



People with Physical Disabilities Satisfaction with Modification of Access to Services in  
Public Housing  
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**Abstract:** This study examined people with physical disabilities satisfaction with modification of access to services in public housing Estates in Yola Nigeria. Thirteen variables were used to measure user satisfaction at planning, design and construction stages of the modification and Analysis of Variance (ANOVA) to compare the mean satisfaction level with modification outcomes at the three phases of the modification. Findings from the study indicate that residents were most satisfied with modification outcomes at the construction phase and overall satisfaction with modification outcomes has a significant positive correlation at  $p < 0.01$  level with the variables. The variable, "Door handles 48 inches high or less and operable with a closed fist" ( $\rho = 0.918$ ), had the highest positive correlation with overall satisfaction level after building alterations. The study recommends user-led planning, design and construction of housing, to achieve high level of housing satisfaction especially for people with physically disabilities.

**Keywords:** Disability, Housing modification, User satisfaction

### Introduction

"A person with disabilities shall have the right and necessary facilities to access the physical environment and buildings on an equal basis with, others; no public building shall be constructed without; necessary accessibility aids such as ramps to make them accessible to and usable by persons with disabilities including those on wheelchairs and the visually impaired" (Federal Government of Nigeria, 2018). Despite this disability discrimination law in Nigeria, the availability of appropriate accessible housing remains a challenge for many Nigerians with disabilities. Many existing homes are inaccessible and inaccessible homes continue to be built. Problems with existing housing include poor access to services; unsuitable internal layouts; inadequately designed entrances, bathrooms, kitchens and laundries (Gusheh *et al* 2021).

. According to Tan (1979) and Leong (1979) the inadequately and inappropriately designed housing units to meet the cultural and religious needs of the occupant force them to make some alterations and adaptation to overcome the problems. The inappropriateness of house design in mass housing stems from the nature of the formal mode of housing provision employed in Nigeria. Formal mass housing provisions deny user participation in the design and construction process of the houses and this is considered as the major cause of user dissatisfaction (Noraini, 1993). According to Turner (1987) if people have no control or are not responsible for key decisions in the housing process, fulfilments of their housing need cannot be achieved and dwelling environments will instead become a barrier to personal fulfilment and a burden on the economy. Modification is therefore a user participated home making (Jusan, 2007b) an option when people are forced to live in an unsuitable environment (Priemus 1986).

The provision and availability of accessible housing for people with disability can be enhanced in two ways: by ensuring that all housing is constructed to meet minimum accessibility requirements from the outset, or through some form of modification or adaptation. (Gusheh *et al* 2021). While mainstreaming new accessible housing design and housing modification programmes are the most common way in which countries seek to meet the housing needs of people with disabilities (Okoye, 2014). Mainstreaming will have a limited effect in the short to medium term, most people with disability will live in existing stock (Okoye, 2017). The need for modification will remain. The question is, what is the extent of satisfaction of people with physical disabilities with the modification outcomes?

Achieving a housing stock that is functional for people with physical disabilities and their families; and that will support the ageing population, is a major challenge in Nigeria housing sector. Ensuring the accessibility of the stock and improving its comfort and safety are all critical elements of making Nigerian's stock sustainable. An accessible, well performing stock has benefits not only to people with disabilities, but all whose mobility may become compromised as they age. It is not simply an issue for the disability sector or even the housing sector. The issue needs to be considered in the context of making our built environment resource efficient and sustainably supporting livable homes and communities. It is within this context that this research becomes very necessary and timely.

