Journal of Natural Sciences Research www.iiste.org
ISSN 2224-3186 (Paper) ISSN 2225-0921 (Online)
Vol.4, No.16, 2014

Categorical Determination of Occupants' Responses on Habitability Factors of Public Housing Estates in Anambra State

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Abstract
The perception of the occupants in public housing estates in Awka and Onitsha towns in Anambra State was evaluated using Adam's Equity Theory that hinges on balancing inputs and outputs. The thrust of this study lies on, habitability. The survey of the study area revealed 2,805 occupants comprising mainly housewives and 2,805 house units. The sample size, derived from Taro Yamani technique was 842 and from this figure, stratified random sampling was adopted to arrive at the obtained data. Complete responses were 797 comprising 299 occupants in Awka and 498 occupants in Onitsha. A 22-item item structured questionnaire on public housing (QPH) consisting of six (6) sections was developed, which consisted of 5-point Likert rating scale ranging from 1-5 in which respondents indicated the extent of their perception of listed variables. The mid-point of 3 implied that any result significantly different from this mean value was assumed to be either positive or negative. This instrument was face and content validated. Cronbach Alpha Technique index was used for reliability test which gave a value of 0.90. A pre-test on a sample of 30 respondents of one non-studied public housing estate was conducted. The research questions were processed using percentages, means, Chi-square, Contingency Table Analysis (CTA) and One way Categorical Data Analysis of Variance (CATANOVA), while the hypotheses were tested using Z-test. The results of this study show that (1). the 48.7%, of occupants responding positively to habitability, of public housing in Onitsha are greater than the 37.8%, responding positively to it respectively in Awka. It can then be stated from this work that in planning a housing estate such checklists as habitability should be included so as to satisfy the major stakeholders and the occupants.
Key terms: Categorical, Determination, responses, habitability and public housing.

Problem of the Study

The recent national housing policy 1991, as amended in 2006 and 2012 failed to provide a checklist of what constituted habitability however the Housing Corporation of Britain (HC, 2007), outlined three basic indicators in determining quality of any housing development. These are; location, design and external environment of the house. These indicators consisted of variables such as; access to basic housing and community facilities, the quality of infrastructural amenities within housing neighbourhoods, spatial adequacy and quality of design, fixtures and fittings, building layout and landscaping, noise and pollution control as well as security, among many others. There are however indications from these various studies that a single variable may not be sufficient to assess the habitability of residential development; therefore, housing acceptability and habitability assessment should also take into account type of constructions, materials used, amount of space, services, spatial arrangement and facilities within dwellings, function and aesthetics, among others (Jiboye, 2004 and Jiboye, 2010). In Nigeria, and other third world nations, the need to provide habitable housing based on user's responsive and culturally determined considerations - particularly for the vast majority of the urban population is central to the achievement of sustainable cities and human development. Nonetheless, the use of relevant information evolving from human values in housing development has been negligible.

This study assessed how public housing in the study area had achieved its intended goals in terms of the habitability of public housing and their locations. This list based upon Civil Code §1941.1 and Health and Safety Code §17920.3 was considered a guide to help a researcher identify all of the things that can affect habitability in the absence of a Nigerian checklist. Due to the variety of circumstances which can arise in a given rental situation, all of the possible conditions may not be listed, so the researcher should use his or her own judgment to determine whether a particular condition he or she is concerned with is like one of those listed here. Plainly stated, just because it is not on this list doesn't mean it isn't an uninhabitable one, particularly if it adversely affects living there. Flowing from above the following variables were considered in this study; sizes of living room, bedrooms, provision of sit-outs, doors for circulation, windows for ventilation, kitchen, toilet, bathroom, dining facilities and security measures were because it suited the purpose and nature of the enquiry.

Table 1: **Habitability Checklist**

Electrical Wall switches [all work?] Light fixtures [all work?] Exterior lights work For your exterior doors For stairways For garage/parking For common walkways Electrical outlets [all work?] Power Stable [or goes out?] No shocks from any part GFI [have reset button] plugs Around kitchen sink Around bathroom sink Fans all working ceiling [eg, bathroom] heater [eg, bathroom] above stove Switch/plug Cover plates None missing or broken Smoke alarms work properly Doorbell works well Security system works well **Heating/Air Conditioning** Gas/Electric room heater Exists and works Thermostat works properly Provides adequate heat Pilot stays lit Does not produce odor Other heaters heat lamps [eg, bathroom] wall heaters [electrical] Air Conditioning Exists and works Adequately cools all rooms Makes a loud noise Has a working thermostat Vents have metal adjusters Air filters keep out dust No broken ducts No asbestos in ducts **Appliances** Refrigerator works properly Stove/Oven works properly Washer/Dryer work properly Garbage disposal works well Trash compactor works well Dishwasher works well	**Plumbing** Hot and cold water supplied Hot water heated enough Adequate water pressure For both hot and cold? To all faucets? To washing machines? No bursts Clean water Free of rust, discoloration Odor free No bad taste [eg, sewage] Adequate drainage No backups into sink/tub Fast drainage in all sinks in shower/bathtub Garbage disposal flows Bathtub drain closes fully Sink stoppers close fully Toilets fill and flush quickly No backups, overflows Flushing mechanism works Don't leak at all From water line to wall At the base on the floor From cracks or joints Faucets on sinks and tub firmly placed and unbroken work easily on and off Completely stop [no drips] Leaky plumbing Faucets don't leak when used [from stem] Onto or under counter Drains don't leak under sink Dishwasher doesn't leak Clothes washer doesn't leak Hoses -hot and cold intake Drainage hose Machine itself Broken pipes in ceiling, wall Sewer/Septic system Works properly Adequately maintained No surface discharge, leaks No odor from any part No discharge under building Kitchen sink counter tiled, nonporous and cleanable	**Windows** Adequate number of windows No cracks or broken glass No gaps in panes or windows Weather sealing [no drafts] Windows that open Open easily and don't stick Stay open as needed Close completely and latch Ground floor windows lock All have window screens No holes or tears Frames unbent, unbroken **Doors** Solid in frame [not loose] All open without sticking All easily close securely All have working knobs All have working latches Exterior doors have deadbolts Weather stripping [no drafts] Threshhold is solid, unbroken No broken glass [exterior] Sliding glass doors Slide without effort Close and lock securely No tears or holes in screen Screen door secure in track Screen door latches closed No cracks or broken glass Screen doors on Exteriors Properly mounted Closing device works well Frame unbent and unbroken No holes or tears in screen Opens and closes properly **Flooring** No uncovered holes in floors No floor separating from wall No weak or loose floorboards No buckling or uneven floors No loose/chipped/missing tiles No loose/torn/missing linoleum No torn or loose carpeting No nails sticking up No exposed carpet tack strips Carpeting not mildewed, moldy, smelling of animal defecation or urine, or otherwise unsanitary	**Structure** Ceilings all secure No holes, flaking, looseness No leaks, stains from leaks Not collapsing or soft Walls all secure No holes or gaps to outside No weak, damp or soft spots Protected surface near water Shower area waterproofed Adequate heat insulation Paint is not flaking or peeling, and is not lead-based Stairways and rails secure Earthquake retrofitting done No roof leaks from rain Weather-sealed walls [ie, dry] Sealed underground walls Unflooded basement areas **Common Areas** Working security gates, etc. Clean swimming pool Adequate exterior lighting Working intercom system Walkways with trip hazards Working, lit laundry room Adequate trash bins/pickup No trash/debris/junk **Nuisances** **Health**: Infestations of mice, rats, cockroaches, ants, spiders, termites, bees, wasps, hornets, flies, pigeons, mosquitos, etc. Mold, mildew, mushrooms in any interior part of the unit Unsanitary water, sewage Noxious fumes from sewer, chemicals, paints, neighbors **Crime**: "Drug trafficking" and "gang activity" are nuisances Assault, rape, molestation robbery, burglary, prostitution, etc. are arguably nuisances **Noise**: from construction, neighbors, roof-mounted AC system is arguably a nuisance **Driveway blocking**: is a nuisance [any ingress/egress]

