

Maintenance Practice and Occupant's Satisfaction in Public Housing Estates: An Osogbo, Nigeria Perspective

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ABSTRACT

The paper appraises the maintenance practice and residents' satisfaction of public housing estates in Osogbo, Nigeria with a view to encouraging best practices and adequate maintenance strategies in a proposition to preserving the existing housing stock and enhanced maintenance of public estates in the study area. One Hundred and Five (105) questionnaires were distributed among the residents of two (2) residential estates and 97 questionnaires were retrieved, representing 92.40%. Opinion of the Estate Surveyors and Valuers was also sought on the factors affecting maintenance in public housing estate. Analysis was carried out through the use of mean, severity index, cross-tabulation and Chi-Square test of association. It was discovered that there is no statistically significant relationship between maintenance practice and public services alongside infrastructures in the estates. Although, there is a significant relationship between occupants' level of satisfaction with maintenance of public services and infrastructures; the Phi and Cramer's V tests revealed a very weak strength in the association. The paper therefore suggests an integrated maintenance approach for effective upkeep of public estates infrastructures and facilities.

Keywords: Estates, Maintenance Practice, Public Housing, Occupants, Satisfaction

1.0. Introduction

Housing is one of life's basic necessities which encapsulates shelter, physical and mental health, economic and social wellbeing. However, Ibem and Amole (2010) observed that several Nigerians are still living in poor housing conditions. Hence, in a bid to provide quality housing in Nigeria, there have been government involvements at all levels. This has often occasioned the mass housing estates construction, provision of site and services and other infrastructures in urban centres for all income groups among others (Akindele et al., 2014). This form of housing provision has been construed as public housing, as it emphasizes the role of the government and its agencies in facilitating housing provision.

In spite of the efforts and increase funding by the government, the state of housing maintenance and repair is far from satisfactory (Nor'Aini *et. al*, 2013). Jiboye (2004) had previously noted that public housing has been in a badly maintained condition in Nigeria. The culture of poor and lackadaisical attitude towards maintenance like an infection has eaten deep into the marrow of Nigeria. This is obvious from the way public houses are managed. Buildings are set up and anticipated to live their life span without a bit of maintenance strategy. The less satisfactory maintenance level in most public housing in the country has been attributed to lack of proper and adequate monitoring and the politically motivated bureaucracy of those responsible for the maintenance of facilities and infrastructure in public housing (Adejimi 1998). Little wonder why despite the theories and hypotheses postulated and propounded, maintenance problems remained adamantly unyielding and so unsolved.

Iyagba (2005) maintained that the general absence of maintenance culture in Nigeria as a nation is one of the greatest economic and social problems. According to Harding et al. (2007), successive governments are more interested in the provision of new housing units without recourse to regular

maintenance of the existing ones as a more sustainable way of reducing housing deficit. In addition, there is usually poor implementation of National Housing Policy, inadequate funding, lack of continuity of projects upon change in government, insecurity and neglect of such projects (Jiboye, 2008). Therefore, Anele (2010) opined that Nigeria will continue to waste scarce financial resources on building new infrastructure which cannot be sustained if urgent steps are not taken to embrace good maintenance culture

In view of the forgoing, a number of studies have considered public housing. For instance, Adenuga et al. (2010) examined the need for effective maintenance practices in public buildings and reasons for neglect of maintenance responsibilities. Lack of maintenance culture, lack of maintenance knowledge, lack of emphasis on training, retraining and continuing education on effective maintenance by the establishment, indiscipline and ignorance on the part of users, absence of planned maintenance programme and reactive maintenance, complexity of design, non-involvement of maintenance team at design stage and inadequate funds for maintenance are found to be affecting maintenance of public building in Nigeria.

Similarly, Akindele et al, (2014) assessed the condition of housing, adequacy of housing facilities and residents' perception of housing satisfaction with public estates in Osogbo, Nigeria. Using weighed mean values, it was found that there is a general deficiency in infrastructure development and almost all the estates considered in the study lack basic facilities. The study however, did not consider maintenance of the estates and the strategy adopted, which is one of the drives for this study.