### Literature Review

#### Disability

Disability is part of the human condition. Almost everyone will be temporarily or permanently impaired at some point in life, and those who survive to old age will experience increasing difficulties in functioning (Ferguson, 2001). Most extended families have a disabled member, and many non-disabled people take responsibility for supporting and caring for their relatives and friends with disabilities (Mishra and Gupta 2006) Disability is complex and the interventions required to overcome disability disadvantage are multiple, systemic, and will vary depending on context (World Health Organization (WHO), 2011). More than a billion people are estimated to live with some form of disability, or more than 15% of the world's population (WHO, 2015). This is higher than previous World Health Organization estimates, which date from the 1970s and suggested a figure of around 10% (WHO, 2015). According to the World Health Survey around 785 million (15.6%) persons 15 years and older live with a disability, while the Global Burden of Disease (WHO, 2015) estimates a figure of around 975 million (19.4%) persons. Of these, the World Health Survey estimates that 110 million people (2.2%) have very significant difficulties in functioning, while the Global Burden of Disease estimates that 190 million (3.8%) have "severe disability" – the equivalent of disability inferred for conditions such as quadriplegia, severe depression, or blindness. The Global Burden of Disease measures childhood disability (0–14 years) which is estimated to be 95 million (5.1%) children of which 13 million (0.7%) have "severe disability"

"The number of people with disabilities is growing. There is a higher risk of disability at older ages, and national populations are growing older at unprecedented rates. There is also a

global increase in chronic health conditions, such as diabetes, cardiovascular diseases, and mental disorders, which will influence the nature and prevalence of disability. Patterns of disability in a particular country are influenced by trends in health conditions and trends in environmental and other factors – such as road traffic crashes, natural disasters, conflict, diet, and substance abuse” (WHO, 2011).

A major trend in health and environmental conditions that effect disability in Nigeria and North- Eastern geopolitical region is polio and insurgency. As at August 2016, Nigeria was still one of the three polio endemic countries in the world with the identification of new cases at Internally Displaced Peoples (IDPs) camp in the North-Eastern region of the country. The primary visible distinguishing symptom of poliomyelitis in children is acute flaccid paralysis (Elisha, 2010). The effect of the late eradication of polio is still with us today. Boko Haram insurgency, in the few years of their terror campaign holds a great swath of territory in north-east Nigeria. A post conflict assessment in accordance with international best practices that are verifiable through satellite images and physical analysis, discovered that about 1 million private houses were destroyed by the insurgents, leaving many of the survivors with one form of disability or the other (Shettima, 2016). Nigeria is a member of the United Nations (UN). Goal 11 of the UN sustainable development goals (SDG, 2015) seeks to make cities and human settlements inclusive, safe and sustainable. To realize this goal, Member States are called upon to provide access to safe, affordable, accessible and sustainable housing, with special attention to the needs of those in vulnerable situations, such as persons with disabilities by the year 2030. In addition, it called for providing universal access to safe, inclusive and accessible, green and public spaces, particularly for persons with disabilities. The United Nations Conference on Housing and Sustainable Urban Development, (Habitat III, 2016), recognizes and urge the need for member nations to give particular attention to addressing multiple forms of discrimination faced by persons with disabilities, older persons etc by 2032. It resolved to implement the New Urban Agenda as a key instrument for national, sub-national, and local governments and all relevant stakeholders to achieve sustainable urban development.

#### **User Satisfaction**

Residential satisfaction is the feeling of contentment when one has or achieved what one needs or desires in a house (Mohit and Raja, 2014); There is an awareness by policy makers, architects, planners and developers that residential satisfaction is an important indicator of success or failure of a housing project (Nurzafira *et al*, 2019) and that homes and neighbourhoods in which people with physical disabilities live have profound impacts on their independence, their ability to be socially and economically active, their functionality, and their quality of life (Scott, *et al*, 2007). According to Nurzafira *et al*, (2019) this awareness is expressed as a key predictor of individuals’ perceptions of general quality of life; an ad hoc evaluative measure for judging the success of housing developments; an indicator of initial state of residential mobility; an assessment of residents’ perceptions of insufficiencies in their current housing environment. Measuring residential satisfaction is very complicated as it is very subjective to the particular place, time, and purpose of evaluation and range of people (Bardo and Dokmeci, 1992). Researches by Diogu (2002, 2004), Zola (2005), Okonkwo and Uji (2007) on public housing in Nigeria found significant dissatisfaction with the occupants of the houses. All of them suggest that the dominating factors causing the dissatisfaction included inappropriate designed spaces that does not met the expectation of the occupants. Residential satisfaction improve the quality of life of residents (Isa and Jusan, 2012), on the