From Wikipedia, 2010, the free encyclopedia **as edited by R'n'B (talk | contribs) at 16:24, 6 August 2010.**

.Aim and Objectives

The **aim** of this study was to determine occupants' responses on the level of habitability of public housing estates in Anambra State. The specific objectives were to:

I). Identify and describe the public housing estates in State,

II). determine the perception of the occupants of the housing estates in Anambra State on habitability of their public housing.

Hypotheses

One null hypothesis was tested in this study:

H_0: There is no significant dependence in the mean occupants' perception on the level of habitability of public housing located at Awka and Onitsha.

Theoretical Framework and Review of literature

The theoretical perspective of this study was hinged on the proposal of Adam's Equity theory because it focused on determining whether the distribution of housing resources was fair to both relational partners (Occupants in Awka and Onitsha cities). Equity Theory acknowledged that subtle and variable factors affected an employee's or an occupant's assessment and perception of their relationship with their work/ public housing estate and their employer/ housing provider.

The system composed of inputs, throughputs and outputs, which illustrated a generic framework for habitability using Adam's equity theory.

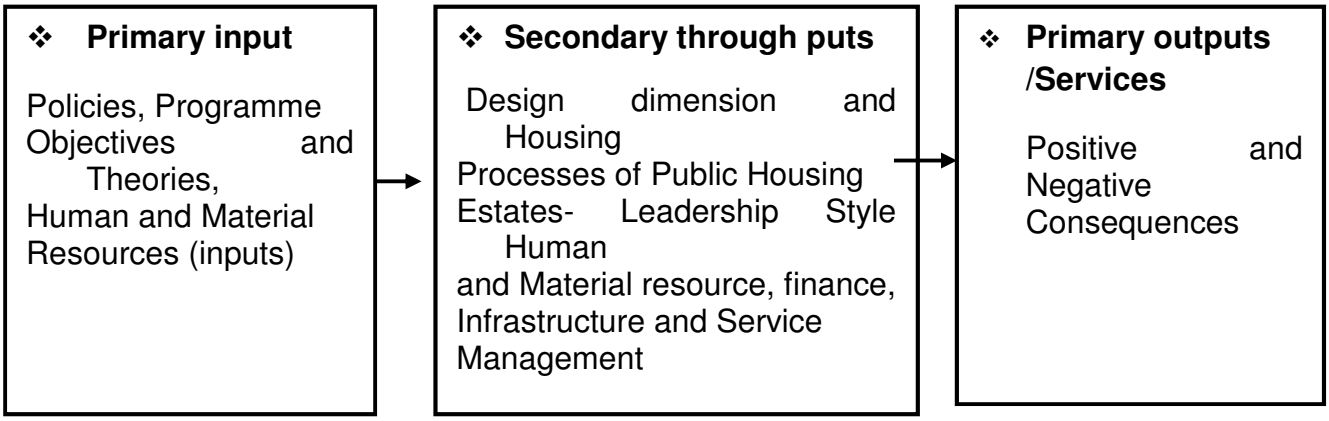

Fig. 1. Framework for Design and Construction of Public Housing

This assessed the balance or imbalance that currently exists between the public housing occupant's inputs and outputs, as follows: Outputs typically include: rewards (such as homeownership or rental) intangibles that typically include: recognition, reputation, sense of achievement, sense of advancement/growth and tenure security, while the inputs that a participant contributes to a relationship can be either assets – entitling him/her to rewards – or liabilities - entitling him/her to costs. The entitlement to rewards or costs ascribed to each input varies depending on the relational setting (Eni, 2014).

Further Outputs are defined as the positive and negative consequences that an individual perceives a participant has incurred as a consequence of his/her relationship with another. When the ratio of inputs to outcomes is close, then the occupant should have much satisfaction with their housing.

From fig. 1 above the various physical criteria, such as the design parameters and the construction quality serve as inputs into public housing. Throughputs viewed as human activities constitute processes that interplay and exacerbate the physical parameters as positive and negative consequences were not considered.