With this state of affair in mind, it is thoughtful to inquire into the satisfaction of the occupants of the Nigerian public housing estates. Residents' satisfaction is the positive or negative emotion exhibited by occupants with respect to their housing. Residents' satisfaction has yet been employed as a measure to examine the success of housing development projects. It has been a very significant tool to evaluate and improve the performance of government policies associated with housing. In that feedback and resident's views collected with regard to housing projects could be fed back into the future design process for improvement (Mohammad and Mohamed, 2012).

2.0. Methodology

2.1. Study Area

Osogbo is situated on latitude $7^{\circ} 46'$ N and longitude $4^{\circ} 34'$ E of Greenwich Meridian. It assumed the rank of a State capital subsequent the establishment of Osun State in 1991. Its population, based on 2006 census was 156,694 and the total land area was about 2,875km². Over the years, the city has witnessed remarkable growth both spatially and in population. In recent times, the location of Osogbo as a state capital coupled with other developmental factors has led to the influx of people from other towns and villages. Despite the increasing provision and availability of some basic infrastructures, the level and condition of these facilities are still very insufficient as a result of the speedy rate of urbanization and population growth observed in the town. The quality of housing amenities and infrastructures is largely poor and falls below the probable standard. Considerably, adequate housing consolidates not only the national development but also determines the health, security, sanitation and socio-cultural and physical wellbeing of the populace. Development in Osogbo is observed as one moves from the interior towards the outskirts while most of the business neighbourhoods are mixed with residential districts.

2.2. Data collection Instrument

The data used for the analysis in this study are primary data and were collected using questionnaires. Eighteen questionnaires out of the 20 questionnaires distributed to the occupants of G.R.A Osogbo were retrieved representing 90%, while 79 out of the 85 questionnaires distributed to the occupants of the Federal housing Estate, Osogbo was retrieved, representing 92.94%. On a general note, 97 out of the 105 total administered questionnaires on the target population were retrieved representing 92.40%. Equally, 19 (86.36%) out of the 22 questionnaires distributed to the Estate Surveyors and Valuers was

retrieved. This suggests a great percentage of response, thus giving sound footing for further analysis. The questionnaire was designed using a Likert scale, where the options of the possible responses from the respondents were ranked. Likert scale Kristin according to (2004) consist of respondents responses to statements about the object, where responses fall into ordered categories.

To assess the condition of infrastructure and services in the Estates, a Likert scale that ranges from ‘1’ = Bad, ‘2’ = Average, ‘3’ = Good was used. For the condition of the infrastructure and services in the Estates, Mean Score above 1.50 are considered to be ‘Good’ while the Mean Score less than 1.50 are regarded as ‘Bad’. Also, a Likert scale ranged from “1” = very dissatisfied, “2”=dissatisfied, “3”=slightly satisfied, “4”=satisfied and “5”=very satisfied, was used to measure respondents’ level of satisfaction on various housing components. The overall satisfaction for each feature of residential satisfaction was analysed based on a mean score of 3.00 as positive indication of satisfaction, and values below 3.00 indicating dissatisfaction. While factors affecting maintenance in public housing estate was evaluated using severity index, further analysis was carried out using cross tabulation and Pearson's chi-square test (chi-square test of association) on statistical Package for Social Sciences (SPSS).

2.3. Method of Data Analysis

i. Weighted Mean Score

Weighted Mean score as explained by Abunab et al. (2016) was adopted to analyse the condition of infrastructure and services and the overall level of residents’ satisfaction.

For the condition of the infrastructure and services, the Weighted Mean Score is given as:

$$WMS = \frac{3n_3 + 2n_2 + n_1}{n_3 + n_2 + n_1} \tag{1}$$

Where n_3 = number of responses for “Good”, n_2 = number of responses for “Average”, n_1 = number of responses for “Bad”.