other hand dissatisfaction effect occupancy. Residents are unlikely to occupy such houses for a long period of time, thus increasing residential mobility and housing modification. Housing modification is therefore a reflection of a living environment that is unsatisfactory to the residents; as a result, an attempt is made to correct the anomaly (Fakere *et al*, 2017).

#### **Housing Modification**

Modification is the act of changing, altering adjusting, adapting, extending and remodelling to meet predetermined intentions (Jusan, 2007b); a manifestation of a desire for territorial control and an expression of aesthetic tastes as well as the result of an effort to make the environment fit activity patterns better (Lang 1987); adaptations of the home environment to reduce the demands from the physical environment to make tasks easier, reduce accident, and support independent living (Fange and Iwarsson, 2005);

Research findings suggest that such housing modifications has lessened the difficulty and independence in performing household tasks for people with physical disability that effect mobility (Connell *et al*, 1993), improved functional performance in the area of care and instrumental activities for daily living for the frail elderly, people with dementia and those with mild functional impairment (Giltin *et al.*, 1999; Mann *et al.*, 1999; Stark, 2004; Trickey *et al*, 1993), and reduced the need for and effectiveness of caregivers (Giltin *et al.*, 2001; Lanspery *et al*, 1997), it has also enhanced the quality of life in wheelchair user paraplegic population (Junaid *et al*. 2013 ) and positively affected the meaning of home as a place of security safety and comfort, decrease the demand of environment and support the continuation of habitual personal routine through which people are linked to their home and by which identity, self-esteem and control are reinforced (Bronwyn *et al*. 2008).

Jusan (2007b) classified modification into three:

- (i). Modifying or rearranging semi-fixed features; which Rapoport (1982) discussed as rearrangement of moveable items and altering small components.
- (ii). Modifying or rearranging fixed-features that include walls, columns, roofs; changing the design of building components such as windows, doors, etc., and extending and resizing of spaces.
- (iii). Modification by moving, which according to Mahmud and Ahmad Bashri, (2005) and (Sinai 1998) is an act of meeting user needs and is influenced by the same personal factors as for modification. This research however emphasises on Modification or rearrangement of fixed-features. Friedman (2002) suggests three categories in which the process of adaptability (modification) can take place:
  - (1). Initial Design – The designer employs strategies and components to accommodate post-occupancy adaptation.
  - (2). Construction – the builder decides on the main characteristic of adaptation, and a range of choices offered to the users.
  - (3). Use – During occupancy, the users exercise modification options available. This implicates the need for user participation in the design process.

#### **Methodology**

People with physical disabilities satisfaction with modification of access to services in public housing Estates in 11 housing estates in Yola , namely: Bajabure, Bekaji 80 unit, GRA Jimeta, Jambutu, Karewa GRA, Legislative Qtrs., 150 Housing, State Low cost, Shagari, GRA Yola town was measured at planning design and construction stages of the modification using thirteen variables adapted from an abridged version of three building instruments, namely, British Standards Institution (2001) – Design of Buildings And Their Approaches To Meet The Needs of Disabled People [BS8300

(2001)], Americans with Disabilities Act Accessibility Guide(2004) [ADAAG (2004)] and Accessibility for the Disabled, A Design Manual for a Barrier-Free Environment, Urban Management Department of the Lebanese Company for the Development and Reconstruction of Beirut Central District [SOLIDERE (2004)] – developed by the UK, USA and the UN, respectively, to provide guidance on good practice in the design of domestic and non-domestic buildings and their approaches so that they are convenient to use by people with disabilities. The variables are:

- Accessible route to all spaces at least 36 inches wide and 80 inches in height clearance
- A 5-foot circle or a T-shaped space for a person using a wheelchair to reverse direction
- Doors into public spaces have at least a 32-inch clear opening
- 18 inches of clear wall space so that a person using a wheelchair or crutches can get near to open the door on the pull side of doors, next to the handle
- Door handles 48 inches high or less and operable with a closed fist
- Threshold edge 1/4-inch high or less, or if beveled edge, no more than 3/4-inch high
- Pathways to materials and services at least 36 inches wide
- All controls that are available for use (including electrical, mechanical, cabinet, game and self-service controls) located at an accessible height
- Controls operable with a closed fist
- The tops of counters between 28 and 34 inches high
- Knee spaces at accessible counters at least 27 inches high, 30 inches wide and 19 inches deep
- Treads have a non-slip surface
- Stairs have continuous rails on both sides, with extensions beyond the top and bottom stairs

The total number of houses in the 11 housing schemes is Two thousand three hundred and twenty seven (2327) units, including houses that were still in their original form. The total number of modified house was found to be 1829, representing 71% of the total number of houses in the study area. 1578 of which were generally modified by people without physical disability while 251units were specifically modified for people with physical disability that effect their mobility in the study area. This number was the sampling frame for the research.

The level of housing satisfaction was measured using a five-point Likert scale – “1” for very dissatisfied, “2” for dissatisfied, “3” for slightly satisfied/neutral, “4” for satisfied and “5” for very satisfied. The overall satisfaction for each modified feature was analyzed based on a mean score of 3.00 on a five point scale as positive indication of satisfaction, and values below 3.00 indicating dissatisfaction. If the mean response is

Below 1.50, this indicates that the respondents are “Very Dissatisfied”

Between 1.50 and 2.49, this indicates that the respondents are “Dissatisfied”

Between 2.50 and 3.49, this indicates that the respondents are “Slightly Satisfied”

Between 3.50 and 4.49, this indicates that the respondents are “Satisfied”

Above or equal to 4.50, this indicates that the respondents are “Very Satisfied”

Data collected was analyzed using statistical package for social scientists (SPSS) version 21 for frequency distribution, percentages, mean, and standard deviation

Further analysis was carried out using correlation (Spearman’s rho), and Analysis of Variance (ANOVA). A paired t-test was used to compare the two population sample means of user satisfaction before-and-after alteration.

## **Results and Discussion**

### ***Extent of Satisfaction with access to Goods and Services***

Table 1 indicates satisfaction levels with access to goods and services in the housing unit. Respondents were most satisfied with Doors into public spaces have at least a 32-inch clear opening (MS=4.99), Threshold edge 1/4-inch high or less, or if beveled edge, no more than 3/4-inch high (MS=4.84), Treads have a non-slip surface (MS=4.47), Knee spaces at accessible counters at least 27 inches high, 30 inches wide and 19 inches deep (MS=4.26), The tops of counters between 28 and 34 inches high (MS=4.25), 18 inches of clear wall space so that a person using a wheelchair or crutches can get near to open the door on the pull side of doors, next to the handle (MS=4.00), Controls operable with a closed fist (MS=3.98), Door handles 48 inches high or less and operable with a closed fist (MS=3.94), All controls that are available for use (including electrical, mechanical, cabinet, game and self-service controls) located at an accessible height (MS=3.86), Accessible route to all spaces at least 36 inches wide and 80 inches in height clearance (MS=3.78), Stairs have continuous rails on both sides, with extensions beyond the top and bottom stairs (MS=3.66), A 5-foot circle or a T-shaped space for a person using a wheelchair to reverse direction (MS=3.65), while they expressed the lowest level of satisfaction with Pathways to materials and services at least 36 inches wide (MS=3.27).