Housing delivery strategies relate to activities, events, processes or functions engaged in the transformation of housing policies, programme objectives and theories, human and material resources (inputs) into housing units and services (outputs). These include different approaches used in realizing programme objectives as well as the participants and resources involved in public housing provisioning (Eni, 2014). Participants in this milieu represent the organizational structure for public housing provision. They comprise public and private organizations involved in public housing provisioning whose actions influence the input, process, output and outcomes of public housing activities. Lusthaus et al., (1995) and Lusthaus et al., (2002) indicated that organizational performance in product and service delivery is influenced by organizational capacity and the external environment. Therefore, organizational capacity describes the ability of organizations to successfully use their skills and resources to provide goods and services and in this circumstance habitability factor of public housing estates. However the internal organizational (intervening) factors that influence organizational capacity such as leadership style, human and material resource, finance, infrastructure, service management, and housing project process management central in the assessment of organizational capacity were ignored as basically the housing providers were the same for both cities(Eni, 2014).

In this regard, Equity theory proposes that individuals who perceive themselves as either under-rewarded or over-rewarded will experience distress, and that this distress leads to efforts to restore equity within the relationship. Equity is measured by comparing the **ratios** of contributions and benefits of each person within the relationship. Adam's equity theory was employed in this study because it made research findings meaningful and generalizable. It also established orderly connections between observations and facts and aided prediction and control of situations. In terms of the usage of Adam's equity theory in this study, it can be seen that as a research tool, the structure has some merits. First, it incorporated both theoretical and philosophical perspectives

into the investigatory process, and thus, linked all aspects of research including problem statement, aim, objectives, literature review, methodology, data collection and analysis as well as the interpretation of findings. Secondly, the framework lent itself to the use of both quantitative and qualitative research strategies as well as multiple data gathering instruments. Thirdly, the framework allowed for the investigation of the input, process, output and outcome of some components of public housing programmes. Where multiple public housing estates delivery is used in a programme, it assisted in assessing and comparing the outcomes of the different estates.

The Study Area

The study area, Awka and Onitsha cities, are located in Anambra State of Nigeria. Anambra State was created on 27th August, 1991. Its name is derived from 'Oma Mbala' now known as Anambra River, a tributary of the famous River Niger.

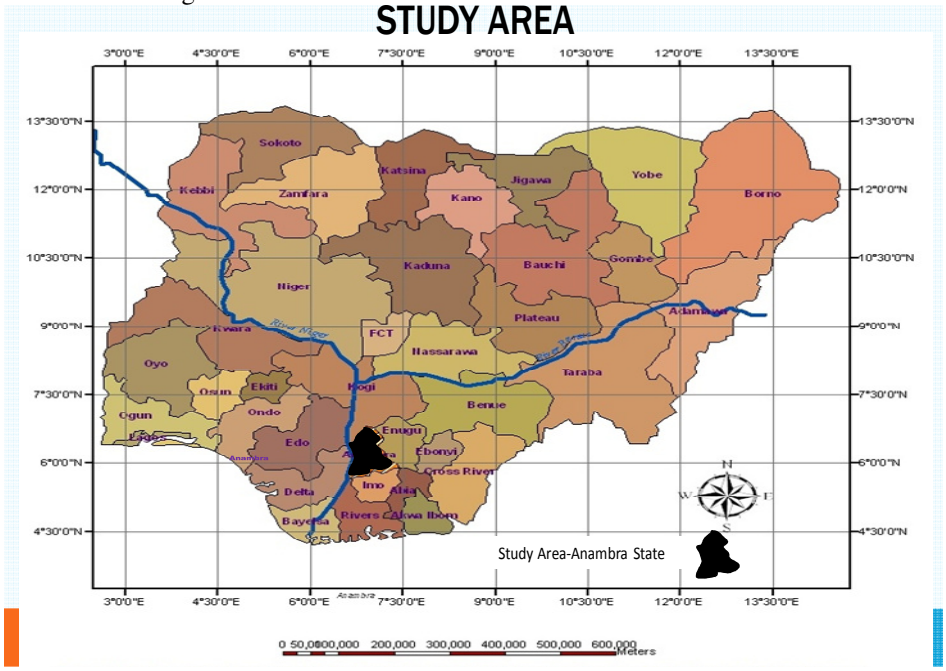

Figure 3.1 Map of Nigeria, showing Anambra State (Study Area)

Source: National Space Research and Development Agency

Anambra State of Nigeria is the second most densely populated state in Nigeria after Lagos State. It has a 2006 population of **4,182,032** with a density of 860 persons per square kilometres (km^2) and is ranked 10th out of the 36 states in Nigeria in terms of total population (National Population Commission, 2006 and National Bureau of Statistics, 2008). It is located between Lat. 9°4′N and Long. 7°29′E and Lat. 9.067°N and Long. 7.483°. According to UN Habitat (2009), it has a total land area of 4,865km^2 (1,870.3sq m) ranking 35th out of the 36 states in Nigeria in land area. With an annual population growth rate of 2.21 per cent, Anambra State had over 60% of its people living in urban areas, making it one of the most urbanized places in Nigeria (UN Habitat, 2009). According to UN Habitat (2009), it had Gross Domestic Product (GDP) of $6.76 billion and a per capita of $1,585 by 2007. Male and female components of the population of Anambra State are 2,174,641 and 2, 007,391 respectively, totaling **4,182,032.**

