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Influence of Building Maintenance Practices on the Security of Lives and Property in Public Housing in Lagos State, Nigeria

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Abstract: ***The desire for security has continued to receive research attention globally. One of the critical aspects has been on how best to secure lives and property in residential neighbourhood in urban areas in the Global south. Although several approaches have been identified on how best to secure the home environment, less research attention has been given to the how maintenance practices can enhance security of lives and property in mass housing environments. This study investigated the influence of building maintenance practices on security of lives and property, using the Lagos State Development and Property Corporation (LSDPC) housing estates as case study. Household survey involving 1036 residents in 14 housing estates was conducted in the study area using questionnaire as the data collection instrument. The data were analysed using descriptive statistics and categorical regression analysis. The result shows that spaces and components of the buildings under the control of individuals and/or households were more frequently maintained than those jointly used spaces. The pruning of flowers and trees, replacement of damaged doors in the buildings and sweeping of open spaces emerged as the top three maintenance practices with the most significant influence on the residents' perception of security of lives and property in the estates. The study implies that maintenance activities should be focused on these three aspects with more attention given to jointly owned and used spaces and facilities if security of lives and property is to be achieved in mass housing environments.***

Keywords: ***Building Maintenance, Environment, Public housing, Security, Lagos State***

I. INTRODUCTION

Security within the residential environment is an essential part of adequate living condition in any dwelling provision, especially in public housing which are provided most times by the government to alleviate citizens' housing needs and to reduce housing deficits. However, security of lives property within these types of housing is very importance.

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This is highlighted in Maslow's hierarchy of needs as explained by [10] who noted that security is one of the most fundamental human needs. Different ideas, conceptions and strategies aimed at achieving safe and secured residential environment have emerged in the past five decades. Some of the ideas have

metamorphosed into theories, such as the (i) defensible space

[11] (ii) eyes on the street [6], (iii) crime prevention through environmental design (CPTED) [8] (iv) situational crime prevention and (iv) broken window [17]. The basic tenets of these theories is that if spaces, where crime most frequently occurs in dwelling units and residential neighbourhoods are eliminated, housing environments would be safer and better secured. The broken window theory by [17] posits that the physical and visible state of the building and its environments provides important clues as to how people behave towards buildings. This means that the more broken windows in terms of the level of maintenance of buildings or the neighbourhoods, the higher the likelihood that there is crime in the area [16]. There are many reasons for the occurrence of crime in residential environments, one of which is the physical appearance of the buildings and their surroundings. The growing insecurity challenges in urban areas across the world calls for measure for preventing and reducing crime in residential neighbourhoods. Although several measures have been suggested in the literature, but adequate attention is yet to be given to how maintenance of buildings and their surroundings can enhance the security of the occupants. It was on this premise that this study examined how the maintenance of buildings and their surrounding environments influences the level of security in public housing, using the estates constructed by the Lagos State Development and Property Corporation (LSDPC) in Lagos Metropolis, Nigeria as case study. Therefore, the study makes contribution to knowledge as it relates to how adequate maintenance practice can promote secured residential environment in urban areas. It also extends knowledge on the application of the theory of broken window in the study of security in mass housing in a developing country like Nigeria.

III. LITERATURE REVIEW

A. Theoretical Framework

The concern for safety and security of lives and property in the built environment has increased over time and the focus has been on the nature,

types and physical appearance and situations of the environment. This idea has emerged from the theory of defensible space [11], which is a prelude to several other theories and ideas such as broken window theory associated with security within the built environment. Defensible space theory has been applied to study planning and architectural design strategies that can promote security of residential environment. The main idea behind the defensible theory is that the way residential environments are planned, designed, constructed, used and maintained can help to prevent the incidence of criminal activities by creating a physical milieu and social fabrics that deter criminal minded person from carrying out their activities.

Based on the above, there a growing knowledge that having various planning and design features that allow residents have physical and visual control over their environment via natural surveillance. In addition, the image of the environment in terms of its appearance, either kept or un-kept, give the impression to an intruder of how secured or otherwise such as place can be. For example, in a dirty environment and poorly maintained building, a potential criminal minded person perceives such a space as controlled by its residents, leaving such an intruder, to be easily recognized and dealt with [11]. What this means is that the physical appearance of the environment and building affects the perception of viewers of the extent to which such environment is safe for criminal activities. This is the key underpinning idea behind the broken window theory. Specifically, the broken window theory is a criminal theory and posits that the visible signs of crime, anti-social behaviour and civil disorder create an urban environment that encourages further crime and disorder, including serious crime. Maintenance of buildings being a fractional part of the broken window theory partly determines the appearance of the built environment. Although the theory is subject to augments of some social sciences, it has been used over times with accountable success in the US, such as in New York City, Chicago, Los Angeles, Baltimore and Boston [3].