Positively correlated results at  $p < 0.01$  were observed in the analysis between the satisfaction levels of the individual 13 variables of “access to goods and services” component and the overall Satisfaction with the building modifications. This infers that as the users’ satisfaction level for each of these variables increased as a result of alteration, thus did the overall level of satisfaction after buildings alterations increase. The results accordingly highlight that these factors are of great importance in the design of a building, if it would accommodate a physically challenged person. A very strong significant relationship with the overall satisfaction level is seen in the variable “Door handles 48 inches high or less and operable with a closed fist” ( $\rho = 0.918$ ), followed by “All controls that are available for use (including electrical, mechanical, cabinet, game and self-service controls) located at an accessible height” ( $\rho = 0.853$ ), and “Accessible route to all spaces at least 36 inches wide and 80 inches in height clearance” ( $\rho = 0.802$ ).

**Table 1: Distribution of extent of satisfaction with access to goods and services variables, their mean rating scores, and correlation (rho) with overall satisfaction with the building Alteration (n=246)**

Component 2										
S/N	Item statement	VD	D	SS	S	VS	Mean	SD	Remark	rho
1	Accessible route to all spaces at least 36 inches wide and 80 inches in height clearance	-	-	40.7%	40.7%	18.7%	3.78	0.74	S	0.802*
2	A 5-foot circle or a T-shaped space for a person using a wheelchair to reverse direction	-	-	47.2%	41.1%	11.8%	3.65	0.68	S	0.716*
3	Doors into public spaces have at least a 32-inch clear opening	-	-	-	1.2%	98.8%	4.99	0.11	VS	0.208*
4	18 inches of clear wall space so that a person using a wheelchair or crutches can get near to open the door on the pull side of doors, next to the handle	-	-	10.2%	79.7%	10.2%	4.00	0.45	S	0.734*
5	Door handles 48 inches high or less and operable with a closed fist	-	-	20.3%	65.0%	14.6%	3.94	0.59	S	0.918*
6	Threshold edge 1/4-inch high or less, or if beveled edge, no more than 3/4-inch high	-	-	2.0%	12.2%	85.8%	4.84	0.42	VS	0.664*
7	Pathways to materials and services at least 36 inches wide	-	-	81.3%	10.6%	8.1%	3.27	0.60	SS	0.750*
8	All controls that are available for use (including electrical, mechanical, cabinet, game and self-service controls) located at an accessible height	-	-	32.5%	48.8%	18.7%	3.86	0.70	S	0.853*
9	Controls operable with a closed fist	-	-	10.2%	81.7%	8.1%	3.98	0.42	S	0.700*
10	The tops of counters between 28 and 34 inches high	-	-	16.3%	42.7%	41.1%	4.25	0.71	S	0.788*
11	Knee spaces at accessible counters at least 27 inches high, 30 inches wide and 19 inches deep	-	-	14.6%	45.1%	40.2%	4.26	0.69	S	0.778*
12	Treads have a non-slip surface	-	-	2.0%	49.2%	48.8%	4.47	0.53	S	0.650*
13	Stairs have continuous rails on both sides, with extensions beyond the top and bottom stairs	-	-	40.7%	52.8%	6.5%	3.66	0.59	S	0.691*
	Overall Satisfaction with the building Alteration	-	5.3%	14.2%	60.2%	20.3%	3.96	0.74	S	1.000

SS – Slightly Satisfied, S – Satisfied, VS – Very Satisfied, rho - Spearman's Correlation Coefficient

\*\*Correlation is significant at the 0.01 level (2-tailed).

**Overall Satisfaction with Modification Outcomes**

Analysis of overall satisfaction with the modification outcomes (Tables 1) shows that the residents are in general, satisfied with the modification outcomes in the eleven housing estates in Yola, with 5.3% reporting as dissatisfied, 14.2% reporting as slightly satisfied, 60.2% reporting as satisfied and 20.3% reporting very satisfied. The mean score for the overall satisfaction with modification outcomes stands at 3.96, (assuming 3 represents moderate satisfaction) the level of overall satisfaction is high and indicates that the residents are satisfied with public housing unit. Although only 5.3% of the residents reported actual dissatisfaction with the modification outcomes, given that the overall satisfaction, there is still need to develop a strategy that will improve the residential satisfaction of residents.