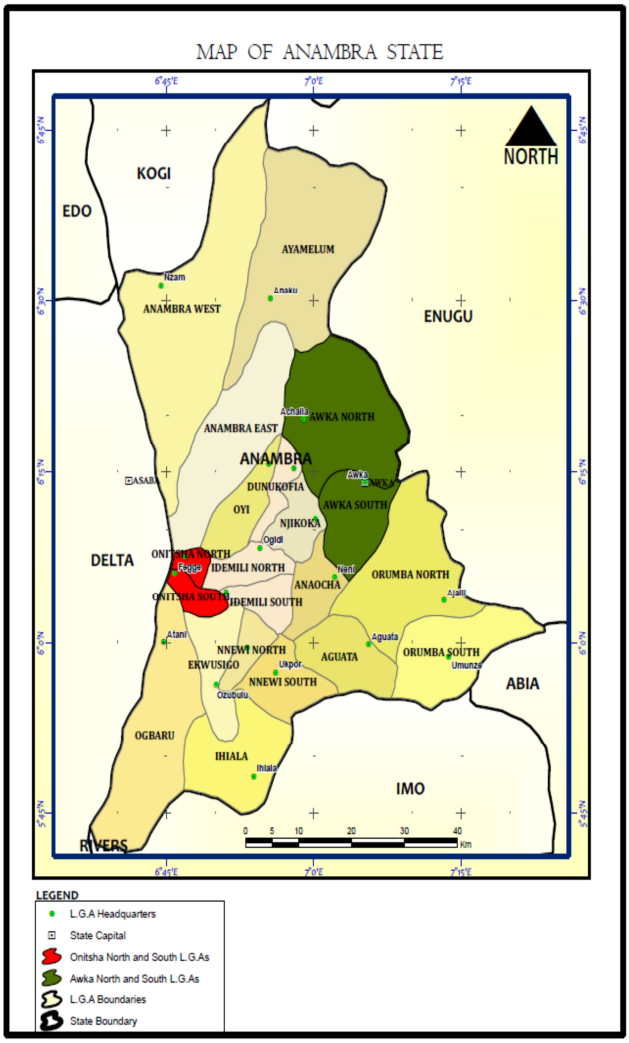

Fig. 2: Map of Anambra State Showing the Study Area.
Source: Adapted from Nwabu, (2010) Google Maps.

Awka City

Awka and Onitsha cities are selected for this study out of the seven urban areas recognized by the Anambra State Government namely; Awka, Onitsha, Nnewi, Ihiala, Ekwulobia, Otuocha and Ogidi. Only these two cities (Onitsha and Awka) have developed public housing estates (Eni, 2014).

Awka became the capital of Anambra state after it was carved out of the old Anambra State in 1991. Awka South had a population of 189,045 persons and Awka North 112 had 6,080 persons (National Population Commission, 2006). This figure is considered

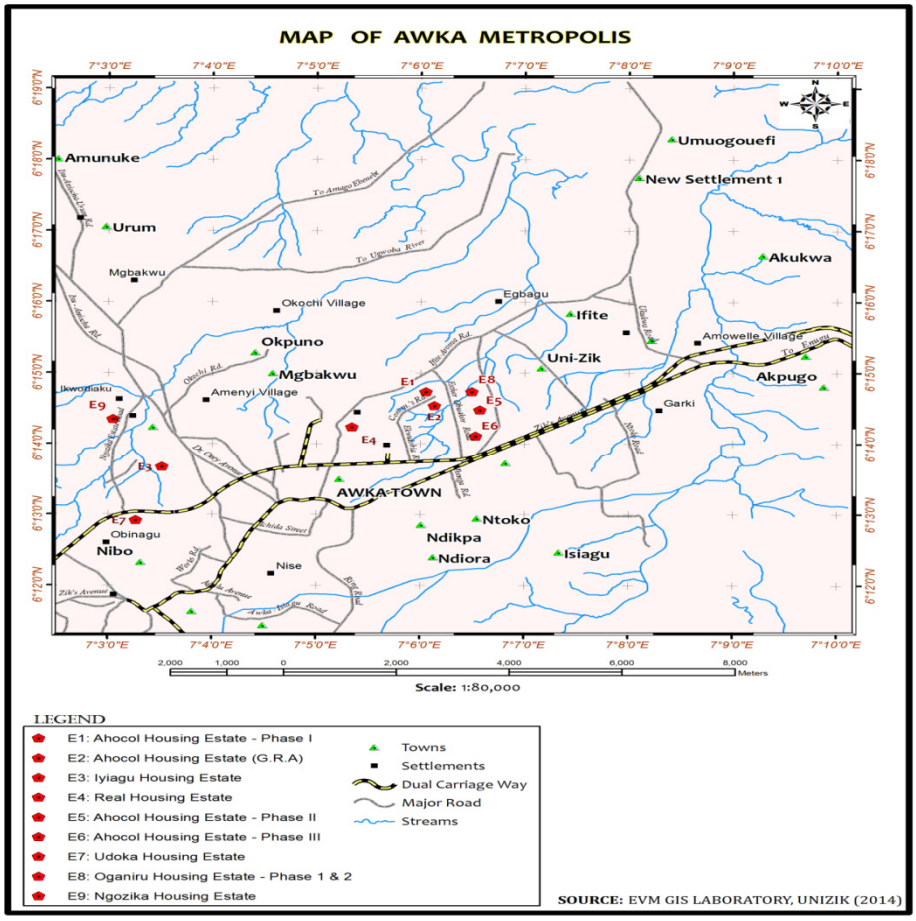

Fig. 3: Street Map of Awka Metropolis viewing Public Housing Estates.
Source: Environmental Mgt GIS Lab NAU, 2014.

doubtful because Awka town had grown from a population of 11,243 in 1953, 40,725 in 1963, and 70,568 in 1978 to 141,262 in 1983. The surprise is that the population of Awka town as at the National Census conducted in 1991 stood at 58, 225. This is made up of 28,335 males and 29,890 females (National Population Commission, 1991). However, the extrapolation of census figures of 1953, 1963, 1978, 1983 and 2006 put the population of Awka city at approximately 90,573 for the year ended 2007 and **375, 000** persons in 2010.

Onitsha City

Onitsha is located on the western part of the State and on the eastern bank of the River Niger and situated between Latitudes 6°.09' N and7.03'N and Longitudes 6°.45' E and 6°.50'E with an estimated land area of 104sq.km (Onitsha Town Planning Authority, 1998). It has nine (9) residential wards or quarters such, Otu, Fegge, Okpoko, GRA, Woliwo, Odakpu, Awada, Inland Town, Omagba and its peri-urban communities(See fig. 3.6). Onitsha had an estimated population of 511,000 with a metropolitan population of 1,003,000 (Minahan, 2002). The population of Onitsha is not well reflected in the Nigerian census figures because the traders migrated to their bases, neighbouring villages and states during census events reducing the official figures. Even the population of the town 623,274 in 2006 is contested (National Population Commission, 2006). This includes the population of the legal city of Onitsha and its peri-urban communities. However, the United Nations' Habitat has rated Onitsha among the world's fastest growing cities (Daily Sun, 2010, p 5). In terms of geology, relief and drainage, Onitsha lies on the Niger Anambra flood plain underlain by Nanka sands. The relief shows a general westward trend towards the River Niger; although local variations of relief exist in some parts of the town (Orajiaka, 1975 and Ofomata, 1975).