For the overall level of residents’ satisfaction, the Weighted Mean Score is given as Weighted Mean Score (WMS) is determined using Equation (2).

$$WMS = \frac{5n_5 + 4n_4 + 3n_3 + 2n_2 + n_1}{n_5 + n_4 + n_3 + n_2 + n_1} \tag{2}$$

Where n_5 = number of responses for “Very Satisfied”, n_4 = number of responses for “Satisfied”, n_3 = number of responses for “Slightly Satisfied”, n_2 = number of responses for “Dissatisfied”, n_1 = number of responses for “Very dissatisfied”.

ii. Chi-Square Test of Association

The Chi-Square test of association is used to discover if there is a relationship between two or more categorical variables measured at an ordinal or nominal scale. This test gives evidence of an association or no association (Pandis, 2016). This was used in this study to test the relationship between the observed and expected level of maintenance of public infrastructure in the estates. It was also used to test for the relationship between the observed and expected level of satisfaction of residents with the maintenance of public services and infrastructure.

Chi-square is given as:

$$\chi_c^2 = \sum \left(\frac{(E_i - O_i)^2}{E_i} \right) \tag{3}$$

Where,

The subscript “c” = the degrees of freedom

E_i = the Expected value; and

O = the Observed value.

iii. Severity Index

Mathematically, severity index according to Kadir et al (2005) is given as:

$$Severity\ Index\ (SI) = \frac{\sum R_w W}{R_t} \tag{4}$$

Where,

R_w = number of respondents;

W = weight or points assigned; and

R_t = total number of responses obtained from that variable. The scale depicting the degree of severity is interpreted as follows:

S.I \leq 1.4 implies not serious, not difficult or never felt its effect

S.I = 1.5 – 3.4 implies moderately serious or difficult or felt its effect some of the time

S.I = 2.5 – 4.4 implies usually serious, usually difficult or felt its effect many times

S.I \geq 4.5 implies very serious, very difficult or felt its effect most of the time.

3.0. Results and Discussion

The analysis of the data obtained through the questionnaire was carried out using descriptive analysis. Descriptive analysis featured the use of simple frequency distribution table, weighted mean score and Pearson's chi-square test.

Table 1: Condition of infrastructures and facilities

Infrastructures and facilities	Occupants of G.R.A		Occupants of Federal Housing Estate	
	Mean	Rank	Mean	Rank
Water supply	2.78	1st	2.89	1st
Refuse Collection	1.78	13th	2.11	12th
Sewage Disposal System	2.39	8th	2.87	2nd
Drainage	2.17	9th	2.72	3rd
Road Network	2.17	9th	2.50	5th
Schools and educational centers	2.61	3rd	2.06	13th
Health facilities	2.56	5th	2.42	8th
Commercial center	1.83	12th	2.48	6th
Recreational centers	2.17	9th	2.39	9th
Firefighting equipment	2.56	5th	2.43	7th
Electricity	2.61	3rd	2.17	11th
Telecommunication infrastructure	2.44	7th	2.32	10th
Security services	2.67	2nd	2.53	4th

Table 1 shows the assessment of the condition of infrastructural facilities available in the estates. From the G.R.A., the condition of water supply with mean score of 2.78 and security services with a mean score of 2.67 is good and has been ranked 1st and 2nd respectively. The least / relatively in a fair state is refuse collection with a mean score of 1.78 and has been ranked 13th. The occupants of Federal Housing Estate also rated water supply to be in a very good condition with a mean score of 2.89 and ranked 1st, this is closely associated with the good condition of sewage disposal and drainage with the mean scores of 2.87 and 2.72, and ranked 2nd and 3rd respectively. However, all the infrastructures and facilities identified were found to be in at least an average condition, as their Mean Score were all above 1.5, this results show an improvement on the condition of infrastructure in the study area when compared with the results of Akindele et al, (2014) who had earlier found a poor condition of infrastructures in the study area. However, the condition of the school and educational ranked lowest. This is not unrelated to the poorly maintained physical condition of the infrastructures of the schools educational centres as at the time of the analysis of this study. Equally, Kehinde et al. (2015) found that public estates in the entire study area were poorly equipped with infrastructure.