**Mean Satisfaction with Modification Outcomes**

Analysis of Variance (ANOVA) was used to compare the Mean satisfaction level with modification outcomes at the three phases of the modification. The result shows that the

Residents are most satisfied with modification outcomes at construction phase (4.21), followed by planning phase (3.54), and design phase (3.53) (table 2).

**Table 2: Comparison (Mean & SD) of Level of Satisfaction for the Different Phases of the Building modification Using Analysis of Variance (ANOVA)**

Mode of User Participation	Planning Phase			Design Phase			Construction Phase		
	Mean	SD	Remark	Mean	SD	Remark	Mean	SD	Remark
A	1.80	1.095	DS	1.71	1.254	DS	3.14	0.690	SS
B	1.19	0.680	VD	1.28	0.669	VD	2.95	1.359	SS
C	1.43	0.787	VD	2.00	1.732	DS	3.00	1.177	SS
D	2.00	1.549	DS	2.29	1.890	DS	3.60	1.075	S
E	1.20	0.447	VD	1.44	1.014	VD	3.00	1.581	SS
F	2.46	1.681	DS	2.75	1.581	SS	3.78	0.600	S
G	4.52	0.876	VS	4.34	1.150	S	4.64	0.623	VS
Total	3.54	1.682	S	3.53	1.672	S	4.21	1.027	S
F Value	57.055			33.309			28.724		
P Value	<0.001*			<0.001*			<0.001*		

\*Mean difference significant at  $P \leq 0.05$ , SD – Standard Deviation

VD – Very Dissatisfied, DS – Dissatisfied, SS – Slightly Satisfied, S – Satisfied, VS – Very Satisfied

**User Satisfaction Before-and-After Modification.**

Paired sample t-test was used to compare the two population sample means of user satisfaction before-and-after alteration.

The result indicated that satisfaction is significant related to after- alteration, (table 3).

**TABLE 3: Comparison (Mean & SD) of Level of Satisfaction before building alteration and Overall Satisfaction with the building Alteration Using Paired Samples t-Test (n=246)**

	Mean	SD	Remark
Level of Satisfaction before building alteration	2.54	.697	SS
Overall Satisfaction with the building Alteration	3.96	.746	S
Mean Difference	-1.42		
t Value	-33.080		
P Value	<0.001*		

\*Mean difference significant at  $P \leq 0.05$ , SD – Standard Deviation

SS – Slightly Satisfied, S – Satisfied

Users overall satisfaction with the building alteration gave a statistically significant higher mean level (3.96, satisfied) than their mean satisfaction level before the building alteration (2.54). This depicts that the buildings alteration resulted to a substantial satisfactory level for the building users.

**Conclusion**

The study examined the extent of satisfaction of people with physical disability that effect mobility with the modification of access to goods and services in public housing estates in Yola. The objectives were: to determine the extent of satisfaction of people with physical disability with the modification of access to goods and services; determine the overall satisfaction with the building modification; the level of satisfaction before and after building modification; and to make recommendations that can improve the changing housing needs of people with physical disability that effect mobility. The study revealed that housing modifications in the study area were as a result of absence of designs that suit user’s expectations and changing needs. This implied that to promote provide and improve the housing satisfaction of people with physical disability, users should be involved in the formulation, programming, design and construction of their buildings and their values and opinions respected at all stages.

**References**

Accessibility for the Disabled (2004) A Design Manual for a Barrier-Free Environment, Urban Management Department of the Lebanese Company for the Development and Reconstruction of Beirut Central District (SOLIDERE)

Americans with Disabilities Act Accessibility Guide (2004) (ADAAG).

Bardo J.W and Dokmeci V. (1992) ‘Modernization, tradionalization and the changing structure of community satisfaction in two-sub-communities in Istanbul, Turkey: A Procrustean’, Genetic,

British Standards Institution (2001) *Design of Buildings and Their Approaches to Meet the Needs of Disabled People* (BS8300).