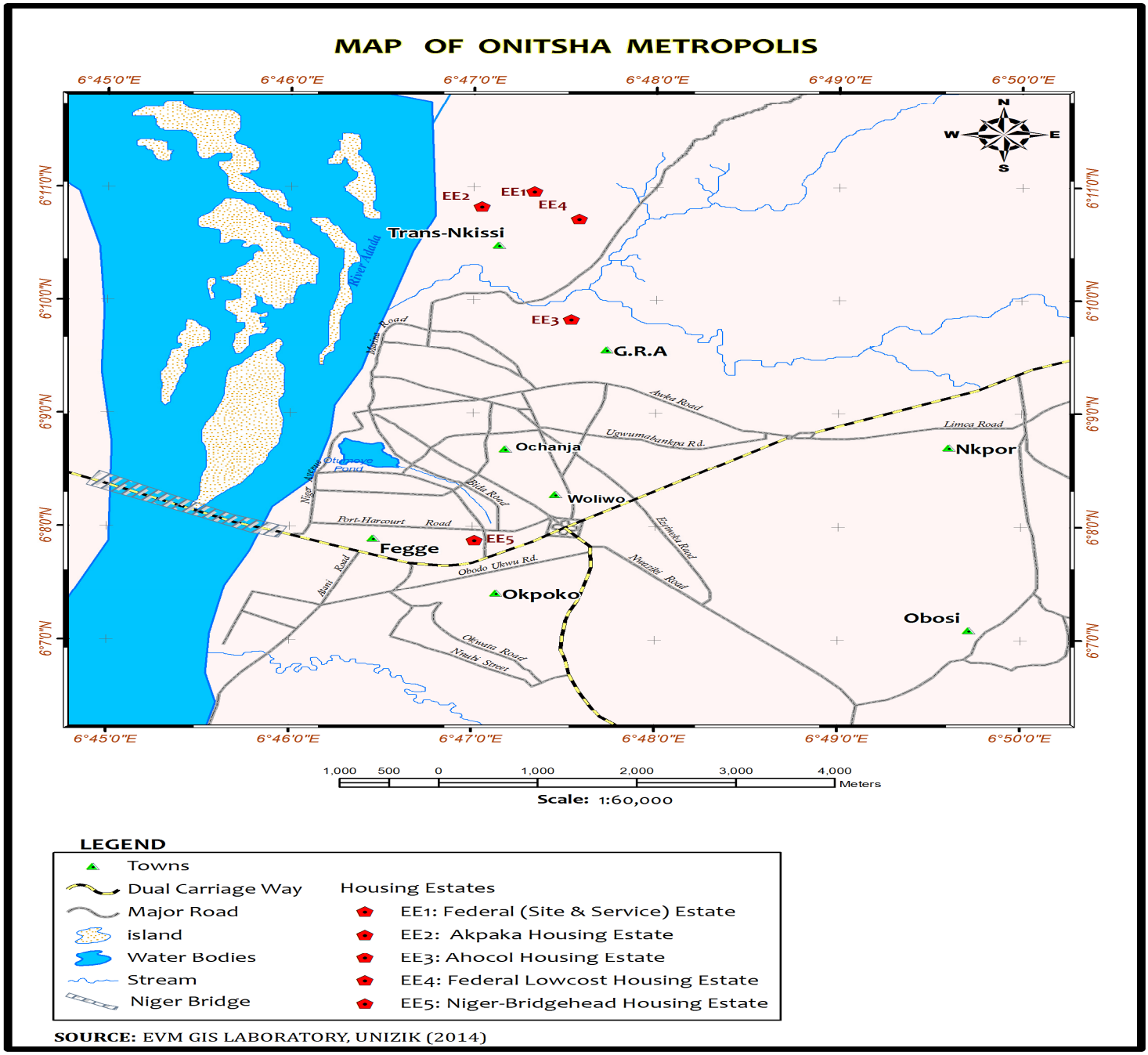

Fig .4 : Map of Onitsha Metropolis Showing Public Housing Estates

Source: EVM GIS Laboratory, Unizik, (2014)

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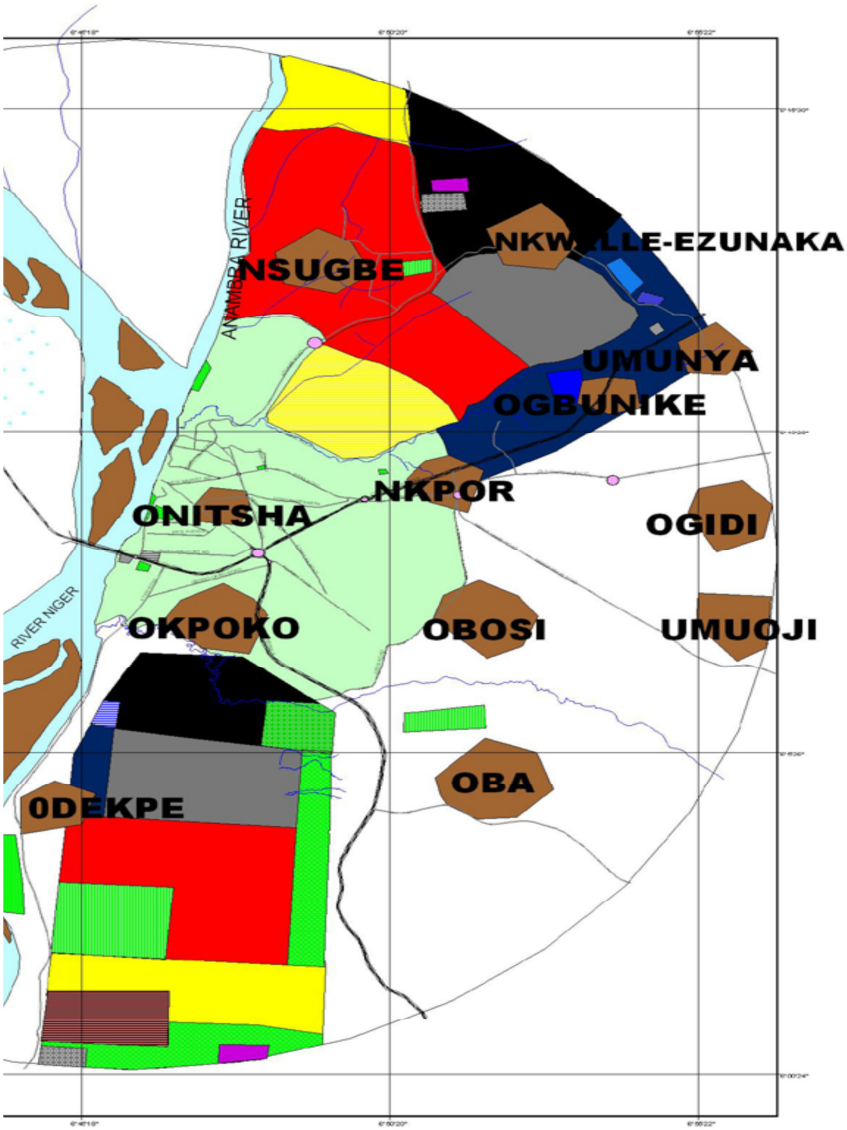