Table 2: Level of Satisfaction with specific building components

Specific Building Components	Occupants of G.R.A		Occupants of Federal Housing Estate	
	Mean	Rank	Mean	Rank
Doors	3.83	4 th	3.44	6 th
Windows	3.50	6 th	3.85	4 th
Roof	4.00	2 nd	4.03	2 nd
Internal Wall	3.61	5 th	4.18	1 st
Beams and columns	4.00	2 nd	3.75	5 th
External walls	4.11	1 st	3.99	3 rd
Finishing	3.22	7 th	2.81	7 th

The level of satisfaction with some specific building components was also assessed and presented in Table 2. The results have been ranked accordingly for better understanding. G.R.A occupants were found to be satisfied with the 'external walls' with a mean score of 4.11, which ranked 1st while the occupants of Federal Housing considered the 'Internal walls' most satisfactory on their list with a mean score of 4.18 and was ranked 1st. 'Finishing' shows the lowest satisfaction at both Estates; showing that the level of satisfaction derived by the occupants of both Estates on the Finishing of the building is low. These results show that there are differences in the level of satisfaction of the resident on the identified building components in both estates. The level of satisfaction of the residents to the roof at both estates ranked second with a mean score that were above 2.5. This explains the uniqueness of different estates and the difference in the value of their land and landed properties. It could be from the law guiding the development of each estate or the ownership which control the type and nature of development.

Table 3: Level of Satisfaction with the available infrastructures and facilities in the Estates

Infrastructures and facilities	Occupants of G.R.A		Occupants of Federal Housing Estate	
	Mean	Rank	Mean	Rank
Water supply	4.22	1st	3.84	2nd
Refuse Collection	2.22	11th	2.73	10th
Sewage Disposal System	4.17	2nd	3.62	5th
Drainage	3.72	3rd	3.41	6th
Road Network	3.72	3rd	3.73	4th
Schools and educational centers	3.56	5th	3.08	7th
Health facilities	2.50	10th	2.58	12th
Commercial center	2.83	7th	2.91	8th
Recreational centers	1.89	13th	2.58	12th
Firefighting equipment	2.83	7th	2.67	11th
Electricity	2.22	11th	3.75	3rd
Telecommunication infrastructure	3.11	6th	2.87	9th
Security services	2.72	9th	3.94	1st

The respondent's level of satisfaction with the infrastructures is presented in Table 3. The occupants of G.R.A. are more satisfied with water which has the highest mean score of 4.22 and has been ranked 1st. This is closely followed by 'sewage disposal', 'Road network and drainage' with mean scores of 4.17 and 3.72 ranked 2nd and 3rd respectively. The least satisfied is recreational centre which is ranked 13th. On the other hand, occupants of the Federal Housing estate consented to the high level of satisfaction with security with a mean score of 3.94. This is closely followed by water supply and electricity with mean scores of 3.84 and 3.75, and ranked 2nd and 3rd respectively. The least satisfied are health and recreational which ranked 12th each. Nevertheless, there were difference in the satisfaction with infrastructure and facilities and their condition when compared Tables 1 and 3. One of the infrastructures and facilities had increase in their rank at the level of satisfaction while others had decrease in their level of satisfaction at both estates. Only water supply maintained the first position of it condition and the level of satisfaction derived from it by the resident at the G.R.A. At both estate, infrastructure such and facilities such a refuse collection, sewage disposal, and telecommunication infrastructure had an increase in their rank at the level of satisfaction, while the health facilities had a drop in rank at both estate. Infrastructures and facilities that had an increase in rank at the level of satisfaction derived from them as compared to their condition imply that though their condition are not as good as other infrastructure and facilities that are ranked higher, the resident derived more satisfaction from them. Also, the infrastructures that had a higher rank in their condition than their rank at the level of satisfaction, imply that it is possible that an infrastructure or facilities may be in a good condition, it does not translate to serving it purpose as expected. The Health facilities for instance could be in a better condition than Electricity at Federal Housing Estate, it however does not satisfy the desire of the resident as electricity does at the estate.