Bronwyn, T., Cheryl, T., and Desleigh, J. (2008) Restoring and Sustaining Homes: The Impact of Home Modification on the Meaning of Home for Older People. *Journal of Housing for the Elderly*, 22: 3, 195 - 215

Connell, B. R., Sanford, J. A., Long, R. G., Archea C.K., and Turner, C. S. (1993). Home modification and performance of routine household activities by individuals with varying levels of mobility impairments. *Technology and Disability*, 2, 9-18.

Diogu, J. O. (2002). Housing the Poor in Nigeria: the Integrated Project approach. *AARCHES Journal* vol. 2 no 1

- Diogu, J. O. (2004). Architecture of low Income Housing: Evolving the Micro Residential system. *AARCHES Journal* vol. 3 no 2
- Elisha, P. R. (2010) *The Politics of Polio in Northern Nigeria*, Indiana University Press,
- Fakere A. A. (2017). Effects of level of Residents Participation in Housing Design on Residential Satisfaction in Public Housing Estates in Akure, Nigeria. *Covenant Journal in Research and Built Environment*.vol. 5, no 1
- Fange A. and Iwarsson S. (2005) Changes in ADL Dependence and Aspects of Usability Following Housing Adaptation- A Longitudinal Perspective. *Am. J Occup. Ther.* 2005; 59:296 – 304
- Ferguson P. M. (2001) Mapping the family: disability studies and the exploration of parental response to disability. In: Albrecht G, Seelman KD, Bury M, eds. *Handbook of Disability Studies*. Thousand Oaks, Sage, 2001:373–395.
- Federal Government of Nigeria (2018). Discrimination against Persons with Disability prohibition Bill in Nigeria
- Friedman, A. (2002). *The Adaptable House: Designing Homes for Change*. New York, McGraw-Hill.
- Giltin, L., Corcoran, M., Winter, L., and Boyce, A., and Hauck W. W. (2001). Randomized controlled trial of home environmental intervention: Effect on the efficacy and upset in caregivers and on daily function of persons with dementia. *Gerontologist*, 41, 4 - 14
- Giltin, L., Swenson miller, K. and Boyce, A. (1999). Bathroom modification for frail elderly renters: outcomes of community based program. *Technology and Disability*, 10, 141 – 149
- Gusheh, M., Murphy, C., Valenta L., Bertram N., Maxwell, D. (2021) *Adaptable housing for people with disability in Australia: a scoping study*. Monash Urban Lab.
- Isa A. A. and Jusan M. B. M. (2012). End- User Participation Approach towards Effective Housing Occupancy in Malaysia: A Review, *British Journal of Art and Social Sciences* 8(2) 183- 197
- Junaid A., Syed S., Fozia S., (2013). Effectiveness of Home Modification on Quality of Life on Wheelchair User Paraplegic Population. *Rawal Medical Journal*: vol. 38. No 3, July – Sept. 2013
- Jusan, M. M. B. (2007b). *Personalization as a means of Achieving Person-Environment Congruence in Malaysian Housing*. Unpublished PhD Dissertation, Universiti Teknologi Malaysia, Skudai-Malaysia.
- Lang, J. (1987). *Creating architectural theory: The role of the behavioral sciences in environmental design*. New York, Van Nostrand Reinhold Company.
- Lanspery, S., Callahan, J. J. J., Miller, R. J. and Hyde, J. (1997). Introduction: staying put. In S. Lanspery and J. Hyde (Eds.), *Staying put. Adapting the places instead of the people*. Amityville, NY: Bawood Publishing Company, Inc.
- Leong, K. C. (1979). Low-Cost Housing Design. In Tan Soo Hai and Hamzah Sendut *Public and Private Housing in Malaysia*. Kuala Lumpur, Heinemann Educational Books (Asia) Ltd.
- Mahmud M. J. and Ahmad B. S. (2005). Personalization as a Sustainable Approach to Mass Housing (The Fundamental Theory). *Conference On Sustainable Building South East Asia (Sb04 Series)*, Kuala Lumpur, Malaysia.
