 17.5% of the public buildings which house facilities that provide basic services to people. This finding is comparable to that of Hamzat and Dada (2005) which showed 20% of the buildings investigated in Ibadan, Nigeria were accessible to wheelchair users.

The present study found that 66.7% of the three buildings that render healthcare services were accessible to wheelchair users. This finding also agrees with that of Hamzat and Dada (2005) which showed that two out of the three hospitals surveyed were accessible to wheelchair users. However, the finding is at variance with that of Rose (1999) which showed wheelchair accessibility into 83.5% of the 20 clinics assessed in Los Angeles and Orange counties in the United States. Direct comparison of the present study findings to that of Rose (1999) on accessibility of wheelchairs should be done with caution. This is because this study examined only three healthcare buildings and was conducted in a Nigerian city without any defined disability code or act. School buildings recorded very low accessibility (14.3%), a finding that tallies again with that of Hamzat and Dada (2005) which reported 6.7% accessibility. Hamzat and Dada (2005) were of the opinion that this very low accessibility can be attributed to poor architectural plan. One implication of these is that students and staff who are wheelchair bound may not be able to easily access education provided and funded by the public, and for the public. Out of the seven social/recreational buildings, only one (14.3%) was accessible to wheelchair users in contrast to the finding by Hamzat and Dada (2005) which showed 100% inaccessibility of social/recreational centres in Ibadan, suggesting that wheelchair bound individuals may have restrictions to participate in recreational activities in the two Nigerian cities. The implication is that this population may become physically inactive which may augment the already existing problems of physical disability with untold arrays of health conditions, especially cardiorespiratory and musculoskeletal health issues. The present study suggests that it may be quite difficult for persons living with disabilities on wheelchairs to seek employment at agencies or ministries housed in government buildings, or if already employed, such people may experience difficulties getting to work. This means to get direct services in these buildings, individuals on wheelchair may have to be carried into the buildings and bear potential negative psychological effects of dependency (Pierce, 1998). Out of the ten multi-storey buildings surveyed, only two had available elevators, one of which was in a state of disrepair. This means that the upper floors of these buildings were inaccessible to wheelchair users.

The relatively high number of accessible entrances/doorways and routes in health and educational buildings could be due to expected high number of people seeking services in these facilities. In the opinion of the authors, these numerous entrances/doorways and routes might have been put in place to enhance traffic flow within and outside the facilities since most are connected to parking lots, and not necessarily originally intended for wheelchair users. The numerous accessible routes in the hospital buildings

may also be in response to the need for easy movement of the hospitals' beds, equipment and motorised stretchers along doorways/entrances. Authors also surmise that the high level of accessible ramps in hospital buildings under health functional category might be due to the fact that these ramps are necessary for wheeling of hospital beds and equipment as well as movement of motorised stretchers along the corridors and into several wards and clinics of the hospitals.

Our finding that shows 15% of entrances/doorways and 57.9% of routes is at variance with that of Hamzat and Dada (2005) in Ibadan, Nigeria which reported that about 50% of the entrances/doorways and 20% of the routes were accessible. Another study by Useh, Moyo & Munyonga (2001) in the central district of Harare, Zimbabwe documented 71% accessibility for entrances/doorways into public buildings. The presence of high doorway thresholds and steps along the routes of the buildings surveyed in this study might be the reason for the low level of accessibility of the entrances/doorways, and thus, the discrepancy in accessibility for these entrances/doorways observed between this present study and the two aforementioned studies (Hamzat & Dada, 2005; Useh, Moyo & Munyonga, 2001).

High doorway thresholds in buildings constitute major physical barriers to wheelchair users. Provision of appropriate ramps alongside steps would make a big difference for wheelchair bound individuals to have access to public buildings. The entrances/doorways of social/recreational functional category had low accessibility (5.9%), and no route was found accessible. This observation does not tally with that of Hamzat and Dada (2005) who reported 68.6% and 18.2% entrances/doorways and routes accessibility respectively in Ibadan, Nigeria. Figoni *et al*. (1998) reported 70% accessibility for the entrances/doorways and 48% for routes in Kansas City metropolitan area, USA. Cardinal and Spaziani (2003) also reported 90% accessibility for the entrances/doorways and 58% for routes into public buildings in Western Oregon, United State of America.

Conclusion

Most of the public buildings surveyed were not accessible to wheelchair. This calls for policy makers in Borno State of which Maiduguri is the capital city, and by extension in Nigeria to enact laws for accessibility guidelines in public buildings as obtainable in most industrialised nations.

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