Table 4: Cross tabulation of the level of maintenance of public services and infrastructures in the Estates

		Level of Maintenance			Total	
		Poor	Fair	Good		
Respondents	Federal Housing Estate	Count	18	44	17	79
		% within Respondents	22.8%	55.7%	21.5%	100.0%
	Government Reserved Area (GRA)	Count	2	7	9	18
		% within Respondents	11.1%	38.9%	50.0%	100.0%

Table 4 gives insight into the respondent’s opinion of the level of maintenance of public services and infrastructures at both estates. The result of the table shows that the majority of the respondent at the Federal Housing Estate believed that the estate is fairly managed at 55.7% while the majority of the respondent at the GRA responded that the level of maintenance of the estates is good. However, at both estates, poor level of maintenance has the least percentage of response. This implies that the maintenance of the estates are between fair and good.

Table 5: Chi-Square Tests of association of the maintenance of public services and infrastructures in the Estates

	Value	Df	Asymp. Sig. (2-sided)	Approx. Sig.
Pearson Chi-Square	6.193	2	0.045	
Likelihood Ratio	5.728	2	0.057	
Linear-by-Linear Association	4.973	1	0.026	
N of Valid Cases	97			

Table 5, shows that the critical value of chi-square $\chi^2 = 6.193$ is greater than the observed value of chi-square $p = 0.045$ ($p < 0.05$). This suggests that there is no statistically significant difference between the opinion of respondents of both estates on the maintenance of public services and infrastructures. Hence, it is evident that the level of maintenance of public services and infrastructures is not differ from one public estate to another. This may be corroboration of poor building maintenance habits earlier identified by Quayson and Akomah (2016) and Twumasi-Ampofo et al. (2017) as being prevalent in public buildings.

Table 6: Cross tabulation of the level of satisfaction with maintenance of public services and infrastructures

		Quality of the services and infrastructures			Total	
		NS	LS	S		
Respondents	Federal Housing Estate	Count	22	9	48	79
		% within Respondents	27.8%	11.4%	60.8%	100.0%
	Government Reserved Area (GRA)	Count	4	2	12	18
		% within Respondents	22.2%	11.1%	66.7%	100.0%

(NS - Not satisfied = 1, LS - Less satisfied=2, S - Satisfied=3)

Table 6 gives the clear understanding of the respondent’s opinion on the level of satisfaction with maintenance of public services and infrastructures. The level of maintenance in relation to the satisfactory nature of the quality of services and infrastructure shows that majority of the respondents are satisfied with the quality of services at 60.8% and 66.7% at the Federal Housing Estate and G.R.A. respectively. However, 22.2% and 27.8% of the residents of G.R.A and Federal Housing Estate respectively are not satisfied with the quality of services and infrastructures provided in the estates. This clearly indicates the need for an efficient maintenance programme so as to improve the satisfaction of the occupants.

Table 7: Chi-Square Tests of association of the occupants’ level of satisfaction with maintenance of public services and infrastructures

	Value	df	Asymp. Sig. (2 sided)	Approx. Sig.
Pearson Chi-Square	.257	2	0.879	
Likelihood Ratio	.264	2	0.877	
Linear-by-Linear Association	.253	1	0.615	
Phi	.051			0.879
Cramer's V	.051			0.879
N of Valid Cases	97			

Table 7 shows that the critical value of chi-square $\chi^2 = 0.257$ which was lesser than the observed value of chi-square $p = 0.897$. This implies a statistically significant association in the opinion of the occupants of the Estates’ on the level of satisfaction with maintenance of public services and infrastructures. Nevertheless, the chi square test does not tell the strength of association. According to Malhotra (2009), strength of association is of interest when the association is statistically significant. The strength of association can be measured by phi correlation coefficient and Cramer's V. The Cramer's V value varies between 0 to +1. If it takes the value of 0, there is no association while +1 shows perfect positive association. A large value of V merely indicates a high degree of association, but does not indicate how the variables are associated. The strength of association through a Phi and Cramer's V test from the test revealed a very weak relationship (Phi = .051 and Cramer's V = .051) between occupants’ and their level of satisfaction with maintenance of public services and infrastructures at both estates’. Kehinde (2015) et al. earlier established that public estates in Osogbo fell short of overall mean value measurement of residents’ satisfaction.