Fig.5: Map of Onitsha City Showing Neighbouring Communities.
Source: Adapted from Google Map, 2011.

Method of Data Collection

A 22-item structured questionnaire on habitability was developed. Section A had open-ended questions or unstructured responses which were used to elicit from respondents why they chose a particular scale which tapped preliminary / personal information such as data bordering on demographics was analyzed using percentages such as gender, age, occupation, marital status, educational qualifications of respondents and section B which focused on habitability of public housing units in the estates and had multiple-choice structured 5-point Likert Scale questions of possible responses from which respondents chose as appropriate. This represented a 5-point Likert rating scale in which respondents indicated the extent to which they considered the listed variables in the buildings for occupants. The mid-point was 3 and this implied that any result significantly different from this mean value was assumed to be either positive or negative. The universe of study consisted of 2,805 respondents g mainly households, and secondly, 2,805 housing units in the studied public housing estates, comprising 1,032 in Awka town and 1,773 in Onitsha town. This instrument was face and content validated. Cronbach Alpha Technique index was used for reliability test which gave a value of 0.90. This technique was pre-tested on a sample of 30 respondents/residents of non studied housing estate. Out of a total of 842 respondents, 797 responded representing 94.7% complete responses. A stratified random sampling of these disparate public housing estates were studied According to Oyeka (1990) and Anaekwe (2007), it is statistically

accepted that a sample size of 30% and above is large although this depends on absolute proportion, while less than 30 is considered small. It is approximately at this sample size of 30% that the magnitude of students' critical values for small sample approaches the Ƶ - critical of normal probability table for large samples. However Ƶ -test was used in the analyses of results.

Table 2: Distribution of Population and Sample size.

Serial No	Categories	Population	Sample Size (30 %)
1.	Occupants	2,805	842
	Total	**2, 805**	**842**

Table 3: Distribution of Public Housing Population and Sample Size in Awka

	Name of Estate									Housing Units
Parameters	**Iyiagu**	**Real**	**Udoka**	**Ngozika**	**Ahocol(GRA)**	**Ahocol(1)**	**Ahocol(2)**	**Ahocol (3)**	**Oganiru**	**Total**
Population	**94**	**90**	**500**	**25**	**8**	**27**	**34**	**174**	**80**	**1032**
Sample size	**28**	**27**	**150**	**8**	**2**	**8**	**10**	**52**	**24**	**310**
Awka town percentage	**9.03 %**	**8.70 %**	**48.40 %**	**2.60%**	**0.65%**	**2.60%**	**3.22%**	**16.80 %**	**7.75%**	**100%**
Overall percentage	**3.32 %**	**3.20 %**	**17.81 %**	**0.95%**	**0.24%**	**0.95%**	**1.88%**	**6.18%**	**2.85%**	**36.82 %**

Table 4: Distribution of Public Housing Population and Sample Size in Onitsha

	Name of Estate					Housing Units
Parameters	**Fed. Trans Nkissi**	**Niger Bridge**	**Fed. Low Cost**	**Akpaka**	**Ahocol(GRA)**	**Total**
Population	**1177**	**554**	**15**	**17**	**10**	**1773**
Sample size	**353**	**166**	**5**	**5**	**3**	**532**
Onitsha town percentage	**66.35%**	**31.20%**	**0.94%**	**0.94%**	**0.56%**	**100%**
Overall Percentage	**41.92%**	**19.71%**	**0.60%**	**0.60%**	**0.36%**	**100%**

A simple random sampling was then drawn from housing units in each stratum. A distribution of the sample from each cluster of the population is shown on Tables 3 and 4.

In order to achieve the stated objectives and to test the hypotheses of the study, the hypotheses were tested at 0.05 level of significance using Chi Square because it fitted the analysis of the data available in this study for these clear reasons: 1. the data were discrete in nature and 2. The data were cross-classified by two classifying

factors: Cities (Awka and Onitsha) and responses (VLH-Very largely habitable, LH-largely habitable, MH-Moderately habitable, BH-Barely habitable and NH-Not habitable).
Finally appropriate statistical tools were used to completely analyze the data for this research, which met the scope and nature of data and still were able to answer the research questions.
Two research questions and one null hypothesis were formulated and tested. The research questions were processed using percentages, means, chi-square, Contingency Table Analysis (CTA) and one way Categorical data analysis of variance (CATANOVA), while the hypotheses were tested by proportion of difference using Z-test.
A two –way (r- c) contingency was used. Consider the r x c table below where r = number of rows and c = number of columns.