B. Building Maintenance and Security

All the definitions of building maintenance found in the literature tends to suggest that the essence of maintaining buildings is to prolong their usefulness, retain and keep them in order to allow the functions to continuously go on perfectly the way the buildings were from inception. Building maintenance is also aimed at ensuring the safety, health and satisfaction of the users, hence most of the exiting maintenance manuals and trainings had been designed to promote sustainability of buildings resulting to high-performance buildings, which could be green and energy efficient [4].

Achieving sustainability in the performance of buildings requires the need for regularly maintenance which should be holistic and covers aspects like the mechanical, electrical, plumbing, architectural components and the structural systems of the building. This idea is supported by [2] who noted that the layout and maintenance of buildings have a strong influence on the productivity of its occupants and their well-being. Moreover, the maintenance of the technical infrastructure of the building, which involves the lighting, furniture, space and general cleanliness of the building, requires adequate and prompt attention. All these aspects of maintenance in buildings align with the theory of broken window and the milieu aspects of defensible space theories, which have implication for security in buildings. A well-maintained space, building, home, or community deters offenders by creating a feeling of being observed by neighbours or owners of the spaces who care about the area, as explained in a previous study [8]. The elements of maintenance in building followed the conception of broken window theory showing that neglected and poorly maintained properties and environments are breeding grounds for criminal activities and behaviours. The theory argues that "broken window" or nuisance, if allowed to exist in any environment, will attract criminal activities and ultimately the decline in security of the entire neighbourhood.

C. Public Housing, Security and Building Maintenance

Security in public housing is a challenge that has been in existence for many years in the different countries [18]. As a result, there is a perception that crime is part of public housing development, and that there is always an association between public housing development and crime [12]. Many research works on public housing suggest this. A good example is the study of Pruitt-Igoe housing development in St. Louis in the USA. Resulting from this, Newman [11] recommended extensive attempts to clean up the physical appearances of public housing environment with emphasis on the importance of social programme for public housing residents [15]. However, ensuring security within public housing is very essential. One of the ways for solving this problem can be through policy implementation that would affect the design of public housing to align with appropriate maintenance strategy. Ready, Mazerolle and Revere [15] presented the problem-solving approach to checking crime in public housing, to include the aspects of maintenance system practices of building and their surroundings.

In the context of this study, it is important to consider the materials that are used in the construction of houses, which can provide a measure of security for the residents. This has brought to the fore the use of steel as doors, burglary proofs, security fence, and barricades to entrances. Apart from enhancing security, these materials can also have effect on the milieu of buildings. Everyday new construction materials are being invented and produced, which had brought about an increase in their uses. However, there should be consideration to their security implications for building users. The cost of these materials and expertise in fixing and using the materials can be an influencing factor that can have implication for security of buildings. Security challenges of the 21st century call for attention to the use of construction materials that are align with the tenets of crime prevention through environmental design. This means that more attention should be given to the type and choice of building materials that are durable and have low maintenance needs.

D. Evaluation of Security Needs of Building Occupants

Post occupancy evaluation **(**POE) or evaluation of building in use involves the systematic collection of data on occupied built environment and comparing the data with performance criteria, particularly as they relate to user's needs, preferences and experience [13].

It also involves a systematic evaluation of constructed facilities with a view to examining the satisfaction with such facilities by end users over a period of time. Such evaluation includes quality assessment,

indicators for failure or success and assessment of the use of such facilities or buildings in accordance with the overall intent. POE has witnessed improvements in its implementation to include defensible space theory and touching on the aspect of crime within the built environment. Kaplan [9] began to investigate environmental preferences from the design direction of Oscar Newman's milieu (appearances) principle of "defensible space" and crime prevention through environmental design (CPTED). Although Newman's focus was on the dimension of crimes, he had taken a post-occupancy approach in evaluating the performance of public housing from the occupants' perspective [14]. Based on this, the study developed a method to evaluate the perceived visual quality (environmental aesthetics) and fear of crime in neighbourhoods.