- Mann W. C., Ottenbacher, K. J., Frass, L., Tomita, M., Granger C. V. (1999) Effectiveness of assistive technology and environmental interventions in maintaining independence and reducing home care costs for the frail elderly- a randomized controlled trial. *Arch Fam Med* 8, 210 – 217.
- Mishra A. K. and Gupta R. (2006) Disability index: a measure of deprivation among the Disabled. *Economic and Political Weekly*, 41:4026-4029.
- Mohit, M. A. and Raja, A. M. (2014). Residential satisfaction e concepts, theories and empirical studies. *Planning Malaysia e Journal of Malaysian Institute of Planners*, 3, 47-66
- Noraini Y. (1993). *A culturally appropriate and economically sustainable housing delivery system for Malay urban low-income households in Malaysia*. Texas A&M University: PhD. Theses.
- Nurzafira et al, (2019) IOP Conference Series: Earth Environmental Sciences 385
- Okonkwo, M. M., & Uji, Z. A. (2007). *Housing the Poor in Nigeria. User Involvement in the Production Process*, Enugu: EDCPA Publishers.
- Okoye, K. C. (2014). *The Needs of the Physically Challenged in the Design and Planning of Government Housing in Yola, Nigeria*. Unpublished M.Phil. Thesis, Abia State University Uтуру, Nigeria.
- Okoye, K. C. (2017). *Design Strategy for the Needs of People with Physical Challenges in Public Housing Estates in Yola, Nigeria*. Unpublished PhD. Thesis, Abia State University Uтуру, Nigeria.
- Priemus, H. (1986). Housing as a social adaptation process: A conceptual scheme. *Environment and behavior* 18(1).
- Rapoport, A. (1982). *The meaning of the built environment. A nonverbal communication approach*. California, USA, Sage Publication, Inc.
- Scott, M., Smith, K., & James, B. (2007). *International Trends in Accessible Housing for People with Disability, a selected review of policies and programmes in Europe, North America, united kingdom, Japan and Australia. Working paper 2*
- Shettima, K. (2016) Boko Haram destroyed 1m houses in Borno  
<https://www.vanguardngr.com/2016/03/boko-haram-destroyed-1m-houses-borno-shettima/> accessed 25 October. 2016).
- Sinai, I. (1998). *Housing Choice and Housing Uses in Kumasi, Ghana*. University of North Carolina at Chapel Hill: PhD Thesis.
- Stark S. (2004) Removing environmental barriers in homes of older adults with disabilities improves occupational performance. *OTJR Occupational Participation and Health*. 24, 32-39.
- Tan S. H. (1979). Factors Influencing the Location, Layout and Scale of Low- Cost Housing Projects in Malaysia. In Tan Soo Hai and Hamzah Sendut *Public and Private Housing in Malaysia*. Kuala Lumpur, Heinemann Educational Books (Asia) Ltd.
- Trickey, F., Maltais, M. A., Gosslin C. and Robitaille, Y. (1993) Adapting older people's homes to promote independence. *Physical and Occupational Therapy in Geriatrics*. 12. 1 – 14
- Turner, J. F. C. (1987). The Enabling Practitioner and the Recovery of Creative Work. *The Journal of Architectural and Planning Research* 4(4): 273-280.
- United Nation (2006). *Convention on the Rights of Persons with Disabilities*. New York, (<http://www.un.org/disabilities/documents/convention/convoptprot-e.pdf>, accessed 8 June 2015).
- United Nations (2016) *Housing and Sustainability*, Conference on Housing and Sustainable Urban Development, (Habitat III)
- World Health Organisation (2011). *World Report on disability*.
- World Health Organisation (2015). *Global Burden of Disease*.