Table 5: Contingency Table Analysis (CTA) Data format

Levels of First Variable of Classification	**Levels of second variable of classification**					
	1	**2**	**3**	**…j…**	**C**	**Total n_{i}..**
1	n_{11}	n_{12}	n_{13}	…n_{1j}…	n_{1c}	n_{1}
2	n_{21}	n_{22}	n_{23}	…n_{2j}…	n_{2c}	$n_{2.}$
3	n_{31}	n_{32}	n_{33}	…n_{3j}…	n_{3c}	$n_{3.}$
:	:	:	:	:	:	:
I	n_{i1}	n_{i2}	n_{i3}	n_{y}	n_{ic}	n_{i}
:	:	:	:	:	:	:
ϒ	$D_{ϒ1}$	$D_{ϒ2}$	$D_{ϒ3}$	…$n_{ϒj}$...	$n_{ϒc}$	$n_{ϒ}$
Totals n_{j}	$n._{1}$	$n._{2}$	$n._{3}$	…$n._{j...}$	n.c	n…

n_{ij} is the observed counts or frequency of objects/subjects/elements/items etc cross-classified by the ith level of the first variable of classification and the jth level of the second variable of classification ni. (i=1, 2…ϒ) is the marginal total of all the elements classified by the first variable of classification = n_{j} is the marginal total of all the elements in the jth level of the second variable of classification . Finally n… is the total of all the elements in the table.
Under the number hypothesis of independence,

$$P_{ij} = P_{ij} \times P_{j} = \frac{n_{i.}}{n} \times \frac{n_{j}}{n\ldots}$$

The corresponding expected frequency, e_{ij}, under the null hypothesis, H_{O}, is then obtained by multiplying P_{ij} by the total frequency n.ij that is 1.

$$e_{ij} = np_{ij} \times n_{oo} = \left(\frac{n_{i.}}{n} \times \frac{n_{j.}}{n\ldots}\right)$$

$$\therefore e_{ij} = \frac{n_{i.}}{n} \times \frac{P_{.j}}{n\ldots}$$

If we represent observed counts (frequency) by Oij such that Oji= nij, other entries unaltered, the test statistics

$$\chi^2 = \sum_{ij} \frac{(O_{ij}-e_{ij})^2}{e_{ij}}$$

follows chi-square distribution with (ϒ -1) (c – 1) degrees of freedom when the null hypothesis of independence is true.If the calculated χ^2 is equal to, or greater than, the tabulated critical value then $\chi^2_{1}\ \alpha_{;}$ (r -1) (c – 1), the null hypothesis of independence is rejected at the α level of significance; otherwise the null hypothesis is accepted.

Source: (Oyeka, 1996; pp. 361-362).

Table 6: Catanova Data Format

Factor level of Classes	Responses				
	1	2		J	n_i
1	n_{11}	n_{12}	▪▪▪	n_{1j}	n_i
2	n_{21}	n_{22}	▪▪▪	n_{2j}	n_2
. . .	. . .	. . .	... … …	. . .	. . .
J	n_{j1}	n_{j2}	▪▪▪	n_{ij}	n_i
n.j	$n._1$	$n._2$		$n._j$	n..

Table 7: One way CATANOVA

SV	Df	SS	T-statistic
Row or factor level	I-1	RSS	$\chi^2 = \frac{RSS(n-1)(I-1)}{TSS}$
Within Row	n-I	WSS	
Total	n-1	TSS	

If the null hypothesis of independence is true, the test statistics follows

χ^2 1- α, (I-1) (J-1) and the null hypothesis is rejected is $\chi^2_{cal} \leq$

χ^2_{tab}

$$RSS = \sum \frac{nij^2}{nj} - \frac{nij^2}{n}$$

$$= Cj - Ci$$

$$TSS = n - \sum \frac{n^2}{n}$$

$$= n - Ci$$

WSS = TSS - RSS = n-$C_{\check{Y}}$

*Source: (Arua et al, 2000; pp. 406 – 411).

Test of Difference between Two Population Proportions

To test the null hypothesis, Ho, that two population proportions λ_1 and λ_2 are equal against and of the alternatives. They are not equal, one is less than or greater than the other. $\lambda_{1\ is}$ the population proportion for group 1 and λ_2 [is] the population proportion for group II. If P_1 and P_2 are sample proportion for group 1 and II respectively, P_1-P_2 is approximately normally distributed with $\mu p_1 - p_2 = \lambda_1 - \lambda_2$ and standard deviation.

$$¡p_1 - p_2 = \frac{\lambda 1\sqrt{1-\lambda 1} + \lambda 2(1-\lambda 2)}{n1 \quad n2}$$

But λ_1 and λ_2 are often unknown. Thus, they are estimated by P_1 and P_2 such that

$$¡p_1 - p_2 = \frac{\sqrt{p_1(1-p_1)} + p_2(1-p_2)}{n_1 \quad n_2}$$

Therefore,

$$\frac{(p_1 - p_2) - (\lambda_1 - \lambda_2)}{\frac{\sqrt{p_1(1-p_1)} + p_2(1-p_2)}{n_1 \quad n_2}}$$

which has approximately unit normal distribution. For a one-sided test Ho: is rejected at the ∝ level of significance, if /-Ƶ/ > Ƶ, - α

Data Analyses, Presentation

The analyses of the preliminary or background information yielded the following findings:

- 97.5% (777) of the respondents are females, while only 2.5% are males.
- the ages of most of the respondents is as follows ; 40.02%(319) aged 20-30 years , 7.41%(59) were between 31 and 40 years of age, 49.44%(313) were between 41-50 years , while 3.13% (25) of the respondents were above 50.
- that civil servants constituted 56.33% (449) of all respondents, while non-civil service respondents made up of traders, self-employed professionals and artisans constituted 43.67% (3 48).
- out of the 797 respondents, 90.58 %(722) were married, 5.27 %(42) were unmarried, while 4.15% (33) did not disclose their marital status.
- 3.13 %(25) of the respondents had School Certificate, 9.41 %(75) had National Diploma, 57.34% (457) possessed HND/ B. Sc. / B.A, 26.86 %(214) had M. Sc. / M. A. / Post Graduate Diploma, while only 3.26 %(26) had Ph. D degrees.