Moreover, the review of literature has shown that the main themes for effective POE are the usage, experience, appraisal of the main structure, spaces assessment, complaints, climate, behavioural aspects and technical aspects, which include the structure and facilities [14]. Also, POE has been used and defined by different authors based on their area of interests. A previous study [5] has analysed these areas of usage in his study of public private partnerships in housing. One key observations from the existing studies, is that POE has been less used in the assessment of the security needs of residents and crime prevention in residential buildings. The earlier links of POE with "defensible space" and CPTED by Oscar Newman was in the early 70s. Since then, its usage in crime prevention strategies has continued to spread globally.

IV RESEARCH METHODS

The study was carried out in Lagos State, located in the Southwest, Nigeria. Lagos metropolis, as at 2013 consists of 16 Local Government Areas with population density of 2,593.7/km^2 (6,717.8/sqm) and a land mass of 3,475.1/km^2 (1,341.7/sqm). The State comprises the Main land and the Island areas. The study used as case study public housing estates constructed by the Lagos State Development and Property Corporation (LSDPC), which was created in 1972 to engage in public housing provisioning in Lagos State. A total of 14 housing estates drawn from a pool of housing estates developed by the LSDPC were investigated.

With population size of housing units of 14,560. Sample size was calculated using the formula by Yemane [19] for finite population used by previous researcher as [7] and [1]. The formula is given as $n = \frac{N}{1+N(e^2)}$

Where n = the sample size, e = the level precision of ±3% at confidence level 97%, making the sample size to be 1036 housing units. The distribution of the housing units across the 14 housing estates sampled is shown in Table 1.

Table I: The Number of Housing Units and Sample size in each Housing Estate

S/N	Location of estates	No of Housing Units and Households (N=14,560)	Percentage of the total population sampled	Sample size for each estate (housing units)
1	Abesan	4,272	29.3	299
2	Amuwo-Odofin	2,068	14.2	144
3	Dairy farm/Ijaiye	708	4.8	52
4	Dolphin/Ikoyi	576	3.9	40
5	Iponri	1,026	7	72
6	Isolo	3664	25.1	257
7	Ojokoro	534	3.6	41
8	Ijaiye / Ogba Phase II	824	5.6	65
9	Opebi/Mary land	120	0.8	8
10	Ebute-Meta	528	3.6	41
11	Alapere	140	0.9	10
12	Omole	100	0.6	7
	Total	**14,560**	**100**	**1036**

Source: Compiled by the Authors

The research design adopted for this study was a cross-sectional survey. The survey took place between April and July 2016 in the study area, with structured questionnaire designed by the researchers as the instrument for data collection. Questionnaire was administered by hand to the respondents and retrieved by the researchers and trained field assistants, all copies of the questionnaires were used for the study. The data collected using two sections of the questionnaire were used in this paper. The first section of the questionnaire was used to gather data on the socio-economic and demographic characteristics of the residents, who are the respondents in the survey. The second section of the questionnaire was used to obtain data on the resident's involvement in different maintenance practices in their apartments and housing estate. The questions were structured based on 5- point Likert type scale with 1 representing Never; 2 for Rarely, 3 for Not Sure; 4 for S= Sometimes and 5 for A=Always. The Statistical Package for the Social Sciences (SPSS) software was used to analyse the data. The type of analyses used were descriptive statistics: frequencies and percentages used to describe the different socio-economic and demographic characteristics of the respondents. In addition, the descriptive statistics were also used analyse the data on the frequency of the resident's participation in maintenance activities in their apartments and housing estates. Categorical regression analysis was used to examine the influence of the frequency of maintenance activities and general perception of security of lives and property in the housing estates.

V. RESULTS AND DISCUSSION

A. Residents socio-economic characteristics.

The respondent's socio-economic and demographic characteristics from the survey is shown in Table 2.

Table 2: Respondents Socio-economic and Demographic characteristics

Respondents' Characteristics/Variables	Categories	Frequency (N= 1036)	Percentage
Sex	Male	532	51.4
	Female	477	46.0
	No response	27	2.6
Age	20-30 years	322	31.1
	31-40years	305	29.4
	41-50years	175	16.9
	51-60years	90	8.7
	Above 60	103	9.9
	No response	27	2.6
Marital status	Single	359	34.7
	Married	576	55.6
	Widow/widower	56	5.4
	Separated	19	1.8
	No response	26	2.5
Education	No education	12	1.2
	Primary	22	2.1