Table 8: Source of infrastructure and facilities Maintenance

Source	Occupants of G.R.A Osogbo		Occupants of Federal Housing Estate Osogbo	
	Percent	Frequency	Percent	Frequency
Development Levy	4	22.2	8	10.1
Joint Community Service	5	27.8	38	48.1
Through Government Efforts	5	27.8	13	16.5
Individual Efforts	3	16.7	14	17.7
Others	1	5.6	6	7.6
Total	18	100.0	79	100.0

Table 8 assesses the body majorly responsible for the maintenance of the infrastructures and amenities in the neighbourhood. The result shows that 27.8% of the respondents at G.R.A. indicated that maintenance of the infrastructure is done through Joint Community Service while 48.1% of the respondents at Federal Housing Estate also revealed that the maintenance of the infrastructure is done through Joint Community Service. At G.R.A. and Federal Housing Estate respectively, 27.8% and 16.5% also confirm the involvement of the Osun State and its relative agencies in the maintenance of the infrastructures. The use of development levies was also identified by the study. On the other hand, some of the respondents also agreed to the combined role of residents association and the government agencies marked as ‘others’ for the maintenance of the estate services and infrastructures with the highest percentage at the Federal Housing estate representing 7.6% and 5.6% for G.R.A.

Table 9: Factors affecting Maintenance in Public Housing Estate

Mean	Severity Index (SI)	Rank
Use of substandard of materials and building components	4.1	1 st
Maintenance Culture	4.0	2 nd
Availability of fund for maintenance of the building	4.0	3 rd
Low concern to future maintenance	3.9	4 th
Behaviour and attitude of occupants	3.9	4 th
Lack of care/use of building components and services	3.8	6 th
Lack of care/use of building components and services	3.8	6 th
Clients attitude to maintenance	3.7	8 th
Inadequate building maintenance standard and policy	3.7	9 th
Workmanship during construction and maintenance	3.6	10 th
Design affecting Resolution	3.5	11 th
Improper selection of building material component and system	3.4	12 th
Technological changes and fashion	3.4	13 th
Availability of skilled maintenance personnel	3.3	14 th
Ignorance about the basic properties of building materials and components	3.3	15 th
Poor maintenance of maintenance group	3.2	16 th
Non availability of replacement parts and components	3.1	17 th
Use of new materials and components in building	3.1	18 th
Lack of communication between maintenance contractors, clients and users	2.8	19 th
Delay in occupancy after completion	2.5	20 th

Table 9 analyses the respondents' opinion on the factors affecting building maintenance in public estates. The various factors were assessed, presented with SI and ranked for better meaning and interpretation to the study. The most ranked factors are the 'use of substandard of materials and building components' 'maintenance culture' and 'availability of fund for maintenance of the building' with the SI score of 4.1, 4.0 and 4.0 respectively. These factors fall within 2.5 - 4.4 and implies that the factors are usually serious, usually difficult or its effect are felt many times. These factors and others that are highly ranked in this analysis corroborated the factors established in Adenuga et al., (2010) especially lack of maintenance culture, and low concern for future maintenance (absence of planned maintenance programme).

4.0. Conclusion

The study assessed the maintenance of public housing estates in Osogbo, Nigeria with a view to embracing best practices and adequate maintenance policies in an attempt to provide rational guide to make objective decision in preserving the present housing stock and further enhance maintenance of public estates in the study area. It has identified the various infrastructures available in the estates and analysed them in terms of their availability, condition and the relative satisfaction of the occupants with respect to the availability of the infrastructures. The level of satisfaction of the occupants to the general features of the buildings and infrastructures has also been considered. The analysis of this study show that though the condition of a facility or infrastructure may be better than other infrastructure, it might not be satisfactory in its level of utilization. Therefore, the provision of the facilities and infrastructure are not enough, the impact of their utilization is also to be given adequate attention. The results of this study therefore suggest that for maintenance of public infrastructure and facilities to be effective, there is the need for an integrated maintenance approach.

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