The following research questions were answered;

List of Public Housing Estates

Nine public housing estates were acknowledged and described in Awka city provided by both the Federal and State governments while five such public housing estates provided by the same governments were identified and described. Below is the enumeration of public housing estates in the state with the dates of commencement:

Table 8: Showing Public Housing Estates in Awka and Onitsha Cities

AWKA CITY		
S/No	Names and Descriptions of Studied Public Housing Estates	Year of Establishment
1.	AHOCOL (Inner City Layout) Housing Estate (otherwise called the GRA), Amaenyi, Awka.	1990
2.	AHOCOL (Think Home) Housing Estate Phase 1 (or Ahocol 1), Awka	1991
3.	Iyiagu Housing Estate, Awka	1992
4.	Real Housing Estate, Awka	1992
5.	AHOCOL (Think Home) Housing Estate Phase 1 Extension (or Ahocol 2), Awka.	1993
6.	AHOCOL (Think Home) Housing Estate Phase 2 (or Ahocol 3), Awka	1995-2014
7.	Udoka Housing Estate, Obinagu, Awka	1996
8.	Oganiru Housing Estate Phases1&2 Awka	2005
9.	Ngozika Housing Estate, Ikwodiaku, Awka	2006
ONITSHA CITY		
S/No	Names and Descriptions of Studied Public Housing Estates	Year of Establishment
10.	Niger Bridge-head Housing Estate, Fegge, Onitsha	1980.
11.	Federal Low Cost Housing Estate, Trans- Nkissi Onitsha	1985
12.	AHOCOL Housing Estate, Niger Drive, GRA, Onitsha	1990
13.	. Federal (Site and Services) Housing Estate, Trans-Nkissi (or 33), Onitsha	1992.
14.	Akpaka Housing Estate, Onitsha	2008

Evaluation of Occupants' Perception on Habitability of Public Housing and Occupants Location.

To respond to this research question, Chi-square test was conducted.

Table 9: Level of Occupants' Responses on Habitability of Public Housing

Serial No.	Responses	χ^2 cal	DF	P-Value	Level of Significance(α)	Decision
13.	Size of Living Room	42.281	4	0.00	0.05	Reject
14.	Size of Bedrooms	107.860	4	0.00	0.05	Reject
15.	Provision of Sit-Outs	56.828	4	0.00	0.05	Reject
16.	Doors for Circulation	68.497	4	0.00	0.05	Reject
17.	Windows for Ventilation	37.695	4	0.00	0.05	Reject
18.	Kitchen Facility	78.625	4	0.00	0.05	Reject
19.	Toilet Facility	97.183	4	0.00	0.05	Reject
20.	Bathroom Facility	70.586	4	0.00	0.05	Reject
21.	Security Measures	225.607	4	0.00	0.05	Reject
22.	Dining Facility	52.110	4	0.00	0.05	Reject

Significant at 0.05 level of confidence

Table 9 showed that P-value was less than the alpha level (α), therefore Ho was rejected:- There is no significant relationship between respondents' location and respondents' opinion on the level of occupants' perception on habitability of public housing and occupants' location. Therefore the inference was that respondents in one location were more of the opinion that the public housing was habitable.

Examination of the Average Response of Occupants on Habitability

To examine the average response of occupants on habitability, the data were obtained by averaging the responses in questions 13 to 22. CATANOVA was used as the analytical tool. The scaling was follows; VLH = Very largely habitable =5 points, LH =largely habitable =4 points, MH = moderately habitable =3 points, BH = Barely habitable =2 points, NH=Not habitable =1 point

Table 10: Occupants' View on the Level of Habitability of Public Housing and Occupants' Location

Location	VH	LH	MH	BH	NH	Total
Awka	41	72	103	49	34	299
Onitsha	127	136	103	88	44	498
Total	**168**	**208**	**206**	**138**	**78**	**797**

TSS = 373.656
RSS = 115.669
WSS = 257.987
χ^2_{cal} = 985.639
$\chi^2_{0.95,4}$ = 9.488

The null hypothesis of independence between occupants' perception on habitability expressed by public housing occupants' location at Awka or Onitsha was rejected because χ^2_{cal} (985.639) was greater than table value $\chi^2_{0.95,4}$(9.488). Then decision was that there is significant dependence of occupants' perception on habitability of public housing estates on occupants' location. Hence it was contingent that public housing at one location was more habitable than those at the other location.

Test of Difference between Proportions

The data on habitability was also obtained by pooling positive response and negative responses separately. Positive responses were VLH and LH, neutral was MH and negative responses were BH and NH.

Table 11: Test of Difference between Proportions on Habitability

Location/Response	Positive	Neutral	Negative	Total
Awka	113	103	83	299
Proportion (Awka)	0.378	0.344	0.278	1
Onitsha	263	103	132	498
Proportion (Onitsha)	0.487	0.269	0.244	1

Ho: = $\lambda_1 \leq \lambda_2$
H1: = $\lambda_1 > \lambda_2$
/Zcal/ = 3.0372
$Z_{0.005}$ = 1.64

We accepted the null hypothesis that the proportion of occupants responding positively to habitability of public housing in Awka was at most equal to the proportion responding positively in Onitsha because /Zcal/ (3.0372) was greater than $Z_{0.005}$ (1.64). Thus, we concluded that the proportion of occupants responding positively to habitability of public housing in Awka was less than the proportion responding positively to it in Onitsha. Respondents commented that old technocrats who designed and planned most of the estates in Onitsha paid better attention to Onitsha and that the technocrats adopted design criteria that suited the family patterns, tenure system, social status and lifestyles of occupants in spaces in the dwelling units such as the sizes of living rooms, bedrooms, facilities such as toilets, dining, bathrooms, kitchens, doors, windows, and security measures that met and matched the preferences of the Onitsha respondents.

Discussion of the level of habitability of Public Housing

The findings of this study showed that there is a high level of habitability of the dwelling units in the study area. There was a convergence of opinions as the values and preferences of the respondents were met. According to Onibokun (1985) variables such as family patterns, tenure system and social status are relevant factors in social and cultural issues. Therefore it could be assumed that the technocrats in Onitsha adopted design criteria in the dwelling units such as the sizes of living rooms, bedrooms, facilities such as toilets, dining, bathrooms, kitchens, doors, windows, and security measures that met and matched the preferences of the respondents. This vindicated Salau (1979) who advocated the integration of the social and cultural variables in housing design (whether owner developed or corporation developed) and to incorporate the needs and demands of the inhabitants (occupants) in relation to their lifestyles. In the study area particularly in Onitsha, the need to provide habitable housing based on users' responses and culturally determined considerations seemed to have been employed and public housing targeted at different salary scales especially in Federal Housing Trans-Nkissi were serviced plots where allocated to home owners to build according to their taste and lifestyles.

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