	WASC/GCE/O'LEVEL	166	16.0
	OND/NCE/A;LEVEL/HND/B.SC	646	62.4
	Masters /PhD degree	163	15.7
	No response	27	2.6
Employment	Unemployed	149	14.4
	Self employed	427	41.2
	Public sector/civil servant	102	9.8
	Private sector	193	18.6
	Retired	84	8.1
	Others	24	2.3
	No response	57	5.5
Nationality	Nigerian	993	95.8
	Others	8	.8
	No response	35	3.4
Ethnic group	Yoruba	770	74.3
	Hausa	25	2.4
	Igbo	144	13.9
	Others	79	7.6
	No response	18	1.7
Religion	Christianity	783	75.6
	Islam	221	21.3
	Atheist	1	.1
	Traditional worshiper	4	.4
	Others	2	.2
	No response	25	2.4
Income Level	Below 18,000	147	14.2
	18,000-62,000	306	29.5
	63,000-102,000	172	16.6
	103,000-142,000	72	6.9
	143,000 above	139	13.4
	No response	200	19.3
Length of residing in the Estate	Less than 1 year	57	5.5
	1-5 years	230	22.2
	6-10 years	203	19.6
	11-15 years	146	14.1
	Above 15 years	377	36.4
	No response	23	2.2
Tenure status	Rented	402	38.8
	Bought by you	339	32.7
	Inherited	62	6.0
	Family house	173	16.7
	Others	20	1.9
	No response	40	3.9

Source: Authors' Fieldwork (2016)

Table 3 and Table 4 shows the frequency of maintenance in the housing units and the housing estate environment respectively.

Table 3: Frequency of Maintenance Activities in the Housing Units.

Variables	Range	Frequency (N= 1036)	Percentage
Repainting of external wall of building.	never	98	9.5
	rarely	214	20.7
	not sure	145	14.0
	sometimes	338	32.6
	always	132	12.7
	no response	109	10.5
Replacement of broken windows in building	never	60	5.8
	rarely	146	14.1
	not sure	143	13.8
	sometimes	319	30.8
	always	257	24.8
	no response	111	10.7
Replacement of damage doors in building	never	47	4.5
	rarely	119	11.5
	not sure	154	14.9
	sometimes	301	29.1
	always	301	29.1
	no response	114	11.0
Replacement of leaking roofs of building	never	89	8.6
	rarely	136	13.1
	not sure	151	14.6
	sometimes	278	26.8
	always	257	24.8
	no response	125	12.1
Replacement of broken internal walls and floor tiles in building	never	79	7.6
	rarely	121	11.7
	not sure	168	16.2
	sometimes	297	28.7
	always	242	23.4
	no response	129	12.5
Repair of damaged staircase of building	never	131	12.6
	rarely	135	13.0
	not sure	193	18.6
	sometimes	287	27.7
	always	141	13.6
	no response	149	14.4
Repair of broken walls of unit apartments	never	119	11.5
	rarely	160	15.4
	not sure	163	15.7
	sometimes	283	27.3
	always	175	16.9
	no response	136	13.1
Cleaning of dirty windows of building	never	39	3.8
	rarely	73	7.0
	not sure	113	10.9
	sometimes	275	26.5
	always	403	38.9
	no response	133	12.8

Source: Authors' Fieldwork (2016)

Table 4: Frequency of Maintenance Activities in the Housing Estates Environment.

Items	Variables (Range)	Frequency (N= 1036)	Percentage
Reconstruction of collapsed perimeter fence	never	170	16.4
	rarely	118	11.4
	not sure	209	20.2
	sometimes	232	22.4
	always	155	15.0
	no response	152	14.7
Cutting and weeding grass	never	57	5.5
	rarely	95	9.2
	not sure	153	14.8
	sometimes	269	26.0
	always	339	32.7
	no response	123	11.9
Replacement of damaged landscape	never	114	11.0
	rarely	129	12.5
	not sure	267	25.8
	sometimes	225	21.7
	always	153	14.8
	no response	148	14.3
Pruning of flowers and trees	never	119	11.5
	rarely	130	12.5
	not sure	190	18.3
	sometimes	259	25.0
	always	186	18.0
	no response	152	14.7
Replacement of non-functional external street lights	never	95	9.2
	rarely	137	13.2
	not sure	173	16.7
	sometimes	280	27.0
	always	219	21.1
	no response	132	12.7
Clearing of blocked drainages	never	73	7.0
	rarely	109	10.5
	not sure	165	15.9
	sometimes	308	29.7
	always	248	23.9
	no response	133	12.8
Sweeping of open spaces	never	67	6.5
	rarely	87	8.4
	not sure	122	11.8
	sometimes	307	29.6
	always	316	30.5
	no response	137	13.2
Replacements of outdoor furniture	never	135	13.0
	rarely	127	12.3
	not sure	225	21.7
	sometimes	249	24.0
	always	148	14.3
	no response	152	14.7
Repainting of gates and perimeter fence	never	156	15.1
	rarely	136	13.1
	not sure	208	20.1
	sometimes	255	24.6
	always	131	12.6
	no response	150	14.5
Replacements of broken water and soil pipes	never	70	6.8
	rarely	101	9.7
	not sure	179	17.3
	sometimes	284	27.4
	always	271	26.2
	no response	131	12.6
Collection and disposal of refuse	never	23	2.2
	rarely	57	5.5
	not sure	106	10.2
	sometimes	251	24.2
	always	477	46.0
	no response	122	11.8
Estates/Association joint facilities	never	69	6.7
	rarely	104	10.0
	not sure	210	20.3
	sometimes	276	26.6
	always	261	25.2
	no response	116	11.2

Source: Authors' Fieldwork (2016)

The frequency distribution of maintenance practices in the housing estates environment as shown in Table 3 and Table 4 The results shows that for the maintenance of the estates environment reported the following: cutting and weeding grass 608 (58.7%), clearing of blocked drainages 556 (53.6%), sweeping of open spaces 623 (60.1%), replacements of broken water and soil pipes 555 (53.6%), collection and disposal of refuse 728 (70.2%) and states/association joint facilities management 537 (51.8%). However, six of the activities have low frequency below average,

these are reconstruction of collapsed perimeter fence 387 (37.4%), replacements of outdoor furniture 397(38.3%), repainting of gates and perimeter fence 403 (37.2%), replacement of damaged landscape elements 378 (36.5%), pruning of flowers and trees 445 (43%) and replacement of non-functional external street lights 499 (48.1%). A possible reason for this low frequency of these activities could be because these facilities are jointly owned and shared by all the residents, and thus the responsibility for their maintenance is not assigned to any one in particular but assumed to be carry out by the developer and owner of the public housing, which is the LSDPC. Table 4 also shows the result of the frequency of maintenance activities on the buildings. These include repainting of external wall of the buildings 470 (45.3%), replacement of broken windows in the buildings 576 (55.6%) replacement of damage doors in buildings 602 (58.2%), replacement of leaking roofs of buildings 535 (51.6%), replacement of broken internal walls and floor tiles in the buildings 539 (52.1%), repair of broken walls of dwelling units 458 (44.2%) and cleaning of dirty windows 678 (65.4%). But for two activities: repair of damaged staircase of building with 428 (41.3%) and repainting of external wall of buildings with 470 (45.3%), the frequencies are less than average. The joint ownership of these parts of the buildings could have been responsible for this result. Figure 1 and Figure 2 shows the port state of these parts of the buildings that are not regularly maintained by the residents.

Figure 1: Balcony and staircase shared by occupants at Abesan Estate
Source: Authors' Fieldwork (2016)

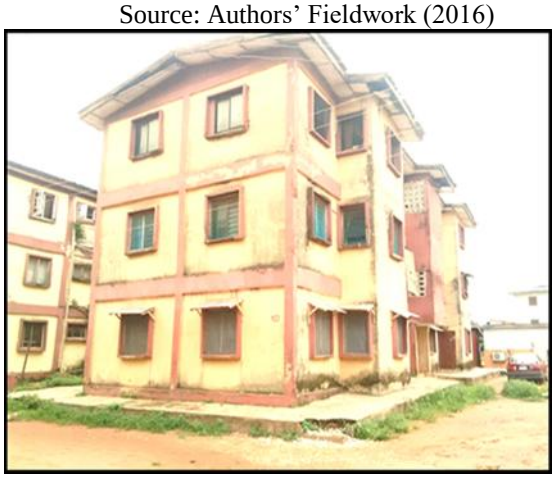

Figure 2: Building external walls are shared occupants at by occupants at Abesan Estate
Source: Authors' Fieldwork (2016)

Categorical Regression analysis was carried out with the level of general security in the estate as the dependent variable and the respondent socio-demographic variables and the frequency of maintenance of the housing units and the housing estates' environment the independent variables. Model for the regression and ANOVA results are presented in Table 5 and Table 6 respectively.

Table 5: The Regression Model

Model Summary

Multiple R	R Square	Adjusted R Square	Apparent Prediction Error
.476	.226	.141	.774

Table 6: The ANOVA Table

	Sum of Squares	df	Mean Square	F	Sig.
Regression	234.638	103	2.278	2.649	.000
Residual	801.362	932	.860		
Total	1036.000	1035			

The regression result with $F_{37, 998} = 2.649$, P= 0.000 reveals that 15 factors accounted for 22.6% of the influence of maintenance activities on residents' perception of the level of general security in the housing estates. Table 7 shows the factors and their levels of contribution

Table 7: Coefficients of the Regression Analysis to identify Maintenance practices that predict the level of general security in the housing estates.

Coefficients					
Variables	Standardized Coefficients Beta	Bootstrap (1000) Estimate of Std. Error	df	F	Sig.
Repainting of external wall of building	.090	.050	4	3.250	.012*
Replacement of broken windows in building	.116	.051	4	5.248	.000 *
Replacement of damage doors in building	.137	.058	4	5.690	.000*
Replacement of leaking roofs of building	.090	.044	4	4.170	.002*
Replacement of broken internal walls and floor tiles	.080	.056	4	2.060	.084
Repair of damaged staircase of building	.057	.041	3	1.911	.126
Repair of broken walls of unit apartment	.094	.050	4	3.533	.007
Reconstruction of collapsed perimeter fence	.115	.046	4	6.267	.000*
Cutting and weeding grasses	.093	.041	4	5.068	.000*
Replacement of damaged landscape	.049	.043	4	1.294	271
Pruning of flowers and trees	.184	.050	3	13.539	.000*
Replacement of non-Functional external light	.058	.037	4	2.478	.043
Clearing of blocked drainages	.102	.044	4	5.390	.000*
Cleaning of dirty windows of building	.057	.048	4	1.406	.230
Sweeping of open spaces	.124	.047	4	6.797	.000*

Replacements of outdoor furniture	.102	.042	4	5.800	.000*
Repainting of gates and perimeter fence	.034	.032	3	1.131	.335
Replacements of broken water and soil pipes	.092	.036	4	6.508	.000*
Collection and disposal of refuse	.036	.042	4	.739	.565
House type	.122	.047	3	6.886	.000*
Sex	.031	.031	2	.999	.369
Age	.070	.034	3	4.405	.004*
Marital status	.060	.035	3	2.997	.030
Education	.060	.033	2	3.217	.041
Employment	.019	.025	3	.572	.634
Nationality	.005	.022	1	.048	.826
Ethnic group	.066	.035	3	3.678	.012*
Religion	.026	.023	1	1.280	.258
Income	.049	.032	3	2.299	.076
Living length	.084	.033	3	6.302	.000*
Tenure status	.028	.033	3	.726	.536

**significant predictors*

From the β values in Table 7 it is evident that pruning of flowers and trees has the highest β value of (0.184, F = 13.539, P = 0.000). Next to this is replacement of damage doors in building β value (0.137, F = 5.690 , P = 0.000), followed by sweeping of open spaces with β value of (0.124, F = 6.797 , P = 0.000), next is house type with β value of (0.122, F = 6.886 , P = 0.000), replacement of broken windows in building β value of (0.116, F = 5.248 , P = 0.000), reconstruction of collapsed perimeter fence having β value of (0.115, F = 6.267 , P = 0.000),replacements of outdoor furniture with β value of (0.102, F = 5.800 , P = 0.000), clearing of blocked drainages with β value of (0.102, F =5.390 , P = 0.000) and others. Based on this result, the top maintenance-related factors that contribute most to security in the housing estates are pruning of flowers and trees, replacement of damaged doors in the buildings and sweeping of open spaces.

VI. CONCLUSIONS

The study investigated the influence of building maintenance practices on the security of lives and property in public housing in Lagos State, Nigeria. Using the broken window theory as the main theoretical framework, the finding reveals that maintenance practices, indeed have significant influence on resident's sense of security or insecurity in residential environment. It was also found that the top maintenance-related factors that contribute most to security in the housing estates are pruning of flowers and trees, replacement of damaged doors in the buildings and sweeping of open spaces. The result showed that jointly owned spaces are given less maintenance attention when compared to areas owned by and under the control of by individuals and households. The key implication of this study is that simple maintenance practices such as pruning of flowers and trees, replacement of damaged doors in the buildings and sweeping of open spaces have significant impact on how residents feel secured within their residences in mass housing environment. It is therefore suggested that developers and residents of mass housing estates should put in place mechanisms that ensure that these type of maintenance activities should be regularly carried out in the estates. In such maintenance framework, spaces, facilities and part of the buildings that are jointly owned should be given more attention than spaces owned and controlled by individuals or households.

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